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ALBERT FIELD.
TAUNTON, MASS.

THOMAS FLETCHER.
PROVIDENCE, R.I.

PIONEER AMERICAN MANUFACTURERS.

SAMUEL DOWNER
BOSTON.

SAMUEL BISHOP.
NEW YORK.

D. D. BADGER.
NEW YORK.

JOHN SAVERY.
CARVER, MASS.

Engd by G. E. Perine & Co. N. York.

THE STATE HISTORICAL SOCIETY OF WISCONSIN
1846

flour & grain
grain crops

A HISTORY

OF

American Manufactures

FROM

1608 TO 1860:

EXHIBITING

THE ORIGIN AND GROWTH OF THE PRINCIPAL MECHANIC ARTS AND MANUFACTURES, FROM THE EARLIEST COLONIAL PERIOD TO THE ADOPTION OF THE CONSTITUTION;

AND COMPRISING

ANNALS OF THE INDUSTRY OF THE UNITED STATES IN MACHINERY, MANUFACTURES AND USEFUL ARTS,

WITH A NOTICE OF

The Important Inventions, Tariffs, and the Results of each Decennial Census.

BY J. LEANDER BISHOP, A.M., M.D.

WITH AN APPENDIX, CONTAINING

STATISTICS OF THE PRINCIPAL MANUFACTURING CENTRES, AND DESCRIPTIONS OF REMARKABLE MANUFACTORIES AT THE PRESENT TIME.

IN THREE VOLUMES.

VOL. I.

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1868.

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TO

EDWIN T. FREEDLEY, ESQ.,

AT WHOSE INSTANCE THIS WORK WAS UNDERTAKEN,

BY WHOSE JUDICIOUS COUNSEL AND KIND ENCOURAGEMENT IT HAS BEEN CARRIED ON,

THESE PAGES ARE INSCRIBED,

AS A GRATEFUL EXPRESSION OF THE RESPECT

AND

LONG CHERISHED FRIENDSHIP

OF

THE AUTHOR.

PREFACE.

In presenting the public with the first portion of a work on the Manufactures of the United States, I do not deem an apology necessary for the design.

The short period of our national history, has furnished an unexampled progress in productive industry, and in the creation and development of all the elements of a great and increasing material prosperity. The annual product of Manufactures, according to the last published returns in 1850, had reached an aggregate value of more than ten hundred and nineteen millions of dollars: and the capital employed in them, exceeded five hundred and fifty millions of dollars. To attain this result from a state of great feebleness in little more than three-fourths of a century, while the other branches, Agriculture and Commerce, which constitute the tripedal support of a nation's prosperity, have been commensurately increased, is a subject of national gratulation. The record of such a progress might be expected to show remarkable illustrations of national character and appetencies, of the influence of social and political institutions, of public economy and of individual genius and enterprise. The operative industry of the country, has exercised no little influence in shaping the public and social organization of the country and the legislative policy of the general and local Governments, and has in turn been modified by each and all of these. Its history furnishes lessons of instruction bearing upon nearly all the great questions of the day, interesting alike to the legislator, the political economist, the merchant, the manufacturer, and the philanthropist. Its importance therefore seemed to justify an attempt to trace the successive steps by which our present position has been attained, and the principal causes which have retarded or promoted that progress. This attempt has, however, in the present instance, been confined chiefly to a record of the facts, which have marked the growth of our Manufactures and their more important and ascertained relations to causes, leaving the discussion of abstract principles and questions in legislation, in moral, political, social, legal, physical, or mechanical science, which may connect themselves therewith, to abler hands. The more humble design of

collecting a body of facts upon the subject, has appeared to me the less presumptuous inasmuch as the ground had not been previously occupied to any great extent. We have the valuable statistical works of Pitkins, Seybert, and some others, on the early commerce and resources of the United States, and a few specialities upon particular branches of the practical arts, as those of Thomas, on Printing, and of White (Memoirs of Slater on the Origin of the Cotton Manufacture. The Federal Government since 1810, has decennially collected the statistics of Manufactures, though very imperfectly; and several of the local Legislatures publish, at stated intervals, returns of the industry of their States, while much useful information is now constantly furnished by the periodical press, through the organs of special branches of trade and manufactures, of scientific and mechanical associations, or publications devoted wholly or in part to the discussion of industrial topics; but no work has yet appeared in which the progressive increase of our national Manufactures, has been consecutively presented in one entire view. Believing that it would prove serviceable to a large number of intelligent manufacturers, and others interested in the development of the industry and resources of the country, I have spent much time, and unremitted, and nearly unaided labor, in collecting and arranging, with a simple aim at usefulness, the materials for such a history. The hope of securing the co-operation of many who have it in their power to aid in the further prosecution of the work, by furnishing corrections, suggestions, and contributions of facts, has induced an assent to the request of the publishers, to issue a portion of it in advance of the completion of the whole work.

In the volume which is here offered, I have traced more circumstantially than was at first intended, the origin and early condition of several branches of Manufactures which have since become important, or seem likely, at no distant time, to be engrafted upon the staple industries of the country. I have endeavored to follow the history of each as an art, from its first introduction, as nearly as could be ascertained, in each of the colonies, through the transitional period of our history, to the adoption of the present Constitution, when we may be said to have first had a national existence. The space thus occupied may, to some, appear disproportioned to the importance of the subject, inasmuch as our domestic manufactures were yet quite in their infancy. It was indeed, in all but its latent physical and moral resources, a day of small things with this nation. Though emancipated from foreign political domination, the people seemed yet chained in complete dependence upon the workshops of Europe, —from which, notwithstanding our marvelous progress, they are not entirely liberated. But the foundations of a broad and varied industry had been already laid in the patient toil, indomitable energy, and prudent foresight of an

ancestry, gathered from the skillful ranks of all nations. Far back in the colonial period where the germs of American liberty and independence were implanted, were sown also the seeds of those frugal and industrious habits, that facility in adapting means to ends, and in meeting the peculiar contingencies of their lot, that still characterize the majority of American people. The early colonists planted most of the mechanic arts, and the roots of a vigorous civilization on our soil, while their children carried shoots from the same hardy stem, into the fast-receding wilderness. The revolutionary fathers, asserting the right to labor and enjoy the fruits of their toil as free-born men, defended the tree of liberty through the storm and tempest of war. The prohibition of their manufactures, restrictions upon their trade, and taxation of their industry, were serious counts in the bill of indictment against the mother country. The blow they struck for equal rights, was not in defense of a mere theory or abstract principle. But while their uncompromising assertion of the rights of the subject taught the sacredness of political freedom, the example of their earnest and laboring lives, also taught that—

"Thus at the flaming forge of life
Our fortunes must be wrought;
Thus on the burning anvil shaped
Each burning deed and thought."

They bequeathed us an enfranchised industry and respect for property, without which the useful arts can never flourish. And now the nation has been long sitting in grateful complacency beneath the vine and fig-tree of this early planting and defense, and historians and antiquarians, with affectionate zeal, are sifting the dust of the remote past, and are questioning every traditional source for anything pertaining to the personal history, thoughts and deeds of those who, in any way, contributed to build up the fair fabric of our national civilization and liberties. It cannot therefore be deemed unworthy of the subject, to inquire as to what were their everyday pursuits, how they lived and supported their families, and shaped the character or directed the channels of American labor, as well as to know their lineage and connections, for whom they voted, and how they fought. Unfortunately, history has been too little cognizant of anything but the public acts or words of the world's benefactors; while often the more instructive examples of their struggles and triumphs, the heroism of their daily life, is consigned to a narrower influence. It has been justly said, that "the world might well afford to lose all record of a hundred ancient battles or sieges, if it could thereby gain the knowledge of one lost art; and even the pyramids bequeathed to us by ancient Egypt in her glory, would be well exchanged for a few of her humble workshops and manufactories as they stood

in the days of the Pharaohs. Of the true history of mankind, only a few chapters have yet been written; and now, when the deficiencies of that we have are beginning to be realized, we find the materials for supplying them have in good part perished in the lapse of time, or been trampled recklessly beneath the hoofs of the war-horse." Our histories, though in all other respects full and complete, contain very meagre and unsatisfactory accounts of the daily life and employments of the people, their modes of cultivation, their arts and systems of economy.

In endeavoring to rescue from oblivion the facts in relation to our early industry, recourse has been had, as much as possible, to original or cotemporaneous records, and such later ones as appeared deserving of confidence. All the general histories of the country and those of particular States, as well as many town histories, State papers, volumes of laws, minutes of assemblies and councils, early periodicals, the publications of the various historical societies, and many English works, have been diligently sifted and collated. It would be tedious to particularize all the sources of information from which we have drawn: suffice it to say, that no accessible field which promised anything has been left ungleaned. Credit has been generally given, although it has been found impossible to assign authority for every separate statement where a multiplicity of facts is given.

With a view to convenience, the matter in this volume has been topically arranged; thus grouping together such facts as could be gathered with regard to the history of each art in the several original States. The local details which might otherwise seem inadmissible, thus fall into their proper relations, and it is hoped may prove interesting, at least to many who are still pursuing in their original seats, the same forms of industry that were introduced several generations back. This method while it may have practical advantages by presenting a topic in its completeness, has involved, I am aware, some repetition in regard to governmental policy and other extraneous circumstances. In regard to dates, which I have endeavored to ascertain and give, in place of vague general statements, much care has been used, and it is hoped they may generally be found correct. But, at this distance of time, and with so many sources of error, it is impossible to vouch for entire accuracy in all cases. Notices of particular enterprises will in a few instances, as in that of Iron, be found to extend beyond the date (1790) which was intended as the limit of this volume. I have not pursued a strict method in that respect, when an increased activity in any branch generally, or in particular regions, warranted references which could not be made hereafter.

It was intended, had space allowed, to have noticed several branches of

colonial industry, which were relatively more important than some that have been noticed. Of this class, were manufactures of Pot and Pearl Ashes, Tar, Pitch, Turpentine, and other naval stores, Distilling, and some others, which were profitable occupations, while Vine-growing, and a few more, were quite otherwise. The former, however, are less strictly manufactures than most of those treated of, and have now—from the disappearance of much of our forest—ceased to be of national importance, while wine-making, if still an inconsiderable branch, will, it is confidently believed, one day become highly important.

With these explanations, this volume is offered to the candid consideration of the public, in the hope that, whatever its imperfections, it will be found to contain a larger collection of facts than is elsewhere to be obtained pertaining to the early manufactures of this country. The author claims only the merit of pains-taking diligence, and a conscientious desire to render it useful and reliable by presenting a true and impartial statement of those facts. For the remaining portion of the work, which will probably require another volume larger than the present, the sources of information are not only more ample and multifarious, but also more strictly authentic and reliable. The matter being more fresh and recent, will be found to possess a much larger degree of interest to most readers, as a considerable portion of the events to be recorded have transpired within the recollection of living men. Much valuable material has been collected, and an earnest appeal is made to all interested in the subject, to communicate interesting facts in their possession, that nothing may be wanting for a presentation of the essentials of our recent marvelous progress. The summary which it is designed to furnish, of the Census statistics of manufactures in each decennium since they first began to be collected, will, it is believed, be a valuable feature of the work. The occasions and dates of the introduction of new branches of manufacture, the establishment of new centres of industry, throughout our rapidly expanding territory, the evidences of the many-sided, fertile, inventive talent of the American mind, furnished by the more important, labor-saving machines, and processes it has originated, and numerous other topics, it is confidently hoped, will render the book not unworthy the acceptance of intelligent Business Men.

J. L. B.

A HISTORY

OF

MANUFACTURES IN THE UNITED STATES.

CHAPTER I.

ORIGIN OF AMERICAN MANUFACTURES, AND A GLANCE AT THE STATE OF THE ARTS IN EUROPE IN THE SIXTEENTH CENTURY.

THE origin of American Manufactures may be said to be contemporaneous with the first settlement of the country. The earliest mention in history of an attempt at a manufacturing establishment within the present territory of the United States is in 1608, only one year after the first effective English settlement was made at Jamestown in Virginia, and one hundred and sixteen years subsequent to the discovery of the continent by Columbus.

This event carries us back to a period anterior to the discovery and application of nearly all those great instrumentalities in science and mechanism which have revolutionized the industrial aspects of the world, and affected its social, moral, and political condition. We are transported to a time when the latent energy of steam and the subtle agency of the electric fluid were scarcely suspected; and the cotton gin, power-loom, and spinning-jenny, were unimagined. The lucifer match and the daguerreotype, with an infinity of applications of the principles of nature, now most familiar, were then unknown; and the discoverer of the great Law of Universal Gravitation was himself unborn. Indeed brief as the intermediate period has been, it covers nearly all the improvements which, in the present century, are deemed of the most essential importance. The art of Printing, it is true had been discovered; but stereotype plates, cylinder and power-presses; lithographic, mezzotint, and other forms of Engraving, and most of the improvements

which have made that Art the most potent agent of civilization, are of more recent origin. The Mariner's Compass had been invented, but the Quadrant was undiscovered; and Chronometers, if used, were most imperfect; while the Thermometer, Barometer, and Telescope had not revealed their uses; Shipbuilding was but a rude art, and the geography of the sea was altogether unwritten. Those great agencies of mechanical industry which have augmented a thousand-fold the productive power of man, and proportionally increased his comfort, as the use of fossil coal and the blast furnace in the smelting of Iron, of gunpowder and steam in Mining, of the flying shuttle, spinning-frame, power-loom, and carding-machines, and improvements in bleaching, dyeing, and stamping, and others in the Textile manufactures, and the wonderful discoveries in Chemistry, all belong to a subsequent period. Cotton, which now employs millions of people and millions of capital in its growth and manufacture, was not long before only regarded as a worthless weed or a curious exotic. The fire-engine, safety-lamp, life-boat and life-preservers, gas-light, vaccination, the tourniquet and chloroform, and many other appliances for the conservation of life and property, were unknown in that era. In short, whatever proficiency may have been attained in the Arts of civilization in the early ages, we may say truly that their present development from a state of almost barbaric rudeness has been contemporaneous with American History.

Let us consider briefly the condition of the principal countries in Europe at the time of which we write, especially with reference to the state of the Arts. When the "London Company" made its first settlement in Virginia, the vigorous but haughty sway of the Tudors, which had been exercised for one hundred and twenty years, had come to a close by the death of Elizabeth, and James the First of England had been four years seated upon the throne of the Stuarts. The rule of the former line, commencing with Henry Seventh, who united the rival claims of York and Lancaster, was an eventful period. It had witnessed the decay of the feudal system, and the emancipation of labor and the common people; the subversion of the power of the barons and the encroachments of royal prerogative; the use of the mariner's compass and the growth of navigation; the discovery of America and the opening of new scenes of enterprise and civilization; the general use of the printing-press and the steady revival of learning and intelligence; the spread of the Reformation and the establishment of the rights of free thought. It saw the chaotic elements of European nationalities settle down into pretty much their present form, and closed with the consolidation, under the new dynasty, of England, Scotland and Ireland into one kingdom, nearly double in extent that which Elizabeth had left.

Great Britain in 1608.

The weakness and incapacity of James, and the arbitrary character of his successors, plunged the nation into civil wars, and at length expelled the offending race; but it taught the people their power, and secured the foundation of free institutions and of the subsequent growth of English greatness and power.

In France, the long line of the House of Valois, which had held regal authority for two hundred and sixty years, had in 1589 become extinct by the death of Henry the Third; and the Bourbon prince, Henry of Navarre, surnamed "the Great," was now upon the throne as Henry the Fourth. He was a lineal descendant of the good St. Louis, and inherited many of his virtues; emulating him especially in acts of justice and toleration. Having in 1598, by the Edict of Nantes, put an end to the religious wars which for many years had distracted France, aided by his minister, the able Sully, he took effective measures to promote the welfare of his subjects and to repair the desolations caused by nearly half a century of civil and religious strife. His efforts in behalf of Commerce and Manufactures, and all the arts of peace, were suspended by his untimely assassination in 1610. During the minority and reign of his son, Louis XIII., the celebrated Richelieu established despotic power, renewed the persecution of the Protestant Huguenots, and subsequently, with diplomatic facility, became leagued with the Protestant powers of Germany in the Thirty Years' War commenced in 1618, which involved nearly all Europe in the miseries of that final conflict of the Reformation. During his iron rule, however, Richelieu encouraged literature and the arts, founded the French Academy and "Garden of Plants," built the Sorbonne and the Palais Royal. To him, but especially to the Duke de Sully, and to Count Colbert, the prime minister of Louis XIV., France owes the establishment or first encouragement of many of her most valuable public improvements and manufactures. In the time of Henry, the celebrated silk manufactures of Lyons received their first impulse. He rewarded with patents of nobility those who had spent twelve years in the manufacture. Colbert placed under royal patronage the famous Gobelin tapestry manufactures, to which he also annexed a celebrated manufactory of Flemish carpets, originated in 1607 by Sully, under letters patent from the king. A vast manufactory of Sevres china was established in that town by Colbert, which became the pride of the splendid reign of Louis XIV. The manufacture of Glass, little produced before in France, was brought by him from Venice, and put on a permanent footing; *Tin*, till then unknown there, as well as the manufacture of fine cloth and the stocking-machine, was introduced from England; and Wall-paper, in which France has so much excelled, was invented about the same time. Those splendid public works, the Louvre, the

France in 1603.

Invalides, and Palace of Versailles, were built, and the Canal of Languedoc commenced under the same munificent patronage. But the revocation of the Edict of Nantes by Louis, in 1685, drove from his kingdom nearly half a million of his best subjects, who carried to England, America, and other parts, the knowledge of the arts which he had fostered, and gave a serious check to the industry of France, from which to this day she has not fully recovered. The knowledge of working tin and steel is said to have wholly disappeared from France with the Huguenots.

By the abdication of Charles the Fifth of Austria—the grandson of Ferdinand and Isabella—in 1556, his Spanish possessions in Europe and America fell to his son, Philip the Second, who also, in 1583, inherited the crown of Portugal, with all its Colonies in America and the East, rendering him the most powerful of European kings. The Netherlands constituted one of the most valuable portion of his dominions. Its arts, Manufactures, and commerce were equally flourishing. Antwerp was the most important mart of Europe, and Holland the market-garden of England. But the zealous bigotry of Philip, like that of Louis XIV., drove vast numbers of his Protestant subjects, with their arts and enterprise, to England, establishing their Manufactures and horticulture there. Under the same impulse, he planned the disastrous attempt to invade England. During his reign, which continued but fifteen years, and that of Philip the Third, who succeeded him in 1598, not only Holland was lost to the Spanish crown, but a revolt in Portugal placed the family of Braganza upon the throne of that kingdom. The expulsion of the Christian Moors from Spain, to the number of six hundred thousand of his most industrious subjects, and the general corruption and neglect of industry induced by the golden wealth of the American Colonies, now rapidly hastened the decline of Spain from her former grandeur and prosperity.

The Austrian dominions of Charles were at this time ruled by the eccentric Rudolph II., who was succeeded in 1612 by Mathias, and in 1619 by Ferdinand II., King of Bohemia, who was elected Emperor of all the German States. The revolt of his Protestant subjects was the commencement of the Thirty Years' War. Denmark, Norway, and Sweden did not become prominent in the affairs of Europe until after this. The heroic Gustavus Adolphus succeeded Charles IX. of Sweden in 1612, and was contemporary with the early events in the Anglo-American colonies. The Papal power was at this time shorn of much of its influence by the progress of the Reformation, and Russia had not emerged from barbarism. Such was the vexed and unpromising political condition of Europe during the latter part of the Sixteenth and beginning of the Seventeenth centuries. War was still the game of kings, as

it had been in past ages; the balance of power, religious animosity, or personal ambition, the ruling motives. In times so turbulent as those, the arts of peace could scarcely thrive; and consequently we find the social and industrial features of that age wholly unpromising.

Arts in the Middle Ages.

During the Middle Ages, nearly all knowledge of the arts of antiquity had perished in the gulf which swallowed up so much of the virtue and manly sentiment, and political and social rights of the people, and Feudalism debased all labor, physical and intellectual, and every Art but that of carnage. The feeble lamp of learning burned dimly, and only in the cloister of the monk. At length the spirit of Chivalry arose to stay the hand of oppression, to succor the weak, cultivate the principles of truth, honor, justice, and generosity, and to plant the wide moral waste with the sentiments of love and of poetry. In process of time, this institution itself degenerated into one of mere pageantry and phantasm. During the Fourteenth and Fifteenth centuries, the principal arts in requisition were those of the armorer, the jeweler, the beed-maker, and the costumer. They fabricated corslets and suits of embroidered silk and cloth of gold, or jeweled and enamelled insignia for the mailed knight, gay trappings of lace and silver for his steed, and chaplets, rosaries, gold and silver clasps, and images of the Virgin for the hand of his lady-love.

From the fascinating spectacle of the Tournament, where gallant knights, who could neither read nor write, received the meed of valor from the hands of high-born ladies, whose only knowledge was the management of their palfreys or their hawks, how to play the spinet or the lute, make a little needlework or confectionary, the boorish and degraded populace retired to their wretched dwellings to rest on floors of clay, with billets of wood for their pillows.

About this time, indeed, we read of the rich laces, splendid brocades, and cloth of gold, the elegant products of the silk looms of Venice; of the linen fabrics of Brescia, the woolen manufactures of Padua, and the glass-houses of Murano, all dependencies of the "City on a Hundred Isles." These unrivaled manufactures, as well as the riches of Egypt, Syria, and the East, her enterprising traders transported to the most distant parts of Europe, and built up in their sea-girt refuge from oppression, amid the shallow waters of the Lagunes, the most splendid maritime, commercial, and manufacturing power of the Middle Ages. Her only rivals in opulence, art, and naval supremacy, were the cities of Genoa, Pisa, and Florence, which, with Venice, rose to the height of their influence about the middle of the Fourteenth century. The maritime genius of the former nurtured the adventurous spirit of Columbus, and the liberality of the merchant princes of the latter fostered the new-

born arts and learning of Europe. But when at length the knowledge of the silk, plate-glass, woolen and other manufactures slowly found their way into Western Europe, as they had been slowly introduced into Italy, by the Greeks and Saracens from the East, they long continued, as in their former seats, to minister chiefly to the magnificence of courts and of the nobility, while the humbler manufactures and the mechanic arts had scarcely an existence. The condition of the common people, and even of the wealthy classes, was therefore but tardily improved during the slow growth of knowledge and of industry. And when Manufactures began to revive under more favorable auspices, the injurious effects of monopolies, growing out of the abuse of royal prerogative, by limiting its profits to a favored few, repressed all competition and all stimulus to improvement.

The condition of the English people, as respects their civilization and social comfort in the century which includes the very early history of the American colonies, may be inferred from a few facts, which supply the place of correct statistics. During the comparatively tranquil reign of Elizabeth, England had rapidly progressed in wealth and power; and as history too commonly deals only with the intrigues of courts and cabinets, and the actions of illustrious persons, it might be inferred, from the splendor of her court and nobility, that the common people of England were in a condition of comparative comfort. In mere outward display, particularly of dress, upholstery, and retinue, those days exceeded our own; but in point of comfort, even the nobility and gentry of the Sixteenth century, scarcely equalled the humblest peasantry or mechanics of England or the United States at this time; while the latter classes were for the most part worse fed, clothed, and lodged than any class at present known among us.

English comfort in Sixteenth Century.

In the beginning of the Sixteenth century, the houses of the common people were, many of them, built of mud and wood, thatched with straw, and consisted of one room without division of stories. The floor was the bare earth or clay covered with rushes or straw, "under which," says Erasmus, "lay every thing that is nauseous." Chimneys were almost unknown, even in the houses of the gentry; and late in the century, even in the larger towns, but few houses contained a chimney. The fire was kindled against a hob of clay called the *rere dosse*, in the back or centre of the room, which was filled with smoke from wood—the only fuel used—that found its way out by an opening or lantern in the roof. In this apartment the family dined and dressed their meals; and in farm houses the oxen often lived under the same roof. Their utensils were mostly of wood; glass was scarce, and pottery wholly unknown. In the reign of Henry the Eighth, no fire

was allowed in the University of Oxford. Glass windows, carpets, chairs, and looking-glasses, were still less common than chimneys; and forks were not known until the time of James I. Glass windows in Elizabeth's reign, were movable furniture in the houses of the nobility, and the dining halls of the gentry were covered with rushes or straw.

The bedding consisted of straw pallets or rough mats covered only by a sheet and coarse coverlet, with a good round log instead of a bolster or pillow. An old annalist says: "As for servants, if they had any sheet above them it was well; for seldom had they any under their bodies to keep them from the pricking straws that ran oft through the canvas of the pallet, and rased their hardened hides." A mattress or flock-bed and sack of chaff for a pillow, were considered evidences of prosperity in one who had been seven years married, who considered himself "as well lodged as the lord of the town." Skipton Castle, one of the most splendid mansions of the North, had but seven beds, and none of the chambers had chairs, glasses, or carpets. Even the Baronial household of Northumberland, in the beginning of the century, employed but two cooks for a retinue of two hundred persons, including seventy strangers daily counted upon; had no sheets; and the table linen, often extremely costly, was washed about once a month. Forty shillings was the yearly allowance for the washing of the household. The earl had three country seats, with furniture for but one, and carried all with him when he removed, one cart sufficing for all the kitchen utensils, cooks' beds, etc.

The food of artificers and laborers in Henry the Eighth's reign, was "horsecorn, beans, peason, oats, tares, and lentils." Barley bread was the usual food of the poorer classes in 1626, and white bread was but little used by them in 1689. Even as late as 1725, when an improved agriculture had made wheat bread common in the southern counties, in Cumberland, it is said, none but a rich family used a peck of wheat in a year, and that at Christmas. A wheaten loaf was only found after much search in the shops of Carlisle. Servants, and the very poor, ate dry bran bread, sometimes mixed with rye meal. Yet the English peasantry were better fed than the French at that period, who ate apples, water and rye meal. Corn was mostly ground at home by the querne or hand-mill, in the time of Elizabeth. Holland at the time supplied London with vegetables, and a century later a large part of England was an unproductive waste. In the early reign of Henry VIII., it has been said, not a cabbage, carrot, turnip, or other edible root grew in England. Traveling was most tedious and perilous, as well on account of the wretched condition of the roads, as the prevalence of moss-troopers and highwaymen, who as late as the times of Charles II. were hunted in some counties with blood-hounds. In the reign of Henry VIII., it is

said, 70,000 thieves were hanged in England. Until the middle of the Sixteenth century nearly all traveling was on horseback, and goods were transported on pack-horses, the foremost wearing a bell to warn travelers to turn out to let them pass, such was the narrowness of the way. Coaches did not become general until the time of Elizabeth, or later, when they were without springs and very clumsy. The queen in her old age is said to have reluctantly used so effeminate a conveyance, which it was a disgrace for a young man to be seen to use; and she is said also to have declined a breakfast at Cambridge because she had *twelve miles* to travel before she slept! Turnpikes were established by Act of Parliament in the time of Charles the Second, but the gates were pulled down by a mob. In 1703, public coaches were advertised to perform the whole journey from London to York in *four days!* And in 1760, a coach left Edinburgh for London once a month, and occupied a month in the journey. Owing to the difficulties of transportation, many articles were nearly worthless a few miles from any market.

Coals, in the time of Henry VIII., were worth but 12*d.* per chaldron at Newcastle, and four shillings in London. They became so dear in 1643, that many perished for want of fuel, which the tardy means of supply could not prevent. A pamphlet of that period has the imprint—

"Printed in the year
That sea coal was exceeding dear."

Pins were introduced from France in 1543, previous to which, royal ladies used instead ribbons, clasps, and skewers of brass, silver, gold, ivory, bone, or wood. They were first made in England in 1626. Umbrellas, though of great antiquity, were not known in England until 1768, and their first use excited the jeers of the vulgar. London and Westminster were first lighted by order of Parliament in 1743, and coal gas was first used for that purpose in 1814. Yet at that late day the measure was opposed by so enlightened a person as Lord Brougham.

But our theme does not permit us to enlarge upon this topic. Every department of the public, private, and social economy of the period, in its intellectual, moral, or industrial aspects, would furnish ample evidence of the dwarfish condition of the kingdom, compared with its present august stature in all the arts of civilized life. Those who would derive a most instructive lesson from history, would do well to consult the third chapter of Macaulay's History of England, and compare the state of England, as depicted by him, just previous to the Revolution of 1688, when the population of the kingdom was between five and six millions, with that of Great Britain as she exists at this day. The progress made since the beginning of the century had been comparatively small; and the examination may better enable the reader to appre-

ciate the evidences of activity, and of slow but steady progress made amidst poverty, hardship, and savage hostility, in our own country, even previous to the time when national independence and public spirit, combined with a suddenly progressive character in the age, gave our industry a permanent impulse. The period of our colonization was one of much talent and great promise, but the "car of improvement" was many years in getting under way. Macaulay assures us that a large part of the country beyond Trent was, down to the eighteenth century, in a state of barbarism! That in 1685, the value of the produce of the soil far exceeded the value of all the other fruits of human industry. Yet the wheat crop was estimated at less than two millions of quarters. But the mineral wealth of the kingdom was still less developed. Tin had been an article of export for over two thousand years, and was still one of the most valuable of native minerals. Its product was about sixteen hundred tons. In 1856, it was reported at eight thousand seven hundred and forty-seven tons. The copper mines, he says, then lay wholly neglected, and were not reckoned in the value of land; but Cornwall and Wales, at the time he wrote, produced fifteen thousand tons annually, worth near a million and a half sterling, or twice the annual value of the produce of all English mines in the Seventeenth century. In 1854, Great Britain produced twenty-three thousand and seventy-three tons of copper, worth over two and a quarter millions of pounds sterling.[1] Beds of rock salt were discovered after the Restoration, but not worked, and the salt made in rude brine pits was nauseous and unwholesome. A great part of the iron used at the close of Charles the Second's reign was imported, and the whole quantity cast annually did not exceed ten thousand tons. In 1740, England and Wales, from fifty-nine furnaces, produced only seventeen thousand three hundred and fifty-six tons; and in 1750, twenty-two thousand tons. In 1856, the product of pig-iron was officially stated to be three millions of tons.[2]

The wages of farm laborers, at the same period, did not exceed ordinarily four shillings a week, but ranged as high as six or seven in summer. And for workmen in woolens, the staple manufacture of England, six shillings were considered fair wages. These prices, it is evident, were not more than one half the rates paid at present; while most articles of consumption cost more than half their present prices. Although as early as 1351, free labor had been recognized in place of villeinage by the legislature, the statute book continued to be loaded with iniquitous laws, regulating the price of labor, down to the time of Elizabeth, when the law of supply and demand was seen to be a better regulator of wages

(1) Annals of British Legislation, vol. ii. (2) Ibid.

than acts of Parliament. But artificers were even then compelled (by 5th Eliz.), under penalty of the stocks, to assist in getting in the harvest.[1] Four-fifths of the common people, says Mr. Macaulay, were, in the Seventeenth century, employed in agriculture; a sufficient evidence alone of the undeveloped state of the manufacturing arts. The rate of increase in the population was still more slow, From the year 1075 to 1575, the population of England and Wales but little more than doubled in five hundred years. From 1600 to 1700, the increase was about thirty per cent., and twenty per cent. in the next fifty years. In the first half of the present century, the population of the United Kingdom doubled itself, besides furnishing a constant stream of emigration to this country and to Canada, Australia, California, and other parts of the globe.

Even so late as the latter part of the Sixteenth century, when the first adventurers to America were born and reared, the great majority of the English people had experienced only in a very limited degree, that general comfort which is the fruit of diffused intelligence, and a developed state of mechanical industry. Some grand discoveries had been made in science, and some ingenious minds had labored in the virgin mine of invention. The art of printing, and the use of movable types, had been discovered, gunpowder invented, and the polarity of the magnet was known. Roger Bacon, many years before, had discovered some faint glimmerings of the greater light to be found in the direction of experiment, and the patient observation of nature; and had made some discoveries in Astronomy, Optics, Chemistry, and Mechanics. But his illustrious namesake, the Chancellor of James I., had not yet published his *Novum Organum*. That great work appeared in 1620; and when the genius of the author had pointed out the way, the world seemed ill prepared to walk in it. So long narcotized by ignorance and superstition, and the nostrums of the past ages, the mental energy of Europe had not recovered from the torpor thereby induced. "Bacon," observes Macaulay, "had sown the good seed in a sluggish soil and at an ungenial season. He had not expected an early crop, and in his last testament had solemnly bequeathed his fame to the next age. During a whole generation his philosophy had, amid tumult, wars, and proscriptions, been slowly ripening in a few well-constituted minds." "The year 1660," he adds, "the era of the restoration of the old constitution, is also the era from which dates the ascendency of the new philosophy. In that year the Royal Society, destined to be a chief agent in a long series of glorious and salutary reforms, began to exist."

But it is always likely to be an axiom that improvements coming in the shape of innovations shall in one form or another meet with opposition.

(1) "Rights of Industry."

At this moment, in progressive England, where labor-saving appliances have so enlarged the area of useful industry, and promoted the comfort of all classes, the boot and shoe manufacturing districts of Northampton and Staffordshire are trembling in apprehension of popular violence, upon the attempt to introduce the sewing-machine in that business. But in the Seventeenth century, it was not owing to the opposition arising from the sudden displacement of labor, the interference with prerogatives and monopolies, or a conservative dread of innovation merely, that improvement so long lingered on its march. The general apathy of the age, the imperfect and tardy interchange of knowledge, the want of a stimulating collision of ideas, and often impolitic legislation, clogged the wheels of progress. The slow accumulation and insecurity of capital, and its conflicts with labor, powerfully impeded the success of industry. Ignorance of the true sources of individual and national power and wealth, and of nearly all the principles of political economy, paralyzed much of the industrial effort of the times. "It is not more than a century ago," says a modern author, "that even those who had 'a great deal of philosophy,' first began to apply themselves 'to observe what is seen every day;' exercising, in the course of human industry, the greatest influence on the condition and character of individuals and nations. The properties of light were ascertained by Sir Isaac Newton long before men were agreed upon the circumstances which determined the production of a loaf of bread; and the return of a comet after an interval of seventy-six years, was pretty accurately foretold by Dr. Halley, when legislators were in almost complete ignorance of the principle which regularly brought as many cabbages to Covent Garden as there were purchasers to demand them." Centuries were required, in some instances, for the knowledge of particular arts to travel into contiguous kingdoms, or to be usefully applied. Thus the art of making Glass was known to the Romans when they conquered Britain, and was introduced into the island as early as 674; but glass did not begin to be used in windows there until the Thirteenth century. It was rarely found in windows, and was not made in England until the middle of the Sixteenth. It was more than a hundred years later before its use became general; and country houses in Scotland were not glazed as late as 1661. Plate glass was first made in England by Venetian artists, at Lambeth, in 1673. The manufacture of silk was more than one thousand years in traveling into England from the shores of the Bosphorus. It had been practiced four hundred years in Italy before it crossed the Alps.

CHAPTER II.

ORIGIN OF AMERICAN MANUFACTURES CONTINUED, AND THOSE IN VIRGINIA, TO THE CLOSE OF THE SEVENTEENTH CENTURY, CONSIDERED.

THE origin of American Manufactures is usually referred to a period in our history much less remote than that stated in the previous chapter. It was not until 1810, two hundred years after the first colonization of Virginia, that any systematic attempt was made to collect general statistics of Manufactures. The few particulars which can now be gathered, as to the progress made during those two centuries, are scattered through numerous memorials, local histories, records of councils, and statutes of assemblies. These are nevertheless interesting and instructive, as showing from what feeble beginnings our ancestors conducted their infant manufactures, through numerous difficulties, and laid the foundation of their present success. Comparing their condition, even up to the close of the last century, with the state of productive industry in our time, or with the progress made during the last half century, in which many new agencies of great power have added intensity to every form of intellectual and material progress, the product makes but a small figure in the annals of history. But it is to be remembered that their advance was at that time equally slow in most parts of the world. Even at the present day, many countries which were reckoned elders in the family of nations, ere the ring of the axe was heard in the forests of America, are essentially less independent in regard to some products of manufacture, than were the American Colonies at the period of the Revolution. Equally with the sister arts of Agriculture and Commerce, our Manufactures have, from the first settlement of the country, advanced with the increase in population. We shall proceed to notice, in their chronological order, some of the early attempts to establish mannfacturing industry in this country, and a few of the encouragements and hindrances which attended those efforts during the colonial period, and up to the time when our Manufactures first attained stability and a commanding national importance

The first settlers in America brought with them to these shores a knowledge of most of the Arts and Manufactures of the parent country. Many of them, moreover, were accustomed to the comforts, and even

what were considered luxuries in that era of civilization. Their primary wants in their new homes were those of subsistence, shelter, and clothing. These could only be supplied by their own energy in subduing the unbroken forest and the virgin soil, which labors again required for their rudest exercise the implements of husbandry and other mechanical appliances. To obtain the means of ameliorating their condition, the colonists, whose only wealth was the strong arm and the iron will, were forced to rely mainly upon their own unaided exertions. This was particularly the case with regard to the first settlers of New England, whose expatriation was a voluntary one, in behalf of their principles, which left them without that support and patronage which watched over the more speculative enterprise of the earlier and wealthier colonists of Southern Virginia.

The early efforts to make settlements upon the coasts of North America, had been stimulated by the accounts of the great wealth that Spain had drawn from the discoveries of gold in her transatlantic Provinces, and the London Company, which in 1607 first successfully planted a colony at Jamestown, had hopes of similar discoveries. But they seem also to have, from the first, contemplated some form of manufacture. We are informed by one of her historians,[1] that in the second voyage of Captain Newport to the colony, in the latter part of 1608, the Company sent out in the ship—which brought also a crown for the Sachem Powhatan, and orders for his "crownation"—eight Poles and Germans to make Pitch, Tar, Glass, Mills, and Soap-ashes, which, he observes, had the country been peopled, would have done well, but proved only a burthen and hindrance to the rest. After noticing a voyage of exploration and for the purchase of corn, and the return of the vessel to Jamestown, he continues, "No sooner were they landed but the president dispersed as many as were able, some to make glass, and others for pitch, tar, and soap-ashes. Leaving them at the Fort under the Council's care and oversight, he himself carried thirty about five miles down the river, to learn to cut down trees, *make clapboards*, and lie in the woods.[2]" The Council in London, complaining that no gold or silver was sent, wrote an angry letter to the president, threatening that if the expenses, £2000, were not

(1) Stith's History of Virginia, London, 1753, p. 77.

(2) "Among these were two *fine and proper gentlemen*, of the last supply. These were at first strange diversions for men of pleasure. Yet they lodged, eat, and drank, worked or played, only as the president himself did; and all things were carried on so pleasantly that within a week they became masters; and thirty or forty of those voluntary gentlemen would have done more in a day than a hundred of the rest, who must be drove to it by compulsion. * * But the axes often blistering their tender fingers, they would, at every third stroke, drown the echoes with a round volley of oaths, to remedy which sin, the president ordered every man's oath to be recorded, and at night, for every oath, to have a can of water poured down his sleeve, which so washed and drenched the offender, that in a short time an oath was not heard in a week."

defrayed by the ship's return, they should be deserted. To this letter Captain Smith returned "a plain and scholarly answer" by the ship, "which was at length dispatched with the *trials of Pitch, Tar, Glass, Frankincense, and Soap-ashes, with what wainscot and clapboard* could be provided." This cargo, of the value of which we are not informed, appears to have been the first export made from the British Colonies to a foreign country, with the exception of a load of sassafras gathered near Cape Cod in 1608, and consisted almost exclusively of *manufactured* articles, in the strict sense of that term.

The *Glass-house*, he informs us, stood in the woods, about a mile from Jamestown, and though probably very unpretending in its dimensions and appointments, it was doubtless the first manufactory ever erected in this country.[1] During the next year (1609), in which a new charter was granted, we are told they prosecuted their business with alacrity and success. They made three or four "lasts [2] of tar, pitch, and soap-ashes; produced a trial of glass; sunk a well in the fort; built twenty houses; new covered the church; provided nets and seines for fishing; built a block-house to receive the trade of the Indians; thirty and forty acres of ground were broke up and planted, etc. * * * And *for their exercise* at leisure times, they made clapboards and wainscot."[3] The year following, Sir Thomas Gates testified before the Council in London [4] that the country so abounded in white mulberry trees, that with so favorable a climate he believed it would yield silk equal to Italy; that there were divers minerals, especially "*iron oare*," some of which, having been sent home, had been found to yield as good iron as any in the world; that a kind of Hemp or Flax and Silk grass grew there naturally, which would yield material for excellent cordage, etc.

But the prospects of the country having, from various causes, greatly declined, when Captain Argall arrived as Governor in 1617, he found the public buildings and works of Jamestown fallen to decay, and only five habitable houses in the place. The people had turned their attention to the cultivation of tobacco, and he found the market-place, the streets, and all spare places planted with it. Its price was about three shillings per

(1) The first patent granted in England for the manufacture of glass, was on 22d May, 1623, to Sir Robert Mansell, for "a method of making glass with sea coal, pit coal, or any other fuel not being timber or wood." Glass bottles and window-glass were first made there in 1557, and plate-glass in 1673.

(2) A "last," according to McCulloch, is generally estimated at 4,000 lbs., but varies much according to the article, and in different countries. A last of pitch, tar, or ashes, is about fourteen barrels.

(3) The Colony, at this time, consisted of 200 persons, but was increased soon after to 500.

(4) A True Declaration of Virginia, 1610. Force's Collection of Tracts, vol. iii.

pound, at which price it was fixed shortly after by the governor's edict, under penalty of three years slavery to the Colony.

On the 17th of May, 1620, a meeting of the Company was called in London, at which many persons of the highest distinction joined the enterprise, and Sir Edwin Sandys, whose term of office as treasurer of the Company had just expired, made, we are told, "a long and handsome speech" on the affairs of the Colony. He stated the means he had taken to turn the attention of the colonists from tobacco to other more useful and necessary commodities. That for this purpose one hundred and fifty persons had been sent to set up three *iron-works;* that directions had been given for making cordage, as well as hemp and flax, and more especially silk grass, which grew there naturally in great abundance, and was found upon experiment to make the best cordage and line in the world. Each family was ordered to set one hundred plants of it, and the governor himself five thousand. They had also been advised to make pitch, tar, pot and soap-ashes, and timber for shipping, masts, planks, and boards, etc., for which purpose men and materials had been sent over for erecting sundry *sawing-mills.*[1] The cultivation of mulberry-trees and silk was strongly recommended, and the king, for the second time, had furnished silk-worm seed of the best sort, from his own store; and as grapes of excellent quality were a natural production, several skillful vine-growers, with abundance of vine slips, had been sent; and lastly, that the *salt-works*, which had been suffered to go to decay, were restored and set up, and that there were now hopes of such plenty as not only to serve the Colony for the present, but also shortly to supply the great fishery on the American coasts.[2]

Ample provision, indeed, appears to have been made for the domestication of the principal useful arts in Virginia, as the following list of the tradesmen whom it was designed to transfer thither will show: viz., "Husbandmen, Gardners, Brewers, Bakers, Sawyers, Carpenters, Joyners, Shipwrights, Boatwrights, Ploughwrights, Millwrights, Masons, Turners, Smiths of all sorts, Coopers of all sorts, Weavers, Tanners, Potters, Fowlers, Fish-hook-makers, Netmakers[3] Shoemakers, Ropemakers,

(1) It is probable that no saw-mill was erected thus early, since in 1649 it was stated that a saw-mill was much wanted there. See page 31. Saw-mills were not erected in England until many years later. Yet it was stated in July following, that in addition to those sent in the spring to erect saw-mills, there are lately come from Hamburg divers workmen, very skillful, to be sent in the next ship.

(2) Stith, Book iv., p. 176. "For salt," says the original record, "order is given for making it in abundance, and after the manner of those hotter climates, which may prove a great help to enrich the plantation."

(3) In respect to the last two, the Virginia adventurers seem to have been more provident than those of Plymouth, for four years after this (1624) *fish-hooks*, and seines, and nets were much wanted in that Colony. Winslow, in his "Good News for New Eng-

Tilemakers, Edge-tool-makers, Brickmakers, Bricklayers, Dressers of Hempe and Flax, Lime-burners, Lether-dressers, Men skillful in vines, Men for iron-works, Men skillful in mines." Of the character of these, says the old chronicle :[1] "The men lately sent have been, most of them, choice men, borne and bred up to labor and industry; out of Devonshire about one hundred men brought up to husbandry; out of Warwickshire and Staffordshire above one hundred and ten; and out of Sussex about forty, all framed to *iron-workes*, etc." Among the natural commodities enumerated in the same Tract, are "*cotton-wooll* and suger-canes, all of which may there also be had in abundance, with an infinity of othermore."[2]

As much as possible to discourage the use and cultivation of tobacco,[3] several other branches of industry were encouraged; and to promote still further the culture of silk, a person skillful in the business was sent over from the king's own garden at *Oatlands* to instruct others in it. Others were expected from France; and to give full instruction in it, a French treatise on the subject was translated by one of the Company, printed at its expense, and sent over in sufficient numbers for distribution. In reference to the *iron-works* above alluded to, Beverley, in his History of Virginia, after noticing several appropriations of the Burgesses, the first Colonial Assembly ever held in America, who met the governor and Council in May, 1620, observes, "Many of the people became very industrious, and began to vie one with another in planting, building, and other improvements. A *salt-work* was set up at Cape Charles on the Eastern shore, and an *iron-work* at Falling Creek in Jamestown River, where they made proof of good iron ore, and brought the whole work so near a perfection that they writ word to the Company in London that they did not doubt but to finish the work, and have plentiful provision of iron for them by the next Easter."[4]

In 1621, three of the master-workmen having died, the Company sent over Mr. John Berkeley with his son Maurice, who were commended as very skillful in that way, with twenty other experienced workmen.[5] On

land," says, "For though our bays and creeks are full of bass and other fish, yet for want of fit and strong seines and other netting, they, for the most part, brake through and carried all away before them." If they had had these, they could hardly have suffered so much for want of food. Young's "Chronicles of Plymouth," pp. 171 and 294.

(1) A Declaration of the State of Virginia, 1620. Force's Coll., vol. iii. No. 5.

(2) Ibid. p. 4. Mr. Bancroft, vol. i. p. 179, anno 1621, observes: "The first cultivation of Cotton in the United States deserves commemoration. This year the seeds were planted as an experiment, and their plentiful coming up was at that early day a subject of interest in America and England."

(3) "Against which," says Stith, "that Solomon of England (King James) wrote a treatise entitled 'A Counterblaste to Tobacco.'"

(4) History of Virginia, p. 36.

(5) Stith.

the 22d of May following, the plan of a general massacre was put in execution by the Indians, of whom all fears had for some time been laid aside, and Berkeley with all his workmen and people, except one boy and a girl, who managed to hide themselves and escape, were cut off, with others, to the number of three hundred and forty-seven. The iron-works and the glass-house were entirely demolished, and the preparations for the manufacture of other commodities were abandoned.[1] That the iron-work on Falling Creek had really gone into operation appears from further reference to it by Beverley. "The iron," he says, "proved reasonably good; but before they got into the body of the mine, the people were cut off in that fatal massacre, and the project has never been set on foot since, till of late; but it has not had its full trial"[2] * * * * "The superintendent of this iron-work also discovered a vein of lead ore, which he kept private, and made use of it to furnish all the neighbors with bullets and shot. But he being cut off with the rest, and the secret not having been communicated, the lead mine could never after be found, till Colonel Boyd, some few years ago, prevailed with an Indian, under pretense of hunting, to give him a sign by dropping his tomahawk at the place, (he not daring publicly to discover it, for fear of being murdered.) The sign was accordingly given, and the Company at that time found several pieces of good lead ore upon the surface of the ground, and marked the trees thereabouts. Notwithstanding which, I know not by what witchcraft it happens, but no mortal to this day could ever find that place, though it be upon part of the colonel's own possessions. And so it rests till time and thicker settlement discovers it."[3] This mine was subsequently rediscovered, and lead obtained from it not many years ago.

The use of Iron, notwithstanding its high antiquity—furnaces for extracting the metal from its ores, and its manufacture into swords, knives, etc., being assigned to a period before the time of Moses—seems to have been unknown to the Indians generally, although gold and copper were known to those of Mexico before the discovery of that country by the Europeans. This is doubtless owing to the fact, as stated by McCulloch, that "iron, though the most common, is the most difficult of all the metals to obtain in a state fit for use; and the discovery of the method

(1) It is a curious circumstance, that about the same time that the savages in Virginia were putting an end to this "good project" for the manufacture of iron, an ignorant mob in England destroyed the works of Edward Lord Dudley, for the smelting of iron ore with pit coal by his newly-discovered process, patented in 1621; and the use of which, though of as vast importance to the world as the former was to Virginia, was, like the latter, not again revived for about one hundred years.

(2) The revival of the iron-manufacture alluded to took place about the year 1712–15.

(3) Beverley.

of working it seems to have been posterior to the use of gold, silver, and copper."

Notwithstanding several attempts to divert the people from the cultivation of tobacco, so profitable had the business become through the increased productiveness under the improved cultivation by the spade, commenced in 1611, and the increased consumption and price in Europe, that in 1621, store-houses and factors were established at Middleburgh and Flushing, and fifty-five thousand pounds were exported to Holland, but none to England.[1] The year following they made sixty-six thousand pounds, and in 1639 the Assembly ordered all the tobacco in the Colony made in that and the two succeeding years to be destroyed, except one hundred and twenty thousand pounds, in due proportion for each planter. For several years preceding the Revolution, the exports of tobacco from Virginia were about the same annually as in 1621. The instructions brought by Sir Francis Wyatt to his government in the latter year were, to withdraw attention from tobacco, and to direct it to corn, wine, silk, and others already mentioned; to the making of *oil of walnuts*, and employing the apothecaries in distillation; and searching the country for minerals, dyes, gums, drugs, and the like. A fund was also subscribed for a glass-furnace to make beads, which were the current coin with the Indians; and one Captain Norton, with some Italian workmen, was sent over for that purpose.[2] The next year a master shipwright, named Barret, and twenty-five men, were sent to build ships and boats.

In 1623, Alderman Johnson, in justification of himself and Sir Thomas Smith, who had been charged with ruining the Colony [3] during the administration of the latter ending in 1619, drew up an account, in which he states, among other evidences of its prosperity in that time, that barks, pinnaces, shallops, barges, and other boats, were built in the country; but some of his statements seem to have been questioned by the Assembly.[4]

(1) This was in consequence of the impost which had been laid upon tobacco. Spanish tobacco sold about this time, we are told, at eighteen shillings per pound, while that of Virginia was limited in the Colony to three shillings, and the duty was the same upon both. The following was the valuation of a few articles, growing or to be had in the Colony in 1621, viz.: Iron, ten pounds sterling per ton; silk coddes, 2*s.* 6*d.* per lb.; raw silk, 13*s.* 4*d.* per lb., which rose in 1650 to 25*s.* and 28*s.* per lb.; silk-grass for cordage, 6*d.* per lb.; hemp, from 10*s.* to 22*s.* per cwt.; flax, from 22*s.* to 30*s.* per cwt.; cordage, 20*s.* to 24*s.* per cwt.; *cotton wooll*, 8*d.* per lb.; hard pitch and rosin, each, 5*s.* per cwt.; madder, 40*s.*; coarse, 25*s.* per cwt.; woad, from 12*s.* to 20*s.* per cwt.; anise-seed, 40*s.* per cwt.; masts for ships, 10*s.* to 3£ a piece; potashes, from 12*s.* to 14*s.*, which were in 1650, 35*s.* to 40*s.* per cwt.; soap-ashes, 6*s.* to 8*s.* per cwt.; etc. A man's labor was then computed at ten pounds stg. per annum.

(2) Stith.

(3) At the end of twelve years, the Company had expended £80,000, and were £4,000 in debt, and the Colony only numbered 600 persons.

(4) "But in the midst of these troubles and alarms," says Mr. Stith, under this date,

To promote the silk culture, the Legislature of Virginia in 1623 ordered all settlers to plant mulberry trees, and in 1656, passed an act imposing a fine on every planter who should not have at least one mulberry tree to every ten acres of land. In 1651, premiums were offered for its encouragement; and it is said that Charles II. wore, at his coronation in 1651, a robe and hose of Virginia silk, the art of weaving which was introduced into England in 1620. Sir William Berkeley, the governor, on his return from a visit to England, upon the Restoration, carried his majesty's pressing instructions for encouraging the people in Husbandry and Manufactures, but more especially to promote silk and vineyards. The Company had established a vineyard in the Colony previous to 1620, and a few years after sent out a number of French and Italian *vignerons*, who, through bad management, were unsuccessful. Wines were made in the Colony in 1647 by a Captain Brocas; and in 1651, premiums were also offered for its encouragement as well as for that of hemp; and in 1657, for flax also, both which latter were annually grown, spun, and woven by Captain Matthews of that State, prior to 1648.[1] In 1662, an edict of Virginia required each poll to raise annually and manufacture six pounds of linen thread. The manufacture declined on the withdrawal of the premiums.

A tract entitled, "A Perfect Description of Virginia,"[2] published in London in 1649, states, that "they had three thousand sheep, six public brew-houses, but most brew their own beer, strong and good; that indigo began to be planted and throve wonderfully well, from which their hopes are great to gain the trade of it from the Mogul's country, and to supply all Christendom; that the quantity of tobacco had so increased that it had fallen in price to three pence a pound; that they produced much flax and hemp; that iron ore was abundant, and had been tried and proved good; and that an iron-work erected would be as much as a silver mine; that they had four wind-mills and five water-mills to grind corn, besides many horse-mills; that a saw-mill was much wanted to saw boards, inasmuch as one mill driven by water will do as much as twenty sawyers; that they make tar and pitch, of which there was abundant material, as

"the *Muses* were not silent. For in this time Mr. George Sandys, the Company's Treasurer of Virginia, made his translation of *Ovid's Metamorphoses*, a very laudable performance for the times." In relation to this performance, Mr. Moran, in his "Contributions toward a History of American Literature," remarks, "It is curious that the first book *written*, and the first book *printed* in what is now the United States, were in verse, the one being *Sandys' Translation of Ovid's Metamorphoses*, the other the *Bay Psalm Book*, works widely different in character, and yet somewhat prophetic of the practical taste of the future nation to whose early literary contributions they belong."—*Trubner's Guide to American Literature.*

(1) Patent Office Report, 1853, 201.

(2) Force's Collection of Tracts, vol. ii. No. 8.

well as for pot and pearl-ashes; that all kinds of tradesmen lived well there, and gained much by their labors and arts as turners, potters, coopers, to make all kinds of earthen and wooden vessels; sawyers, carpenters, tyle-makers, boatwrights, tailors, shoemakers, tanners, fishermen, and the like."

At what time precisely this want of a saw-mill was supplied does not appear, but Ed. Williams published in London in 1650, a small tract containing an "Explication of the saw-mill or engine wherewith, by force of a wheel in the water, to cut timber with great speed." It was accompanied by an engraving, and contained some ingenious modifications of the mill as then used in Norway. Substituting weights for the toothed wheels which moved the carriage in the former, which done, he says "the ingenious artist may easily convert the same to an instrument of threshing wheat,[1] breaking of hemp or flax, and other as profitable uses." All this he proposed to make very useful in Virginia.[2] This mill is said to have differed little except in the use of less iron from many to be seen within a very few years in parts of the country in our day.

In an earlier pamphlet, or an earlier edition of the same, by this writer (published the same year),[3] he holds out to the adventurers in a

(1) The practice of *treading* out grain by horses—and sometimes by oxen, after the manner of the ancients—was generally practiced on the peninsula of the Chesapeake Bay as late as 1790. Horses, however, were preferred; and the advantages of this mode over that by the flail, as used in the Northern States and England at that time, were, that an entire crop could be beaten out in a few days, thus securing it from the ravages of the fly, which prevailed there, and also from *thieves*, and having it earlier ready for market. Three thousand bushels could be secured thus in ten days, which would employ five men one hundred days with the flail. Treading-floors were sometimes shifted from field to field, but a permanent floor of good waxy earth, which became smooth, hard, and glossy by use, was preferred. The floors were made from forty to one hundred and thirty feet diameter, usually sixty to one hundred, with a path or track at the outer circumference twelve to fourteen feet wide, on which the sheaves were laid; and they were usually fenced round, sometimes with an outer and inner fence. The horses were led round by halters, in ranks equidistant from each other, and at a sober trot. Thus, four ranks would preserve the relative position of the four main arms of a wheel, or the four cardinal points of the compass. This method was then believed by some to be preferable to any known mode of threshing grain. It is probable the threshing-maching has rendered it obsolete by this time.—See *American Museum*, vol. vii. p. 64.

(2) Moore's Patent Office, Append. 306.

(3) The title of this curious volume runs thus: "VIRGINIA, more especially the Southern part thereof, richly and truly valued; viz., the fertile Carolana and no less excellent Isle of Roanoak, of latitude from thirty-one to thirty-seven degrees; relating the means of raysing infinite profits to the adventurers and planters. The second edition, with addition of the discovery of silk-worms, with their benefit, and in planting of mulberry trees; also, the dressing of vines for the rich trade of making wines in Virginia; together with the making of the saw-mill, very useful in Virginia for cutting timber and clapboard to build withal; and its conversion to many as profitable uses: by E. W. Gent, London, 1650." The account of the saw-mill he promises soon to publish.

style of glowing description the immense profit to be derived from the Colonies, and recommends their encouragement by government as a means of getting rid of criminals from the kingdom, a plan already adopted by King James some years previously, and which afterward proved a source of great detriment to the social and moral interests of the colonists as well as to their industry. "It will be," he says, moreover, "to this commonwealth a standing full magazine of wheat, rice, cole-seed, rape-seed, flax, cotton, salt, potashes, sope-ashes, sugars, wines, silks, olives, etc." In regard to Iron he says: "Neether does Virginia yield to any other province whatsoever in excellency and plenty of this oare: and I cannot promise to myself any other than extraordinary successe and gaine if this noble and usefull staple be but vigirously followed." He compares Virginia with Persia and China in regard to climate and productions, allowing the latter no advantage but in their antiquity; and in reference to the silk grass already mentioned he says: "For what concerns the Flax of China, that we may not lose the smallest circumstance of parallell with Virginia, Nature herselfe hath enriched this her bosome favourite with a voluntary plant which by art, industry and transplantation may be multiplied and improved to a degree of as plentifull but more excellent nature, which because of its accession to the quality of silke wee entitle silke grass; of this Queen Elizabeth had a substantial and rich peece of Grogaine made and presented to her. Of this Mr. Porey, in his discovery of the great river Chamonoak, to the south of James River, delivers a relation as of infinite quantity covering the surface of a vast forest of pine trees, being sixty miles in length."

In reference to these early attempts to establish the manufacturing arts, Mr. Bancroft remarks: "The business which occupied the first session under the written constitution (1621) related chiefly to the encouragement of domestic industry; and the culture of silk particularly engaged the attention of the assembly. But legislation, though it can favor industry, cannot create it. When soil, men, and circumstances combine to render manufacture desirable, legislation can protect the infancy of enterprise against the unequal competiton with established skill. The culture of silk, long, earnestly and frequently recommended to the attention of Virginia, is successfully pursued only where a superiority of labor exists in a redundant population. In America the first wants of life left no labor without a demand. Silk-worms could not be cared for when every comfort of household existence required to be created. Still less was the successful cultivation of the vine possible." He regards it as a fortunate circumstance that their attention was turned from such efforts, to the more profitable one of cultivating tobacco. Of the prosperity of the colony a few years later he writes: "Possessed of security and great

abundance of land, a free market for their staple, and practically all the rights of an independent state, having England for its guardian against foreign oppression rather than its ruler, the colonists enjoying all the prosperity which a virgin soil, equal laws and general uniformity of condition could bestow, their numbers increased; the cottages were filled with children, as the ports were with ships and emigrants. At Christmas, 1640, there were trading in Virginia, ten ships from London, two from Bristol, twelve Hollanders, and seven from New England. The number of colonists was already twenty thousand."

In 1662 for the encouragement of Manufactures, prizes were offered for the best specimens of linen and woolen cloth, and a reward of fifty pounds of tobacco was given for each pound of silk. It was enjoined upon every person to plant mulberry trees in proportion to the number of acres of land he held. Tan-houses were erected, with "curriers and shoemakers attached," one in each county, at its own expense, at which hides were received at a fixed price and shoes sold at rates prescribed by statute: and to encourage the salt-works of Colonel Scarborough on the Eastern Shore, the importation of salt into that county was prohibited. Rewards were appointed in proportion to their tonnage of all vessels built, and all fees and duties payable to such shipping were remitted. The duty imposed upon tobacco by Cromwell (1652),[1] and reënacted at the Restoration, so embarrassed this trade, that in 1666 new efforts were made to introduce Manufactures. Each county was ordered to set up a loom at the public expense; the rewards for silk were renewed, and severe penalties imposed for neglecting flax, hemp, etc.[2] Sir Edmund Andros, governor in 1692, we are informed, greatly encouraged Manufactures; in his time fulling-mills were set up by act of Assembly, and he also "gave particular marks of his favor toward the propagation of cotton, which since his time has been much neglected." Of his successor Governor Nicholson (1698), it is complained that, "instead of encouraging Manufactures, he sent over inhuman and unreasonable memorials against them: viz. That while he represented their tobacco crops as insufficient, from its low price, to procure them clothing, he recommended Parliament, "to pass an act forbidding the plantations to make their own clothing," which, in other words, is desiring a charitable law that the planter shall go naked.[3]

But manufacturing enterprise seems also to have been less congenial

(1) This seems to have been the commencement of the system of interference with American trade and manufactures.

(2) Beverley p. 58.

(3) Beverley, p. 82. There can be no doubt that the injudicious policy of Great Britain was much influenced by the representations of her Colonial governors.

to the Virginia colonists than to those of New England; and the former continued long almost entirely dependent upon England for their clothing and other supplies, which they received in exchange for their great staple Tobacco, although not wanting in the raw materials, iron, flax, hemp, silk, wool, leather, etc., which usually incite to such undertakings.

So great was their dependence, that Beverley, who published in 1705, reproachfully laments the sad defection of his countrymen from the habits of industry which he had commended in the first settlers, and the indisposition of the assemblies to give that encouragement which they had formerly bestowed. "They have their clothing of all sorts from England, as linen, woolen and silk, hats and leather. Yet flax and hemp grow nowhere in the world better than there. Their sheep yield good increase and bear good fleeces; but they shear them only to cool them. The mulberry tree, whose leaf is the proper food of the silkworm, grows there like a weed, and silkworms have been observed to thrive extremely and without any hazard. The very furs that their hats are made of perhaps go first from thence; and most of their hides lie and rot, or are made use of only for covering dry goods in a leaky house. Indeed, some few hides with much ado are tanned and made into servants' shoes, but at so careless a rate that the planters don't care to buy them if they can get others; and sometimes perhaps a better manager than ordinary will vouchsafe to make a pair of breeches of a deer skin. Nay they are such abominable ill husbands, that though their country be overrun with wood yet they have all their wooden ware from England; their cabinets, chairs, tables, stools, chests, boxes, cart wheels and all other things, even so much as their bowls and birchen brooms, to the eternal reproach of their laziness."

As a reason for this state of things, he assigns, in addition to their want of concentration in towns, and other causes, what was probably a very true one in that case, that "such Manufactures are always neglected where tobacco bears any thing of a price."

The Virginia colonists were essentially Planters, and regarded commercial as well as manufacturing pursuits as less respectable than those of agriculture: hence their carrying trade,—the exportation of their tobacco and the importation of their supplies,—was left in the hands of the more commercial New Englanders. The climate and the fertility of their soil, the cheapness and abundance of the land, enabling many to acquire estates almost manorial in extent, all concurred with the native tastes of the inhabitants in fostering this sentiment; and Manufactures have not to this day become so general in that State as in many others whose settlement has been much more recent.

CHAPTER III.

SHIP-BUILDING IN THE COLONIES OF MASSACHUSETTS, MAINE, CONNECTICUT, NEW HAMPSHIRE, AND RHODE ISLAND.

We have seen that the history of the efforts made during the first hundred years, to introduce the Manufacturing Arts into the oldest of the American Colonies, is little more than a record of unsuccessful enterprise. Passing, however, to the Colonists whose advent upon these shores took place December 22, 1620, an event still commemorated in solemn festivals, we shall probably find some degree of success even in their earliest attempts in the industrial arts. With a sterile soil and a rugged climate, they early betook themselves to Manufacturing and Commercial enterprises; and so successfully, that, at the present day, there is scarcely a useful art of ancient or modern times, that is not "naturalized" among them, and scarcely a region of the globe so remote or inaccessible that is not familiar with the products of their labor. Those efforts, so far as we have been able to glean a knowledge of them from various sources, we shall proceed to notice, nearly in the order of their occurrence.

Next to the cultivation of the soil for the supply of the means of subsistence, the abundance of *timber*, and the comparative ease with which it could be prepared for market, naturally attracted attention to it as a cheap and ready resource. For the products of the forest in every shape there was an ample demand at that time in England, where the timber had already been so wasted for the supply of iron-works, that as early as 1581 it had been found necessary to restrain its use. The West India Islands also were ready to exchange their staple products for pipe-staves, hoops and lumber, etc. Hence the first products of the industry of the Plymouth colony, of Rhode Island, and probably of others, sent to a foreign market, were manufactured from the almost inexhaustible wealth of the American forests.

On the 10th of September, 1623, a ship of one hundred and forty tons, called the "Anne," Mr. William Pierce, Master, was freighted at Plymouth, and returned to England, her cargo consisting of *Clap-boards*, with a few beaver skins and other furs.

Limiting our researches, however, at present to only one branch of

Industry, in which the products of the forest were made available in aid of Commerce, and in which this country has since become pre-eminent, viz., SHIP-BUILDING, we find that the first vessel, with the exception of a few open boats, built by the followers of De Soto, ever constructed by Europeans in this country, was a Dutch Yacht, named the "Onrest," or "Restless," of 38 feet keel, 44½ feet long, 11½ feet wide, and 16 tons burden. She was built by Captain Adriaen Block, at Manhattan River, in 1614, to supply the place of one destroyed by fire, which, with four others, arrived there that year from Amsterdam. In her, Captain Hendrickson, in August, 1616, discovered the Schuylkill River, and explored nearly the whole coast from Nova Scotia to the Capes of Virginia, after which he returned to Holland; and having presented a finely executed map of the coast, he asked a grant of the country, which was not conceded however. During the same year (1614), Captain John Smith sailed for "North Virginia" with two ships and forty-five men and boys, to make experiments upon a gold and copper mine. Shey reached the island Monahigan, on the coast of Maine, latitude 43° 30′, in April, where they made some attempt at the whaling business; but failing in that, they built *seven boats*, in which thirty-seven men made a very successful fishing voyage. Thus the first humble attempt at the fishing business was made in American bottoms.

1. SHIP-BUILDING IN PLYMOUTH.—In 1624, within four years after the landing, the Colony at Plymouth received an accession of a carpenter and a salt-maker, sent out by the Company. Of the former, Governor Bradford says, "He quickly builds two very good and strong shallops, with a great and strong lighter, and had hewn timber for Ketches (a much larger description of vessel), but this spoilt; for in the heat of the season, he falls into a fever and dies, to our great loss and sorrow." The salt-maker —for whom the lighter appears to have been built—selected a site and erected a building, and made an attempt to manufacture salt for the fishery, first at Cape Ann, and the next year at Cape Cod, both of which essays were, through his ignorance and self-will, unsuccessful.

At Monamet, now Sandwich, near Cape Cod, whither the settlers removed about that time, a pinnace was built by the Plymouth people in 1627, for the purpose of fishing. But the first vessel of any size constructed there, was a bark built by subscription in 1641. She was of about fifty tons burden, and was estimated to cost two hundred pounds. It appears by the records of Plymouth, there were thirteen proprietors, of whom William Paddy, William Hanburry, and John Barnes, owned each one-eighth part, and William Bradford, John Jenny, John Atwood, Samuel Hicks, George Bower, John Cook, Samuel Jenny, Thomas Willets, Stephen Hopkins and Edward Bangs, each one-sixteenth part.

The building of this vessel, though small, it has been truly remarked, "was an undertaking at that period of exigency and privation, surpassing the equipment of a Canton or Northwest Ship with our means at the present day."(1) John Drew, from Wales, who settled at Plymouth, as early as 1660, is believed to have been a ship-carpenter; and a number of his descendants, in that and other towns, pursued the business—one of them at Halifax, on the Winetuxet, a small branch of Taunton River.

2. SHIP-BUILDING IN MASSACHUSETTS.—In the records of the Governor and Company of Massachusetts Bay, it is stated, April 17, 1629, that they had "six shipwrights, of whom Robert Molton is chief"; and in May following it was recorded that provision had been sent over "for building ships, as pitch, tar, okum, tools, etc.," and it was proposed to set apart a house for such stores, to make an inventory of them, and to give Molten the charge of the whole. Fishing vessels were to be built on shares. The first vessel ever built in *Massachusetts*—Plymouth being then a separate colony—was a bark launched at Mystic (now Medford) on the fourth of July, 1631, and named by Governor Winthrop, to whom she belonged, "The Blessing of the Bay." In the course of the season this vessel made several coasting trips, and soon after visited Manhattan and Long Island. On this occasion, Mr. Winthrop says, the sailors were surprised at seeing, at Long Island, Indian canoes of great size. Some of these specimens of aboriginal boat building were capable of carrying eighty persons. The natives were no doubt equally amazed at the proportions and novel architecture of the largest vessel, probably, that had yet floated on the waters of the Sound. Another vessel of sixty tons, called the "Rebecca," was built in 1633 at Medford, where Mr. Cradock, the first governor chosen by the Company, had a shipyard. A ship of one hundred and twenty tons was built at Marblehead by the people of Salem in 1636.

The business appears to have received its first impulse about this time from the same cause which threw the colonists upon their own resources for the supply of many of the necessaries of life. They had been hitherto supplied with all but their corn and fish, by the many emigrant ships which had yearly added to their numbers. A suspension of this emigration was brought about by the civil wars in England, and the diminished intercourse caused thereby left them dependent on mercantile enterprise alone, which the state of navigation then rendered precarious in the extreme. "The general fear," says Governor Winthrop, in his Journal, "of want of foreign commodities, now our money was gone, and that things were like to go well in England, set us on work to provide shipping

(1) I. Mass. Hist. Coll., i. 278.

of our own; for which end Mr. Peter, being a man of very public spirit and singular activity for all occasions, procured some to join for building a ship at Salem of three hundred tons, and the inhabitants of Boston stirred up by his example, set upon the building another at Boston of one hundred and fifty tons. The work was hard to accomplish for want of money, etc.; but our shipwrights were content to take such pay as the country could make." Corn was that year made a legal tender for debt.

He speaks in another place of the *Trial*, of about one hundred and sixty tons, probably the vessel alluded to above, as the first ship built at Boston. She sailed for Bilboa on 4th June, 1642, with Thomas Graves as master, laden with fish, "which she sold there at a good rate, and from thence she freighted to Malaga, and arrived there this day (March 23, 1643, O. S.) laden with wine, fruit, oil, iron, and wool, which was a great advantage to the country and gave encouragement to trade." Thus early began the circuitous and profitable trade to distant ports, in which colonial vessels, at no remote period, bore so prominent a share.

In 1642 five other vessels, all of considerable size, were built at Boston, Plymouth, Dorchester, and Salem; and in 1644, two of two hundred and fifty and two hundred tons respectively, were built at Cambridge and Boston, which sailed for the Canaries with pipe staves, fish, etc. A ship of three hundred tons was built at Boston in 1646.

"New England's First Fruits," a work published in London, in 1643, thus refers to the subject: "Besides boats, shallops, hoyes, lighters, pinnaces, we are in a way of building ships of one hundred, two hundred, three hundred, four hundred tonne: five of them are already at sea, many more in hand at this present."

In October, 1641, the Court enacted that, "Whereas, the country is now in hand with the building of ships, which is a business of great importance for the common good, and therefore suitable care is been taken that it will be well performed, according to the commendable course of England and other places, it is therefore ordered surveyors be appointed to examine any ship built, and her work, to see that it be performed and carried on according to the rules of the art."

A ship was that year built at the Point, now called Warren Bridge Avenue, by Francis Willoughby, afterward Deputy Governor of Massachusetts, who was a merchant, and did much to improve Boston by building wharves and in other ways.

In May, 1644, the Assembly granted the ship-builders an act of incorporation, which states that: "For the better building of shipping, it is ordered that there be a company of that trade, according to the manner of other places, with power to regulate building of ships, and to make such orders and laws among themselves as may conduce to the public

good." Such a charter seems to admit a sufficiently liberal interpretation. Captain Johnson says, in 1647: "Many a fair ship had her framing and finishing here, besides lesser vessels, barques and ketches; many a master, besides common seamen, had their first learning in this colony. Boston, Charleston, Salem, Ipswich, etc., our maritime towns, began to increase roundly, especially Boston—the which, of a poor country village, in twice seven years is become like unto a small city."

"The people of New England at this time," says Hubbard, A. D. 1646–51, "began to flourish much in building ships and trafficking abroad, and had prospered very well in these affairs, and possibly began too soon to seek great things for themselves; however, that they might not be exalted overmuch in things of that nature, many afflictive dispensations were ordered to them in this lustre, which proved a day of great rebuke to New England; for the first news they heard from Europe in the year 1646, was the doleful report of two of their ships, that were wrecked the winter before upon the coast of Spain, one of which was built in the country the former year by Captain Hawkins, a shipwright of London, who had lived divers years in the country before, and had with others been encouraged to fall upon such dealings as he had formerly been acquainted with. At the last he had built a stately ship at Boston, of four hundred ton and upward, and had set her out with great ornament of carving and painting, and with much strength of ordnance. The first time she was rigged out for the sea was the 23d of November, 1645, when they set sail for Malaga with another ship in her company, whereof Mr. Karman was master." He then gives a narrative of her loss at sea with nineteen persons on board. Another ship of two hundred and sixty tons built at Cambridge, and which sailed the same year for the Canaries, he tells us, was "set upon" by an Irish man-of-war with seventy men, and twenty pieces of ordnance, the New England ship having but thirty men and fourteen pieces; the latter got off with the loss of two men. This action Mr. Cooper regards as the first regular naval combat in which any American vessel is known to have been engaged. Another vessel of one hundred tons, built at New Haven, was lost the same year, with seventy persons and a cargo of wheat.

By papers delivered to the Commissioners of King Charles on the 16th of May, 1665, it appears that Massachusetts then had the following ships and tonnage, viz.: about eighty of from twenty to forty tons, about forty from forty to one hundred tons, and about a dozen ships above one hundred tons, making in all over one hundred and thirty sail.

In October, 1667, the General Court of Massachusetts having received information "that divers unskillful persons pretending to be shipwrights, do build ships and other vessels in several parts of this country, which

are very defective, both of matter and form, to the great prejudice of the merchants and owners and the danger of many men's lives at sea," ordered a committee of five (one of whom was Captain EDWARD JOHNSON, cited on the last page) to draw up and present suitable laws for the regulation of the business.

On the same occasion an order was made to encourage the building of a *dry dock*, by which it was decreed that any person who should undertake the construction of such a dock in a suitable place in Boston or Charlestown, fit to take in a ship of three hundred tons, should have liberty to do so with a monopoly of the privilege for fifteen years. In April, 1668, the enjoyment of the right was extended to twenty-one years to the person who should build and keep a dock in repair.

The Court in May, 1667, laid a tonnage duty of half a pound of gunpowder, or its equivalent in money, per ton on all ships and vessels above twenty tons burden, not belonging within the jurisdiction or principally owned within it. The duty was levied on every voyage and was chiefly designed for the support of the fort.(1)

In Dec., 1673, the ship Anthony and a ketch, were ordered to be fitted out for the defense of the coast and the vessels of the province, some of which had been taken by the pirates and the Dutch of New Netherland.

As an evidence of the energy with which this business was prosecuted in Massachusetts from the earliest period, it is mentioned that upon the North River, crooked, narrow, and shallow at low water, ships were built of the size of three and four hundred tons throughout its whole course. *Scituate*, at its mouth, was long noted for its Ship-building. An early chronologist believes the art of Ship-building, so early established at North River and Boston, may be traced to the dock-yards of Chatham on the Medway. In 1666, EDWARD GOODWIN, of Boston, a shipwright from Chatham, in Kent, purchased a plantation at Scituate, where he commenced the business. EDWARD and MICHAEL WANTON, the former believed to be the ancestor of several governors of Rhode Island, whither he subsequently removed, carried on Ship-building at Scituate as early at least as 1670. The barque *Adventure*, of forty tons, owned by the people of Scituate and Marshfield, in 1681 engaged in the West India trade. The fishery then, as well as later, greatly stimulated this department of industry. Not long after the close of the Revolution, it was declared by an intelligent writer to be of more value to Massachusetts than would be the pearl fisheries of Ceylon. This business was actively pursued by the inhabitants of Scituate. They had in 1770 over thirty sail of vessels in the mackerel fishery. From Forster's Ship-yard

(1) Records of Gov. and Company, vol. iv., pp. 331, 344, 573.

upon the Scituate side of the river, ships of five hundred tons were turned out. The aggregate of the tonnage of ship-rigged vessels built there in the last century would, if known, be a considerable item in the domestic tonnage of Massachusetts.

Salem, so early incited to the same branches of industry by Mr. Peters, long prosecuted Ship-building with great enterprise. Hardy's Cove, on South River, was in 1677 a principal locality for that business. The shipping of that and other towns suffered much by the Indians at this time. They captured in 1677 about fifteen Ketches belonging to Salem. A prominent ship-builder in the town in 1690 was RICHARD HOLLINGWORTH, who owned the property now or recently in the possession of the Hawthorne family. Boston and Salem together, in 1735, owned about 25,000 tons of shipping. The reputation of Salem for commercial enterprise was at that time, and long after, second only to that of Boston. For several years previous to 1721 it cleared yearly about 80 vessels on foreign voyages, and in 1748 about 130.

The enterprise of her merchants, ship-owners, and seamen, among the earliest and most conspicuous of whom were the Derbys, gave ample employment to her ship-yards. A marine society was formed there in 1766, and incorporated in 1771. This town has also the honor of having produced from the bosom of that adventurous class the distinguished mathematician, NATHANIEL BOWDITCH, to whom the ship-owners, merchants, and mariners of Europe and America are more indebted for the preservation of life and property than to any other man this country has produced. While he was himself a mariner, and practically acquainted with the wants of those who "go down to the sea in ships," he prepared with marvelous accuracy his *Practical Navigator*, which, as the *London Athenæum* has observed, "goes both in American and British craft over every sea of the globe, and is probably the best work of the sort ever published."

Newburyport was formerly celebrated for the extent and excellence of its Ship-building, as well as its commerce. Its vessels were in repute in Great Britain no less than throughout the Colonies. It appears by the Town Records that Ezra Cottle commenced Ship-building near the foot of Federal street in that town as early as 1698. In 1723 the same business was carried on in the locality known as Thorla's Bridge. The town was noted for the number of vessels yearly turned out from its ship-yards. The business declined considerably after the commencement of the Revolution. The Continental frigates *Boston* and *Hancock* were built there, besides many large private armed vessels during the war. In 1772 ninety vessels were built there; in 1788 only three. Notwithstanding the reverses which overtook all commercial towns during that period, New-

bury in 1790 owned nearly 12,000 tons of shipping, which, in the next sixteen years, was increased to 31,974 tons. Its reputation in this branch is still maintained.

New Bedford was famous in Ship-building long before the Revolution, and although it suffered damage in 1778 to the extent of nearly £100,000, it early recovered its enterprise. The villages of Westport, Rochester, Wareham, and Dartmouth, in its immediate vicinity, were little more than shipyards, and, with the town itself, were engaged in supplying vessels and boats for the several branches of the fishery in which its mariners were engaged. The Cod, Mackerel, and particularly the Whale Fishery, must be regarded as the chief support of the Ship-building interests of the Colonies.

Until the close of the last century this was the principal fish-producing country of the world. The whale fishery was a means of bringing into service a larger class of vessels than had been previously constructed. This industry had been carried on in boats near our shores from the earliest period, and in 1690 was commenced on a large scale by the hardy seamen of Nantucket. After the "shore whaling" began to fail, an aged man, concerned for the future interests of the class, pointed to the ocean, and prophetically exclaimed, "There is a green pasture, where our children's grandchildren will go for bread." The people of Nantucket, with those of New Bedford, who were from the same stock, were the first to push that arduous enterprise among the denizens of the Southern Seas. It was the school in which American seamen acquired that maritime skill which has covered the ocean with our merchant fleets.

Salisbury, Massachusetts, a few miles from Newburyport, was from an early day a principal Ship-building station, in which business it continued active until the Revolution. A frigate of thirty-two guns, launched at Salisbury about the time of the Treaty of Amity and Commerce with France in 1778, and from that circumstance named the "Alliance," was the favorite of the Navy and the American people during the remainder of the war, filling the place in the public regard afterward occupied by the "Constitution" frigate. She was a beautiful vessel and a swift sailer, and after the war was converted into an East Indiaman.

In addition to Boston, and the other places we have named, the business was actively prosecuted in colonial times at *Medford*, where it first commenced, and at Charlestown, Ipswich, Haverhill, and several other places, in which it is still conducted. Some of these carried it on to a greater extent than they have done since that time. In the counties of Essex, Middlesex, and Suffolk, the business has always been a considerable one.

3. SHIP-BUILDING IN THE DISTRICT OF MAINE.—In Maine, then and long after a district of Massachusetts, upon the numerous bays, coves, and streams near the seaboard, in localities now destitute in a great measure of the timber formerly so abundant, Ship-building was commenced with energy almost as early as in any part of the country. It was begun there some time previous to the acquisition by Massachusetts of a right to the territory by purchase from the heirs of Gorges in 1677. Captain JOHN SMITH, the hero of Virginia, visited the coast in 1614 for the purposes of trade and fishing, and at the island of Monhegan, in Lincoln County, erected dwellings and built a number of fishing boats. There, as in other parts of the New England provinces, the fishery was the principal occasion of the settlement of many towns, and a source of profit and even wealth to many early settlers. It was the great means of fostering the Ship-building interests. Next to these, the conversion of the abundant timber which densely clothed the banks of all the eastern rivers furnished the most profitable return for labor. Timber, converted into masting, lumber, staves, shingles, and other merchantable forms, by axemen and numerous saw-mills, was floated to the tide-waters, where vessels were built to convey it along with their fish to England, Spain, the Canaries, and West India Islands, and other foreign and domestic ports, to be exchanged for the manufactures of Europe, salt, wines, and tropical products, or provisions from the Southern Colonies. The vessels were often sold in foreign ports after the discharge of their cargoes, the great cheapness with which they were constructed enabling their owners to do so at a good profit, and at a less price than those built in other countries. These branches of industry combined, constituted for two hundred years the principal occupations of the people of Maine and parts of New Hampshire, and enlivened with enterprise many places in which the hum of the factory has succeeded to the ring of the axe or the clatter of the saw-mill, and others still which are now the sites of flourishing cities.

Pemaquid Point, twelve miles north of Monhegan, was an early fishing station, much frequented by the English on the first settlement of Maine, at which Ship-building was also carried on. At this place was born, in 1650, Sir WILLIAM PHIPPS, the first Royal governor of Massachusetts, who, at the age of eighteen, commenced an apprenticeship to the Ship-building Art. On the completion of his service he worked at the trade for a time in Boston, and subsequently engaged in it on his own account on the Sheepscote River, east of the Kennebec, where he built a ship for merchants in Boston. He afterward abandoned the business for a maritime life, and was knighted by James the Second in consideration of his having, in 1687, successfully conducted an expedi-

tion in search of a Spanish wreck sunk near Hispaniola, from which property to the value of £300,000 was recovered. This laid the foundation of his future wealth, although it is said his generosity allowed him to receive only £16,000 as his own share. He was afterward conspicuous in the affairs of the New England provinces.

At *Kittery Point*, on the Piscataqua, opposite Portsmouth, N. H., the oldest corporate town in the State, Ship-building was also successfully conducted at a very early period. This place, in 1696, gave birth to another distinguished Provincial, SIR WILLIAM PEPPERELL, an eminent merchant of Mass., who was also long identified with the fishing and ship-building industry of the province. His father, William Pepperell, a native of Tavistock, near Exeter, in Cornwall, England, while a young man in humble circumstances, came to the Isles of Shoals, nine miles south of Kittery, in 1675, in a fishing vessel, that place being celebrated for producing the delicate *dunfish*, which sell much higher than cod. After four or five years spent in the business, he removed to Kittery, and married the daughter of an old ship-builder, John Bray, who conducted the ship and boat-building business largely after the conclusion of King Philip's war had rendered property more safe. The Pepperells also built many vessels for themselves and others, and had, at times, over one hundred sail on the Banks of Newfoundland, either manned by them or let on shares, engaged in the fisheries, and they traded largely with southern ports. The elder Colonel Pepperell, died in 1734, after having filled several offices, civil, judicial and military. His operations at an early period appear to have been extended to other rivers than the Piscataqua, and vessels were built for him at Saco, where he afterward purchased large tracts of land, now covered by the factories and improvements of that place. A letter from him to Captain John Hill, Commander of the Fort at Saco, in November, 1696, the year in which his son, Sir William, was born, exhibits the energy of the man, a needful virtue in those perilous days, and illustrates the customs of the times among ship-builders.(1)

For some years previous to the French war, Ship-building had been active and profitable in Maine, and large numbers were to be seen on the stocks, as well as throughout New England generally. The several colonies

(1) "Sir—With much trouble I have gotten men and sent for the Sloop, and desire you to despatch them with all speed; for, if all things be ready, they may be fitted to leave in two days as well as in seven years. If you and the Carpenter think it convenient, and the ground has not too much descent, I think it may be safe and better to bend her sails before you launch her, so as to leave immediately. But I shall leave it to your management, and desire you to hasten them day and night; for, sir, it will be dangerous tarrying there, on account of hostile savages in the vicinity; and it will be very expensive to keep the men upon pay. I send you a barrel of rum, and there is a cask of wine to launch with."

of New England had in 1741, about one thousand sail engaged in the fishery, nearly the whole of which was probably of home construction, as vessels were frequently built for English and foreign merchants. After the peace it revived again, and the ship-yards of Maine turned out great numbers of the new class of vessels, called Schooners, which were found particularly useful in fishing, one of them being worth, in the cod-fishing, two of the shallops in use before their introduction. The small vessels built for this service were in great demand. They were constructed not only on the banks of the larger rivers and in the numerous coves along the seaboard, but far up the smaller tributary streams at the head of navigation, and sometimes at considerable distance from the river, to which they were drawn on sledges in the winter season. They were not unfrequently built two or three miles from the water, and as timber became scarcer, were occasionally framed several miles inland, and then taken apart and transported to the water-side, where they were reconstructed and launched.

In addition to Pemaquid and Kittery, which included the two Berwicks and Elliot, the towns of Wiscasset, Warren, Portland, or Falmouth, and other places on the Casco and Penobscot Bays, on the Kennebec, Saco, St. George's, and more eastern rivers, became early engaged in this business. Bath, Bangor, Brunswick, and other extreme eastern towns, now so extensively engaged in ship-building, were settled at a date considerably later, and had made comparatively little progress in it during the period now under review. Bath, which has now a registered tonnage of over one hundred thousand tons, was first permanently settled in 1756. Bangor, settled in 1769, had in 1790 only 160 inhabitants. The vast lumber trade and other business of this town now employs between two and three thousand sail of vessels annually. A large part of Falmouth, including Portland, was burned by an English frigate in 1775. Ship-building has long been an important business of the place. In 1785, the two towns owned 5341 tons, engaged in the foreign trade, and 1628 tons in the fishing and coasting business, amounting altogether to 6969 tons. The tonnage registered at that port in 1795, was 13,798. Wiscasset employed, in 1789, thirty-five vessels of 2090 tons, and in 1795, registered 102 vessels of 9944 tons in the aggregate.

Ships were built at this period on the rivers of Maine, according to M. de Rochefaucault, for about $26.50 per ton, or $33.50 all things supplied, and were sold in Boston for $40 to $43 per ton. The tonnage of Maine has always been large in proportion to her population. In the beginning of this century, it amounted to 87,390 tons. The yearly returns of new tonnage for that State, now nearly equals one-third that of the whole Union.

One of the most eminent ship-builders in the Colonies at the commencement of the Revolution, and among the first in this country to apply the principles of science in the draughting and modeling of ships, was JOHN PECK, of Boston. Peck is said to have been "the most scientific, as well as the most successful naval architect which the United States had then produced." The ships built by him were so superior to any then known, that they attracted the attention of Congress, and he was employed to build some of their ships of war. But his talents did not bring him that pecuniary reward which all who knew the superiority of his skill, have admitted was his due.

The success of Mr. Peck as a Marine Architect, in combining the great essentials of stability, capacity and swiftness, was admitted by intelligent foreigners. The Belisarius, the Hazard, and the Rattlesnake, constructed by him, were known during the war of the Revolution for their fast sailing, a quality to which the American cruisers owed their efficiency more than any other. They were also said to carry more than others of the same class. It was a common remark at that period, that "to have a perfect vessel, it must have a Boston bottom and Philadelphia sides."

In the year 1676, just a century before the Declaration of Independence, the following vessels are said to have been built in Boston and its vicinity, and then belonged to that neighborhood, viz.:

30	vessels	between	100	and	250	tons.
200	"	"	50	"	100	"
200	"	"	30	"	50	"
300	"	"	6	"	10	"

There were at this time in the Colony, thirty Master Shipwrights.(1)

The trade of Massachusetts in 1717, employed 3493 sailors, and 492 ships whose tonnage amounted 25,406. In 1731, there were 600 sail of ships, and sloops of thirty-eight thousand tons burden, engaged in the same commerce one half of which traded to Europe. From five to six thousand men, and one thousand sail of vessels were at the same time employed in the fisheries. The tonnage employed in these branches was chiefly home built. The ship-yards at that date were actively employed, and many vessels were sold in foreign ports.

Dr. Douglass has the following observations on New England Ship-building about the year 1746. "In New England Ship-building, a vessel fitted to sea, two-thirds of the cost is a profit to the country, the other third is iron, cordage, sail-cloth and small stores, from Great Britain. The ships built in Boston, exceed all of other building yards, the many

(1) 2 Mass. Hist. Coll. vol. x. p. 163; Hutchinson, Mass., Cooper's Hist. U. S. Navy

merchants and ship-masters, good connoisseurs, transiently inspect them; every bad piece of timber, or length of plank is censured. In Newberry, where they are not much inspected, the builders act at pleasure, and as the contracts are generally to be paid in goods, they build accordingly; thus a noted builder, T. W., jocosely said 'that he had built for —— a calicoe ship.' The other country building places are still worse, particularly North River, where, instead of what is reckoned ship-timber, they use forest wood of any sort; these vessels, with repairs, last only two or three voyages, and are designed as a bite upon ship-buyers at home." In relation to the business in Boston, he afterward remarks: "Ship-building is one of the greatest articles of our trade and manufacture. It employs and maintains about *thirty* several denominations of tradesmen and artificers; but as in all other articles, so in this, more particularly, for a few late years, this country has the symptoms of a galloping (a vulgar expression) consumption, not so desperate but by the administration of a skillful physician it may recover an athletic state of health, *sublata causa tollitur effectus*. I shall illustrate the gradual decay of Ship-building, by the Ship-building in Boston, meaning top-sail vessels.

Anno	1738	on the stocks	41	vessels of	6,324 tons.
"	1743	"	30		
"	1746	"	20		
"	1749	"	15	"	2,450 tons."

In 1769, Massachusetts, according to the tables of Lord Sheffield, extracted from the books of the Custom House at Boston, built new vessels to the number of one hundred and thirty-seven. Their registered tonnage, which was at the rate of sixteen barrels of flour to a ton, and was always below the real tonnage, was eight thousand and thirteen tons. The amount was more than three times that of any other Colony, and was nearly equal to that of New Hampshire, Connecticut, Rhode Island, Pennsylvania, and Maryland, collectively, which were the next four in amount. The average tonnage of each vessel, making an addition of one-fifth to the registered amount, according to the official direction, was about seventy tons, which was below those of Pennsylvania, Maryland and South Carolina. The real tonnage is believed to have been one-third higher than the registered, which would give a total of over ten thousand tons of new shipping for that year. The tonnage returned in that year for Massachusetts and New Hampshire, was more than half that of all the Colonies now in the Union, a proportion which was preserved by these provinces in the two years following.

The shipping cleared from the province in the year ending January 5, 1771, was 70,284 tons, and the amount entered was 65,271, the outward exceeding the inward by 5,013 tons, partly made up of shipping built for

sale, of which New England at this period, annually sold about fifty vessels. As a branch of her manufactures, the building of ships for sale was always a considerable source of profit and employment in Massachusetts. It was predicted by Lord Sheffield in 1783, that the business would be at an end, after the separation of the Colonies, if England, which had always been a principal customer, ceased to take American shipping. Upon the revival of commerce, however, after the organization of the Government under the present Constitution, and the imposition of tonnage and other discriminating duties, the business extended with greater rapidity than before the war. The tonnage returned by the State, for the year ending March 4, 1791, of which we are unable to give the precise amount, is stated by Mr. Tench Coxe, in his review of Lord Sheffield's observations, to have exceeded the average of the three years, 1769, 1770, and 1771, as given in his Lordship's tables, by three thousand seven hundred and thirteen tons. The district of Maine alone, in the eighteen months preceding December 31, 1792, built 15,476 tons, although the returns were incomplete for that section.

4. SHIP-BUILDING IN CONNECTICUT.—The earliest mention we have met with of Ship-building in *Connecticut* is in 1640, when the General Court declared: "It is thought necessary for the comfortable support of these plantations, that a trade in *cotten wooll* be sett uppon and attempted, and for the furthering thereof it hath pleased the Governor that now is (Edward Hopkins, Esq.) to undertake the finishing and setting forth a vessel with convenient speed to those parts where the said comodity is to be had, if it be phesable, etc." It is probable that the vessel was finished and dispatched for the purpose named; for, more than two years after, in accordance with the Court's order, of which the above is a part of the preamble, the several towns had agreed upon the proportion of the "cotten wooll" that each should take from Mr. Hopkins. The contingent for Hartford was £200 worth. In the same year (1642) the court appointed "Persons to take the account of what the several towns will disburse toward the building of a shippe, and (if feasible) they have power to engage workmen and to carry on the work." In that year it was ordered that hemp-seed should be sown, or sold to those who would sow—"For the better furnishing the River with cordage towards the rigging of shipps." In 1666, by the same authority, all vessels upon the stocks were exempted from taxations in that colony." (1)

Soon after the building of the vessel at Rhode Island for the New Haven Colony in 1646, which was lost at sea on her first voyage, the

(1) Colonial Records, vol. 1, pp. 59, 79; vol. 2, p. 255.

united Colonies of New Haven and Hartford built and equipped a vessel carrying ten guns and forty men to cruise on Long Island Sound, to prevent the encroachments of the Dutch in that quarter. This Mr. Cooper considers to have been the first regular cruiser employed by the American Colonists, who afterward became so efficient in that species of warfare.

The attention of scientific and practical men in England was in 1662 called to the advantages of some of the North American provinces for Ship-building, by Mr. John Winthrop of Connecticut, who, in September of that year, while in England as agent for the Colony to obtain a Charter, read a paper on this subject before the Royal Society, then just incorporated. He had been some sixteen years a resident of Connecticut, but we believe Virginia was more especially pointed out as affording facilities for the business, on account of the quality of its timber and abundance of naval stores. New England was much indebted to the practical and enterprising mind of Mr. Winthrop in many of the arts; and his efforts on this occasion doubtless contributed to draw orders from British merchants, which afterward became a profitable source of employ in the Colonies.

New London, on the Thames, appears at an early period to have led the way in Ship-building in Connecticut; but the vessels at first constructed there were for the most part of a small description. The first shipwright in the place was John Coit, whose master builder was his own son-in-law, Hugh Mould. The latter appears to have had some reputation as a builder, and the vessels turned out from their ship-yard were generally called Mould's vessels. Between 1660 and 1664, they built a considerable number of small vessels called barques, ranging in burden from twelve to twenty tons, and in value from fifty to eighty pounds: one of these, "The Endeavour," made several voyages to the West Indies, and was sold in Barbadoes for two thousand pounds of *sugar*. A vessel called "The New London Tryall," was built in 1661 by John Elderkin, another of the primitive engineers of the place, and one of the original grantees of the town, by contract with merchants of New London and Newport, which cost, exclusive of iron-work, nails, spikes, etc., two hundred pounds: this was considered a great enterprise at that time. She was the first actual merchant-vessel owned in that place. The term *barque*, so frequently met with in the history of that period, was applied to any small vessel above the size of a boat. The shallops and pinnaces of that day were little more than decked boats of about twenty tons. The "New London," of seventy tons, called a ship, built by Mould & Coit in 1666, for merchants of New London, was the largest vessel that had been built there up to that time. Many of these small craft, which

were chiefly employed in the coasting business, belonged, as did their cargoes, in part to their masters: and New London was as much noted at that period for these coasting vessels and skippers, as in late years for her smacks and smackmen. Voyages were, however, occasionally made to the West Indies, to Newfoundland, and even to Europe. With the Islands a considerable trade was growing up already; and in 1661, we are informed there was in New London a "still and worm," recently set up for distilling rum from the molasses procured there in exchange for the exports of the Colony. As early as 1668–9, there was a Company formed at that port for the purpose of Whale-fishing in boats along the coast. Whaling was commenced about eight years previous to this by the people of Nantucket, but for many years was confined principally to the coasts.

The largest ship built by Mould was the "John Hester," of ninety or a hundred tons, in 1678; but many of less size, some of which made voyages to Europe, were built by him. In 1680, the magistrates of New London returned to the Lords of Trade and Plantations a list of vessels belonging to the port. They consisted of two *ships* of seventy and ninety tons respectively, three ketches of about fifty, and two sloops of fifteen tons each; these together were equal to about one-third the tonnage of the Colony.

The entire number of vessels belonging to Connecticut was twenty-seven, viz.: four ships, three pinks, eight sloops, and some other small vessels. The total tonnage was only 1050. There were then in the Colony about twenty small merchants, who traded to Boston, New York, Newfoundland, and the West Indies. Population of the Colony, about 12,000.

The progress of all kinds of manufactures was slow in Connecticut for many years. In 1713 it was said to own but two brigantines, about twenty sloops, and some vessels of smaller size; and the number of its seamen was but 120.(1)

In 1711, there arrived at New London, within six weeks, fourteen sloops from Boston. The vessels built at New London previous to this time were chiefly sloops, with occasionally a brigantine, snow, or perhaps a brig; sloops were also built in other parts of the province. Joseph Wells of Westerly, and John Leeds, were ship-builders of some note, who succeeded Mould; and larger vessels now began to be produced. Captain John Jeffrey, who had been a master ship-builder in Portsmouth, England, about the year 1720, emigrated to America, and settled on the opposite side of the river, at Groton, where in 1723 he contracted with

(1) Trumbull's Hist. Conn., i., 435.

one Captain Sterling, to build the largest ship that had been constructed on this side of the Atlantic, and received, on petition, from the town of Groton, a grant of land for a building-yard on condition that he built the "Great ship." She was built and launched in 1725. Her burden was seven hundred tons. Jeffrey built, in addition to a number of smaller vessels, another large ship of five hundred and fifty tons, named "The Don Carlos," which sailed for Lisbon in 1733. New London had now acquired the reputation of building large ships.

In 1730, an association called "The New London Society of Trade and Commerce" was formed under the patronage of the Assembly. It was composed of about eighty members, belonging to the Colony, and built and purchased a number of vessels, and opened new channels of enterprise, in which it prospered for a year or two, but was dissolved in 1733.

Oldmixon, in 1741, speaks of the convenience of New London for Ship-building, and mentions a fine ship of two hundred to three hundred tons built there, which he saw at Bristol. New London was at that period a place of some importance in trade, as was also Norwich, one of the oldest towns in the State. At the Norwich Navy-yard, at a later period, a frigate was built for Congress by Joshua Huntingdon. General Jabez Huntingdon, of the same place, owned at one time previous to the Revolution, it is said, about forty vessels. The latter was a member of the Council of Safety in Connecticut in 1775, and sacrificed his fortune in the service of his country, in which he, with four sons and two sons-in-law, entered with active zeal.

Douglass, in his History of the British Settlements in America, written previous to 1750, thus refers to Connecticut Ship-building: "In Connecticut are eight convenient shipping ports for small craft, but all masters enter and clear at the port of New London, a good harbor five miles within land, and deep water; here they build large ships, but their timber is spongy and not durable, it splits or rives well into staves; small vessels are built at Sea-Brook, Killingsworth, New Haven or Wallingsford, etc."(1)

Ship-building was commenced at Essex, in Saybrook township, in 1720, by John Tucker. In 1775, Uriah Haydon built at that place the ship "Oliver Cromwell," of twenty-four guns.

About the same time, this town gave rise to a novel and quite original specimen of naval architecture, which is worthy of notice rather on account of the ingenuity displayed by the inventor, than for the practical

(1) For the above particulars we are chiefly indebted to the valuable History of New London, by Frances Manwaring Caulkins.

utility or humanity of the design, although the principle may be one capable of useful application. This was the construction of a submarine vessel contrived by David Bushnell, of Saybrook, for the purpose of blowing up an enemy's shipping. Submarine inventions were not new, having employed the ingenuity of eminent mechanics previously, as they did that of Fulton at a later date. But the contrivance of Bushnell, of which the design was matured while a student of Yale College, and carried out immediately after his graduation in 1775, was essentially different, it is said, from any previous attempt. The structure, of which a detailed account may be found in the *Transactions of the American Philosophical Society*, and in *Silliman's Journal* for 1820, is more briefly described as "A machine for submarine navigation, altogether different from any thing hitherto devised by the art of man. This machine was so constructed as that it could be rowed horizontally at any given depth under water, and could be raised or depressed at pleasure. To this machine, called the 'American Turtle' (from its resemblance to two upper tortoise shells placed in contact) was attached a magazine of powder, which was intended to be fastened under the bottom of a ship, with a driving screw, in such a way that the same stroke which disengaged it from the machine, should put the internal clockwork in motion. This being done, the ordinary operation of a gun-lock at the distance of half an hour, or any determinate time, would cause the powder to explode, and leave the effects to the common laws of nature. The simplicity yet combination discovered in the mechanism of this wonderful machine have been acknowledged, by those skilled in physics and particularly hydraulics, to be no less ingenious than novel. Mr. Bushnell invented several other curious machines for the annoyance of the British shipping; but from accidents, not militating against the philosophical principles on which their success depended, they but partially succeeded."

In 1777 Congress offered rewards for the destruction of British ships, and Bushnell made an attempt on the Cerberus frigate, Commodore Simmons, at anchor off New London, in which he destroyed a vessel lying near her. About Christmas, of the same year, he sent a fleet of kegs down the Delaware, to destroy the British ships which held possession of the river, and against which fire-ships had been ineffectually employed. Owing to the darkness, they were left at too great a distance from the shipping, and were dispersed by the ice, but, during the following day, exploded and blew up a boat, occasioning no little alarm to the British seamen. This circumstance gave rise to the humorous song, by Hon. Francis Hopkinson, entitled "*The Battle of the Kegs.*"

Connecticut, in 1769, according to Lord Sheffield's tables, built fifty

sail of vessels, whose aggregate tonnage, as entered with the Register, was 1542 tons.

In 1774, according to the same statistics, New York and Connecticut together built new vessels to the value of £30,000, and in 1775, £22,000. The decrease was doubtless occasioned by the war. The tonnage returned for Connecticut in March, 1791, as having been built the year previous, showed an increase of 534 tons, or 40 per cent. over the average of the years 1769, 1770, and 1771; showing the business to have increased as in other States.

5. SHIP-BUILDING IN RHODE ISLAND.—In 1646 the New Haven colony built a ship of a hundred and fifty tons, at Rhode Island, which seems to have been about the commencement of the business there, where it has ever since been an important branch of industry.

At Newport, Bristol, Warren, and other settlements on the Narragansett Bay, as well as at Providence and several places on Providence and Taunton rivers, the business was carried on at an early period, and sustained by the flourishing fisheries and lumber trade of the province. It had probably made no great progress previous to the year 1672, when Roger Williams went from Providence to Newport in a log canoe, to hold a controversy with the Quakers of that town. The Report of the Lords of Trade, in 1680, says: "We have no shipping belonging to the Colony, but only a few sloops." In the next twenty-five years it appears to have increased much. In the ten years from 1698 to 1708, the number of vessels built in the Colony was one hundred and three: viz., eight ships, eleven brigantines, and eighty-four sloops. The entire number belonging to the Colony at the last date, was one hundred and forty.

In 1704 the Legislature of Rhode Island imposed a tonnage duty on all vessels not wholly owned by the inhabitants of that Colony. New York followed the example in 1709, and Massachusetts in 1718; the act, in the last instance, being accompanied by a duty, also, on English goods imported, which drew upon the Governor of that Colony a sharp rebuke from the Administration for having assented to it.

Some time previous to 1709, Edward Wanton, a ship-builder of Scituate, in Massachusetts, settled in Rhode Island, where he carried on the business. In that year the Colony purchased of him, for £400, the sloop *Diamond*, and the fourth part of another, the *Endeavour*, owned by him and Henry Beere, for £112 16*s*., for the service of the expedition then fitting out against Port Royal, in Nova Scotia. This led to the issue of paper currency, which afterward injured the trade and credit of the Colony. In 1746 Connecticut equipped a sloop-of-war, built in 1740, with 100 seamen, on the expedition against the same place.

The increase of Ship-building and Commerce previous to 1722, led to

the establishment, under the patronage of the Legislature, of a manufacture of sail duck, on which a premium of twenty shillings per bolt was offered, which was that year paid to William Borden. Bounties on hemp were also given about the same time.

Providence and *Newport* were, at this time, rising commercial towns, and, in 1730, contained each about 3800 white inhabitants, which, exclusive of negroes and a few Indians, was, unitedly, about one-half the population of the Colony.

From that date to the Revolution, Newport rose rapidly in importance, and became one of the principal seats of opulence and refinement on the continent. Its West India trade was immense. In 1739 upward of one hundred sail of vessels were owned there. Its importations of molasses, at a later period, employed thirty distilleries in the manufacture of rum,—a staple article in the African slave trade, which tarnished the fair fame of its enterprising traders. The whale fishery was also prosecuted by the Newport merchants: one of whom, Aaron Lopez, who at one time employed about thirty sail of vessels, was among the first to send ships to the Falkland Islands. This business, about the year 1769, employed seventeen sperm oil and candle manufactories in the town, where there were also five or more rope-walks. At this time, when its population was about 12,000, as many as eighteen West Indiamen were known to arrive in a single day, and there was insufficient wareroom to store its merchandise. It was considered a rash prediction that "New York might, one day, equal Newport." The port now employed two hundred vessels in foreign trade, and between three and four hundred coasting vessels, and had a regular line of London packets. The town felt the force of English resentment, on account of its early resistance to government measures, in the destruction of the sloop Liberty, stationed in the harbor to enforce the revenue laws, in 1769, and has never recovered its relative rank.

Providence, in 1764, owned fifty-four sail of vessels, of 4320 tons, and in 1791, had one hundred and twenty-nine sail of 11,943 tons. Other towns of Rhode Island had an active commerce, foreign and domestic, in colonial times. The commerce of the province may well be supposed to have given much employment to its ship-yards, which were favorably situated as to materials and facilities generally.

Providence early engaged in the East India trade, for which a ship of nine hundred and fifty tons was constructed in the town a few years after the peace. The number of vessels built in Rhode Island, in 1769, was thirty-nine, whose tonnage was 1428 tons, carpenter's measurement. The business increased considerably under the revenue laws of the Federal Government.

6. New Hampshire.—In New Hampshire, the building of ships has

been a prominent branch of business, from the first settlement of the Province. The first employments of the people were like those of Maine. But the wealth of the Colony, for more than a century, was found, to a greater extent than that of any other, in the vast resources of its primeval forests. Its first settlements, however, were made upon the Piscataqua, for the prosecution of the fisheries, which at once gave employment to boat and ship-builders. Sawing-mills were erected upon its rivers almost as early as in any part of the country, and the export of lumber, staves, and the usual staples of our infant commerce, soon became a leading interest. After the value of colonial timber began to be known in England, this Province, which abounded in white and red oak, pine, chestnut, and other valuable forest trees, the export of masts, spars, and ship-timber, became a profitable industry. The preparation of these employed multitudes upon its large rivers and their branches, while the building of ships for the fisheries, for the merchant service, and for the Royal Navy, was vigorously pursued, at all convenient places. The excellence of New Hampshire ship-timber, was generally admitted. Though possessed of but about eighteen miles of sea-board, and a single avenue to the ocean, the activity of the lumbering and ship-building branches on the Piscataqua and its tributaries, rendered Portsmouth, advantageously situated at its mouth, a principal seat of colonial commerce. The building of vessels for home and foreign markets, was carried on at that place, and the neighboring towns, with no less enterprise than at Kittery Point, and other places on the opposite side of the river.

Of the value of the timber, and the ship-building interest of New Hampshire, a writer(1) on its commerce and resources, thus speaks."

"The timber used in the construction of the Constitution Frigate, the famous 'Old Ironsides,' was taken from the woods of Allenstown, on the border of the Merrimac, fifty miles from the ship-yard. So of the Independence 74; the Congress, and several other vessels of war. Ships of war were also built at Portsmouth in early times, viz.: the Faulkland of 54 guns, in 1690; the Bedford Galley, 32 guns, in 1696; the America, of 40 guns, in 1749; the Raleigh, 32 guns, in 1776; the Ranger, 18 guns, in 1777; and a ship of 74 guns, called the *America*, was launched at Portsmouth, November 5, 1782, and presented to the King of France by the Congress of the United States.

"Ship-building has always been a considerable branch of business at Portsmouth. Prior to the Revolution, European traders came thither to build ships, which they could do much cheaper than at home, by reason of the large profit on the goods which they brought out with them. The merchants of Portsmouth also built numerous ships of 200 and 300 tons, for the West India trade. Most of these were freighted with lumber and fish, live stock &c.; and having proceeded to the islands, the cargoes were exchanged for sugars, which were taken to England in the same ships, and there sold for merchandise for the

(1) J. B. Moore, quoted in Macgregor's Commercial Statistics of America.

Colonies. Other vessels laden with spars and timber, proceeded directly for the British ports, and were sold with their cargoes for the same purpose. The coasting trade to the Southern ports, was an exchange of West India productions for corn, rice, flour and naval stores, portions of which were re-exported to Newfoundland and Nova Scotia. As early as 1668, the Government of Massachusetts, (which then included New Hampshire), passed an order, reserving for public use, all white-pine trees, measuring twenty-four inches in diameter, at three feet from the ground. In the reign of William III., a Surveyor of the Woods was appointed by the Crown; and an order was sent to the Earl of Bellamont, to cause Acts to be passed for the preservation of white-pine trees in New Hampshire, Massachusetts, and New York. Under Queen Anne, the people were forbidden to cut any trees without leave of the Surveyor, who was ordered to mark all such trees as were fit for the use of the Navy, and keep a register of them. A perpetual struggle was kept up between the people and the Surveyors; fines were exacted, and trees were purposely destroyed; and the subject was perpetually dwelt upon by the Royal Governors, in their dispatches home."(1)

In answer to the queries of the Lords of Trade and Plantations, in 1730, the Governor reported the trade of the Province to consist in lumber and fish. "The number of shipping belonging to the Province are five, consisting of about five hundred tons; and there are about three or four hundred tons of other shipping that trade here (annually) not belonging to the Province."

(1) The first of the ships, named America, above mentioned, was built under the control and supervision of Sir W. Pepperell, of Kittery, and was launched May 4, 1749; the second of the same name was the heaviest ship constructed in America, up to that time, and was the only one of the three seventy-four's ordered at the same time that was built. She was taken by the British from the French, in an engagement on 1st of June.

The following outline of a description of the *America*, by Paul Jones, is given in Cooper's History of the U. S. Navy, and may not be uninteresting, as a specimen of early naval architecture, in its highest display at that time, and as exhibiting what were deemed peculiarities in the construction of ships of that day.

"The upper deck bulwarks were particularly described as 'breast-works, pierced for guns;' and he adds, that all the quarter-deck and forecastle guns, could be fought at need on one side; from which it is to be inferred, that the ship had ports in her waist. The poop had a 'folding breast-work,' grape-shot proof, or bulwarks that were lowered and hoisted in a minute. The quarter-deck ran four feet forward from the mainmast, and the forecastle came well aft. The gangways were wide and *on the level of the quarter-deck and forecastle.* The ship had only single quarter galleries, and no stern-gallery. She had fifty feet six inches beam over all, and her inboard length on the upper gun-deck was one hundred and eighty-two feet six inches. 'Yet this ship, *though the largest of seventy-fours in the world,* had when the lower battery was sunk, the air of a delicate frigate; and no person at the distance of a mile could have imagined she had a second battery.' Unfortunately her intended armament is not given."

Of the others mentioned, the *Faulkland* is said to have been the first line of battle-ship built in America, and the *Raleigh* to have been built in sixty days.

From December, 1747, to December, 1748, the clearances from Portsmouth, were 121, of the following class, viz. : 13 ships ; 3 snows ; 20 brigs ; 57 sloops ; 28 schooners. The number entered at the port during the same time, was 73. There was besides about 200 coasting sloops and schooners trading to Boston, Salem, Rhode Island, &c. The port had little foreign trade. The number of vessels built in New Hampshire in 1769, according to the Colonial Custom House books at Boston, was forty-five sail, which was about equal to the excess of the number cleared above the number entered at the port in the years above mentioned. This excess of clearances, was, in most of the ports of the country, made up, in some measure, of vessels disposed of in foreign or domestic ports. The total tonnage of the vessels built in 1769, is given as two thousand four hundred and fifty-two tons, registered measurement, which is allowed to have been from one-fifth to one-third below the real burden. The average tonnage of each vessel on the former supposition, was 65 tons. In amount, the Province ranked next to Massachusetts. Of sixty-four thousand six hundred and seventy-nine tons of new shipping, built in the colonies in the three years, 1769, 1770, and 1771, rather more than one half was built in Massachusetts and New Hampshire. There were entered for that Province, for the year ending January 5, 1771, fifteen thousand three hundred and sixty-two tons, and cleared twenty thousand one hundred and ninety-two tons of shipping. The excess of outward tonnage, amounting to nearly five thousand tons, consisted in a great measure, as before remarked, of vessels built for sale.

Under the revenue system adopted by the New Government in 1790, the ship-manufacture of New Hampshire, in common with that of other building States, made rapid advances. The number of ships built in the State in that year, was only eight ; in the following year, twenty sail of vessels were built at Piscataqua, which then owned 33 vessels of 100 tons and upward, and 50 under 100 tons burden, in all 83 sail. Of 277 vessels which cleared from the port in that year, the total tonnage was 31,097 tons, of which 26,560, was American.

The extensive business in lumber, masting, yards, and other naval stores, carried on at Piscataqua, employed, during the colonial period, a very heavy description of vessels, called *mast ships*, built expressly for that use, which were usually about four hundred tons burden, and carried twenty-five men, and from forty to fifty good masts each trip. Exeter and Portsmouth were also largely engaged in the business. The employment for this class of transports, it may be concluded, was large, from the dependence placed by the Commissioners of the Royal Navy on the timber of these Provinces.

CHAPTER IV.

SHIP-BUILDING IN THE MIDDLE AND SOUTHERN COLONIES.

It has been incidentally mentioned on a previous page, that "The Restless," built at Manhattan, in 1614, by the Dutch *schipper*, Adrian Block, and called, by an early chronicler, a yacht, was the first decked vessel, it is believed, ever constructed by Europeans in this country. This little pioneer craft, whose name so aptly preindicated the commercial activity of the future city, after passing through Hellgate and the Sound, over which had glided for ages only the bark canoe of the savage, proceeded on a voyage of discovery; and perpetuated the name of her owner, by the discovery of Block Island, off Newport harbor.

Ship-building in New York.—An early and successful prosecution of the business of Ship-building could have been more reasonably expected of none of the first Colonists of America, than of the settlers at Manhattan. Holland was at that period, and long after, in the enjoyment of the carrying trade of the world. Though not possessed of a foot of timber, she built and armed more ships than all the rest of Europe. "The Low Countries," says Sir Walter Raleigh, addressing the King on the subject of English commerce, about ten years before, "have as many ships and vessels as eleven kingdoms of Christendom have, let England be one. They build every year near one thousand ships, although all their native commodities do not require one hundred ships to carry them away at once." Planted by this commercial people, and by merchants and capitalists of Amsterdam, then the mercantile metropolis of Europe, exclusively for the purposes of trade, it appears somewhat surprising that the facilities afforded by the new territory for ship-building were not made available to a greater extent, by the parent nation. But the administration of a privileged mercantile association, such as the "West India Company," which, in 1621, was invested with a monopoly of its trade, was unfavorable to the development of the resources of the Colony. The Knickerbockers, who succeeded the first adventurers, built, nevertheless, as we are told, many small vessels, sloops and pirogues, in which they

prosecuted an active Indian trade, in the bays, sounds and rivers of the Colony. It was a complaint against the Company, by delegates sent to the Hague, in 1649, to procure a reform of the government, that, among other unnecessary expenditures, it had built "the ship New Netherlands at a great expense." She was said to have been of the burden of eight hundred tons, and was built about the year 1630. The carrying trade between Holland and America, and the trade with Brazil, where the Company had sustained losses equivalent to "one hundred tons of gold," were, about this time, thrown open to the Colonists, and private ships were, for the first time, entered at Amsterdam, and publicly advertised for New Netherlands. Other restrictions, which had fettered commerce, were soon after removed, and the trade of the world, with the exception of that to the East Indies, and the trade in Furs, were open to the Colonists. The duties which, in 1638, had been fixed at ten per cent. on imported, and fifteen on exported goods, had left some difference in favor of English colonial bottoms, by which goods were imported first to New England, and thence, at a low rate, into New Netherlands. It was in 1651 modified, by laying sixteen per cent. upon all such goods, except Tobacco; thus discriminating in favor of the navigation of the Province.

Up to this time (1652), when the first city magistracy was appointed, there was but one small wharf, for the landing of goods from scows and small boats, which was now extended to fifty feet, to accommodate a larger trade

Grants of land were first made in 1642, and, at the date of its capitulation to the English, in 1664, a number of property holders of the ship-building profession resided in the part of the city then known as "De Smit's Valey," and afterward as the "Vly," or "Fly," along the shore road, between Wall street and the present Franklin Square. Among these were two brothers, Lambert Huybertson and Abraham Lamberzen Mol, Stoffel Elsworth, Joost Carelzen, John Adriance, Pieter Harmenzen, and Pieter Jansen, whose residences were all outside the water gate or city palisades, at Wall street, within which lived Dirck Jansen Vandeventer, of the same business, and a number of prominent traders and shipping merchants. Govert Loockermans, one of the most extensive and wealthy of these, was the father-in-law of the insurrectionist, Jacob Leisler, and the partner of the pilgrim trader, Isaac Allerton, of Plymouth.

In 1672, the trade of New York employed ten or fifteen vessels, of about one hundred tons each, of which six small ones only belonged to the city. In 1678 the shipping owned in the port consisted of three ships and fifteen sloops, and other small sailing vessels. In that year a measure designed to promote the interests of the city was adopted by Governor Andros, who conferred upon its inhabitants a monopoly of the

business of bolting flour, and of exporting flour and biscuits from the Province. The privilege appears to have been beneficial to the trade and navigation of the port, though doubtless at the expense of other portions of the Province. When the Bolting Act was repealed in 1694, on the petition of other communities, the shipping had increased to sixty ships and one hundred and two sloops, and other vessels. The revenue from imports and exports had increased from two thousand to six thousand pounds per annum.[1] The withdrawal of the privilege caused great complaint, and appears to have seriously damaged the trade and especially the shipping interests of the port. Some merchants suspended their shipping business altogether, and many mariners were thrown out of employment. The occurrence of war with France, soon after, induced many to engage in Privateering, which they are reputed to have carried to the extent of preying on friendly vessels; a charge which, though possibly true in some individual cases, was nevertheless, with little truth probably, laid at the door of some of the highest functionaries of the Province. The depredations of Captain Kid, who was regularly commissioned, and commenced his career in this business, probably gave currency to the charge. Others of the distressed ship-owners afterward entered into the Slave Trade with the Dutch possessions on the coast of Guinea, and found great profit in the iniquitous, but at that time perfectly lawful traffic. In 1683, the city had enrolled, by their names and their owners, three barks, three brigantines, twenty-six sloops, and forty-six open boats.[2]

An official Report of Gov. Dongan, in 1686, states there were then belonging to the Province nine or ten three-mast vessels of about eighty or one hundred tons burden, two or three ketches, a bark of about forty tons, and about twenty smaller vessels of twenty to twenty-five tons each, all of which, excepting the sloops, traded with England, Holland, and the West Indies.[3]

So considerable had the increase of shipping in the Colonies become, that England was supplied with numerous transports; and a large propor-

(1) Governor Andros, in 1678, reported that the merchants in New York were not numerous: "A merchant worth £1,000 or £500 is accounted a good and substantial merchant; a planter worth half that in movables is accounted rich. All the estates may be valued at £150,000." The number of houses in New York was then 343, and were found to contain ten persons to each, making the population 3,430. In 1696, they had increased to 594 houses and 6,000 inhabitants.

(2) Watson's Annals of New York, page 150. The names of some of these, it is said, were peculiar indeed. The Dutch affected high-sounding names for their vessels. The following are from an old record of vessels at one time in New York:—The Angel Gabriel, King David, Queen Esther, King Solomon, Arms of Rensellaerwyck, Arms of Stuyvesant, The Great Christopher, The Crowned Sea Bears, the Spotted Cow, etc.

(3) Documentary Hist. of New York, i., 160.

tion of the carrying trade between the two countries was already conducted in colonial bottoms.

In 1696, the shipping of New York had increased to the number of forty square-rigged vessels, sixty-two sloops, and sixty boats, although the population did not exceed six thousand. There were already quite a number of enterprising merchants, Dutch, French, and English. A prominent merchant and citizen of New York, toward the close of the seventeenth century, was Rip Van Dam, who built many vessels, which were launched from the rear of the present Trinity Church-yard. His dispute and lawsuits with Governor Cosby, respecting the salary of the executive office which the former had filled *ex officio* for one year previous to the arrival of Cosby, produced serious commotions in the Province, and was an incipient stage of the future conflict between imperial prerogative and favoritism and the assertion of colonial rights and equality.

The talent for invention was less conspicuous in the early settlers of New York than their thrift. In 1693, however, an application was made to Governor Fletcher "for aid to perfect an invention to increase the speed of vessels," by one John Marsh, a carpenter, who, on another occasion, was an applicant to the governor respecting an engine he had invented. His petition states that he was "about making A small wessell that shall saile faster than all others by aboundance, that this exsolent art that I have found out will be mightyly for the Honour and profite of the King and Kingdome of England, and Likewise it will be A meaines to Advance New York." He asks for a grant of sail-cloth and rigging to the amount of seven pounds, which he would repay to double the amount if he did not perform what he promised. It does not appear in what his invention consisted.[1]

In 1707, the Assembly of New York passed an act imposing a tax or tonnage duty of two shillings a ton on every vessel, the one half of which did not belong to the inhabitants of the Colony. According to Lyne's plan of the city, made from actual surveys in 1728, the river front, from Beekman street to the northern limits of the city, near the present Catharine street, was principally occupied by the ship-yards and docks of ship-builders. There were others at different points on the North and East rivers. The names of the proprietors indicate that the business at that date was chiefly in the hands of English constructors. In the locality mentioned, we meet with the names of Dally's, Walton's, French's, Wessel's, Vanase's, and Bennet's ship-yards. At a later date the business was carried on between Beekman and Burling's slip; also Hunt's ship-

(1) Moore's Patent Office, Appendix, p. 316.

yard on Lyne's Chart is placed opposite the foot of Whitehall street, in the neighborhood of the present Ferry.

The answers returned in 1747 by the Collector of the Port to the queries of the Board of Trade, state the number of vessels owned in New York to have been ninety-nine, and their tonnage per register was four thousand five hundred and thirteen tons, the seamen at the same time numbering seven hundred and fifty-five. This tonnage was doubtless chiefly home-built, as New York at that period was building ships in considerable number for the London merchants. The commerce of the port was then about the same with that of Philadelphia, the number entered at each port in 1748 being 211, and the clearances from Philadelphia 215, and from New York 222.

In the following year, 1749, the returns to the Board of Trade give the whole number of vessels belonging to the Province as one hundred and fifty-seven, whose tonnage amounted to 6406 tons, and the number of seamen, 1228.

Governor Tryon's Report on the Province of New York, in 1774, states, "The annual amount of the exports to Great Britain, on an average, is £130,000 sterling, exclusive of the cost of ships built here for the merchants in England, to the amount of thirty thousand pounds sterling, annually." Lord Sheffield, in Table No. 12, gives the value of new vessels built in New York and Connecticut, in 1774, as £30,000, and in 1775, at £22,000. The vessels built at this port, though not so numerous as those constructed at Boston and Philadelphia, were many of them, at this period, of large size. Poughkeepsie and Albany had also acquired some prominence in the art. Of thirteen vessels, of the class of frigates, ordered by Congress in December, 1775, to be constructed, two, the *Congress*, of twenty-eight, and the *Montgomery*, of twenty-four guns, were assigned to New York; both of which were built at Poughkeepsie.

In consequence of the occupation of the river by the British, from August, 1776, to November, 1783, neither of these vessels, however, ever got to sea, and were burned in 1777, to prevent their falling into the enemy's hands; which was also the fate of some others ordered at the same time. Of the six frigates first ordered for the Federal Navy in 1794, which were placed in the hands of the best builders, the *President*, of forty-four guns, was built in New York.

New York did its share, during the Revolutionary war, in equipping privateers, as a substitute for a national naval force upon the seas, having, in common with all seaport towns, suffered an almost total ruin of its commerce. After the peace, her Commercial Marine was quickly resuscitated, and an enlarged commercial spirit became apparent. The *Empress of China*, Captain Green, which sailed from New York, February 22,

1784, was the first ship that displayed the American flag in the port of China. And the *Enterprise*, Captain Dean, a sloop of eighty tons, built at Albany, which made the voyage out and back in 1785, was the first, it is said, that made a direct voyage to that country, the former having touched at Europe. She was navigated by seven men and two boys.

Ship-building was carried on to some extent at Albany in Colonial times. Vessels were built there some years after the Revolution, principally of fir timber, at a cost of about twenty-seven and a half dollars per ton. If the timber were dry and well seasoned, it was said they would last thirty years and upward.

Ship-building on the Western Lakes.

The unexampled progress of the industrial and commercial growth of this country, is nowhere exhibited more forcibly than in the vast increase of the trade and navigation of the Western Lakes. As the great feeder of the foreign commerce of New York, in particular, and a means of developing the infinite resources of the great valley of the St. Lawrence and the Upper Lakes, the increase of the steam and sail marine of those great reservoirs is a subject of much interest and importance. At the time when these States became an independent nation, those vast inland seas, covering an area of over ninety thousand square miles, and draining nearly four times that extent of territory, abounding in every element of wealth, were almost untracked, save by the aboriginal canoe, and devolved their waters to the ocean through nearly unbroken solitudes. Now the internal and foreign commerce carried upon those same majestic highways, supports a tonnage of steam and sailing vessels equal to about four hundred thousand tons, and a lake and river commerce equal, at least, to three hundred and fifty millions annually. To reach this great traffic, New York has constructed her public works upon a scale unequaled by any other State, and through this enterprise, and the wealth of the treasury she has opened, she has become the maritime capital of the whole Union. Upon her lake-shore, the trade of this region has built up a city of over one hundred thousand inhabitants, and the whole lake border is skirted with opulent marts of trade, which are duplicating, at least in every ten years, a commerce and tonnage already equal to the entire European trade of the whole Union. A considerable part of the large amount of tonnage built annually by New York, in which she is the third State in the Union, is constructed upon her lakes. *Buffalo*, which is a principal seat of this industry, has grown up within the last half century; yet its advantages for trade, at the outlet of the Upper Lakes, was not overlooked by France, which, at an early day in our Colonial history, aimed at extensive dominion upon this Continent, and took possession of these regions. In the middle of the seventeenth

century she had begun to belt the American settlements with a line of fortresses for the support of her claims, and the extension of her rival interests. A few years after Father Marquette and Sieur Joliet had penetrated, with bark canoes, to the Mississippi, and explored that river to the mouth of the Arkansas. Sieur de la Salle, under a commission from the King of France, set out from Fort Frontenac (now Kingston), in November, 1678, in a small vessel, the first ever seen on Lake Ontario, and, accompanied by Fathers Tonti and Hennepin, and a number of mechanics and sailors, with military and naval stores and goods for the Indian trade, established a trading post upon the present site of Fort Niagara. On the 26th of January, 1679, at the mouth of Cayuga Creek, on the American side of the Niagara, about six miles above the great falls, they laid the keel of a small vessel of sixty tons burden. At this place, long after used, it is said,[1] as a shipyard, by Americans, and still known as the "Old Shipyard," under the suspicious eyes and exposed to the hostile attempts of the Iroquois, who endeavored to burn the vessel, and compelled the blacksmith even to defend his life with a red-hot bar of iron, the adventurers finished and equipped with seven small cannon and the usual armaments of a man-of-war, the first vessel that ever set sail upon Lake Erie. She was named the "*Griffin*." On the 7th of August, of the same year, after several ineffectual attempts to ascend the rapids, favored by a good wind, the little bark, with a griffin flying at her jib-boom and an eagle above, entered, amid the discharge of her diminutive artillery, and the chanting of the Te Deum, the waters of Lake Erie, an object of "terror among all the savages who lived on the great lakes and rivers within fifteen hundred miles." Having cautiously sounded her way through Lake Erie, the Griffin, on the 11th of August, reached the mouth of Detroit River, and thence passed into a lake, which they named St. Clair, and on the 23d of the same month, entered Lake Huron, the Te Deum still rising in thankfulness for their preservation thus far. Crossing this lake amid some perils, they sailed forty leagues to Green Bay, in Wisconsin, whence La Salle, having completed a rich cargo of firs, valued at 60,000 livres, dispatched the vessel, in charge of the pilot and five men,

(1) Documentary History of New York, 3, 1190. "This locality has been questioned. Governor Cass locates La Salle's Shipyard at Erie. Mr. Bancroft, at the mouth of the Tonawanda, or rather did so in his History of the United States. In a letter to the author, dated London, May 17, 1848, he says, 'As to the Ship-building of La Salle above Niagara Falls, Mr. Catlin is quite confident it took place upon the opposite or Canadian side of the river. His local knowledge is greater than mine, and his opinion merits the most respectful consideration.' Hennepin, who was present, says it took place 'more than two leagues above the Falls.'"—*Turner's History of the Holland Purchase.*

on her return to Niagara. The vessel was never after heard of, and is supposed to have foundered in Lake Huron, with all on board.

But the French were not destined to open the treasury of these fruitful regions, or to build up a naval or commercial power upon the lakes and and rivers of the West. Although La Salle afterward laid a keel of forty feet, for the construction of a vessel at Fort Crevecœur, on the Illinois, and with indefatigable zeal, established a cordon of forts from the St. Lawrence to the Gulf of Mexico, the supremacy which he with others sought to establish for his most Christian Majesty, was ultimately extinguished with a suddenness not inaptly prefigured by the disastrous issue of his first maritime effort. While a spirit of territorial aggrandizement, that sought to limit the English Colonies to a narrow margin upon the seaboard, undoubtedly governed the councils of France, her Colonists were chiefly intent in the prosecution of the trade in peltry with the Indians. In that business, her *Couriers du bois*, and traders, called to their aid, it is probable, no marine of any consequence, beyond the bark or log canoe of the savage, the batteau or scow for greater burdens, and occasionally a decked boat for defense or dispatch. It remained for the Colonies of her successful rival to check the lust of empire, which had led her governors thus early into the heart of the Continent, and to people either shore of those interior seas with nations, whose countless ships and floating-palaces testify to the opulence of their commerce.

At a later period, when the Lake regions became the field of contest between the French and English, some small naval preparations were made on each side, but it was some years after the Revolution, before mercantile vessels began to be constructed, to any extent, upon those waters. During the Revolution, the frontiers became the centre of interest at times, and some of the greatest achievements of American valor were effected, with naval armaments, constructed with magic speed upon the borders of the lakes.

The first English vessel built on Lake Ontario, was a schooner of forty feet keel, with fourteen sweeps or oars, and twelve swivels, launched June 28, 1755.[1]

During the same year, Governor Shirley, of Massachusetts, led an expedition through the wilderness, from Albany to Oswego, where he made preparations for an attack on Forts Niagara and Frontenac, similar to that in which Braddock had been defeated at Fort Duquesne. He built at Oswego, a sloop and schooner, of 60 tons each, two row-galleys, of 20 tons each, and eight whale boats, each capable of carrying 16 men. His designs were seconded by the Assembly of New York, who directed him

(1) Documentary History of New York, i., 472.

to prepare for the construction of one or more vessels of a larger class, to mount ten six-pounders, besides swivels, two more row galleys, and a hundred whale boats.

The first *American* vessel built on Lake Ontario, was "at Hanford's Landing," three miles below Rochester, in 1798. She was of thirty tons only, and called the "Jemima." The first national vessel built on Lake Erie, was launched the year previous, at Four Mile Creek, near Erie, Pennsylvania, and was named the "Washington." She was lost soon after, which proved a discouragement to similar attempts.[1]

Early in the war, Lakes George and Champlain, as the highway between Canada and the revolted colonies, became the scene of naval operations, in which both powers sought to gain the control of their commanding position, and their fortifications. To construct a naval armament was a work of no small enterprise, as materials were unprovided, and skilled labor only to be obtained from the seaports. Congress, on 3d July, 1776, empowered the Marine Committee to engage shipwrights to go to Lake Champlain for the purpose, at the rate of thirty-seven and two-thirds dollars per month, with a ration and a half, and a half pint of rum per day, for each man. By the 22d of August, a small squadron was built at Skenesborough, (Whitehall), consisting of one sloop, three schooners, and five gondolas, carrying 58 guns, 86 swivels, and 440 men, which were set afloat in the short space of seven weeks from the date of the resolution. Six other vessels were nearly ready for launching at the same time, by which the flotilla was afterward augmented, and the whole placed under the command of General Arnold. With these and a number of gun-boats, Arnold, on 11th October, fought the first naval battle of the Revolution, near Valcour's Island, against a fleet much superior in number and strength, constructed by the British with the same marvelous dispatch—a portion from materials brought from England for the purpose, and under the command of Captain Pringle.

A considerable amount of shipping has been yearly built on this Lake since that time, and the steam-vessels of Champlain are among the finest built in the Union. Burlington, on the eastern shore, is the only place in Vermont where vessels are built to any extent.

The talents of Henry Eckford and others, at a later period, raised the reputation of New York in Ship-building, deservedly high. The services of John Stevens, of Chancellor Livingston, and especially of Robert Fulton, in giving the first practical demonstration of the value of steam

(1) Henderson's Annual Statements of Trade and Commerce of Buffalo, 1845. Andrews' Report, p. 49.

in navigation, ushered in a new era in naval architecture, but they do not fall within the limits of this retrospect.

New Jersey.—The business of Ship-building commenced in New Jersey, as early as 1683. In the previous year, Samuel Groome, a mariner, of Stepney, who had visited the Province on his return from a voyage to the West Indies, in 1676, accompanied Deputy-Governor Rudyard, to East Jersey, as one of the twelve original proprietaries. He died in 1683, leaving unfinished, upon the stocks, the first vessel built in East Jersey.[1]

It is probable that vessels were previously built on the Delaware, and other parts where settlements were made some years earlier, as vessels were already owned in several of the towns, and a West India trade was carried on.

In 1694, the Assembly enacted a law for the benefit of this branch of industry, which is represented to have been hurtful to the general interests of the Province, and of little advantage to the particular object it was intended to promote. It was enacted, that for the better encouragement of building of ships and other vessels, within the Province, ("as if," says the historian, "the whole Continent should depend upon the skill of Jerseymen,") the exportation of any timber, planks, boards, oak-bolts, staves, heading, hoops, or hop-poles, was expressly forbidden, except to some parts 'over the broad seas,' that is to say, into Great Britain, the West Indies, the Summer or Wine Islands, directly, and there to unload the same.

The object of this law appears to have been the promotion of a direct foreign and coastwise carrying trade, and especially a desire to render Perth Amboy the successful rival of New York, with which it then strove, with some hopes of success, for the supremacy. We find, indeed, that Governor Fletcher, of New York, in a letter to the Lords of Trade the same year, complains that the Jerseys "are now making war upon us in point of trade," and refers to the Act above mentioned, "by which," he says, "they will draw the shipping thither, and establish a free port to the great prejudice of this place, and sink the trade greatly; they pay no duty to the King, and all will flock to it. We already feel that of Pennsylvania, where they trade at large, under no regulations; this being much nearer, and upon the same river with us, will utterly ruin the revenue of the Province."

(1) Whitehead's East Jersey. Newark, settled by Connecticut people in 1666, appropriated lots in the town to the first person of each mechanical pursuit who should settle in the place. In 1668, John Rockwell was voted a member of the community, upon condition "of his moving here forthwith, and maintaining his present, or other sufficient *boat*, for the use of the town."—Barber and Howe's Hist. Coll. of N. J.

In December, 1702, Miles Foster, of Amboy, received from the Board of Proprietors a grant of a town lot, in consideration of his having built the first *sloop* launched at that place.

Salem and Burlington were the principal towns in West Jersey at this time, the last-mentioned being the seat of Government. Ship-building was carried on at these places, at an early day. Thomas, in his account of Pennsylvania and West Jersey, in 1698, mentions the commodious docks and large timber yards of the former place, and that "several fine ships and vessels, (besides Governor Coxe's own great ship), have been built," at Burlington. He speaks of the product of Cape May County, as consisting of whalebone and oil from the whale-fisheries, in which great numbers were taken yearly: a business, which, on all our coasts, employed many boats and small vessels.

The sloop Adventurer, of sixteen tons, owned by John and Richard Townsend, was licensed, in 1705, to trade between Cape May and Philadelphia and Burlington. Such was the infancy of shipping enterprise in that quarter.

A letter from Governor Morris, to the Lords of Trade in 1742, states that "the foreign trade is not considerable. I think they have three brigantines and about four or five sloops, that trade to Madeira and the West Indies. Most, if not all, their European commodities, are supplied from New York and Pennsylvania, in exchange for wheat, flour, and timber; without which last, it is said, Pennsylvania cannot build a ship or even a tolerable house, nor ship off a hogshead or a pipe-stave; and New York, also, has a great supply of timber from this Province."

Ship-building was a principal occupation of the inhabitants of Little Egg Harbor, in Burlington County, who also carried on fishing, and a profitable lumber trade.

There were built in the Province, in the year 1769, four small vessels, of about twenty-five tons each. In 1772, there was but one built, whence it is probable the business never reached any great extent there. The Province suffered much during the Revolution, its ports on the Delaware being shut by the British occupation of that river, while those on the seaboard, were exposed to the ravages of war. A fine schooner was fitted out at Bridgton, in 1779 and 1780, as a letter-of-marque, and was named "The Governor Livingston." But she was captured on her second voyage, with a valuable cargo, near the Capes of the Delaware, and the attempt was not renewed.

PENNSYLVANIA.—*Philadelphia* very early entered upon the business of building vessels. William Penn, in 1683, the year after his arrival, writes: "Some vessels have been built here, and many boats." William West about this time commenced a ship-yard at the foot of Vine street.

He acquired a considerable fortune in the business, his orders, which were sometimes more than he could fill, being chiefly from English and Irish houses abroad.

So rapid was the growth of Philadelphia, that six years after (1689) it contained one thousand houses, and freighted ten vessels with the produce of the province for the West Indies alone. Fourteen cargoes of tobacco were exported in one year, about this time, from the Province. In 1698, according to the account of an English author who had resided some time in the city, the wharves and other facilities for receiving, discharging, and storing merchandise, for loading and unloading, building and repairing ships, were numerous and convenient. Among these are mentioned, at that early date, "a curious and commodious Dock with a drawbridge to it, for the convenient reception of vessels, where have been built some ships of two or three hundred tons each. They have very stately oaks to build ships with, some of which are between fifty and sixty feet long, and clear of knots, being very straight and well grained. In this famous city of Philadelphia are several Rope-makers, who have large and curious rope-walks, especially Mr. Joseph Wilcox."[1] Ship-carpenters, carvers, block-makers, turners, and rope-makers, are named among the tradespeople who received adequate encouragement. Ship carpenters, we are told, received from five to six shillings a day as wages. Vessels were at this time built also at Newcastle, Salem, Burlington, and other places on the Delaware, and were freighted with horses and other live stock, which were raised in large numbers, with staves, provisions, etc., for ports in the West Indies, where they were often sold with their cargoes. This profitable channel of trade, and the manufacture of ships for sale, continued throughout its provincial history, to be a fountain of profit to Philadelphia, and speedily raised her to the position of the most flourishing port in the Colonies.

The whale fishery was established by the founder and the Free Society of Traders at the mouth of the Delaware, where for some years it was actively pursued near the shore, and employed many boats and small craft.

The ship-yards of Philadelphia in early provincial times, occupied the river front from the present Market street to Vine or Callowhill, and were gradually driven north by the improvements in the city. In July, 1718, Jonathan Dickinson wrote to a correspondent: "Here is a great employ for ship-work for England. It increases and will increase, and our expectations from the iron-works, forty miles up the Schuylkill, are

(1) History of Pennsylvania and West New Jersey by Gabriel Thomas: London, 1698.

very great." In 1721, he incidentally mentions that the sails and rigging coming from England for his new ship had escaped the pirates.

A duty previously laid on vessels in Pennsylvania for revenue purposes was this year renewed by an Act of the Assembly.

Among the vessels mentioned in 1722 at Philadelphia, were a pink or galley, and a great fly-boat of four hundred tons, all of which traversed the Atlantic. The following vessels were built there in the three years 1722–24, viz.:

1722	10 vessels	428 tons.
1723	13 "	507 "
1724	19 "	959 "

The clearances in the seven years from 1719 to 1725, averaged one hundred and nineteen sail annually. In 1748–9, the entrances and clearances were about three hundred annually. Four or five years later, it was said as many as twenty sail of vessels were to be seen upon the stocks at one time, so well adapted were the docks for ship-building. At that time, the city was spoken of as containing a great many wealthy merchants; and its trade, and the profits of it, as prodigious. The Collector of the port was a "patent officer," and the Custom-House officials had the highest salaries of any in North America.

The return of new shipping built in Pennsylvania was, however, according to the same authority, in 1769, but 1469 tons; in 1770 it was 2354; and in 1771 only 1307 tons. The number built in 1769 was 22. Adding one-fifth to the registered tonnage of that year, to make it real tonnage, the average of each becomes 80 tons, which exceeds the average of any other except that of Maryland, which is the same. The tonnage, however, given to the Register at that time was uniformly below the real burden of the vessels, and one-third is believed to be about the proper increment by which to reach the actual tonnage. The tonnage entered in Pennsylvania in 1771 was 50,901, and that cleared in the same year 49,654 tons, the outward-bound exceeding the inward by 1247 tons, a difference in part occasioned by the sale of new vessels in Great Britain. About three-eighths of this tonnage was owned in the province by natives, and the remaining five by British merchants residing in Europe or occasionally in the Colonies. Pennsylvania built in the year 1772 only eight vessels. At this time the business appears not to have been very flourishing, except in New England, which in the same year built 123 vessels and 18,149 tons of shipping, out of a total of 182 vessels and 26,544 tons built in the Colonies in that year.

Although the building of ships for domestic commerce and for sale was not equal to that of New England, it had long been considerable. At the time of the Revolution, Philadelphia had become among the first in

naval architecture; her vessels being no less noted for beauty of form and finish than for their swiftness. In none of the Colonies, however, were the vessels built for sale equal in quality to those contracted for on private account. A species of ship, constructed at Philadelphia in early times, but scarcely belonging to naval architecture perhaps, were huge raft ships, similar to those constructed at a later period in Canada. These colossal structures were built for the purpose of carrying a great quantity of timber, and were designed to be broken up on arriving at their destination. The last of this class from Philadelphia was constructed at Kensington a few years before the Revolution. The "Baron Renfrew," built at an earlier period, of upward of five thousand tons, or double the measurement of an ordinary seventy-four, made a safe passage into the Downs.

The reputation of her naval architects had now become high, and the position of the city as the largest in the Provinces, with an extensive commerce, with numerous productive Iron-works in the vicinity, and the greatest facilities for procuring the best of timber and naval stores from the Southern Colonies, gave her superior advantages. These were brought into requisition during the war, for the naval defense of the port, and of the country generally. Of thirteen frigates ordered by Congress, under the prize law of December, 1775, the keels of four, the *Washington* and *Randolph*, of 32 guns, each; the *Effingham*, of 28, and the *Delaware*, of 24 guns, were laid at Philadelphia.

One of the three seventy-four's ordered in the following year, a brig of 18 guns, and a packet-boat, were also assigned to the Ship-yards of Philadelphia; and many smaller vessels were built and equipped there on private and public account.

Despite the strongest efforts by means of galleys, batteries, rafts, fire-ships, and torpedoes, to defend this important port, the harbor was successfully blockaded by the enemies, and the *Delaware* and *Effingham*, were burned, to prevent them falling into the enemy's hands. The *Randolph* was one of the first cruisers that got to sea in 1777.

The flourishing commerce of Philadelphia was nearly destroyed, and her shipping swept from the sea. But it is doubtful if any other place in the country saw both resuscitated with more remarkable success after the peace.

During the existence of the State Impost Laws, which were all rendered void by the new Constitution and the Federal Laws, Pennsylvania laid a duty of two shillings per ton on foreign shipping, and on American vessels four-pence per ton. She actively advocated the ratification of the Constitution of 1789, and experienced the full benefit of the national system, adopted in 1790, which gave protection to the industry of the

large body of her manufacturers. During the year ending March, 1791, Pennsylvania and Delaware, which, as the "Lower Counties," have been included in the foregoing statements with Pennsylvania, built an amount of tonnage exceeding the average of the years 1769, '70, and '71, by 3,900 tons, or over 5,600 tons. In 1793, the amount built in Pennsylvania, was 8,145 tons, notwithstanding a desolating epidemic afflicted the city; an amount double that of any other port in the United States. These were of Southern live-oak and cedar, and were of the most substantial character, and their excellence was acknowledged everywhere. The astonishing increase of trade is evidenced in the fact that the exports of the State, or its seaport, Philadelphia, for the year ending September, 1793, exceeded all the exports of New England, by $1,717,572; and, that the mere increase of its exports over those of the previous year, are stated to have exceeded the total exports of New York in 1793, by $2,934,370. The aggregate value of goods shipped to foreign countries, in 1792, was $3,820,646; in 1793, it was $6,958,736; and for the half year ending March 31, 1794, $3,533,397. The exports of Pennsylvania, in 1793, were more than one-fourth of the exports of the whole Union.[1]

For her success in this branch of industry, as well as for a due share of the reputation in Ship-building enjoyed by the Colonies, Philadelphia is much indebted to the genius of several who were pre-eminent in their departments. Foremost among those we would mention the name of THOMAS GODFREY, a native of Pennsylvania, whose improvement of the Quadrant which bears the name of Hadley, renders his name dear to all who are concerned in trade and navigation. His Reflecting Quadrant was first brought into use in West India vessels, about the year 1731,–'32, and was thence carried to England, where Hadley acquired the credit of the improvement. It was introduced into French ships, in 1736, by M. De Mannevillette, the Maritime Geographer, who published an account of its advantages. Dr. FRANKLIN also deserves honorable mention for the suggestion which he made for the improvement of models and sailing qualities of ships, an account of which may be found, accompanied with illustrations, in the collection of his published works. He was probably the first in this country to call attention to the advantages of *water-tight compartments* in vessels, which of late years has been so advantageously introduced in the vast naval structures of the age. He was led to approve and recommend the superior safety of this method of construction from the study of the arts, customs, government, and policy of the Chinese. Their prudence in this respect he especially commended; the bottom of their ships being constructed of a number of separate chambers, or com-

(1) Coxe's "View of United States."

partments, a leak could only fill the chamber with which it communicated, whereby he conceived they were rendered obviously more safe than those of European construction. Some other of his suggestions were afterward adopted by the naval architects of the country.

The reputation and abilities of JOSHUA HUMPHREYS as a naval architect, contributed to the pre-eminence enjoyed by Philadelphia in Ship-building. His professional talents had rendered him long widely known, and after the organization of the Federal Government, when the defenseless state of American commerce forced upon Congress the necessity of providing a Naval Armament, he suggested some important improvements in the construction of the vessels ordered by that body, and was called upon to furnish drafts and models for the six frigates which formed the germ of the American Navy. Their efficiency in the service is believed to have satisfied the country of the value of his innovations, and to have led to a modification in the system of naval construction in European dockyards. The frigate *United States*, constructed under his immediate superintendence, at Philadelphia, proved to be one of the fastest ships of her time. Tempting offers are said to have been made to him, while abroad, to give the benefit of his talents to a foreign service.

As a Ship-carver and Sculptor, WILLIAM RUSH, probably, had few superiors in his day. The figure-heads executed by him excited no little admiration in foreign countries, and orders, it is said, were sent to him from England. He particularly excelled in the execution of figure-heads representing the Indian character, in which his graceful and spirited designs were perhaps unequaled. Walking attitudes, little in use before his time, were immediately improved by him, with a degree of taste and skill in design and execution previously unequaled. The figure-head of the "Indian Trader," upon the ship William Penn, in Indian costume, excited great observation in London, it is said, and attracted numbers of artists daily, in boats, to observe and sketch designs from it. Orders were sent from England for several figures for ships building there, although the duties cost more than the first cost of the images. This circumstance is supposed alone to have stood in the way of a profitable employment of the artist upon foreign orders. Rush executed a full-length statue of Washington, for the Academy of Fine Arts in Philadelphia, and there are several other of his works still preserved in his native city. He was the son of a Ship-carpenter of Philadelphia, and learned the business with Edward Cutbush, from London, one of the best Ship-carvers of his day.[1]

(1) The intense anxiety with which the country awaited the action of the several States relative to the adoption of the new Constitution is well known. To the mercantile and manufacturing classes generally, it was fraught with benefits in prospect, but to

Invention of Steamboats.—It is proper, before dismissing the subject of Marine construction in Pennsylvania, briefly to notice the part taken by its citizens in introducing the splendid era of Steam Navigation. The first experiments were made on her waters. The limits of this article do not permit us to enter upon any discussion of the question of priority, which has been so warmly contested by rival claimants in this country. Nor is it our province to arbitrate the claims of different nations to the first conception of the idea of employing steam in navigating vessels. Should we yield the originality of the attempt to England, and she to France or Italy; and should all these acknowledge their obligations for the discovery of the potent agency of steam to Hiero of Alexandria, there still remains to England and America, at least, abundant honor in the improvements of Watt, Savery, Hulls, Miller and Taylor, or Symington, in the former, and of Evans, Fitch, Rumsey, Fulton, and Stevens, in this, to compensate for the surrender. Especially may this country be content with the credit of having, through the genius of Fulton, so combined the conceptions of previous experimenters, as to produce a practical, working *Steamboat;* and in having, in a short time, covered the vast reach of its navigable rivers and the great expanse of

none more so than to the ship-builders, which were a numerous class in Philadelphia and vicinity.

The Federal procession held in Philadelphia, on the 4th of July, 1788, when ten States, including Pennsylvania, had ratified the new compact, was one of unusual eclat, and evinced the joy of all classes.

The participation of the ship-builders in this fête, is thus described in the fourth volume of the American Museum, and displays some of the skill of Philadelphia Shipwrights:—"The Federal ship Union, mounting two guns, with a crew, including officers, of twenty-five men, thirty feet long, and proportionally deep and wide. Her bottom was the barge of the ship Alliance, and the one which formerly belonged to the Serapis, taken by Paul Jones, in the Bon Homme Richard. The Union was a masterpiece of elegant workmanship, perfectly proportioned and complete throughout, and decorated with emblematical carving. And what was truly astonishing, she was begun and completed in less than four days. The workmanship and appearance of this beautiful object commanded universal admiration and applause, and did high honor to the artists of Philadelphia, who were concerned in her construction. She was mounted on a carriage, and drawn by ten horses. She was followed by the Pilots of the port, and

SHIP-CARPENTERS,

headed by Francis Grice and John Norris, with the draft of a ship on the stocks, cases of instruments, etc., and a flag bearing a ship supported by Messrs. Harrison, Rice, Brewster, and Humphreys, followed by Mastmakers, Caulkers, and Workmen, to the amount of three hundred and thirty, all wearing a badge in their hats representing a ship on the stocks, and a green sprig of white oak.

BOAT-BUILDERS

in a shop 18 feet long, 8 feet wide, and 13 high, who set up and nearly completed a boat thirteen feet long during the procession. These were followed by Sailmakers, Shipjoiners (twenty-five in number), Ropemakers, and Ship-chandlers, about sixty in number."

The procession, representing all the various trades, with similar displays, numbered about five thousand persons, and attracted some seventeen thousand spectators to Union Green.

its lake surface, and to a less extent the ocean, with a Steam Marine of unequaled magnitude.

To Oliver Evans, whose mind was occupied as early as 1773 with the subject of steam propulsion, both by land and water, belongs the merit of the first effective application of the high-pressure steam-engine. This is almost the only one now used on the Western river boats, or adapted for locomotives for railroads, of which he may be regarded as the inventor. The cylinder flue boiler for high-pressure engines is also his invention. Although the fame of that ingenious mechanic mainly rests upon his valuable improvements in Mill Machinery, his successful attempt to move a Locomotive carriage in the streets of Philadelphia and a boat on the Schuylkill, with the same apparatus, by means of paddle-wheels, fully establishes, in the opinion of the British engineer, Mr. Galloway, "his claim to the first contrivance of a practical steamboat." The predictions of Evans, as to the ultimate triumphs of Steam, and of his own apparatus, have been remarkably fulfilled.

The subject appears to have engaged the attention of several about the same time, and among others, as mentioned by Fitch, it was the subject of conversation between Mr. Henry, of Lancaster, Pa., and Mr. Andrew Ellicott, in the year 1776. The former had even made drawings of a steamboat to lay before the Philosophical Society. In 1778, Thomas Paine recommended Congress to adopt measures for encouraging the building of steamboats on the plan of Jonathan Hulls, "to go against wind and tide," patented in England in 1736.

In 1784, James Rumsey, of Maryland and Virginia, exhibited to General Washington the model of a boat for stemming the current of rivers by the force of the stream acting on setting poles, which he patented in several States; and, among others, he obtained the exclusive right for ten years "to navigate and build boats calculated to work with greater ease and rapidity against rapid rivers," from the Assembly of Pennsylvania in March, 1785. The same thing had been unsuccessfully attempted by a farmer of Reading, Pa., in 1750.

In 1785, John Fitch had completed a model of a steamboat, and in that, or early in the following year, moved a small shallop on the Schuylkill, by the agency of steam acting on paddles at the stern. The knowledge of this attempt appears to have reached Europe; for on the 22d of April, 1786, Mr. Jefferson wrote from London to Mr. Charles Thompson, of Philadelphia: "I hear you are applying the same agent (steam) in America to navigate boats." Fitch immediately set about the construction of a new steamboat, of which a description was inserted by the inventor in the 1st volume of the *Columbian Magazine* for Dec., 1786. On the first of the following May, he made an experiment with

this *first* American Steamboat upon the Delaware. She attained by accurate measurement, in the presence of Messrs. Rittenhouse, Ewing, Ellicott, and others, the rate of eight miles an hour at dead water, and afterward went eighty miles in a day.

The Legislature of the State, on March 28th, 1787, gave Fitch "the sole right and advantage of making and employing the steamboat by him lately invented, for a limited time," viz., 14 years. Fitch obtained similar privileges from the Legislatures of Delaware, New York, and Virginia.

In Dec., 1787, Rumsey made his first experiment with a Steamboat on the Potomac, at Shepherdstown. Although Fitch had clearly the precedence in point of time, his claims were strongly contested by Rumsey, on the ground that, in his early marine experiments, he contemplated the use of steam as a motive power; and, by aid of the Rumseian Society of Philadelphia, and other influential friends, was successful in maintaining his claims in the Legislatures of New York, Maryland, and Virginia; but Fitch was sustained by those of Pennsylvania, Delaware, and New Jersey.

Rumsey patented in England, in 1788, some improvements in boilers; and both parties, on the establishment of the Patent Office, took out patents for their marine inventions.

There is little doubt that defects in the size of the wheels, the weight and imperfection of the engine, and other minor faults, avoided by those who came after him, alone prevented Fitch from giving to the world a practically useful Steamboat many years before the successful enterprise of Fulton with one of Watt's improved engines.

DELAWARE.—Ship-building was also carried on at a very early day, at the Swedish settlements upon the Delaware, particularly in the vicinity of the present city of *Wilmington*, in Delaware. In the grant of privileges to Henry Hockhammer, to establish a Colony at New Sweden, (after Minuit), in 1640, they were permitted to establish all sorts of manufactures and industry, engage in all commerce, in and out of the country, with the coast of the West Indies and Africa, belonging to friendly powers—but *only* in vessels and yachts built in New Sweden—under promise of the Government's assistance. It is stated on the authority of Campanius, that when he arrived there in 1642, four years after Governor Minuit, and about forty years before the landing of Penn, he found Ship-building, boat-building, and cooper work, carried on upon "Cooper's Island." The first vessel for foreign trade belonging to that port was a brig called "The Wilmington," built in 1740, by William Shipley, D. Ferris, and others. She sailed the following year, laden with flour, ship-bread—the staple production of the place, pipe staves, and the usual

assortment of produce, for the West Indies, and was the first in that trade, which was afterward prosecuted with enterprise.

New Castle was also engaged in Ship-building, to some extent, as early as the days of William Penn. Until the relinquishment of the proprietary jurisdiction in 1775, Delaware constituted "the three lower counties" of Pennsylvania, and its shipping returns are embraced in those of the adjoining State. Hence, in the tables of new shipping, in 1769, Delaware is not named, its new vessels forming a part of the twenty-two registered for that province. The medium of the registered tonnage of the two districts in that and the two following years, was 1770, and of the actual tonnage, 2300.

In 1790, the two returned an increase over the average of those years, of 3900 tons.

The reputation of Wilmington Ship-builders was early established. The *General Washington*, a fine ship of two hundred and fifty tons, was launched from the ship-yard of William Woodcock, in Wilmington, in 1790. Few places have better sustained their ancient industry, or acquired a worthier fame in this branch, than the flourishing metropolis of Delaware.

MARYLAND.—We have been able to collect few particulars of the progress or extent of this industry in Maryland, during the Colonial period. Her staple products, and the pursuits of her people, were similar to those of Virginia. Agricultural products, and especially Tobacco, were her principal exports, but the transportation of these was left, in a great measure, to British ships, or to those of New England, and the middle provinces. Her facilities for Ship-building were unsurpassed by those of any other Province. There was no county in the Colony, that did not possess a highway to the ocean, by some navigable river, or the noble bay which divides it. Its proximity to the live-oak and yellow pine of Carolina and Georgia, besides a good supply of native oak and other timber within its borders; the early possession of productive iron works, of manufactories of cordage and linseed oil, and of naval supplies, such as rosin, tar, turpentine, etc., from the neighboring provinces, gave Maryland many advantages for the production of shipping, which in later times have been well improved.

As early as 1662, for the promotion of trade, a Mint was established for the coinage of sixpences; and about the same time a curious tonnage duty was established for the support of Government. Every vessel having a flush-deck fore and aft, coming to trade in the Province, was compelled to pay one-half pound of powder, and three pounds of shot for every ton of burden.

Annapolis was, in 1695, made a port town, with a resident Collector,

and Naval Officer. In 1723, there were five ships in the Patapsco up for London. Although its site was much earlier occupied, Baltimore, which now is the fourth town in the Union in the extent of its Ship-building interests, was not laid out as a town until the year 1729, nearly one hundred years after the settlement of the province. Vessels were probably built previous to that, upon the Patapsco, and, in other parts of the Chesapeake. Fell's Point, in the neighborhood of the rising town, was early occupied as a Ship-building station.

The tobacco annually sent to England by Maryland and Virginia, at this time, was estimated to employ 24,000 tons of shipping.

In 1752, however, the only sea-going vessels owned in the town, were a brig called the "Philip and Charles," evidently named after the Calverts, and a sloop named the "Baltimore," the latter owned by Captain Lux, who as early as 1733 commanded a ship in the London trade.[1] Baltimore had already commenced its rapid growth in commercial prosperity. In October of the preceding year, (1754), no less than sixty wagon loads of flax-seed came into Baltimore for shipment from the back settlements, and its incipient commerce must have called to its aid the art of the ship-wright before that time. Douglass, who died in 1752, remarks of Maryland, "Their oak is of a straight grain, and easily rives into staves; in building of vessels it is not durable; they build only small craft; some years since they built a very large ship, called the *British Merchant*, burden one thousand hogsheads—with many repairs, she kept in the Virginia trade thirty-six years."[2]

In 1753, a lottery was appointed in Baltimore to raise 450 pieces-of-eight to build a public wharf. The facilities afforded by Fell's Point for Ship-building, and the number of artisans, with all the materials requisite for the business collected there, rendered the prospect fair, in 1765, that it would become the site of the future city. At that place, where, within the present century, a large proportion out of sixty-three vessels, and over 12,000 tons of shipping, have been constructed by Baltimore in a single year, the business has been conducted for about one hundred years.

The Province of Maryland, according to the tables of Lord Sheffield, built in the year 1769, twenty vessels of 1344 tons. One-fifth being added according to the directions for the real tonnage, gives an average of eighty tons for each vessel, which is higher than that of any other Colony. Those of Pennsylvania being the next, of which the average was seventy-nine, upon a total of twenty-two vessels built, and 1469 tonnage.

In 1772, the number of vessels built in Maryland was only eight, and

(1) Griffith's Annals of Baltimore, p. 33. (2) British Settlements in America, vol. ii., 376.

those of Pennsylvania, the same number. Of the tonnage employed in the Colonial Trade at this time, the proportion belonging to British merchants resident in Europe, engaged in the trade of Maryland and Virginia, was greater than that of any of the other Provinces. The amount thus owned was six-eighths of the whole, while of the remaining two-eighths, one belonged to British merchants, occasionally resident in the Colonies, and one-eighth only to the native inhabitants of these Colonies.

The total tonnage entered in Maryland, from January 5, 1770, to January 5, 1771, was 30,477, and the amount cleared in the same time, was 32,474 tons.[1] Until the year 1780, all vessels entered and cleared at Annapolis.

During the Revolution, Maryland was active in fitting out Cruisers, to annoy the enemy and supply the want of a regular navy. A sloop and a schooner, equipped at Baltimore by the Marine Committee, is said to have been the first that got to sea under the new Government. Top-sail schooners, sailing best upon a wind, and adapted to the use of sweeps for chasing, and for escaping the heavy ships of the Royal Navy, were particularly serviceable; one of the first of this class fitted out was the Antelope, built for merchants of Baltimore, by Mr. J. Pearce, carrying 14 guns. The citizens of Maryland bore off many trophies from the scenes of conflict during the war.

The building of the frigate *Virginia*, of 28 guns, one of the first Continental war ships ordered by Congress, in 1775, was entrusted to the Maryland Ship-builders. Two others, of 36 guns each, were ordered to be built there in 1776. The Constellation, of 38 guns, was subsequently constructed there for the Federal Government, upon the improved system then adopted.[2]

As already mentioned, a tonnage duty was established by the Proprietary Government at an early day in this Province. About the year 1771, a tax of fourpence a ton was laid on vessels entering at Baltimore for the erection of a Light-House on Cape Henry. After the peace with England, in 1783, the different States resorted to discriminating duties, in favor of American shipping, for the promotion of the shipping interest of the country. Maryland laid a duty of eight-pence on domestic vessels; on foreign ships belonging to nations, with which the United States had treaties, one shilling; on foreign ships not belonging to a power in treaty, one shilling and seven-pence; and on British ships, three shillings and six-pence. A want of uniformity rendered this plan, in a great measure, unavailing, and often injured the trade of those adopting the highest prohibitive rate. In 1786, Commissioners met at Annapolis, from several

(1) Pitkin's Statistics. (2) Cooper's History of U. S. Navy.

of the Colonies to take into consideration the deranged state of trade, and commerce. And in the following year, a more general Convention met by their recommendation in Philadelphia, and formed the present Constitution, which on March 4, 1789, went into operation, with power to regulate all matters relating to Foreign Commerce.

On the 4th May, 1789, just two months after the organization of the New Government, the Shipwrights of Baltimore, following the example of those of South Carolina, sent up a petition to the first Congress, praying for the passage of a Navigation Act, similar to the British Navigation Law of 1660. They represent that the Commerce and Shipping of the United States was falling into decay, and had involved thousands in distress; and that, in their opinion, the country was as well prepared for such a law as England was, at the date of its enactment. In support of their views, they quote the opinions of Sir Josiah Child, as to its effects:

"It is worthy of notice, moreover," they remark, "that when this Act passed, the English could neither dress nor dye their white woolen cloths. Their linens were chiefly imported from foreign kingdoms. They were unacquainted with the weaver's loom-engine. They had neither white writing paper nor printing paper. They had no manufacturers of fine glass; calico printing was unknown. There was not a single wire-mill in the whole kingdom, nor could they, as yet, tin iron plates. About this time, also, the legal interest of money was eight per cent.

"With respect to our Manufactories, we have several valuable ones already established, and others which, it is well known, only want encouragement to prove of the greatest national advantage. With respect to our Shipping, we cannot pretend to offer any accurate estimate of the tonnage. It appears, however, from an authentic return, signed Thomas Irwin, Inspector-General of the Imports and Exports of North America, and Register of Shipping, that the eleven States which form the United States of America, employed in the year 1770 three hundred and nine thousand five hundred and thirty-four tons of Shipping, from which we think it reasonable to infer, that the present tonnage belonging to the United States of America, exceeds the Commercial Tonnage of England when she passed the Navigation Act."[1]

So rapid had been the recent growth of Baltimore, that although it was not laid out until 1729, and fifty years after contained but fifty houses, and scarcely any Shipping, the value of its imports six years after the date of this petition, amounted to over five millions of dollars. The arrivals during the same year, 1795, numbered no less than 109 ships,

(1) American State Papers, Vol. 10, p. 5.

162 brigs and snows, and the prodigious number of 5464 bay craft. This almost unprecedented increase of the Commerce of her principal port, the greater efficiency of the new Government, and especially the benefits of a uniform Revenue System, had rendered the Ship-building interest highly prosperous in Maryland. In 1790, she built as many vessels as any two of the States, of New York, Connecticut and Rhode Island; and exceeded the ship-manufacturing State of New Hampshire. In the year preceding the 4th of March, 1791, the Ship-building of the Port of Baltimore alone, exceeded the highest amount of new tonnage built in the State during the three years 1769, '70, and '71, by one hundred per cent.[1] Her manufacture of cordage, iron, and other contributory branches, had proportionally increased.

SHIP-BUILDING IN VIRGINIA, THE CAROLINAS, AND GEORGIA.—In the States south of Maryland, the building of vessels has never become an important branch of industry, notwithstanding an abundance of the very best materials for the purpose. In *Virginia*, it is said, that a few barks, pinnaces, and other decked boats or small craft, were built there previous the reorganization of the Government, in 1621; and, certainly, shipwrights were sent to that Colony, as mentioned in our Sketch of Virginia, during the seventeenth century, as early as 1622. It does not appear, however, that the business of constructing vessels made much progress, for in Governor Berkeley's Account of the Province, submitted to the Lords' Committee on Colonies, he states, that "For shipping, we have admirable masts and very good oaks, but, of our own, we never yet had more than two at a time, and these not more than twenty tons burden." He attributes the slow progress of improvements to the Act of Parliament of 1663, which was a re-enactment and extension of the Ordinance of 1651, in prohibition of commerce.

"Mighty and destructive have been the obstructions to our trade and navigation by that severe Act of Parliament, which excludes us from having any commerce with any nation of Europe but our own; so that we cannot add to our Plantation any commodity that grows out of it, as olive trees, cotton, or wines. Besides this, we cannot procure any skillful men for our now hopeful commodity of silk; and it is not lawful for us to carry a pipe-stave, or a bushel of corn to any place in Europe out of the King's dominions." The Act produced remonstrances and petitions from Virginia, but, nevertheless, continued to be enforced by strict injunctions to the Governor, and by cruisers on the coast. But the burdens imposed thereby on trade, although generally evaded, were felt to be so

(1) Coxe's View of U. S.

grievous, that they had no small influence in producing, in 1676, the insurrection headed by Nathaniel Bacon.

A paper bearing the date of 1673, was published in the eighth volume of the Philosophical Transactions of England, pointing out the great advantages afforded by Virginia for the business of Ship-building, on account of the abundance of oak, pine, cypress, and other timber, of materials for rosin, pitch and tar; and the adaptation for raising hemp for cordage and sail-cloth, and for the manufacture of iron, on account of the abundance of its ore, and of fuel and of lime for working it. But it does not appear that any extension of the business arose from this public recommendation in an influential quarter. The Virginians were not a mercantile people, and Tobacco occupied the principal care of the planters. Although this article, in 1729, employed nearly three hundred sail of ships in its transportation from Virginia and Maryland, which produced, jointly, over six hundred thousand pounds worth, yielding a revenue of about two hundred thousand pounds annually, the producers were little concerned in the transportation themselves.

Oldmixon, remarking on their neglect of a profitable industry in the production of naval stores, observes, that "The Virginians are so far from improving their manufactures that, though they see others send thither to build ships, they seldom or never do it themselves."

Virginia produced, in the year 1769, twenty-seven sail of new vessels, whose average burden, actual measurement, was fifty-six tons each. Of the amount of tonnage entered in colonial ports for the year ending January 5, 1771, the proportion owned by native inhabitants of Maryland and Virginia, was only one-eighth of the whole quantity engaged in the trade of these Provinces. A larger proportion of the shipping then employed by those two Colonies, than of any others, was the property of British merchants residing in Europe, and constituted six-eighths of the whole.

During the Revolution, the excellent portal facilities of Richmond, Norfolk, and Portsmouth attracted attention, and the last-mentioned place, which had been a naval station for the King's ships before the war, was chosen by the General Government as a site for one of the most important of its Navy-yards. The Marine Committee of the Continental Congress, in 1776, ordered two frigates of thirty-six guns each, to be built in Virginia; and the frigate Chesapeake, one of the first vessels of war built under the Central Government, in 1794, was laid down at Portsmouth. At that date the business of ship-building had much increased in the Southern Colonies, and each of the three States of Maryland, Virginia, and North Carolina, exceeded New Hampshire in that branch. The first two had also more manufactories of cordage and cables than

any two of the States of New Jersey, Connecticut, New York, and New Hampshire. Virginia had even ventured to lay a duty of two-thirds of a dollar upon cordage.[1]

We have already alluded to the achievements of an adopted citizen of this State, JAMES RUMSEY, of Berkeley County, Virginia, in applying steam as a motive power, yet a more particular mention may not be irrelevant. Although, as elsewhere stated, we believe that the weight of evidence is in favor of John Fitch, yet, as early as 1788, he published "A Plan wherein the power of Steam is fully shown, by a new-constructed Machine for propelling Boats or Vessels of any burden against the most rapid streams or rivers with great velocity, etc." Virginia granted him, in 1784, a monopoly of the navigation of her rivers, bays, and creeks, by a method he had then devised, by the aid of setting-poles. In 1787 she also encouraged, by a more comprehensive grant, the project of Fitch to navigate by steam, but this she repealed on the remonstrance of Rumsey. As an evidence of the strength of the claims of this ingenious, and, equally with his rival, unfortunate inventor to this discovery, it may be mentioned that the Legislature of Kentucky, in 1839, passed the following resolution: "Resolved by the Senate and House of Representatives, etc., etc., That the President be, and he is hereby requested to present to James Rumsey, Jr., the son and only surviving child of James Rumsey, deceased, a suitable gold medal, commemorative of his father's services and high agency in giving to the world the benefits of the Steamboat." Rumsey went to England to prosecute his steam projects, after his first experiment on the Potomac, and died there.

Passing to the more Southern Colonies, the CAROLINAS and GEORGIA, we find them distinguished rather for their supplies of excellent materials, which they have contributed for the use of the Ship-builders of the Northern and Middle States, than for their own success in building ships. Dr. Ramsey, in his excellent history of South Carolina, remarks:

"Ship-building is connected with the Arts of a country, and at all times ranks with its Manufactures. For carrying on this noble art, the Carolinas have great advantages. Their live-oak, their cedars and pines, furnish the best materials for the construction of serviceable and lasting ships. Their live-oak is equal to any in the world, for the timber of ships. It is of so solid a texture, that, different from most other wood, it sinks in water. An experiment was made some years ago of the comparative weight of English oak and Carolina live-oak. A few cubic inches of the latter, weighed eighteen pounds; but the same quantity of the former, no more than fifteen. Ships built of live-oak, have been known to last up-

ward of forty years, though employed in the West Indies, and in carrying sugars, than which nothing is more trying on their timbers.

"About the year 1740, the Carolinas began seriously to attend to Ship-building; five ship-yards were erected, one in Charleston, three in the vicinity, and one in Beaufort. In these, twenty-four square-rigged vessels, besides sloops and schooners, were built between the years 1740 and 1779."

In Georgia, the business was commenced about the same time. An account published in 1741, states, that some vessels had already been built there, and it was expected the business would increase.

In 1750, according to our naval historian, a new era in Ship-building was introduced, by the discovery of the valuable properties of the live-oak for that purpose. In that year, a vessel, the first built of that material, and thence called the Live Oak, arrived at Charleston, South Carolina. We are not informed where she was built. To what extent the people of Carolina and Georgia employed their resources in this branch, it is now difficult to ascertain. In the year 1769, according to the Custom House tables, quoted by Lord Sheffield in his observations on American Commerce, North and South Carolina each built twelve vessels, of which the aggregate tonnage was 607 and 739 tons, respectively. This measurement is stated to have been one-fifth at least below the actual tonnage, which, after the proper addition, averages sixty tons for the former, and seventy-eight tons for the latter, per vessel.

Georgia, during the same year, built two vessels averaging each thirty tons.

The carpenter's prices in South Carolina, for building a live-oak ship, just after the Peace, was five guineas, sterling, per ton; and the whole cost of the ship equipped for sea, seven to eight guineas, sterling.

Those were the prices of ships built for sale, and were probably below the usual cost of vessels built on private account.

Very excellent ships were said to be built in Carolina at that time of live-oak, which was reputed by competent judges to be as lasting as the best English oak, notwithstanding Lord Sheffield declared them to be less durable than British ships, or those of cedar.

On the commencement of difficulties with Great Britain, South Carolina, next to Massachusetts, was distinguished for the spirit with which she resisted the measures of Parliament, and for her activity in fitting out cruisers and *guarda costas*, for the defense of the American coasts. Her own harbors were utterly defenseless at the commencement of hostilities, the Province, like many others, not having a single armed vessel in her service. Private merchant vessels were armed in the emergency; and in very short time the schooner, Defence, of sixteen guns, a merchant ship,

the Prosper, of twenty guns, and the Comet, a coaster, with sixteen guns, were equipped. A galley called the Beaufort, was built, and three others converted into galleys, for the protection of the coast, and a schooner of ten guns to guard Georgetown.

After Congress authorized reprisals, the first three above-named were converted into brigs, to cruise on the high seas, and captured several prizes.

A Navy Board was created by the Legislature, with "authority to superintend and direct the building, buying, or hiring of all vessels in the public service, and to direct the outfit of the same, etc.," for which they were authorized to draw warrants on the Public Treasury, for the necessary funds. The Board had the control of the above-mentioned vessels, and built a brig of fourteen guns, named the Hornet. These vessels constituted the Navy of the Province, during the first four years of the war. In 1777, the *Randolph*, Captain Biddle, built and commissioned at Philadelphia, put into Charleston, to refit. She sailed on a cruise, and returned in eight days with four rich prizes; but on a later cruise, in 1778, in company with several smaller Carolina vessels, tempted by her success, the Randolph blew up in an engagement. The expense of these armaments cost the Province over $200,000, which far exceeded the profits of the enterprise.

Ship-building, suspended except for warlike purposes, was renewed after the Peace, and prosecuted with spirit.

On 13th April, 1789, some five or six weeks after the commencement of the Federal Government, the Shipwrights of Charleston petitioned Congress for the enactment of a Navigation Law, "on account of the diminished state of Ship-building in America, and the ruinous restrictions to which our vessels are subject in foreign ports, etc."

In this they were followed, in May, by a similar memorial from the Ship-builders of Baltimore; which is an evidence, in some degree, of the value of the interest involved in the business in those cities, which had now both become important commercial towns. It is also indicative of the extent to which the industrial interests of the country, and particularly its commerce, suffered in the absence of an efficient central authority, to regulate the foreign relations of the country—which in this particular were early attended to by the Constitutional Legislature then in session. The business of Ship-building made considerable progress after this time in North Carolina; and in 1794 she was in advance of New Hampshire in that branch. In 1791 three districts out of five returned new shipping, exceeding by nearly one thousand tons the medium of the three years, 1769 to 1771.

Having traced the origin and subsequent progress, so far as we have been able, of this important industry in each of the Colonies which originally formed this Confederacy, a few general statements must close this sketch.

It is apparent that the American Colonies had, within a very short period, amidst all the privations incident to new settlements, constructed a fleet of coasting and ocean-traversing vessels of no inconsiderable extent. They had already entered upon commercial enterprises, which had begun to attract attention. Within fifteen years Massachusetts alone had built up an infant marine, not destitute, it appears, in some cases, of architectural embellishments and respectable warlike equipment, considerably exceeding, it is probable, the entire tonnage of the Port of Liverpool, in England; which Macaulay informs us was, at that period, about fourteen hundred tons, or less than that of a single modern Indiaman of the first class. The number of seamen belonging to the Port was not over two hundred.

The commerce in which the Colonies engaged with the British and foreign West India Islands, and different parts of Europe, and of which their activity in Ship-building was at once a cause and a consequence, early attracted the attention of the parent State. Within little more than twenty-five years after the settlement of New England, a series of trade regulations were established with a view to a monopoly of its advantages, the most important of which was the celebrated Statute, (12 Car. II.,) entitled "An Act for the Encouraging and Increasing of Shipping and Navigation." It was enacted, (Cap. 18), "That from and after the first day of April, 1661, no Sugars, Tobacco, Cotton, Wool, Indigo, Ginger, Fustic, or other dyeing woods, of the growth, produce, or manufacture of any English Plantations in America, Asia, or Africa, shall be shipped, carried, conveyed, or transported from any of the said English Plantations, to any land, island, territory, dominion, port, or place whatsoever, other than to such other English plantations as do belong to his Majesty, etc., etc." This Act was designed, virtually, to secure to the English markets the produce of the Colonies, and was but an extension of an Act passed in 1650, by the Parliament of Cromwell, restricting the import and export trade of the Colonies to English, or Colony-built ships. The list of articles named in it, and which was extended from time to time, embraced what were known as *enumerated* articles. Two years after, in 1663, it was enacted that, "No commodity of the growth, production, or manufacture of Europe, shall be imported into the British plantations, but such as are laden and put on board in England, Wales, or Berwick-upon-Tweed, and in English-built shipping, whereof the master and three-fourths of the crew are English." The effect of this would be to compel

the Colonies to *buy* as the former did to *sell* in the English markets exclusively. But these laws were very little regarded by the Colonies, with the exception of Virginia, where they excited remonstrances and almost rebellion, and were not until a later period enforced upon them. The primary object of the monopoly, was to prevent the commercial rivals of England from supplantiug her in the colonial Trade.

Among the chief benefits believed to have been derived from these regulations was "the bringing our people to build ships for carrying on such an extensive commerce as they had not before, and the exclusion of all other nations from the direct carrying trade, or correspondence with the American plantations."

English writers are divided in opinion as to their effect upon the extraordinary subsequent growth of English commerce and shipping, and the decline of those of her rivals. Although, upon the whole, there can be little doubt that English navigation was promoted by a law which Adam Smith considered as "perhaps the wisest of all the commercial regulations of England;" and although the Colonies were permitted a full participation in the carrying trade between them and the mother country, it is probable that the increased demand for shipping, consequent on the augmented trade, was more than counterbalanced by the restrictions laid on their foreign Commerce. Navigation and naval power, it has been said, are the children not the parents—the effect, not the cause—of Commerce.

Iudeed, the increase of shipping in the Plantations was not regarded with favor in England among the adherents of the exclusive policy. Strange as it may seem, the prosperity of the Colonies, which at this time was very great, and every incipient attempt at manufacture excited the jealousy of the commercial and manufacturing interests. "The Colonies," it was said, "are beginning to carry on trade; they will soon be our formidable rivals: they are already setting up manufactures; they will soon set up for independence." The Discourse on Trade, by Sir Josiah Child, before quoted, thus expresses the prevailing opinion of this class in relation to the subject before us: "New England is the most prejudicial plantation to this kingdom. Of all the American plantations, his Majesty has none so apt for the building of shipping as New England; nor none comparably so qualified for the breeding of seamen, not only by reason of the natural industry of that people, but, principally, by reason of their Cod and Mackerel fisheries; and, in my poor opinion, there is nothing more prejudicial, and, in prospect, more dangerous to any mother Kingdom, than the increase of shipping in her Colonies, Plantations, or Provinces."

It was only by an evasion or relaxation of the Laws of Trade, which

was connived at by the Revenue officials, that the Colonies were ever enabled to pay for the enormous amount of British Manufactures and European Merchandise annually received from England; which at the beginning of the eighteenth century, amounted to nearly four hundred thousand pounds sterling, and, toward the close of the provincial period, three millions and a half sterling, or nearly one-fourth of the English Export Trade at those periods. None of the Colonies north of Maryland ever had balances in their favor, but were, on the contrary, much in the arrear. Their obligations could only be met by the circuitous trade carried on, in contravention of the Trade Acts, with foreign countries, whence they derived most of their specie and remittances suitable for returns to their English creditors. By this illicit traffic, English Commerce was as much benefited probably as that of the Colonies. Lord Sheffield admits that, between the years 1700 and 1773, the Colonies must by this circuitous trade have remitted to Great Britain upward of thirty millions sterling in payment of goods taken from her, over and above their direct remittances in produce and fish. Ships built for sale constituted an important element in this foreign Colonial Trade, the value of which was usually remitted in specie or bills of exchange on London.

The nature of this traffic, and the way in which it fostered the Shipbuilding interests of the Colonies, is indicated in the following passage from the work by Joshua Gee on the Trade and Navigation of Great Britain, A. D. 1729, in which he attributes a vast increase of English Commerce and Navigation to the Colonial Trade, and speaks of the proceeds of Colony-built ships, sold in Spain and Portugal, as an important part of the remittances of the Colonies.

"We have a great many young men who are bred to the sea, and have friends to support them; if they cannot get employment at home, they go to New England and the Northern Colonies with a cargo of goods, which they there sell at a great profit, and with the produce build a ship and purchase a loading of lumber, and sail for Portugal or the Straits, etc., and, after disposing of their cargoes there, frequently ply from port to port in the Mediterranean till they have cleared so much money as will in a good part pay for the first cost of the cargo carried out by them, and then perhaps sell their ships, come home, take up another cargo from their employers, and so go back and build another ship; by this means, multitudes of seamen are brought up, and, upon a war, the nation better provided with a greater number of sailors than hath been heretofore known. Here the master becomes merchant also, and many of them gain by this lumber trade great estates; and a vast treasure is thereby yearly brought into the Kingdom in a way new and unknown to our forefathers, for indeed it is gaining the timber trade heretofore carried on by the Dutch and Swedes, our Plantations being nearer the markets of Portugal and Spain than theirs are."

In 1724, the enterprise of the New England people in this branch, again became the subject of complaint in England. The ship-carpenters on the Thames, probably from the loss of contracts in the way just mentioned, complained that their trade was hurt, and that their workmen emigrated, since so many vessels were built in New England. But the Board of Trade could not venture to recommend so extreme a measure as the prohibition of Ship-building in the Colonies, and were unable to provide a remedy.

In 1745, the New England Colonies owned, exclusive of fishing craft, about one thousand sail of vessels.

The peace of Aix-la-Chapelle, which took place two years after, found the Navigation of the Colonies in a prosperous condition; and the mercantile tonnage of the American Provinces was thought to have been equal to that of the mother country, considered in reference to the population, which in 1749 amounted in the former to 1,046,000.

Colonial Ship-building, near the same time, received a new impulse, by the employment of the invaluable live-oak of the Southern Provinces, which came into use about the year 1750. This was found to be much superior to the common white oak and chestnut previously employed, and added to the reputation of American-built ships.

The tonnage of vessels built in the American Colonies in the years 1769, 1770 and 1771, was as follows:—

In 1769	20,001 tons.
" 1770	20,610 "
" 1771	24,068 "

It was customary at that time, in order to evade the duties, light money, and other expenses, to enter with the Register an amount considerably short of the real tonnage. The Custom-house books kept at Boston, from which the statistics of tonnage were derived, direct one-fifth to be added, but an addition of one-third is considered nearer the proper proportion.

The following table, given by Mr. Champion in his review of Lord Sheffield's "Observations on American Commerce," shows the amount and relative proportions of tonnage built in each of the Colonies in 1769, to which he has added the average of each vessel, as directed by the Custom-House.

	Vessels built.	Tonnage.	Average tonnage of each vessel: one-fifth added.
New Hampshire	45	2,452	65
Massachusetts	137	8,013	70
Rhode Island	39	1,428	43
Connecticut	50	1,542	36

New York	19	955	60
Jerseys	4	83	25
Pennsylvania	22	1,469	79
Maryland	20	1,344	80
Virginia	27	1,269	56
North Carolina	12	607	60
South Carolina	12	789	78
Georgia	2	50	30
Total	389	20,001	

The entire amount of tonnage entered in the several Colonies during the year ending January 5, 1771, was 331,642, and the amount cleared was 351,686 tons. The difference between the outward and inward tonnage was occasioned, in part, by the sale of Colonial ships in Great Britain, and amounts to about 20,000 tons. About fifty Colony-built vessels were then annually sold in the parent country.

The number of vessels built in the Colonies in 1772 was one hundred and eighty-two, with an aggregate tonnage of 26,544; and, of this number, one hundred and twenty-three, containing 18,149 tons, were built in New England, fifteen in New York, one in New Jersey, eight in Pennsylvania, eight in Maryland, seven in Virginia, three in North Carolina, two in South Carolina, and five in Georgia.

Mr. Champion estimated that, at the beginning of the Revolutionary War, 398,000 tons of Colonial-built shipping was employed in the general commerce of Great Britain, or nearly one-third, and if the West India trade were included, about two-thirds of the whole.

Massachusetts was then estimated to own nearly one vessel for every one hundred inhabitants. She built many on contract and for sale, as did also Pennsylvania, to the amount of about six thousand tons annually. Ship-building and Commerce were nearly ruined by the war, and the former was only sustained by the building of a few privateers, or small frigates for Congress.

The skill with which American ship-builders adapted these to the unequal contest with the heavy ships of Great Britain, and rendered them truly formidable, is thus spoken of in Charnock's History of Marine Architecture :—

"The American Marine, however, soared not, but with very few exceptions in its private capacity, beyond the classes of brigs or schooners. Those of the former denomination proved particularly destructive. Their dimensions were far enlarged beyond those limits which it had been customary to give vessels in that class; and their force, on many occasions, exceeded the greater part of the British sloops-of-war, nearly equaling some of the minor frigates. In defiance of the common prejudice then entertained

against long and narrow vessels, the American builders ventured their opposition, and the success which attended the principles they introduced, materially differing from the practice of any country at that time, proved their superior skill in the construction of corsairs."

The new relations between Great Britain and her former Colonies, established by the Peace, called for some regulation of the commercial intercourse between the two. But the bill of Mr. Pitt, for a temporary adjustment of the matter, was defeated by the violent opposition of the British navigation interests. The Orders in Council soon after having excluded American ships altogether from the West India trade, and the original Confederation having no power to remedy the matter, the several States sought to protect themselves by discriminating duties in favor of American vessels, and, in some cases, of those countries with which the United States had treaties. The want of uniformity, and the conflicting character of these State imposts, were a principal cause of the adoption of the present Constitution, which repealed all the State laws on the subject, and vested the power in Congress.

The recommendation of Mr. Adams, and petitions from various quarters, induced Congress, in July, 1790, to impose tonnage duties of six cents per ton on all vessels of the United States entering from foreign ports; on vessels built in the United States, but partly owned abroad, thirty cents; and on other ships or vessels, fifty cents,—which last was afterward much increased.

Under this system of protection, and the exclusion of foreign vessels from the coasting trade, and the American trade with China, American Ship-building, in succeeding years, experienced an unparalleled increase, and became a cause of alarm to British merchants. A system of Registration and Enrolment or license was also adopted, the returns of which are annually transmitted from each District to the Treasury Department.

In 1789 the registered tonnage of the Union amounted to 123,893 tons, and in 1790, to 346,254 tons. The total tonnage of the Union, including enrolled and licensed, was, in 1789, 201,562, and in 1790, 478,377 tons. The *registered* tonnage (consisting of American-built vessels only) had increased in the year 1800 to 669,921 tons.

CHAPTER V.

INTRODUCTION OF SAW-MILLS AND MANUFACTURE OF LUMBER.

ALTHOUGH the Saw is a very ancient implement, being mentioned by Isaiah at a period contemporaneous with the building of Rome, and was in use among the Egyptians a thousand years before the days of the prophet, yet the *Saw-Mill*, as a mechanism for cutting timber, had not been in use in some countries very long before the settlement of America.

Saw-mills were erected in Germany, in the fourth century; in the Island of Madeira, in 1420; and in 1530, the first one in Norway was built.

Prior to the invention and use of Saw-mills, boards and plank were either sawed by hand, or split and hewn with the axe, and consequently such products were exceedingly dear. The latter mode was practiced in the first few years by the American Colonists. The first Saw-mill in Massachusetts, it is said, was built about the year 1633, which was some years before it was employed in England. The clay floors and generally uncomfortable dwellings of the English peasantry, in the sixteenth century, and the floors of timber mentioned in the seventeenth, indicate the general absence of Saw-mills.

In 1555, Bishop Ely, the British Embassador at Rome, describes as a curiosity, that "he saw at Lyons, a Saw-mill driven with an upright wheel, and the water that makes it go is gathered into a narrow trough, which delivereth the same water to the wheel. This wheel hath a piece of timber put to the axletree end, like the handle of a *brock* (a hand-organ), and fastened to the end of the saw, which being turned with the force of water, hoisteth up and down the saw, that it continually eateth in, and the handle of the same is kept in a ringall of wood from severing. Also the timber lieth as if it were upon a ladder, which is brought by little and little to the saw by another vice." More than a century after, the first Saw-mill in England was put up by a Dutchman, near London, and had to be removed on account of the jealousy of the working-classes, who feared it would deprive the sawyers of their labor: apprehension of the same fate prevented a renewed attempt when proposed in 1700; and the populace actually destroyed one as late as 1767.

The scarcity of labor, and its better remuneration in this country, as well as the varied resources of industry, and perhaps a more general appreciation of the value of labor-saving appliances, have for the most part prevented any exhibition of hostility to such improvements, and has facilitated their speedy adoption among us.

In the first volume of the Transactions of the Society instituted at London, in 1754, for the *encouragement of Arts, Manufactures, and Commerce*, it is stated that the prejudice against Saw-mills had so far given way before a spirit of improvement, and the rewards offered by the Society, that Saw-mills were then (1783) firmly established in England.

A pretended prohibitory Act of Parliament, it is intimated, had been made the pretext for submitting, for many years, to have timber cut into boards by the Saw-mills of Holland, and other foreign countries. It is an evidence of the enterprise of Holland that, equally destitute of timber and of water-power, it should thus perform for England, which abounded in both, one of the simplest of mechanical operations, and first introduce the labor-saving contrivance into the island. This is said to have been done in the year 1663.

As will appear from the following pages, the increase of Saw-mills, although hindered by the exclusive and restrictive conditions of laws intended for their encouragement, in individual cases, has from the first settlement of the country been deemed worthy of the patronage of local and general authorities.

Saw Mills in Massachusetts.—The Court of Assistants in London made provision for the introduction of both Grist and Saw-mills, with the first emigrants to the Colony of Massachusetts Bay, the government of whose affairs was entrusted to its care.

Among the persons sent to the Colony in 1628, '29, were men skillful in making Pitch and Salt, Vine Planters, etc. The Court was also desired by Mr. White, the Minister who first planned the Colony, and in the Company's second letter of instructions to Governor Endicott, he is directed, "To give approbation and furtherance to Francis Webb, in setting up his *Saw-mill*," to be sent over in the "'Lyon's Whelpe,' with other stores from Dorsett and Somersett, England."[1]

Whether the proposition of Webb, to erect a Saw-mill in Massachusetts, was carried into effect or not, we are unable to say. No auxiliary more valuable to the infant Colonies could have been introduced; and

(1) Colony Records, 1, 401. Mr. Webb, it is stated in Young's Chronicles of Massachusetts, page 179, was not a colonist, but one of the adventurers, a member of the Company, and subscriber to the amount of £50.

we have seen that some years previous to this, their future importance had been understood, and steps had been taken for the erection of such mills in Virginia.

It is not quite clear when the first Saw-mill was erected in Massachusetts. It has been stated that the first was built about the year 1633, but we have seen no evidence to corroborate it. Mills were erected even previous to that, but it does not always appear for what uses they were designed.

The first erection of the kind in New England, of which we have seen any distinct notice, was in New Hampshire, near the present city of Portsmouth, where a Saw-mill was built previous to the year 1635. It was put up at the Falls of the Newichewannock, or Salmon Falls River, a part of the Piscataqua, between Berwick and the Cocheco branch of the river, and was situated in that part of the grant, called the Patent of Laconia, made to Mason and Gorges in 1631, by the Council of Plymouth, in England. The first settlement of New Hampshire, was made at this place and near Dover, in 1623, by the erection of a fishing station, salt-works, and other improvements. The Saw-mill, at the Falls, was in charge of Ambrose Gibbons, as the language of the historian seems to imply, as early as 1631; and, became in 1634, or 1635, the property of Mason, by purchase of a tract of land, extending three miles in breadth along the river, on the north-east side, from its mouth to its head, "including," he says, "the Saw-mill which had been built at the Falls of Newichewannock." A letter from Captain Mason to Gibbons, dated May 5, 1634, states that he had sent men and provisions with Mr. Jocelyn, to set up two mills. Gibbons, in acknowledging the receipt of the letter, informs the proprietor, that on the 22d day of July, "the carpenters began about the mill." This appears to have been a Saw-mill, as he advises him in the same letter to send "a stock of iron-work to be put away with his boards from the mill," and was probably the first and only mill of the kind at that place, if not in all New England.[1]

This prompt attempt, through the enterprise of Captain Mason, to turn to account the woodland wealth of New Hampshire, from which for over two hundred years so considerable a share of her native resources have been drawn, appears to have been made at a time when "bread was either

(1) It is stated, in Young's Chronicles of Plymouth, that in September, 1623, the "Ann," of one hundred and forty tons, which brought over, among others, several artificers to the Colony, returned to London laden with clap-boards, beaver and other furs. The year following, a ship of one hundred and eighty tons was freighted in the Colony. The clap-boards were probably all sawed or cleft, and prepared by hand. The first water-mill, he tells us, was erected in 1633. Beckman states, that *the first Saw-mill in England was erected in* 1663.

brought from England in meal, or from Virginia in grain, and sent to the wind-mill at Boston, there being none erected here."[1]

The other mill, although there is no further reference to it, was probably intended to be a grist mill. The ship which brought the men and supplies for the mills, after taking in part of a cargo of "iron stoane," sailed for Saco "to load cloave boards and pipe staves," showing how boards were then manufactured in the great lumbering State of Maine. Gibbons, who lived in a palisaded house, was succeeded in the charge by Humphrey Chadbourne, the ancestor of several generations of prominent citizens of the State.

Ship-building was soon after commenced in Maine and New Hampshire, and ships and lumber long constituted the chief manufactures of the people of both Provinces. Saw-mills were speedily multiplied on all the principal streams, many of which afforded excellent water-power, now appropriated to other manufacturing purposes.

The system of granting patents, or exclusive personal interest in the use of new inventions, which is the great stimulus to improvement, had its rise in England early in the seventeenth century, and has been since adopted by most civilized nations. In the system of laws called the "Body of Liberties," adopted by the General Court of Massachusetts in 1641, was a law on this subject. It declared that there "should be no monopolies but of such new inventions as were profitable to the country, and that for a short time only."

One of the first applicants for exclusive privileges under this first New England Code, was JOSEPH JENKS, of Lynn, who came to the Province in 1645, and in the following year presented a petition for a patent for a new application of water-power to mills for various uses, including a Saw-mill. On the sixth of May, 1646, the Court resolved that, "In answer to the peticon of Joseph Jenckes, for liberty to make experience of his abilityes and Inventions for ye making of Engines for mills to goe with water for ye more speedy dispatch of worke then formerly, and mills for ye making of Sithes and other Edged tooles, with a new Invented Sawe-Mill, that things may be afforded cheaper then formerly, and that for fowerteen yeeres without disturbance by any others setting up the like inventions, that so his study and cost may not be in vayne or lost; this peticon is granted so as power is still left to restrain ye exportation of such manufactures, and to moderate ye prizes thereof if occasion so require."[2]

(1) Belknap's New Hampshire, 1, 17, 25; Appendix, p. 13.

(2) Records, vol. ii., 149; vol. iii., 275. The number of Patents granted since the organization of the Patent Office, for inventions and improvements in Saws and Saw-mills, is between three and four hundred.

The ingenious patentee in this case, whose son, Joseph Jenks, built the first house in Pawtucket, Rhode Island, and whose grandson of the same name was Governor of that Colony after Cranston, receives honorable mention in the Records after this time for several inventions, which will be elsewhere mentioned. His improvement in the manufacture of Scythes, included in the above patent, has not been materially modified to this day. Of the specific character of his improvement in Mills we are unable to speak. He was connected with the first iron-works in the Colony at Lynn, but it does not appear that he erected Mills himself.

It is mentioned in "The Description of Scituate," in the Massachusetts Historical Collections,[1] that Robert Studson, Mr. Hatherly, the founder of the town, and Joseph Tilden, built a Saw-mill at that place in 1656, which the writer observes "may be the first in the Colony."

The permission to erect this mill was to be void unless it was built in three months from the date of the grant, which was on November 10th. It was further stipulated by the authorities, "that in case any of the townsmen do bring any timber into the mill to be sawed, the owners of the mill shall saw it, whether it be for boards or plank, before they saw any of their own timber; and they are to have the one half for sawing the other half. And in case any man of the Town that doth bring any timber to the mill to be sawed shall want any boards for his particular use, the owners of the mill shall sell him boards for his own use so many as he shall need, for the country pay at 3*s.* 6*d.* an hundred inch sawn; but in case the men of the town do not supply the mill with timber to keep it at work, the owners of the mill shall have liberty to make use of any timber upon the Common to saw for their benefit."[2] The mill, which stood on "the third Herring Brook," was destroyed by the Indians in 1676.

Such regulations will seem curious to the proprietor of a modern steam-power Saw-mill, producing thirty to forty thousand feet of lumber daily, and who would not hesitate, it is presumed, to accept the condition of sawing at the halves.

The King's Commissioners, who visited New England in 1664, reported the old Colony of Plymouth to contain "about twelve small towns, one Saw-mill for boards, etc." The Saw-mill is believed to have been in Pembroke, then a part of Duxborough.

2. MAINE AND NEW HAMPSHIRE.—We have seen that one of the first Saw-mills in New England, if not the very first, was that built on

(1) Second Series, vol. iv., 225. (2) Ibid. p. 249.

the Salmon Falls River, as early at least as 1634 or '35. In the division of their grant the same year by Mason and Gorges, the north side of the Piscataqua, now a part of the State of Maine, fell to the latter. In this territory, which submitted to Massachusetts in 1652, mills began to be erected soon after its first settlement. At Piscataqua, or Kittery, the oldest town in the State, which included Elliott and North and Sorth Berwick, and upon the opposite side of the river from Mason's Mills, the lumbering business was in early times carried on to a greater extent than at any other place. It employed in 1682 six Saw-mills. Previous to 1643, the town granted a tract of land between Spencer's and Salmon Falls to Wincall and Broughton, on condition that they should erect a Saw-mill thereon. Kittery was also one of the principal Ship-building stations of the District, and had several enterprising traders, who, in their European, West Indian, and coasting adventures, furnished a steady outlet for the lumber manufactured on the neighboring rivers. The most conspicuous of these were the Pepperells, who, toward the close of the seventeenth century, were the owners of a great portion of the country between the Piscataqua and the Saco, including the magnificent water-power on both sides of the Saco, now the seat of so much industry. They erected mills on both these rivers for different purposes, and by their enterprise in Lumbering, Ship-building, and Commerce, acquired great wealth. In 1655, however, probably before William Pepperell acquired the right, the freemen of Saco claimed to have control of the mill privileges, and agreed with Roger Spencer to set up a Saw-mill there, for which he contracted to pay twelve thousand feet of boards, and to employ townsmen in preference to others. The Indians, in 1675, attacked the settlement, erected a battery on the mill-wheels, which they removed, burned the mills and all the dwellings in the place.[1]

Thomas Clark and Sir Bilby Lake built mills at Woolwich, on the Kennebec, about the year 1660, but were driven away in 1675. William Hutchinson, an early settler of Boston, in 1673 purchased lands on the west side of the Saco, and had mills at Newichewannock, or Berwick. This place was also, in 1690, assaulted by the Indians, led by a Frenchman and an Indian sachem, who killed 30 men, took 54 captives, and burned all the houses and mills. There were few towns in Maine that did not at one time or another experience these savage forays, in which the French, who claimed the country from Kittery eastward, were the instigators. They offered premiums for scalps of the English. So intolerable were these assaults, that it was at length determined to reduce the strong-

(1) Sullivan's History of Maine, p. 225.

hold of the enemy, and the younger Pepperell of Kittery was selected to lead the expedition against Louisburg.

The number of Saw-mills in Maine, in April, 1682, was twenty-four, of which six were at Kittery. Wells was the second town in the extent of its lumber business, and Falmouth (now Portland) was the third. White pine merchantable boards in Maine and New Hampshire were then worth 30*s.* the thousand feet; white oak pipe staves, £3; red oak pipe staves, 30*s.*; red oak hogshead staves, 25*s.*; wheat, 5*s.*; malt, 4*s.*; Indian Corn, 3*s.* per bushel; and silver, 6*s.* per oz. At these stated prices, which were fixed from year to year, taxes were paid in lumber and provisions. One-third of the amount was abated for payment in money.[1] In 1664, according to Mr. Williamson, boards were worth in Maine 19*s.* and staves 17*s.* per thousand.[2]

In 1668, the Government of Massachusetts, whose jurisdiction included New Hampshire and a part of Maine, enacted a law reserving for public use all white pine trees measuring twenty-four inches at three feet from the ground. This order, and those of the British Parliament in the reign of William III. and Queen Anne for the preservation of white pine timber for masting for the Royal Navy in these and other Provinces, probably to some extent interfered with the manufacture of lumber from that valuable species of timber. A compensation, however, was found in the encouragement given at the same time for the exportation and manufacture of masts and naval stores by bounties, some of which were continued until after the Revolution. Parliament also appropriated £10,000 for utensils and other aids to the manufacture. The making of pine, spruce, red and white oak lumber, of house and ship timber, of red and white oak staves, heading, hoops, shingles, and clapboards, which were made by the farmers during the winter, and exchanged for merchandise; the contracts for mast timber for the Navy; and the manufacture of Pitch, Tar, Turpentine and Rosin (at a bounty originally of £3 to £4 per ton); and of Potashes from the refuse of their pine forests, were to Maine and New Hampshire a prolific source of wealth, and attracted a large proportion of the working population. The extent to which these branches were made the medium of foreign and domestic exchanges, justified the remark of Lord Caernarvon, who defined timber to be "an excrescence on the face of the earth, placed there by Providence for the payment of debts."

In 1693, two years after the final incorporation of the whole District

(1) Maine Hist. Coll. Belknap's New Hampshire.

(2) Williamson's History of Maine. In 1840, when the Saw-mills in Maine had increased to over 1300, and the value of lumber sold, to two and a quarter millions annually, the price was $10 per M.

of Maine with Massachusetts, the Government relaxed its order respecting the cutting of pine timber in favor of John Wheelwright, who was allowed to take board logs from the public lands, in consideration of his erecting a Saw-mill at Cape Porpoise River.

The Trespass Act of 1711 (9 Q. Anne, Cap. 17), which, for the preservation of Mast Timber in New England, New York, and New Jersey, attached a penalty of £100 for cutting white or other pine trees (not private property), or such as were marked and registered by the Surveyor, caused much dissatisfaction, and was deemed a grievance, inasmuch as the fines were recoverable in a Court of Admiralty, where the cases were tried without a jury.

It would be unnecessary, if it were possible, to trace the erection of Saw-mills upon all the numerous streams of Maine, New Hampshire, or Massachusetts throughout their colonial history. Nor is it possible to arrive at any satisfactory estimate of their increase by means of the export of sawed lumber. Much of the lumber from the ports of those Districts went to Boston or Salem, whence it was exported to foreign countries. The statistics are few and imperfect, and do not well distinguish the species of lumber which were the products of Saw-mills from such articles as staves, hoops, and other kinds, wrought by hand or sold in a cruder state.

The Saco River has within the State of Maine four principal falls, of 70, 20, 30, and 42 feet respectively, affording immense water-power, which was early occupied. The Saw-mills at the lower falls, at the head of ship navigation, six miles from the sea, to which timber was floated down the distance of forty and fifty miles, sawed annually before the war about four million feet of boards. About the same quantity was made at Topsham in 1793. Warren, on St. George's River, exported large quantities of lumber. To improve the navigation of that stream, Major-General Knox, a resident of the town, proposed the construction of a canal around the Rapids at that place, leaving excellent sites for Saw-mills. Mr. Joseph Pope, whom the French traveler, De Liancourt, pronounced the ablest Civil Engineer in all America, the inventor of an ingenious Orrery, and the patentee of several improvements in the mechanism of mills and other branches of the Arts, was employed to construct them on the most improved principles. He died at Hallowell in 1826.

At Damariscotta, on one stream, there were before the close of the century, six Saw-mills within the distance of a quarter of a mile. These are but a few instances of the activity and enterprise employed in this branch of the business in last century.

From October, 1789, to October, 1791, there were exported from the port of Piscataqua 18,034,000 feet of pine boards, of which 11,622,000 went to the West Indies, and 6,247,000 to Europe. Of oak plank, clapboards, staves, and heading, there were exported in the same time in the aggregate 3,394,000 feet, in addition to considerable quantities of shingles, hoops, rafters, pine and oak timber, frames of houses, masts and spars, shooks, and other products of the forest.

In Massachusetts proper, where timber was less abundant, and the pursuits more varied, Saw-mills were nevertheless numerous in early times.

In the central county of Worcester, for example, which is now about the largest manufacturer of lumber in the State, though it has few large streams and no navigable rivers, not less than ninety Saw-mills, of which eleven were in Hubbardston, are enumerated in Whitney's History of the County, published in 1793. This was more than one-half the entire number returned by the Marshalls for the whole State, when, in 1810, seventeen years after, the first census of Manufactures was taken. The number in Massachusetts was then stated at 150, which was far below the real number, as the returns were very imperfect, embracing in fact only the two counties of Berkshire and Hampshire. Many of the mill-streams in the county were mere brooks, often quite dry, or insufficient to carry a mill during the dry season. A Mr. Wetherbee, who built Corn and Saw-mills on the Nashua, one of the largest of these, at Lunenburg, in order to gain a constant supply of water, dug a canal a mile in length, which was deemed an enterprise of no common occurrence in that day. The first white settlement was made in that county at Worcester in 1673–4, but had to be abandoned on account of Indian hostility during the war with King Philip. A second attempt was made in 1684, when Captain John Wing erected the first Corn and Sawing-mills at the north end of Main street, on the site of the present city of Worcester, where remains of the dam are still visible. The third and permanent settlement was made in 1713. A Mr. Sawyer, of Lancaster, in that county, who had been carried to Canada as a captive by the Indians, built for the French, on the river Chamblee, near Montreal, in 1706, their first Saw-mill, as the price of redemption of himself and son. There was, previous to that, no Saw-mill in all Canada, and no artificer capable of building or working one.

John Prescott, a native of the same place, built, about the time that Worcester was settled, the first grist mill in the old town of Groton, in Middlesex, and his son Jonas, an honored name in that place, set up a Saw-mill there in 1686. For that purpose, he was granted leave and the use of Stony Brook, on condition that "he should accommodate the town

with merchantable boards at six-pence a hundred feet cheaper than they were sold at any other Saw-mills, and for town pay, and that town be supplied before any other persons, provided, always, the Saw-mill do not hinder the corn mill." This county now manufactures lumber to a greater annual value than any other in the State.

In the old and well-wooded counties of Hampshire and Berkshire, some Saw-mills were built at quite an early period. At North Adams, Becket, Mount Washington, Pittsfield, in the last-mentioned, and at Greenwich, Enfield, Hadley, Ware, and other places on Mill, Fort, Stony and other rivers, in the former, Saw-mills were erected before or soon after the middle of the last century. The proprietors, in some cases, were enjoined to saw other people's logs at the halves, which would be considered no hard condition at the present day. Much fine lumber was formerly made at Clarksburg, settled in 1769. Florida, in Berkshire, which now has fourteen Saw-mills, making each twenty to one hundred thousand feet of lumber, was not settled until 1783, and Savoy, which supports no less than twenty-five Saw-mills, though it has only about two hundred dwellings, was first occupied by residents in 1777.

3. VERMONT.—Few States of the Union afford better mill-sites than *Vermont*. The multitude of short and rapid streams flowing from the Green mountain range of the interior, eastward to the Connecticut, northward to the St. Lawrence, toward the west to Lake Champlain and the Hudson, or interiorly to Lake Memphremagog, all invite the erection of mills. The navigation to the foot of the rapids on most of these streams furnish an outlet in either direction for the lumber and other products of the well-wooded hills. These rivers have been long since appropriated to the uses of a varied manufacturing industry. Windsor County is particularly rich in the water-power of Queechy, White, Mill and other rivers, the last of which has a fall of sixty feet in one-third of a mile.

The Clyde, in Orleans County, falls one hundred feet in forty rods. Charleston, on this river, was one of the first settlements in the State, but could only be maintained against French and Indian hostility by the settlers who built and labored with their weapons at their side. As the State had not an independent existence until after the Revolution, and its settlement and improvements were inconsiderable until a late period, on account of the contests about jurisdiction between the States of New Hampshire, Massachusetts, and New York, to which it successively belonged, we have nothing special to record in this connection.

4. RHODE ISLAND.—*Rhode Island*, whose first exports were lumber, pipe-staves, etc., as early as 1639–40, enacted a law to regulate the prices

of boards and clap-boards at the mill, indicating that the Colony already possessed those useful appurtenances to new settlements. The prices were fixed at eight shillings the hundred for sound boards delivered at the mill, and one shilling a foot for clap-boards and fencing, to be sound merchantable stuff.[1] A Saw-mill appears, however, not to have been built on the Falls of the Pawtucket, now so profitably applied to other uses, until after the Revolution. In 1810 the State contained twenty-eight Saw-mills.

5. CONNECTICUT.—In *Connecticut*, the younger Winthrop, afterward Governor of Connecticut, had a Saw-mill at New London, previous to 1654, in which year the General Court granted Mr. Will. Goodwin liberty to make use of the timber of waste lands, to keep his Saw-mill in employment. In the year 1661, a Record of the Court states that, "Liberty is granted Mr. Winthrope to find a place to set up a Saw-mill where it may not prejudice the farms or plantations already give out."[2] His son, Fitz-John Winthrop, built another on the Nahantick, near Long Cove, in 1691, and two years after another was erected upon the same river by John Prentis. Others were built apon that river and adjacent streams, by leave of the Colony, in 1713 and 1721, the former by Colonel John Livingston, the other by Samuel Weller & Son. One of the earliest millwrights in Eastern Connecticut was John Elderkin, one of the grantees of New London, in 1650–1. He was invited thither by Mr. Winthrop, from Massachusetts, where he had previously carried on that business, as well as that of house-carpenter and shipwright, in which latter capacity he has been already mentioned. For a period of thirty-five years, he was a general contractor for building mills, bridges, meeting-houses, etc., in New London, Norwich, and the adjoining settlements. He built the first meeting-house there, and was probably the builder of Winthrop's mills.[3]

In 1667, the Court granted Thomas Harris liberty to build a Saw-mill on the brook between Hartford and Wethersfield, on the east side of the "Great River," provided it be accomplished within two years, and he is allowed forty acres for his encouragement therein. In 1671, John Allyn received a grant of one hundred acres of land, with the use of timber on the Commons, and the stream, for a like purpose.

In July, 1680, the town of Norwich, at the head of navigation on the Thames, granted Captain Fitch two hundred acres of land "for his encouragement to set up a Saw-mill, and to have the benefit of the stream

(1) Arnold's Rhode Island.
(2) Colony Records, vol. i, p. 246.
(3) Caulkin's History of New London.

and timber at the place, and no others to set up a Saw-mill upon the said stream to his damage."[1]

The Saw and Grist-mill is so necessary an appendage to new towns, and the employment for them so limited in sparse populations, that it was customary for the towns to make grants of peculiar or exclusive privileges, and donations of land, to persons willing to risk the expense of their erection. It is in the infancy of the Arts that bounties of this kind find their appropriate place. Many of these early monopolies, granted by towns and larger municipalities, contain curious stipulations.

We may add to the foregoing enterprises of the New England people in this business, that the first mill in the present State of Ohio was built in 1789, the year following the settlement in the Northwest Territory, by the "New England Ohio Company" at Marietta. A Saw-mill was that year completed on Wolf Creek, about a mile above its junction with the Muskingum, and sixteen miles from Marietta. Colonel Robert Oliver, Major Hatfield, and Captain John Dodge, received an allotment of land for the purpose from the Company. The crank, weighing one hundred and eighty pounds, was made in New Haven, and taken on a pack-horse over the mountains to Simrel's Ferry, on the Youghiogheny River, and thence, by water, to Marietta. A Grist-mill was built the following year.[2]

Dr. Douglass, writing about 1750,[3] says, "New England abounds in Saw-mills of cheap and slight work; generally carry only one saw; one man and a boy attending, a mill may, in twenty-four hours, saw four thousand feet of white pine boards; these boards are generally one inch thick and of various lengths, from fifteen to twenty-five feet, and of various widths, one foot to two feet at a medium; it is reckoned that forty boards make one thousand feet. These mills stand upon small streams, because cheap fitted, but with the following inconveniences. 1. As the country is cleared of wood and brush, small streams dry up. 2. In living small streams, they do not afford water sufficient to drive the wheels in summer. 3. In winter they are frozen up." A considerable source of profit for the Saw-mills at this period, were the contracts with the Commissioners of the Royal Navy, as well as in preparing lumber for the West India and other markets. There was a surveyor of his Majesty's woods, whose deputies surveyed and marked the logs at the mills, for which they received a perquisite from the lumbermen. "A timberman's estate," says the writer just quoted, "consists in mills and oxen."[4]

(1) Barber's Hist. Coll. of Connecticut, p. 298.

(2) American Pioneer, vol. ii. p. 99.

(3) British Settlements in America, ii., 54.

(4) By the term *lumber*, was generally meant, in America, ranging Timber, Spars,

Mill-saws were manufactured at Canton, Massachusetts, in 1790, to the number of 150 to 200, annually.

6. NEW YORK.—The Dutch and Swedish settlements on the Delaware and North River, were early in possession of Saw-mills, driven both by wind and water. Wind Saw-mills were erected on Manhattan Island, by the Dutch, as early as 1633. An account of New York, published in 1708, says the Dutch built mills to saw timber, "one of which would do more work in an hour than fifty men in two days."

During the administration of the first Director, General Peter Minuit, who in 1626 negotiated the purchase from the Indians of the Island of Manhattan, containing about 22,000 acres, for the sum of sixty Gilders, or twenty-four dollars, the Directors of the Dutch West India Company, whose property it now became, caused the erection of Wind-mills on the Island for sawing lumber and grinding corn. During his time and that of his successor, Wouter Van Twiller, who succeeded in 1633, the Company, as the Provincial documents state, "erected at considerable expense three Saw-mills, which have never produced any profit of consequence." This was afterward urged against the Company in proof of its mal-administration.

It is worthy of observation, that in the employment of this useful class of machinery, the Dutch settlers, whose native country afforded no indigenous timber for their use, was in advance of their contemporaries of Plymouth and Massachusetts Bay, as a Hollander is said to have been the first to erect, some years after, the first Saw-mill in London. One of the first Saw-mills built in New Netherlands, was situated on Nut, or Governor's Island, which was leased in 1639, for five hundred merchantable

Oak and Pine Plank, Oak and Pine Boards, Staves, Heading, Hoops, Clap-boards, Shingles, and Laths. In the Act of Parliament of 1722, extending the operation of the previous laws for encouraging the importation of Naval Stores, the different kinds of lumber were specified, viz., Deals of several sorts, Timber Balks of several sizes, Barrel-boards, Clap-boards, Pipe-boards, or Pipe-holt, White-boards for Shoemakers, Boom and Cant-spars, Bow-stoves, Caprevans, Clap-holt, Ebony-wood, Headings for Pipes, Hogsheads and Barrels, Hoops for Coopers, Oars, Pipe and Hogshead-staves, Barrel-staves, Firkin-staves, Trunnels, Speckled wood, Sweet wood, small spars, Oak, Plank, and Wainscot.

The Commissioners of the Navy in making their contracts, which were usually given to Piscataqua, N. H., and Casco Bay, Maine, specified the kind and number required, and gave a license for cutting the trees, and none could be cut without. Masts were usually required to be thirty-eight inches at the butt, and as many yards long. They sometimes reached forty-two inches at the butt. The premium was one pound per ton of forty feet girt measure. Timber under twelve inches, was called *Ranging* timber; that above twelve inches, *Tun* timber; standards and knees, were called *Compass* timber.—*Douglass' British Settlements.*

boards yearly, half oak and half pine. There was a small stream on the east side of the Manhattan Island, flowing into the East River, which furnished an ample supply of water for several grain and Saw-mills, and was thence called in early times Saw-mill Creek.

About the same time several Saw-mills were built on the creeks and rivers in the neighorbhood of the present city of Albany, settled in 1630, by the first Van Rensselaer, under a system of colonization, granting, by the Charter of "Freedoms and Exemptions," certain feudal privileges, with the title of Patroon, to any person who should, at his own expense, within four years, plant a Colony of fifty persons outside of Manhattan Island. Among the Colonists, embracing a judicious admixture of mechanics, sent thither in 1630, was Andries Carstensen, a master millwright, and two sawyers; and in 1636, Pieter Cornelissen, of the same calling, and Barent Pieterse Koeymans. The latter, who was surnamed "the Miller," in which capacity he came to the Colony, having been several years in the Patroon's grist-mill, in 1645, took charge with Jan Gerritsen, his partner, who came out with him, of the Patroon's Saw-mills, on one of the creeks, for which they were allowed 150 Gilders each a year for board, and three Stivers a cut for every plank they sawed.[1]

In 1647, when he quit the service, he had sawed between three and four thousand boards; whence it may be inferred, that the early Saw-mills of the Province were not very efficient establishments. After having for several years rented other mills in the Colony, he purchased of the Katskill Indians, in 1673, by consent of the Commissioners at Albany, a large tract of land, twelve or fifteen miles south of that city, on the west side of the river. The advantages of this place for the erection of Saw-mills, had been known for several years. Cryn Cornelissen, and Hans Jansen Van Rotterdam, early emigrants, had by license erected Saw-mills there in 1651, on the creek immediately west of Beere, (now Bearen Island), the southern boundary of the Seigniory of Renssalaerwyck. This purchase, twelve miles deep and eight or ten front, now constitutes the ancient town of Coeymans, in Albany County, and the descendants of the proprietor are numerous in that State and New Jersey, where they have been the owners of several mills.[2]

Dirck Jansen had mills within the boundary of Renssalaerwyck, in 1643.

The West India Company also caused Saw-mills to be erected on the

(1) The wages of day-laborers are charged in the Proprietor's accounts at this time, at one florin to one florin ten stivers, (40 to 50 cents), per day; carpenters, two florins, (80 cents); plank, one florin ten stivers, to one florin sixteen stivers each; and palisades, then much in demand, fifteen florins per thousand.

(2) O'Callaghar's New Netherlands.

South River, or Delaware, while they held possession there. There were Saw-mills, in 1712, in the Manor of Livingston, situated on Ancram, or Roeloff Jansen's Creek, eight miles below Hudson, on the eastern side of the river. The Katskill furnished superior water-power, having a descent of 1000 feet in thirty-five miles, and was early occupied by mills.

The French had Saw-mills at Ticonderoga during their possession of that part of the country. At the falls of the Boquet River, some distance above, WILLIAM GALLILAND, an enterprising Irish merchant of New York, aspiring to the possession of a manorial estate, like those on the North River, settled in 1765, and the same year built a Saw-mill and afterward Grist-mills. The manufacture of lumber of Norway pine and oak, rafted over the lake and thence down the Sorel and St. Lawrence to Quebec, where it was sold at large profit, chiefly employed the early settlers. The Champlain Canal afterward opened a market for white pine sawed lumber in Albany and New York, and Saw-mills became exceedingly numerous in the county. During the Revolution, Mr. Galliland was compelled to bury his Saw-mill and Grist-mill irons to save them, and was nearly ruined in estate, and his Saw-mill destroyed.

Much pains was taken to induce the settlers of the Western counties to erect mills, and every facility was afforded them. Toward the close of the last century, they were consequently said to be better supplied in these respects than most settlements twenty years older, as was evinced by the number and appearance of the frame-houses and barns, and of their surroundings. A small Grist and Saw-mill could be built, if the dam were not difficult, for one thousand dollars. Upon the many excellent mill-streams of the Genesee Valley, which still sends down by its canals vast quantities of lumber, Saw-mills sprang into existence with incredible rapidity. The improved mechanism of Saw-mills and grist-mills, and the increasing value of lumber, caused great quantities to be rafted down the Susquehanna to Baltimore, and the Delaware to Philadelphia. The invention about the same time of Arks, a species of huge boat or barge constructed of sawn planks, capable of carrying five hundred barrels of flour, or great quantities of lumber and other produce, and which were afterward broken up and sold for lumber, gave an impulse to the business. The town of Bath, in Steuben County, laid out in the Spring of 1793, had two Saw-mills and a grist-mill erected before winter. Three years after, it had, within a circuit of eight miles, five Saw-mills. The county in 1797 contained twenty Saw-mills; Ontario County, a little earlier settled, had at the same time twenty-eight Saw-mills. Other portions of the State multiplied them in nearly equal ratio.[1]

(1) New York State, in 1824, contained in 1840, 6356 Saw-mills. It still outnumbers 2264 Grist-mills, and 5195 Saw-mills; and all other States in this class of machines.

The exports from New York of boards and lumber, according to Lord Sheffield's Tables from the Custom-House books, was in 1774 ten thousand seven hundred feet. In 1775, owing probably to the commencement of hostilities with Great Britain, it only amounted to five thousand two hundred and eight feet. The value for the two years, at forty shillings the foot, was £31,416.

Albany, having in former times a very flourishing commerce with the West Indies and other foreign ports, and extensive connections with the Western settlements, not only employed numerous Saw-mills, but was the centre of a prosperous lumber trade. It is still among the largest lumber markets in the world; and in 1851 the receipts at tide-water of boards and scantlings were 427,038,600 feet, valued at nearly seven and a quarter millions of dollars.

7. New Jersey.—New Jersey received a portion of its first settlers from the original stock of New Netherlands, and other industrious Colonists from New and Old England. They were not slow to improve the numerous mill-seats in which the Province abounds, and contributed to render the Province, though small in extent, among the foremost in Manufactures. The Dutch, who settled on some of the eastern rivers, probably erected Saw-mills.

The earliest accounts we have met of Saw-mills was about the year 1682, when West Jersey was assigned to William Penn and others, and renewed efforts were made to invite settlers into the Eastern Province. The erection of Saw-mills and corn-mills now became general. Mills existed at that time at Hoboken, opposite New York, which were owned in that city. Some eight or ten towns existed in New Jersey, containing from 300 to 500 inhabitants, of which Newark was the most compact, containing 500 people, and Shrewsbury, of about 400, the most southern one.[1] It is probable that some of them previously possessed Saw-mills, as they did corn-mills. During that year, however, the first Saw-mill in Woodbridge was erected by Jonathan Bishop, on the Rahawack River. A Saw-mill was at the same time built in the southern extremity of the State, at Salem, in West Jersey, by William Hampton, which was the first in that town. In May, 1683, Thomas Rudyard, the Deputy-Governor of the Province, writes from Amboy: "There is five or six mills going up here this Spring, two at work already, which abates the price of boards half in half and all other timber for building, for although timber costs nothing, yet workmanship by hand was London price or near

(1) Whitehead's East Jersey.

upon, or sometimes more, which these mills abate. We buy oak and chestnut boards no cheaper than last year."[1]

Saw-mills and the manufacture of lumber had so far increased in 1698, that the latter formed an important article of export. To encourage "the building of ships and other vessels," and increase the trade of Perth Amboy, which then endeavored to rival its neighbor, New York, in commerce, the Assembly prohibited the exportation of any timber, planks, boards, oak bolts, staves, heading, hoops, and even hop-poles, except directly to England, the West India, Summer, and Wine Islands, and required in the last case bonds to be given, and a vigilant scrutiny on the part of inspectors. This attempt to monopolize the carriage of its only export, while it is believed to have little benefited the Ship-building interests, proved injurious to the trade of New Jersey, and was complained of as severely hurtful to that of New York. The system was continued under the Royal Government, and in 1714 duties and other burdensome regulations were imposed on the exportation of some of the same articles when going to neighboring Provinces. These were repealed in 1717, because "prejudicial to the inhabitants"; but in 1743 were re-enacted, and continued in force until the Revolution.[2] The operation of such laws, by throwing obstacles in the way of the free export of lumber and manufactures of wood, was calculated to discourage the multiplication of Saw-mills.

Ship-building and the manufacture of lumber were principal branches of business at Little Egg Harbor, where, about the year 1704, Edward Andrews erected Saw and grist-mills on Tuckerton's or Andrew's Mill Creek. Saw and corn-mills were built about the year 1758 on the north branch of the Rancocas, at Pemberton, by a company who purchased land of David Budd.

In 1798 there were said to be 1100 improved mill-seats in New Jersey, of which about 600 were occupied with Saw-mills, fulling-mills, forges, furnaces, slitting and rolling-mills, paper, powder, and oil-mills, a large proportion of them being Saw-mills.

8. PENNSYLVANIA.—It has been already mentioned, that the Dutch and Swedes erected Saw-mills at the settlement on the Delaware, before the arrival of Penn.

(1) Whitehead's East Jersey, 273. In 1680, merchantable white pine boards were in New England 30*s.* current money per thousand. Day wages in East Jersey were at this time about 2*s.* per day; and at Amboy, where building was actively going on, 2*s.* 6*d.*, the currency being one-fifth more than sterling. In 1698, handsawyers, which were much depended on in new settlements, received at Philadelphia and Burlington 6*s.* to 7*s.* per hundred for sawing pine boards. The houses building at Amboy in 1683 are described as usually 30 feet long, 16 feet wide, 10 feet between joints, with double chimney of timber and clay, "as the manner of this country is to build," and cost about £50 each.—*Letters in Scot's Model of the Government.*

(2) Whitehead's East Jersey, 298.

Joost Andriansen & Co., in 1658, proposed to build a Saw-mill and grist-mill below the Turtle Falls, near New Amstel, (Newcastle), in the present State of Delaware.

In a list of articles to be sent to the Colony on the South River, or Delaware, in November, 1662, was iron-work for a Saw-mill, for which was paid four hundred and fifty florins, ($180).

In reference to a mill existing a few years later on "Carcoon Creek," it was represented to the Upland Court, in March, 1678, that in consequence of the land being daily taken up around it, it would soon be left destitute of timber, and the Court therefore ordered one hundred acres of land to be appropriated for its use.[1] The Swedes also had a mill, supposed to have been a Saw-mill, in Frankford, before the landing of Penn. It stood near the house of William Kinsey, the first erected in that place.[2]

A Saw-mill appears to have been built for the use of the Colony, by the first settlers under the Proprietary, soon after their landing. In a letter to the Free Society of Traders in 1683, giving an account of Pennsylvania, William Penn alludes to their Saw-mill for timber, and the Glass House, as being "conveniently posted for water carriage."

Richard Townsend, who came from England with Penn, and built the first grist-mill within the present limits of the city, also erected a corn and Saw-mill on Chester Creek, in Delaware County.

"This mill," he says, "I brought ready framed from London, which served for grinding of corn and sawing of boards, and was of great use to us."[3] The mill referred to by Penn, appears to have been the joint property of himself, Caleb Pusey, Samuel Carpenter, and others, probably including Townsend, by whom it was erected and superintended. The iron vane, with their initials, which surmounted it, is still preserved.

Although corn-mills were built in considerable number by the first German and English settlers, Saw-mills do not appear to have been numerous in the neighborhood of Philadelphia. They were said, a few years after the landing, to have a sufficiency of mills, and in different

(1) Hazard's Annals of Pennsylvania.

(2) Mem. of Hist. Soc. of Pennsylvania, vol. 2, p. 163. Ferris, in his History of the Original Settlements of the Swedes on the Delaware, states that he had seen, in his youth, the house at Newcastle, in which Governor Lovelace entertained George Fox in 1672, the timber of which appeared to have been hewed, indicating its erection before the introduction of Saw-mills; and the mortar and cement had been made of lime that was burnt from oyster shells, before any limestone had been discovered. The house was built of brick, and was standing a few years before he wrote, in 1845.

(3) Clarkson's Life of William Penn, vol. 1.

places; but Saw-mills are not particularized. Hand-sawyers are mentioned as in demand in 1698, and received, for sawing pine-boards, six to seven shillings per hundred. The price for the same labor in 1705, was ten shillings, which would indicate an increased demand for lumber without a proportionate decrease in the cost of production. Boards were then ten shillings per hundred; shingles, ten shillings per thousand; timber, six shillings the tun; and wheat, four shillings a bushel. In the neighboring county of Bucks, settled by English Quakers about this time, there appear to have been no Saw-mills as late as 1731, when the framed houses were covered with "nice shaved clap-boards," and "the boards for floors and partitions were all sawed by hand."[1] At least eleven mills were erected near Wissahickon, within the late township of Roxborough, in the northwest part of the City, previous to 1779, but did not include a Saw-mill, according to a recent historical sketch of the place.[2] The "Chester Mills," including a Saw-mill, in part belonging to the estate of Jonathan Dickinson, on Chester Creek, were advertised for sale in 1723. In 1760, the Assessors reported within the county of Philadelphia, forty Saw-mills. Oak, hickory, walnut, and other lumber, either sawed near the city, or rafted down the Delaware, Schuylkill and other streams, was always abundant in the market of Philadelphia, and was exported in considerable quantities. Mills for its manufacture were speedily multiplied in the rivers on the interior, where timber abounded. The industrious Germans of those counties had many mills. In 1786, within thirty-nine miles of the Borough of Lancaster, one-third of whose population were manufacturers, there were sixteen Saw-mills.

In Delaware, which constituted the three lower counties of Pennsylvania, Saw-mills existed on the Brandywine, Christina, and other streams. Some of the first erections in this part of the country, as we have seen, were within its present limits. Vincent Gilpin, in 1772, owned flouring and Saw-mills on the Brandywine, two miles from Wilmington. There was also a Saw-mill within the borough, nearly opposite the site of Hollingsworth and Harney's machine shop, which was demolished toward the close of the last century.

The export of boards and scantlings from the port of Philadelphia in 1765, was 783,000 feet; the value of which at £3 10*s.* per M., was £2470. Staves, heading, and shingles, were exported in the same time to the value of £28,450. The exports of planks and boards in the years

(1) Dr. John Watson, in Mem. Hist. of Pennsylvania, vol. 1, 278.

(2) Genealogical Account of the Levering Family, by H. G. Jones, Esq. App. Note A.

1772, '73, and '74, were, respectively, 1,724, 4,075, and 3,309 thousand feet.[1]

9. MARYLAND.—Respecting the introduction of Saw-mills in Maryland, we have no information. The first water-mill for corn in the Colony, was erected by public subscription in 1639. A century after, the Assembly encouraged the erection of the same class of mills by a public statute.

The mill-sites on the Patapsco were occupied for corn-mills about the year 1763, by Joseph Ellicott and J. & H. Burgess, from Bucks County, Pennsylvania.

10. VIRGINIA.—Making boards and clap-boards by hand-labor was one of the first employments of the Virginians in 1609; and the later emigrants, in 1620, were directed to give their attention to the preparation of timber, masts, planks, boards, etc.

Artisans were sent in the spring of that year, to set up Saw-mills; and others, from Hamburgh, were engaged later in the year for the same purpose.

Of clap-boards or pipe-staves, it was said in 1650, a man could easily make (by manual process) 15,000 in a year, worth in the Colony £4 per thousand; and in the Canaries £20; which would yield, in the lowest market, £60. Walnut, cedar, and cypress planks, were always saleable in England. A Saw-mill at this date was said to be a great desideratum, whence it may be inferred that none previously existed. A Saw-mill, driven by water, would do the work of twenty sawyers.

The following "Explication of the Saw-mill, an engine wherewith, by the force of a wheel in the water, to cut timber with great speed," illustrated by a rude engraving, is contained in a tract published in London, by E. Williams, in 1650,[2] who proposed to introduce it into Virginia, where a Saw-mill did not exist at the time.

"This engine is very common in Norway, and mountains of Sweden, wherewith they cut great quantities of Deal-boards; which engine is very necessary to be in a great Towne, or Forrest, to cut Timber, whether into planks or otherwise. This heer is not altogether like those of Norway, for they make the piece of Timber approach the sawes on certaine wheels with teeth; but

(1) Lord Sheffield's Tables from Custom-House Books, Nos. 9 and 10.

The census of 1810, from eleven out of twenty-six States and Territories, returned 2,526 common Saw-mills, and twenty-one Mahogany mills, of which 1,995 common Saw-mills, and all the Mahogany mills belonged to Pennsylvania. The quantity sawed was ninety-four million feet, of which seventy-four millions was in Pennsylvania. From New York, and several lumber States, there was no return. Chester, Lancaster, Northumberland, and Cumberland, had the greatest number of mills in Pennsylvania.

(2) See note, page 32.

because of reparations which these tooth'd wheels are often subject unto, I will omit that use, and in stead thereof put two waits (weights) about two or three hundred pounds weight apiece, whereof one is marked A, the other B. The chords wherewith the said weights doe hange, to be fastened at the end of the 2 peeces of moving wood, which slide on two other peeces of fixed wood, by the meanes of certaine small pulleys, which should always draw the sayd peeces of moving wood, which advancing always toward the sawes rising and falling, shall quickly be cut into 4, 5 or 6 peeces, as you shall please to put on sawes, and placed at what distance you will have for the thicknesse of the plank or boards ye will cut, and whenn a peece is cut, then let one with a lever turn a Rowler whereto shall be fastened a strong cord, which shall bringe backe the sayd peece of wood, and left againe the weights: and after put aside the peece already cut to take again the sawes against another peece of wood. Which once done, the ingenious ARTIST, may easily convert the same to an instrument of threshing wheat, breaking of hemp or flax, and *other as profitable uses.*"

This primitive instrument appears to have admitted the employment of a gang of saws, and by comparing the description with that given a century earlier by the Bishop of Ely, the reader who is conversant with the mechanism of Saw-mills, as they existed in remote rural districts, not many years ago, will discover fewer changes, we apprehend, in their essential features than he would be led to expect in the course of three centuries. A Saw-mill, down to the close of the last century, was quite a simple affair; and a mill which cost £100, and cut one thousand feet of boards, *per diem*, was considered better than the average. The benefits conferred by steam in cutting timber, and in prompting invention in the machinery, applied to manufactures of wood, are among the most signal of its triumphs.

In a work published in 1731, quoted by Anderson, which set the value of the British Colonies to the parent country in a clearer light than before, the author enumerates among the valuable imports from Virginia and Maryland, fifteen thousand pounds' worth of lumber annually sent in the tobacco ships, two-thirds of which were gain, as it would not cost above four thousand pounds in the plantations. James Rumsey, a native of one of these States, and an adopted citizen of the other, toward the close of this period made some improvements in the mechanism of mills, which he patented in several of the States, and afterward under the Federal laws. "With regard to a Saw-mill," he says, in his Treatise on the Application of Steam, etc., published in 1788, "or any other machines that have retrograde movements, I have contrived a method of supplying them with water in such a manner that one twentieth part of what is generally expended will answer every intent and purpose generally requisite. My new invented machine for raising water is simple, the cost will not be more than twenty guineas to complete the mechanism

of one sufficiently large to raise water to work six saws or a Grist-mill."

11. The Carolinas and Georgia.—The extensive pine forests and other timber lands of the two Carolinas and Georgia invited the first settlers to a lucrative manufacture of lumber and naval stores. But although South Carolina, as early as 1691, passed an Act "for the better encouragement of the making of engines for the propagating of the staples of the Province," and, in 1707, another for "encouraging the making of potash and saltpetre," followed, in 1712, by an Act "for encouraging the building Saw-mills and other mechanic engines," the Saw-mill does not appear to have come into extensive requisition in Carolina during colonial times.

"The resources of Carolina in lumber," says Dr. Ramsay, "may be estimated from the following statement. There are within its limits two hundred thousand acres, each of which, on an average, has growing on it fifty pine trees, and every one of these on an average, when brought in a marketable form to the seaports, would sell for ten dollars. If to these are added the cypress and cedar trees, the oaks, ashes, poplars, maples, beeches, magnolias, palmettos, and other common trees in Carolina which are used in furniture, building, as ship timber, and in various forms by different artists, the sylvan riches of the State will be found to exceed all calculation. So great is the eagerness to plant cotton (1808), that forests containing immense quantities of useful wood are merely cut down and burnt, without any other advantage than what is derived from the fertilizing quality of their ashes. This small residue of what might have been made ten times more valuable, is not improved by being converted into potash. Such are the temptations resulting from the high value of the new staple, *Cotton*, that, to extend its culture, other sources of wealth, to an immense amount, are annually sacrificed."

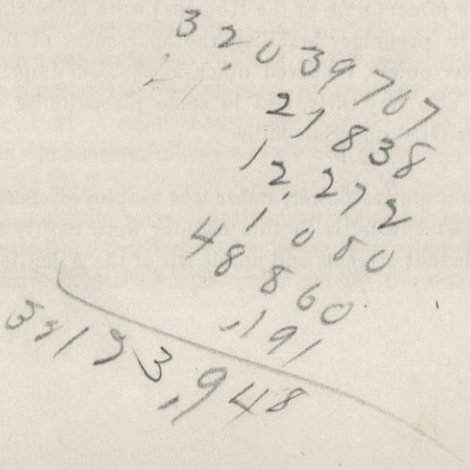
South Carolina had at this date only sixty-five Saw-mills and Georgia one. The last-named manufactured about one and a quarter million feet of lumber. As Rice, and, to a less extent, Indigo and Tobacco, had previously engaged the industry now bestowed on Cotton, there was comparatively little attention paid to the erection of either Saw or grain mills until after the Revolution. We have no record of their progress during that time. It was not until the middle of the last century that those Provinces began to flourish in any good degree. In 1784, the Legislature once more enacted a law for the encouragement of the Arts and Sciences, giving inventors the exclusive benefit of their labors for fourteen years. A Society which was instituted soon after for the encouragement and aid of emigrants, stated, in their Circular, that capital might be profitably employed, among other ways, in erecting mills for

making paper, sawing lumber, and especially for manufacturing flour. There were hundreds of valuable mill-seats, and the woods abounded with pines.

The official value of the different kinds of lumber exported from all the Colonies in the year 1770 was £154,637, or $686,588. This embraced boards, plank, scantling, timber for masts, spars, and buildings, staves, heading, hoops, and poles. In 1792, the exports of lumber were 65,846,024 feet; of shingles, 80,813,357; of hoops, staves, and headings, 32,039,707; of timber, 21,838 tuns and 12,272 pieces; 1080 cedar and oak ship knees; 191 frames of houses; and 48,860 shooks, etc.

It was just previous to the period when our Federal history commences, and the close of the period embraced in these reminiscences, that the application of steam to mill machinery began to be introduced into Europe and America. The Steam-engine had for some time been used in England and elsewhere, for raising water for the use of mills; and as early as 1745, a Steam-engine was constructed and in use in the copper-mine of Mr. Schuyler, in New Jersey. Its improvement had also for several years engaged the attention of Oliver Evans, Rumsey, Fitch, Stevens, and others. But it now began to be used as a direct power for the movement of mill-work for both Saw and Flour-mills. These inventions, of which we shall speak elsewhere, and particularly the high-pressure Steam-engine, and other contrivances of Evans, so admirably adapted to the use of all kinds of factories, opened a new era in the history of Flour-mills and of wood-working machinery. So great has been the influence of the last-mentioned improvements, as to justify the eulogium of a talented writer, who says, respecting their inventor: "Wherever the Steam-mill resounds with the hum of Industry, whether grinding flour on his native Schuylkill, or cutting logs in Oregon, there do you find a monument to the memory of Oliver Evans."[1]

(1) Address before the American Institute, New York, 1850, by S. G. Arnold.



CHAPTER VI.

THE INTRODUCTION OF GRIST AND FLOUR-MILLS INTO THE COLONIES.

THE earliest instrument for grinding or bruising corn or manna consisted of two portable and nicely-wrought stones, one of which was made to revolve, by means of a handle, upon the other. Grinding with these mills was always a servile and laborious operation, and fell to the lot of the maid-servants, or captives taken in war, as Samson was made to grind in the prison-house of the Philistines, and the captive Israelites in Babylon. By the laws of Moses, the mill-stones were not allowed to be distrained for debt. The sound of the mill-stones and the song of the grinders, who plied their task in concert at the early morning hour, furnished the Hebrew writers with images of cheerfulness and prosperity, and their suspension, "when the sound of the grinding is low," conveyed the idea of desolation. As suggestive of the same ideas of plenty and enjoyment, and as an element of the picturesque, the old-fashioned water Grist-mill of our fathers was, both to the eye and the ear, an object of much interest. In many a frontier settlement, its pleasant sounds were unheard for years by the first lonely dwellers, who were forced to prepare their corn for daily use by a modification of the primitive mill above described, or by the scarcely less operose contrivance of the *quern*.

The pestle and mortar, used by the aborigines of this country, was frequently employed by Europeans, and performed the grinding rather by pounding than by rubbing, as in the Eastern mill. Beside these, horse or cattle mills (the *molæ jumentariæ* of the Romans) were quite common for grinding corn, where pecuniary inability, the sparseness of population, or absence of water-power, rendered other mechanism impracticable. Wind-mills were also very early, and in some places quite extensively employed both for Grist and Saw-mills.

1. WIND-MILLS.—As a motive power, water was employed much earlier than wind. The first saw-mills in this country were mostly driven by water, which the abundant streams and ample fall of the Atlantic slope

rendered everywhere accessible. Some of the early Saw-mills in America were, however, propelled by wind, particularly among the Dutch settlers. With those they were familiar in their native land, where, on account of the level character of the country, and the absence of falling streams, Wind-mills were extensively employed long before they were used in England. Mr. Hume considered the man who first introduced Wind-mills a great public benefactor. We are not aware who first conferred that boon upon America; but it was probably the Dutch Colonists at Manhattan.

In the Records of the Governor and Company of Massachusetts Bay, March 17, 1628, (O. S.,) it is entered that eleven pounds were paid for a pair of *mill-stones* to go to New England in the ship, consisting of one hundred and ten burrs, at two shillings each. How early these were brought into use, we find nowhere stated. It is said, however, that the first mill in New England was a Wind-mill, near Watertown, in Massachusetts, which was taken down in 1632, and rebuilt in the vicinity of Boston.[1] This first Corn-mill was removed from its original site, in August of that year, "because it would not grind but with a westerly wind." It was set up at the north end of the City of Boston, on the hill previously called Snow Hill, and afterward Copp's Hill, and "Wind-mill Hill," by which name it is mentioned in the Records, in 1635. This Wind-mill is mentioned by Wood in 1633, and was, doubtless, a conspicuous object throughout the settlements, as being the first attempt to supersede the mortars and hand-mills, previously used by the people. They that year gathered their first harvest of English grain from the adjacent fields, now covered by the solid masonry of the tri-montane city. The principal supplies of food were at first derived from England, in flour or meal, or from Virginia, in grain, which was sent to this mill from all the scattered plantations as far east as the Kennebec.

Watermills were soon after erected, and, in 1636, two more Wind-mills were built, one at Boston and one at Charlestown. The last was blown down in 1648.

A Wind-mill was erected at Scituate, by William Gilson, in 1637, and land was the same year granted John Horn, for one at Salem. It was removed by him, in 1639, to Wind-mill Point, on the south side of North River, where a Corn-mill of the same kind stood in 1771. An-

(1) In *Bond's History of Watertown*, we do not find any mention of the erection of this Wind-mill, and the laborious author was unable to determine who built the first water-mill there. The Wind-mill may have stood within the adjoining limits of Newton, near which, it is said in *Drake's Antiquities of Boston*, to have been originally placed. The mill on Copp's Hill was shattered and set on fire by lightning, in 1642, and the miller rendered insensible for twenty-four hours.

other one stood on Orne's Point, which gave place to the bridge. A Wind-mill was built at Newberry, in 1703.

Edward Holyoke, who took the Freeman's Oath in 1639, owned a Wind-mill on Purchase street, in Boston, near Fort Hill, which he afterward sold to Richard Woodward.

In 1701, John Arnold requested liberty to place a Wind-mill on Fort Hill, and was allowed to build one there "on the Town's land," paying such quit-rent as the Select-men should order. A Wind-mill was, in 1740, removed from Roxbury and placed on the same hill.

In 1661, the Select-men of Portsmouth granted Captain Pendleton liberty "to set up his Windmill upon Fort Point, toward the beach, because the mill is of such use to the public."[1]

Wind-mills, which had thus become numerous in the older settlements of Massachusetts, and were much employed in other parts of the Province, were early introduced into Rhode Island, where, as late as 1803, they were common on every eminence in some parts of the State, presenting a rugged and grotesque appearance, and much diversity of mechanism.[2] They were most numerous in the County of Newport.

The first Wind-mill in Rhode Island was built in 1663, at Newport, by Governor Easton and his sons, who, in 1639, had erected the first European dwelling at that place. This mill was blown down in 1675.[3]

(1) Annals of Portsmouth.

(2) Notes on Compton, in 1 Mass. Hist. Coll., x. 202.

(3) History of Rhode Island, by S. G. Arnold, vol. i. p. 370. A curious stone structure at Newport, supposed to have been built for a Wind-mill about this time, gave rise, not many years since, to considerable speculation and antiquarian discussion. It is described as unique in its style, being a circular and massive stone building, twenty-five feet in diameter, and the same in height, supported on eight arches resting on thick columns about ten feet high, on a foundation five feet deep. The centre arch is about twelve feet high. Its erection was by some attributed to the Northmen; and this theory was used to prove that Rhode Island was the "Vinland" of the Scandinavian voyagers. The Royal Antiquarian Society, at Copenhagen, were incautiously betrayed into this opinion. A Danish writer attempted to prove that it was the work of Northmen; and a gentleman of Albany met, at the residence of the Duke of Tuscany, a Swedish count, who spoke of it as the work of that people. But these opinions were all of recent origin. The mention of the building, in the will of Governor Benedict Arnold, who died in 1678, as "my stone-built Wind-mill," as well as the traditions of the family in whose possession it long remained, leave no doubt that it was built by him. In the "Penny Magazine" for November, 1836, page 480, is an engraving of a Wind-mill at Chesterton, in Warwickshire, England, erected after a design by Inigo Jones, which, without the roof and vanes, is an exact fac-simile of the old mill or tower at Newport. With this, which must have been one of the first in England, Arnold is supposed to have been acquainted in his youth, and to have built in imitation of it after the first mill was destroyed in 1675.

Dr. Palfrey, who has ably discussed the historic character of this structure in the first volume of his History, visited the Warwickshire mill in 1856, and is satisfied that it was the original of the Newport Tower.

It has been made the subject of an infinite

Half an acre of ground was set apart on Tower Hill, in New London, Connecticut, in 1719, for a Wind-mill, which was erected in 1726.

Wind-mills were numerous in New York under the Dutch dynasty, and were employed both for grinding corn and sawing lumber, as before mentioned. They were a scarcely less peculiar feature of Manhattan scenery, than that of the fatherland, where they were a principal dependence before the days of steam. The first mill on the Island was a Horse-mill, built in 1626, by François Molemacker, under the eye of the engineer Kryn Frederick, who in that year staked out a fort at the lower end of the Island, and erected a stone warehouse for the Company, whence the goodly city has since expanded to its present dimensions. The second story of the mill-building was the first humble place of worship of the early settlers, and its site was almost within the shadow of the present Trinity steeple.

A horse-mill, one of the earliest in the city, also stood for many years before the English possession, on the North side of the present South William Street, next the corner of Broad, and gave the name of "Mill Street Lane" to that part of South William.

Minnuit, the first Dutch governor, built, according to Moulton, "two or three Wind-mills at Manhattan, by which corn was ground and boards sawed." One of these, a Flour-mill, stood on a hill which occupied a part of the present Battery, so near the Fort that the latter, which was rebuilt by Van Twiller, in 1633, intercepted the south-east wind, and rendered the mill nearly useless. But one of three Wind-mills previously erected, was in operation in 1638, when Keift came to the government.

On one of their farms, of which they reserved several in different parts of the Island, the West India Company erected a "Wint-molen," (Wind-mill) for the use of the town. It stood near Broadway, between the present Liberty and Courtland streets. After having gone to decay, it was ordered, in 1662, that there be another erected on the same ground, "outside of the city landport (gate) on the Company's farm." "Old Wind-mill lane," running from Broadway to Greenwich street, and between Courtland and Liberty street, upon which it probably stood, was, in Lyne's survey of New York, in 1729, the most northern street west of Broadway, all beyond being the King's farm.

Mills of this class were also built by private enterprise. Jan Teunizen

amount of verse, traditionary, sentimental, and common-place. Some graceful lines by the Connecticut poet, Brainard, embody an Indian legend; and the muse of Longfellow has rescued it from forgetfulness in the beautiful Runic myth of "the Skeleton in Armor." But neither learned research nor poetic genius has been able to fasten upon it a more romantic character than the very utilitarian one above assigned. It was used as a Grist-mill in the last century, and afterward as a Powder-Mill. Therefore,

"Let antiquarians say what they will,
It is nothing but an old stone mill."

had a Wind-mill in 1665, which was standing sixty years after, near the corner of Chatham and Duane streets. This mill was then some distance beyond the limits of the city, on the public road.

The bolting of flour, in those days, was usually carried on as a separate business, and in establishments constructed for that purpose, sometimes at a distance from the grinding-mill, and often as an appendage to the bakery. During the operation of an Act of the Assembly, made in 1684, giving to New York the exclusive right of bolting flour within the Province, mills sprang rapidly into existence in the vicinity of the town, and the manufacture of flour became a principal source of emolument to the city. Two years after, under Governor Dungan, the city received a new charter, giving additional municipal privileges, and confirming the ancient Dutch franchises. A new seal, more rich and elaborate than the old one, was now granted the city, which, as indicative of the principal sources of its prosperity, retained the beaver to represent its ancient commercial interests, and added a wind-mill and a flour-barrel as emblems of its present industry.

A Wind-mill once stood on the hill in the rear of the old jail, or the present Hall of Records, and an eminence near the Chatham Theatre was called "Wind-mill Hill." In 1760, John Burling advertised for sale a Wind-mill near Bowery lane, having two pair of stones.

Wind-mills were also built at an early period in different places in the estates of the Patroons on the Hudson, and elsewhere as population extended, and were an infinite mystery to the simple mind of the native, who bruised his maize between two stones as he sat under the shadow of their revolving vanes.

It is related that the pioneer settlers of Western New York, at a comparatively recent period, when mechanical contrivances were more easily obtainable, had no mills, and prepared their grain by an improvement upon the Indian method. They used wooden mortars, formed of a hollow log set on end, to which they applied a pestle, attached to a sweep like the pole of a well. It is related that some of the first settlers of Onondaga had to go forty miles to a mill, and carry their grist on their backs! The Indians were accustomed to prepare their maize much after the manner of the ancients, by pounding it with stone pestles a foot long and five inches thick. Professor Kalm, the Swedish botanist, who traveled among them about the year 1748, says they were astonished beyond measure when they saw the first Wind-mills to grind grain. They would come from a great distance, and sit down for days near them, to wonder at and admire them! They at first regarded them as endowed with life, or as deriving their momentum from the agency of spirits resident within them. As familiarity abated their reverence, they were often accustomed to assail

them, not like the adventurous Knight of La Mancha, in unequal combat with lance or club, but with the more effective instrument of fire.

This class of machines was not limited among the people of the several Colonies to the manufacture of flour and lumber. They were employed also in grinding cocoa-nut for chocolate, in making linseed and other oils, grinding sugar-cane, beating rice, raising water, and in many other uses. An aged inhabitant of New York remembered a linseed oil factory, existing about the year 1790, a little over one-fourth of a mile north-east of the present City Offices.

As in New York, so in New Jersey, Horse-mills were first used to supercede the primitive and exceedingly laborious performance on the Hand-mill, with which many of the English and especially the Scotch settlers, in whose native highlands the instrument was common late in the last century, if it has yet wholly disappeared, came provided to the country.

Each of the three principal towns of the Province under the Proprietaries, Perth Amboy, Burlington and Salem, and others doubtless, were forced to content themselves with horse-power in the manufacture of flour and meal. A letter from a resident of Amboy to a friend in Scotland, dated New Perth, March 9th, 1685, speaks of a house and mill of this kind which he was then erecting, in a manner which indicates the wants of the community in that respect. "I am told that the mill will be worth £100 a year, but I am sure she will be better than fifty of clear money, for every Scot's boll of wheat or Indian corn payes here for grinding of it 2s. sterling. This house and mill stands me a great deal of money, but there is none such in this country, nor ever was." The great wheel, he adds, is 30 feet diameter.

An autograph letter of one of the primitive emigrants to Burlington, says they were first compelled to "pound Indian corn one day for the next, for there was no mill except some few steed mills." In Salem a Horse-mill was erected near what has in recent times been called Kent's Corner, to grind the grain for the town.

These were succeeded in many places by Wind-mills, and in others by Tide-mills or other water-mills. Three Wind-mills were built by the first settlers of Salem. Wind-mill or Smith's Island, between Camden and Philadelphia, was, as its name indicates, the site of an early structure of this kind.

The Swedes had a Wind-mill at New Sweden, on the Delaware, previous to the year 1643, which Gov. Printz—who built their first Water-mill that year—says "would never work, and was good for nothing"

These machines appear to have been comparatively little used in the

vicinity of Philadelphia. The county contained in 1760 but one of that class and one Horse-mill.

Virginia, in 1649, had in operation four Wind-mills, and five Water-mills.

Notwithstanding the general use of Steam-power in our day, Wind-mills are still much employed in some parts of the country, where fuel is scarce and water inaccessible. In 1855, the Rochester Mill-erecting Company proposed to erect fifty wind flouring-mills on the Western prairies. The improvements in their mechanism of late years are exceedingly numerous, if we may judge from the records of the Patent Office and mechanical journals.

2. WATER-MILLS.—But Wind and Steed-mills were insufficient for the manufacture of flour or meal on a scale commensurate with the requirements of an increased population or sufficient for exportation, which the fertility of a virgin soil and the general attention to agriculture rendered, in a few years, a great resource of the country. The available water privileges in the neighborhood of new settlements, and the afflux of the tide in maritime towns, were speedily made to furnish a superior motive power, natural or artificial, for the use of grist and Flour-mills of greater or less capacity. We shall notice the attempts on the part of individuals and municipalities to introduce, extend, and improve the use of this most valuable class of machinery in the different sections of the country. The individual enterprises in connection therewith, and the regulations made from time to time, curiously illustrate the struggles of an infant people in arts and mechanism, and the progress of ideas in relation to legislative policy. In the extended use of mills of various kinds, and in the improvement of their machinery, America is believed to have been for a long time past in advance of most other countries.

1. WATER-MILLS IN NEW ENGLAND.—The locality of the first Water-mill in New England it is perhaps not easy now to determine. A writer in the Massachusetts Historical Collections[1] says, "The first mill built in Dorchester, and the first in the Colony, was erected by Mr. Stoughton, by leave of the Plantation on the Neponsit River, in the year 1633 (Blake)"; from which we may infer that it was a Water-mill. But from a Record of the Court made in 1628, in which "Roxbury is enjoyned to repair the other way toward the *Dorchester Mill* upon paine of £20 forfett,"[2] it appears that a Mill existed still earlier at Dorchester. The

(1) 1 Mass. Hist. Coll., ix. 164.

(2) Records of Gov. and Comp. of Mass. Bay, i. 316.

earliest mention we find in the Records, of Stoughton's mill, is in April 1st, 1634, when an entry was made, to the effect that "Mr. Israel Stoughton hath liberty granted him to build a myll, a ware, and a bridge over Neponsett Ryver, and to sell the alewives he takes there at 5*s.* the thousand."[1]

A canal called Mill Creek, which originally divided the central part of Boston from the North end, was formed in 1631, and furnished afterward a Tide-mill. A causeway across the neck which separated the tide-water at Dock Square on the east from a cove running up on the north almost to Hanover Square, converted the cove into a capacious mill-pond, covering the space between Charlestown, Merrimac, and Hanover streets, and the Mill Creek through the neck admitted the tide to the mill.

The same year in which the first Water-mill was erected, the General Court was presented with a specimen of rye. The only grain which the people of New England had as yet cultivated was Indian corn. Before the introduction of mills, it was coarsely pounded, and cooked in the Indian mode, and for persons accustomed to a different diet, made, at the best, but an unpalatable bread. "The want of English grain, wheat, barley, and rye," says Johnson, "proved a sore affliction to some stomachs, who could not live upon Indian bread and water, yet they were compelled to it." In reference to the first sample of rye produced, he observes: "This poor people greatly rejoiced to see the land would bear it." Within ten years, wheat became an article of export for Massachusetts, and as the same writer says, "Portugal hath had many a mouthful of bread and fish from us."

The second mill is said to have been built the same year at Lynn, where Mr. Edward Tomlins was granted, in town meeting, the privilege of setting up a Corn-mill "at the mouth of the stream which flows from the Flax Pond," a site occupied two hundred years after by Chase's mill. It was removed into the town about ten years after, and the privilege of water and water-courses was granted it anew by the town.[2]

About the time of its erection, the Pilgrim fathers, who for twelve years or more had been without other appliances for grinding than the primitive ones before spoken of—were supplied with a Grist-mill, which must have been nearly as early as either of the foregoing.

The first Water-mill erected in the Plymouth Colony, was put up by Stephen Dean, near Billington Sea, in January, 1633, which he engaged should be sufficient to *beat* corn for the whole Colony. But it is supposed to have been merely a pounding mill, by which the corn was cleared from

(1) Records of Gov. and Comp. of Mass. Bay, i. 114. (2) Lewis's History of Lynn, p. 81.

the hull and prepared for samp (nausamp) and succotash, the use of which had been learned from the Indians. The next year it was agreed that Dean should surrender his privilege, so soon as a grinding mill should be set up.[1] Soon after, in 1636, John Jenney, a brewer by trade, who came from England in 1623, was granted liberty by the Court at Plymouth, to erect "a mill for grinding and beating of corn upon the brook of Plymouth."[2]

Two years afterward, it appears by the Town Records, Jenney was presented for not grinding corn well and seasonably. Charles Stockbridge was employed, in 1681, to build another Grist-mill, which was the second upon that stream, and was called the Upper Mill.

A Grist-mill was also built at Roxbury in 1633, by Mr. Dummer, and during the following year a Water-mill is believed to have been erected at Watertown, where a portion of the large emigration of 1630 had settled. The late elaborate genealogist and historian of that town, was unable to ascertain the name of the builder, or the precise date of its erection. He supposes it to have been built at the joint expense of Edward How and Matthew Cradock, in the year 1634, certainly before August, 1635. It stood on Mill Creek, an artificial canal, at the head of tide-water, on Charles' River, at the first fall, whence the water was conducted from a stone dam across the river, into what is believed to be the oldest artificial mill-race or canal in the country, and which has been ever

(1) Thacher's History of Plymouth, p. 74. In Davis' edition of Morton, (note, p. 130), 1632 is given as the date of erection which was probably Old Style.

(2) Young's Chronicles of Plymouth, p. 172.

It appears that about this period, there was sometimes but little use for mills of any kind. The Colony, in 1622, consisted of 100 persons. They planted sixty acres of corn, and their gardens afforded ample supplies of vegetables; but the next year a severe drouth destroyed all their corn and vegetables, and they were reduced to the severest want. On this, as on other occasions, they were forced to subsist upon clams, shell-fish, with occasionally wild fowls or deer. In winter much use was made of ground nuts, which were the tubers of a species of wild artichoke, instead of bread, which they often did not taste for three months together. It is said they were at one time reduced to a pint of corn, which, as was their custom with other things, being equally divided among them, gave to each person *five kernels*, which were parched and eaten. When Jenney arrived, in 1623, with Timothy Hatherly and others, Gov. Bradford says, "the best dish we could present them with is a lobster or piece of fish, without bread or any thing else but a cup of fair spring water, etc. The devout Elder Brewster lived for many months together without bread, and chiefly on fish and clams, which were a constant resource in times of scarcity. On one occasion, it is said, a worthy person from a distance, whose stock of provisions was exhausted, in despair resorted to Mr. Brewster for consolation, and was surprised to find him even more destitute than himself. But his discontent was effectually removed when, being invited to partake with him and his family, the good man fervently returned thanks over a dish of clams, that they were so highly favored, as to be permitted "to suck of the abundance of the sea, and of treasures hid in the sand."

since in uninterrupted use. A grant of land was made to it in January, 1634, '35, and in August, How sold one half of it to Thomas Mayhew, for £200, on a bond and mortgage, having also purchased the other half of Mr. Cradock's agent. Mayhew sold the whole to Deputy-Governor Thomas Dudley, for £400. The mortgage to How not having been redeemed, he afterward claimed the title to it.

A decision of the Court, in 1641, declared that the right of present possession to the mill at Watertown belongs to Mr. Dudley, and not Mr. How, who sued for it.

In 1653, it was rated at £140 for the support of the ministry. More than fifty years after, it belonged to the heirs of the Honorable Thomas Danforth.

The next Corn-mill in that place, was on Stony Brook, and was in 1679, '80, exempted from "rates" for twenty years. This was sold for about £240, and was afterward long known as "the Bigelow Mills." Thomas Rider was, in 1690, the proprietor of a Corn-mill on Beaver Brook, near the site now occupied by Kendall's Mills, on which several fulling-mills were also previously erected. These were the only ones in that ancient town during the first seventy or one hundred years. Mills were afterward built on those and other streams in Waltham and Weston, etc., within the original limits of Watertown, which are now appropriated to extensive manufacturing operations.[1]

In 1636, Water-mills were built at Salem, Ipswich, and Newbury. That at Newbury was the first in the place, and was built by Messrs. Dummer and Spencer, on the river Parker, in accordance with a grant of the Court, and agreement with the town, in 1635. In 1638, Mr. Dummer, who built the Roxbury mill in 1633, was granted the exclusive right of having such a mill within the town, provided he made and kept it in a condition to grind corn, and the town agreed to send all their corn to it. In 1645, another Grist-mill was erected there; a committee having been appointed to procure a mill to "grynde the corne," for which an appropriation of £20, in merchantable pay, ten acres of upland, and six acres of meadow, with freedom from all rates for seven years, was granted. In 1679, the town granted John Emery, Jr., twelve acres of land, provided he build and maintain a Corn-mill, within a year and a half. In 1686, the Records state, that "the towne being sensible of the great want of another corne mill," a committee was appointed to view such place or places as may be most convenient, "for ye setting up of a mill."

(1) Bond's History of Watertown. Appendix, p. 1073, etc.

The General Court of Massachusetts, in 1638, made regulations respecting Corn-mills, prescribing the weights and measures to be used in them, and providing that corn should be weighed both to and from the mill, if required.

Although the husbandry of the Colonists, could at that date have made no very great progress, yet their prospects were becoming brighter. Emigrating multitudes of English farmers were coming in; new towns were being settled, and larger quantities of land were put under cultivation, and yielded ample returns. A pamphlet, published in London that year, says, "They that arrived this year, (1637), out of divers parts of old England, say, that they never saw such a field of four hundred acres of all sorts of English graine as they saw at Winter-Towne there. Yet, that ground is not comparable to other parts of New England, as Salem, Ipswich, Newbury, etc." Some years later, about the year 1664, when the Colonies were in a highly prosperous condition, a blight first made its appearance in the wheat, to the no small alarm of the grain growers. Every theory as to the cause and cure, seemed to fail, and at last, for the want of a better cause, it was laid to the *Berberry bushes*, which, brought from Europe, were beginning to grow along every fence and hedge-row. "Unsparing war," says Eliot, "was made upon the beautiful shrub for nigh two centuries, and the belief in its malignity yet prevails."

Trade, which had already become considerable with the Dutch and English Colonies, continental and insular, and with Europe, also, by furnishing outlets for every surplus product, stimulated the agriculture of the country, and increased the demand for Flour-mills, Bolting-mills, and bakeries. The older towns had often no small amount of trouble to provide themselves with the indispensable Grist-mill.

It was customary for towns to grant small tracts of land, as well as certain exclusive privileges, as a bonus for the erection of mills. The town of Groton, on the Nashua, voted to several persons, in 1665, twenty acres of land, within its limits, whereon they might erect a mill. They, at the same time, declared such mill free from taxes for twenty years, and prohibited, for that period, the erection of a mill by any other person, except on his own land, and for his own use merely. A contract was accordingly made and recorded, for the building of a mill by the grantees, who covenanted to build a Corn-mill before the 1st of 11 mo., 1666, to keep it in repair twenty years, "to grind the town's corn sufficiently," taking common toll only. Before the time expired in which they were to complete it, the parties were relieved from their contract, and a new one voted to be made with a Captain Clark, of Boston, who agreed to build a mill. There is no further mention of this attempt. It appears to have become necessary to increase the premium, and, afterward, five

hundred acres of upland and twenty acres of meadow were granted to John Prescott, of Lancaster, for a mill, which, with the land, were to be free from charges for twenty years. The mill was built by him or his son Jonas Prescott, afterward a distinguished inhabitant of the town, in a district still called the "Old Mill," now in the northern part of Harvard. By an agreement with the Town, in 1673, Jonas Prescott was to grind the Town's corn every *second* and every *sixth* day in every week. Similar novel arrangements were made with him a few years later for the erection of a Saw-mill.

Few adequately appreciate the difficulties encountered two centuries ago, in securing even an ordinary Grist-mill in pioneer settlements. It was an enterprise, in most cases, greater than one of tenfold the cost with our more abundant means. The county of Worcester, of which the Prescotts were natives, was well furnished with Grain-mills at an early day. The first occupation of the site of the present flourishing City of Worcester was made by white inhabitants, in 1673. The second attempt to found a town was in 1684, when Captain John Wing, under Captain Hinchman, erected corn and saw-mills, above the bridge on the north end of Main street, where, not long since, traces of the dam were visible on the small island which divides the stream. The town took its present name the same year, and provision was made for the encouragement of useful arts and trades, which have since become so varied and extensive in that city. The Indian wars prevented the permanent settlement of the town until the year 1713.

Rutland, settled the same year, had nine hundred acres of land on Mill Brook, a branch of the Ware, laid off for Benjamin Willard, to promote a mill, which lands were to be free from taxation, "any law or usage to the contrary notwithstanding,"[1] Several good, permanent mill-streams flow through this fine county, as the Nashua, Blackstone, and Millers' River; but it has numerous small rivulets, in which water-power was by no means constant. Many of these were, nevertheless, occupied by mills. Lunenberg was thus deficient in water-power, and its inhabitants were obliged to resort to neighboring towns, a part of the year. The enterprise of a Mr. Wetherbee supplied the deficiency, by constructing an artificial mill-race, a mile in length, which drew water from two small branches of the Nashua to his corn and saw-mills in the town. His mills, after the Revolution, were thought to make the best flour in New England, and grain was brought to them from very distant places. Hubbardston, situated a thousand feet above the level of the sea, was not exceeded in water-

(1) Whitney's Hist. Worcester.—Such grants may seem like evidences of plenary liberality on the part of the town, but the whole Township was purchased of the Indians in 1686, for £23.

power by any place in New England of equal elevation, and had, in 1793, no less than eleven saw-mills and five Grist-mills. The entire county, at that date, had upward of eighty Grist and Flour-mills.'

On the west side of the Connecticut, at Hatfield, a Grist-mill was built in 1661, by Goodman Meakins, by agreement with the Town of Hadley, which engaged to have all its grinding done there, provided he fulfilled his part of the contract, and "made good meale." Finding it inconvenient to cross the river with their grain, the townspeople, the following year, agreed with two persons to carry their grain over, and return the meal when ground. They were to call on Tuesdays and Saturdays for the bags, which were to be ready filled and marked. The compensation was 3*d.* per bushel; payable in wheat, at 3*s.* 6*d.*, or Indian corn, at 2*s.* 3*d.* per bushel. Tired of this tax, however, the Town, in 1667, voted to have a mill on the eastern side of the river, and, about that time, William Goodwin erected a second one on Mill River, at North Hadley. Nearly a century after, in 1750, the third mill was built on Fort River, by Edward Hubbard. The last two are now the only Grist-mills in the town. Samuel Bartlet had leave to build a Corn-mill at Easthampton in 1686–7. At Ware, mills were built in 1730, by Jabez Olmstead, and at Greenwich, in 1745. Enfield, Goshen, North and South Adams, Dalton, Pittsfield, Lee, Mount Washington, and other towns in Berkshire were provided with mills within the next forty or fifty years.

These examples may suffice as illustrations of the manner in which water Grist-mills were introduced and multiplied throughout the Province generally in colonial times.

Account of early Mills in Maine.

In that part of Massachusetts, which is now the western part of the State of Maine, and in the settlements on the opposite side of the Piscataqua there were no Corn-mills in 1633, when they first began to be erected near Boston. In 1632, a pinnace belonging to Captain Neal, of Boston, was sent from Piscataqua, with sixteen hogsheads of corn to be ground at the Wind-mill recently erected on Copp's Hill, there being no mill nearer.[2]

(1) Whitney's Hist. Worcester.—The census of 1810 returned the mills from two counties only of the State, viz.: Berkshire, which had fifty-eight, and Hampshire, twenty-six, in all, eighty-four, about equal to the number in Worcester County at the previous date. The last-named county was not represented in the returns of the Marshals. By the last official returns of the Secretary of the Commonwealth, in 1855, Massachusetts is stated to have thirty-two Flour-mills, of which twelve, or double the number of any other county, many of them small, were in Berks. Six counties made no return. Although the number of mills has so much diminished, their capacity, of course, has been vastly augmented, by the aid of steam-power and improved mechanism. Two mills, in Boston, manufacture more than double the value of flour made by the whole eighty-four in 1810. The recent returns, probably only include merchant-mills, and not grist or customer-mills.

(2) Williamson's, ii. 244.

In 1634, the enterprising patentee of large tracts of land south of the Piscataqua made provision for the erection of two mills within his grant, one of which was a saw-mill, the other, probably, a Grist-mill. The town of Kittery gave lands near Berwick to George Broughton and a Mr. Wincall, for the erection of mills in 1643, which was twenty years after the settlement of the former town. These appear to have been about the first in the district. William Hutchinson, of Boston, had mills near the same place about the year 1675. Clark & Lake built mills at Woolwich, on the Kennebec, which they settled in 1660, and occupied till 1675. A Corn-mill, at Block Point, and one or two at Falmouth, on Casco Bay, (now Portland,) are mentioned by Joscelyn, in 1674. These last were probably burned by the Indians who destroyed the settlement the following year.

So terrible a scourge were these Vandals of the forest, that York, the ancient Agamenticus, one of the oldest towns in the District, after having been ravaged by the French and Indians, in 1692, was obliged, a few years after, in its enfeebled condition, to contract with a person in Portsmouth to erect a mill for grinding their corn. For this service he received a grant of the mill-seat, the use of the stream, a lot of land with certain privileges in cutting timber, and the Town agreed that the inhabitants should always afterward carry their grain to that mill so long as it was kept in repair.[1]

In 1682, a tax was laid on mills for the support of Fort Loyal, as a defense against the Indians and French. This continued to be levied until the time of Governor Andros.[2] Some years later, mills were erected by William Pepperell and his son William, the hero of Louisburg, on the valuable mill-sites of the Saco, now occupied by the extensive manufactories of that town ; and also on the Piscataqua. It is probable, that saw-mills always far outnumbered Flour-mills in the principal lumber and ship-building sections of Maine and New Hampshire. The coasting trade supplied those districts with a large proportion of their breadstuffs from the southern Provinces, much of which came to them in the form of flour or meal, which they received in exchange for West India productions, purchased with lumber, fish, and live stock. A portion of the grain and flour thus received was exported to Newfoundland and Nova Scotia.

New Hampshire constantly imported grain and flour before the Revolution.[3] But the interruption of the foreign trade and its peculiar branches

(1) Williamson's, ii. 25.

(2) Maine Hist. Coll.

(3) Among the many instances of great longevity in the early inhabitants of New Hampshire, it is related of Robert Metlin, a Scotchman, and noted pedestrian, who lived many years at Portsmouth, as a baker, that, up to his eightieth year, he was accustomed to travel on foot to Boston—then sixty miles—in a single day to purchase flour, and having put it on board a coaster, he would walk home the following day. He died at Wakefield, in 1787, aged 115 years. This route, it was announced in the Boston Even-

of industry, by the war, turned attention to agriculture with such effect that in 1776 the Province exported corn in considerable quantity. We find no specific mention of its early progress in Grist-mills, or the manufacture of flour. Its ample endowment with water-power afforded the greatest facilities for every description of mills, and these were well improved for the manufacture of lumber, as they now are for a great variety of manufacturing purposes.

Exeter, a flourishing centre of industry, had, some years before the close of the last century, ten Corn-mills within its limits.

This State, in 1789, granted Oliver Evans the monopoly of the sale of his improved mill-machinery for fourteen years.

In *Rhode Island*, as we have seen, the first dependence was upon Windmills. During the first century and a half after its settlement, while Newport was the second city in New England, and at least the equal of New York in Commerce, it is probable many mills were built for the manufacture of flour and meal. It imported provisions for the neighboring Colonies.

Grist-mills in Rhode Island.

Some years previous to 1734, an Act of the Assembly was made "for regulating mills within the Colony," to which a supplementary one was made that year.[1] In 1746, John Smith, called "the miller," to distinguish him from others of the name, received a grant of the valley, in which he resided, along the line of the present Charles street, Providence, in case he set up a mill. He afterward built the mill "where the first stone lock of the Blackstone Canal now is," which he kept in use until that improvement displaced him. A suit was afterward brought against the family who recently owned,—if they do not still,—the water privilege, on the ground that the original grant of the town, and the subsequent acts of "the miller," obliged them not only to set up, but to keep in repair, a Grist-mill throughout all time.[2]

The quantity of flour brought to market in Providence, from the surrounding country, in 1774, was so much greater than at any time previous, as to be subject of newspaper comment, and excited the expectation that it would in time become "a very considerable article of exportation." That time has not yet arrived, and becomes more and more distant, as the manufacturers of the city increase, to furnish a home market for its agriculture, of which wheat was never a staple product.[3]

ing Post, in April, 1761, would be accomplished by a "stage-chaise, with two good horses, well equipped," once a week, occupying two days each way in travel! It is now performed in a forenoon, allowing abundant time for purchases.

(1) R. I.—Col. Records, vol. 4.

(2) Annals of Providence, p. 612.

(3) The county of Providence had, in 1810, 22 Grist and 28 Saw-mills. There were no returns for the other counties.

In the Colony of Connecticut, the Court, September 2d, 1641, granted R. S. Abbington an attachment against Edward Hopkins,—probably the Governor—upon one-half "the myll standing on the new Bridge," indicating the existence of a mill at New Haven. An old mill in the environs of that city, furnished concealment to Goffe and Whalley, the King's Judges, in 1661, while officers were in pursuit.

Mills in Connecticut.

In all new settlements, a Grist-mill is an object of so much importance that it has been deemed a matter deserving not only of exclusive privilege by local authorities, but one of general public interest. There are few persons in any community, in aid of whose enterprises gratuitous labor is more cheerfully and promptly rendered than those of the "miller." It is not uncommon, in some parts of America, at the present day, when capital and enterprise are more self-reliant than formerly, for the neighbors to assist in a body in the erection of the dam and heavy work, or in restoring it when demolished by freshets, as frequently happens. The precarious crops, from an imperfect agriculture and frequent drouth, and other circumstances, formerly rendered it, moreover, a business of uncertain profits, and the miller not unfrequently pursued another occupation at the same time, which often conflicted with his duty as the servant of the public.[1]

On November 10th, 1650, a town meeting was held at New London, to co-operate with Mr. Winthrop in establishing a mill to grind corn, the inhabitants to be at the charge of "making the dam and heavy work to the milne;" for which labor, six men were to be paid two shillings a day, each. "Further it was agreed, that no person, or persons, shall set up any other milne to grind corne, for the town of Pequett, within the limits of the town, either for the present, or for the future, so long as Mr. Winthrop, or his heirs, do uphold the milne to grind the town corn."

(1) The "Poet Artist," T. Buchanan Read, in the "New Pastoral," has noticed this feature in rural economy, as well as the primitive custom of making the miller's duty subsidiary to other employments. In this case, the miller is also the village minister, and no disparagement of his sacred office is intended by the association:

All week he tends within his noisy mill,
Whose wheel now hangs and dreams o'er yonder stream;
And bends his brawny shoulders to the sacks
Which daily cross the threshold; or among
The ceaseless jar and whirr of rumbling stones,
And clattering hoppers, garrulous with grain,
He walks amid the misty meal, and plans
The solemn lesson for the coming sabbath.
* * * * *
The dam has burst! and, with a roar of triumph,
The freshet mocks the miller as it flies.
* * * * *
The stream has fallen; and at the miller's dam,
The neighbors, by good master Ethan called,
Collecting come with crow-bar, pick, and spade,
And in the breach begin the swift repair."

This "towne mill," which was built soon after, probably by Elderkin, having been leased to James Rogers, whom Mr. Winthrop afterward sued for breach of contract, but without recovering damages, gave dissatisfaction to the people, and the town complained to the General Court that they were not "duely served in the grinding of their corne, and were much damnified." To prevent "disturbance of the peace," the Court ordered Mr. Rogers to give "a daily attendance at the mill." The mill was running, it is said, in 1852.[1]

Leave for a second corn-mill in that town was not granted until 1709, when several persons obtained permission, and a mill was built in 1712, by Richard Manwaring, on the falls of Jordan Brook. Nine years after, Joseph Smith had leave to erect fulling and grist-mills, at Upper Alewive Cove.

The Yantic, and other branches of the Thames, on which they were erected, afford some of the finest mill-seats in New England. Those at the Falls of the Yantic are scarcely exceeded by any in the world; and, after the Revolution, were occupied by the mills of Mr. Lathrop, a descendant of one of the first settlers.

The Assembly of Connecticut, March 9th, 1658, '59, ordained regulations respecting grist-mills, ordering a toll dish, "of just a quart," and others of different sizes, to be sealed for every mill in the Colony, and also a proper "strike," for the grain. Four years after, the toll of such mills was established, by allowing of Indian corn one-twelfth part, and of other grain one-sxith part, for grinding. About the same time, by order of the Court, the "soldiers of Middletown, in the same Colony, are abated of one of the ordinary trainings, that they may help him that carries on the mill there, up with his heavy worke."

Water-wheels were, from a very early period, occasionally moved by the rise and fall of the tide. Many of them were used by the Venetians about 1078. In this country, tidal-mills were also in use in several places previous to the Revolution. In 1773, the people of Saybrook, in Connecticut, were compelled to resort to those on Long Island, a severe drouth having so dried up the streams by which the old undershot-mills were operated, that only twenty bushels of grain were ground in four months. In this emergency, John Shipman, of that place, petitioned and obtained from the Legislature a patent for an improved tidal-mill, of his invention. An exclusive right was granted him for the term of forty years, for the town of Saybrook, and twenty miles west of the Connecticut River; and all others were forbid erecting and improving tide-mills within those limits during that time.[2]

(1) Caulkin's History of New London.

(2) Most of the early water-mills in the Colonies, were of the undershot kind, having, for the most part, been built with as little

2. Mills in New York.—Although the ancient Knickerbockers, and their English successors, made great use of wind-mills and cattle-mills, these were not their sole dependence. Water-mills were also used; and the time is not very remote when, according to her annalists, the sound of the mill-stream could be heard in the vicinity of Wall street. There was a water-mill there previous to the year 1661. It stood near the Kolch, or Freshwater Pond,—a collection of water north of the commons, or present city buildings, in Centre street, so deep as to be thought to be without bottom, and abounding in fish, which, as late as 1734, an Ordinance of the Common Council declared should not be taken in any other way than by angling. The miller had the use of the valley; and, to obtain more water, dug a race which admitted the salt water, to prevent which, he was required by law, in 1661, to hang a waste-gate, to bar its passage. The outlet of the "collect," or kolch, was to the North River, nearly on the line of Canal street, through which the Indians entered in canoes to their village on the banks of the pond.

A measure adopted by Governor Andros, in 1678, for increasing the trade of the city of New York, in disregard of the rights of other sections of the Province, shows the manufacture of flour and bread to have already become an important industry, and the export of these articles considerable. Some regulations were that year made, giving New York a monopoly of the business, by prohibiting the making and bolting of flour in any place within the Province, but in that city only; "nor noe flower or bread to be imported into this city, from any other part of the Province, under penalty of forfeiture." The Council prayed the Governor (Dongan) to confirm these laws, which was done. The arguments used by the Corporation, in enforcing these ordinances, were, that the prosperity of the city depended upon the monopoly; and, that it would take nothing away from any other part of the Province.[1]

expense as possible, upon small streams, in the most convenient localities, and designed only for the limited operation of grinding the family grist. Many of these little streams, as the country became cleared, either wholly dried up in summer, or became too small to supply a mill. As population and agriculture increased, demands were made for mills of greater capacity, and overshot-mills took their place whenever a sufficient body of water could be obtained.

"It is notorious in these countries," says Douglass, in his Summary of the British Settlements in America, "that many streams of water which in the beginning came from woodlands, and carried grist-mills and saw-mills, when these lands were cleared of wood the streams vanished and became dry, the mills ceased, and in some parts the cattle could not be conveniently watered."

(1) A curious regulation was made with regard to bakers, in 1686. There were twenty-four in the city, which were divided into six classes, and one class appointed to serve for each working day in the week. The population of the Province was then twenty thousand. The price of a white loaf weighing 12 oz. was fixed in 1684, at six stivers *wampum*.

Under the operation of this law, in 1691, all flour not bolted in the city was ordered to be seized. This privilege of the city appears to have been abolished in 1694, through the earnest remonstrance of the counties on Long Island and the Hudson River, by an Act of the General Assembly "against unlawful by-laws," which was considered so great a calamity that the city was regarded as irretrievably ruined, unless it could be restored. The merchants and city fathers, in the midst of a worse than modern "panic," petitioned the Governor, memorialized his successor, "my Lord Bellamont," and at length voted money to send an agent with an address to the King, praying for the repeal of the obnoxious law abolishing the Bolting Act.[1] "When the bolting began, 1678," say the Common Council, "there were only 343 houses. In 1696, there were 594. The revenue in 1678, '79, and 1680, not exceeding £2000; in the year 1687, £5000. In 1678, there were 3 ships, 7 boats, 8 sloops. In 1694, there were 60 ships, 40 boats, 62 sloops: since which a decrease. In 1678, New York killed 400 'beefes,' in 1694, near 4000. Lands had advanced ten times in value. If this Act continue, many families in New York must perish." This danger seems to have been more than imaginary, as the inhabitants, in 1696, complained of the scarcity of bread, and the bakers, being summoned, said they could not purchase flour. The Aldermen were ordered to inquire into the matter, and reported that there were in the city only seven hundred bushels of corn, and the population being 6000, it would not suffice for a week's maintenance—the cause of which was, "the liberty and latitude that every planter hath lately taken, of making his house or farm a market for his wheat, or converting the same into flour by boiling of itt, and that under pretence of a privilege, they conceive they have obtained by virtue of a law of the General Assembly, entitled an act against unlawful by-laws." "The calamity," they say, "hath produced anarchy in the Province, and destroyed the reputation of New York flour." The City Recorder, in a letter to the Committee appointed to address the King, in 1698, says, "he is grieved to find the great heat he saw among them, at the last meetings, when the great concern in hand is considered, no less than the livelihood of all the inhabitants of New York." He reminds them that only 700 schepels of corn were found in the city. The business of "boalting" must have been

(1) The "humble address of the Governour and Councill of your Majesty's Province of New Yorke and Dependencys, Aug. 6, 1691," says "New Yorke is the Metropolis, is scituate upon a barren island, bounded by Hudson's River and the East River, that runs into the Sound, and hath nothing to support it but trade, which chiefly flows from flower and bread they make of the corne the west end of Long Island and Zopus (Esopus) produceth, which is sent to the West Indies; and there is brought in return from thence a liquor called Rumm, the duty whereof considerably increaseth your Majesties' revenue."

considerable at that time, at least in the city, when the withdrawal of an unjust monopoly could produce anarchy in the Province, and destroy "no less than the livelihood of all the inhabitants of New York." It is not so easy to understand by what process of manufacture "every planter" could ruin the trade of the city, and starve its inhabitants, by converting his wheat into flour, or "boalting of itt," unless we suppose a supply of mills to have existed.

By the Charter of Patroons, granted in 1629, by the West India Company to all who should plant Colonies in New Netherlands, certain privileges were conferred, which were but an attempt to engraft upon the Dutch Province the decayed institutions of the old feudal system of Europe.

By one of these "Freedoms and Exemptions" the Patroons had the exclusive privilege of "hunting, fowling, fishing, and milling (or grinding), within their manors, to be holden as an eternal inheritance, to devolve as well to females as to males, and to be redeemed on each such occasion on the renewal of fealty and homage to the Company, and the payment within a year of one pair of iron gauntlets and 20 guilders, &c." Every settler was obliged to have his corn ground at the Patroon's mill, and the latter was obliged to erect and keep such mill in repair at his own expense for their accommodation.

The first Van Rensselaer, who settled on the Hudson near Albany under this charter, accordingly sent thither, in 1631, a master millwright and two small mill-stones for a small grist-mill, paying for the latter in Holland 20 florins, ($16). A water-mill was erected previous to 1636, and was that year placed in charges of Barent Pieterse Koeymans, who had been engaged in Holland, for that purpose, at 30 guilders a year. The proprietor soon after erected other corn and saw-mills, those on Patroon's Creek being called the Upper Mills, in contradistinction from those on Norman's Kill, five miles below Albany. The former, Koeymans rented for a number of years; and, in 1673, became the purchaser of a large tract of land on the west side of the river, and erected Saw-mills, where a creek, and the ancient town of Coeymans, still bear his name.

There was also a mill at Rensselaerwyck, in 1643, belonging to Dirck Jansen; and, in 1646, there was one on the third or Rutten Kill.

Nevertheless, in January of that year, they were forced to return to the use of the horse-mill, "the mill situated on the fifth kill being, to the great damage of the Patroon, and the inhabitants of the Colonie (Rensselaer's), for a considerable time out of repair, or unfit to be worked, either by the breaking of the dam, the severity of the winter, or the high water,

(1) O'Callaghan's New Netherlands, i., 218, 325.

or otherwise; besides being out of the way, to the prejudice of the inhabitants in going and returning."

A contract was made with Pieter Cornelissen, the millwright, to erect a horse-mill, which he was to complete for 300 florins—the commissary, or agent of the Patroon, furnishing materials and horses at their joint expense. On its completion, Cornelissen was to work one day for himself, and one for the Patroon, receiving one rix-dollar per day, and an equal share of the profits. In case another mill became necessary for the Colony and strangers who began to resort thither for trade, the privilege of building it should belong to the millwright. Let not the rich flouring corporations of the Empire State, smile at the copartnerships of their Knickerbocker fathers, for they owe much to their prudent efforts.

Mills were set up at quite an early period on Long Island. Southampton was settled in 1640, by people from Lynn, Massachusetts; and Easthampton, by others from the same place soon after. The first Grist-mill, at the last-mentioned place, was driven by cattle; and tradition relates that, before its erection, the people went to Southampton to mill, and carried their grain on the back of the town bull.[1]

It was not, however, until near the present century that Grist-mills were erected in Western New York. Through all the vast region

> "Where wild Oswego spreads her swamps around,
> And Niagara stuns with thundering sound,"

the Mohawk, the Oneida, and the Seneca, pounded his maize and ate his unbolted meal in undisturbed possession of the "backwoods" of the Genesee and the Mohawk Valleys. There were no mills west of German Flatts in Herkimer County, in 1788, and few or no improvements of any kind. There was not even a white inhabitant from Fort Stanwix (Rome), to the Western Lakes. Where

Mills in Western New York.

(1) Doc. Hist. N. Y., i, 678.

This was no uncommon occurrence at that time, in different parts of the country. Richard Smith, who founded Smithtown in the same county, a few years after, acquired the cognomen of "Bull Smith," from the great use he made of the animal; and the family have ever since been so called to distinguish them from the descendants of Col. Wm. Smith, who have been as universally called "Tangier Smiths," from his having once been Governor of that Island. Richard Townsend, who built the first mill in Philadelphia, relates that one of his customers brought his grist on a tame bull. Many had not even that accommodation, and instances are mentioned in the pioneer history of New York, and still later in Ohio, where men carried their sacks 40 miles or more, on their own backs to mill to sustain their families. High antiquity may be pleaded for this use of the animal. It was common with the Plymouth people in the first years of the Colony. It is a well known tradition, that John Alden, the fortunate rival of the courtly Miles Standish, conducted his bride home on a milk-white bullock.

Utica now stands, there were then one log house and only two dwellings in 1794. Four years later, however, both flour and saw-mills were erected, at great expense, at Seneca Falls, by some enterprising persons, who also built a bridge over that river, and co-operated with General Williamson in constructing a good wagon road to Geneva.

On the Genesee lands granted, in 1788 to Messrs. Gorham & Phelps, by the State of Massachusetts, and embracing nearly two millions of acres in a fine agricultural region, there were, in 1790, only four grist-mills and four saw-mills. In that year, George Scriba, a German merchant of New York, purchased 50,000 acres of land in the present counties of Oswego and Oneida, for $80,000. At a place called Rotterdam, on the shore of Lake Oneida, he set up in 1794, a saw-mill, and the year following, built at the same place, (now Constantia Centre), the first Grist-mill in Oswego county, which at the present time manufactures more flour than any other in the State.[1]

The magnificent water-power of the Genesee Falls, at Rochester, which, with the artificial additions, represents an annual value in motive-power of nearly ten millions of dollars, much of which is employed in the flour business, was appropriated to that use by the first settler, Ebenezer Allen, who, in 1788 or 1789, built a mill at that place, fifty miles in advance of the nearest settlers, but soon after sold out to Colonel Fish. The mill went to decay, and in 1809, an enterprising Englishman, the builder of Soho Square, London, who built a mill there, was still a solitary dweller in the wilderness, thirty miles north and west of the nearest settlement, and would have sold his improvements in the "Flour City," for $400. His cabin was on the site of the present Eagle Hotel. In 1814, the first flour was exported from that place, where the third mill was that year built. There are now 24 mills capable of grinding 800,000 barrels annually.

These were probably the first of those numerous mills which now occupy the many mill-seats among the spurs of the Alleghanies, and on all the streams which seek the northern lakes throughout the flour-producing regions.

3. New Jersey.—In the eastern part of New Jersey, mills were probably erected by the Dutch and New England settlers at an early period. One of the first of which we find any mention, was a mill at Woodbridge, in 1670–71, built by Jonathan Dunham, who agreed with the town to

(1) French's Historical and Statistical Gazetteer of New York, 1859. The mills of Oswego City, 18 in number, and with an aggregate of 100 run of stones, are stated to be capable of manufacturing 10,000 barrels of flour daily. The manufacture of barrels for the Oswego Mills, and the Syracuse Salt Works, is a principal business in the county, and amounts to one and a half millions annually.

furnish "two good stones, of at least five feet across." It was the first in that place, and the owner received grants of land as an encouragement. The toll was to be one-sixteenth. Others were built there in 1705, by Elisha Parker; in 1709, by John Pike (a very prominent citizen, from Watertown, Massachusetts) and Richard Cutler; and in 1710, by Richard Soper.

Newark, settled in 1666 by people from Connecticut, of whom Robert Treat—afterward Governor of Connecticut—was one, two years after appointed him and Richard Harrison "to erect a Grist-mill on the brook at the north end of the town," setting apart the second and sixth days of the week as grinding-days.[1] There was a mill at Hoboken, in 1682, which was owned in New York. Flour and grain were that year mentioned as articles of export from the eastern section of the Province. A biscuit-maker and bakery was much needed, it was said, to prepare their meal for the West India and neighboring Colonial markets. A superior horse-mill was built at Amboy, the seat of government, in 1685. Water-mills existed in several places, and others were going up.

About 1680, a water-mill was built near Rancocas Creek, in West Jersey, by Thomas Olive, and the same year a mill was finished by Robert Stacey, at Trenton. Both of these persons were proprietaries of that part of the Province. The inhabitants, it is said, had, previous to this, pounded their corn, or ground it with hand-mills, and that those two mills were the only ones that ground for the country during the first few years after the arrival under the new grants. In 1714, Stacey sold his mill and plantation of eight hundred acres, on each side of the Assunpink, to Colonel William Trent, whose name the city bears. It was, we believe, the only one there previous to his death, in 1724.

The first residents of Salem brought their hand-mills from England, but soon resorted to horse, cattle, and wind-mills—of which they had at least three—and water-mills. Of these last, tide-mills were first employed, and there were several in the county, viz.: at Mill Creek, Elsinborough; Mill-hollow, near Salem; Mahoppomy Creek, in Mannington; Cooper's Creek; on south side of Alloway's Creek; and at Carney's Point, in Upper Penn's Neck.[2]

About the year 1690, John Townsend, one of four brothers, English Quakers, who settled, one in New York, one in New England, one in Pennsylvania, and the other at Little Egg Harbor, New Jersey, crossed the river above that place, and traveled down the shore ten miles in search of a mill-stream. Having found one, he returned, purchased a pair of oxen, got them across the river, took the yoke on his shoulder,—as

(1) Barber & Howe's Hist. Coll., 177. (2) Barber & Howe's Hist. Coll., 435.

there was not room to drive them abreast,—and thus drove them before him, on an Indian path, to the spot previously selected. He there built a cabin and a mill, and made a clearing; which he left, at his death, to three sons, from whom a numerous family have descended. His brother Richard became a pioneer in a like enterprise in the forests of Pennsylvania.

A letter from Princeton to the General Advertiser, in 1790, mentions a new species of water Grist-mill, lately invented by a Mr. Macomb, of that place, which promised entirely to supersede the mills in common use, by its superior excellence in performing the same amount of work with a far less expense of water, by the use of horizontal wheels. He received a patent for it the following year.

The water-mills near the Trenton Falls, about this time, were of a superior kind in regard to mechanism, and in addition to grinding grain, rolled and slit iron, and ground plaster.

New Jersey is remarkable for the number of mill-seats, of which, in 1796, eleven hundred were improved. Five hundred of these were occupied by Flouring-mills.

4. PENNSYLVANIA.—The first Grist-mill in Pennsylvania, was built by Colonel John Printz, the Governor of New Sweden, in 1643. Commissary Hudde, the agent of the Dutch West India Company, who was instructed to watch the actions of the Swedish Colony, reported that Printz built a "strong house," in a place named Kingsessing by the savages, and "about half a mile further in the woods, Governor Printz constructed a mill, on a kill which runs into the sea (river), not far to the south of Matinnekonk" (now Tinicum). He cites Campanius as saying, in reference to it, that "It was a fine mill, which ground both fine and coarse flour, and was going early and late, and was the first that was seen in that country. The creek on which it was built, Campanius says, was the Karatung, otherwise called the Water-mill stream—a fine stream, very convenient for water-mills.[1]

The site of this, the most ancient water-mill in New Jersey, Pennsylvania, or Delaware, is now ascertained to have been on the Darby road, the oldest highway in Pennsylvania, near the Blue Bell tavern, where the holes in the rock, which supported the posts of the frame-work, are still to be seen. The stream, or "kill," on which it was built, is Cobb's Creek, a tributary of Darby Creek, which empties south of Tinicum, of which Printz had a grant from Queen Christina of Sweden, the youthful sovereign from whom the Swedes named the creek at Wilmington, Delaware, where they built a trading house and fort.

In 1658, soon after the formal surrender of the country by the Swedes

(1) Ferris' Hist. of Swedes on Delaware, p. 71.

to the Dutch, Joost Andriansen & Co. proposed to build a saw and Grist-mill below the Turtle Falls at New Amstel (New Castle), in Delaware, and a patent was granted at their request, by the Director-General, Peter Stuyvesant, on condition that they ask no more for grinding than at the Company's mill.[1] The "Company's mill" referred to, was probably the "Wint Molen," already mentioned as having been erected on or near Broadway, upon their farm at Manhattan, and rebuilt upon the same site in 1662. The Company may have had a mill on the South River also, as the Colony of New Amstel is credited, in October, 1661, by Hendrick Reael, for two mill-stones, 82.10 florins. In a list of articles purchased for the same destination in November, 1662, are named,—iron-work for a saw-mill, four hundred florins; and one pair of mill-stones, four and a half feet, six florins.[2] There was a mill on the Delaware, at "Carcoen's Hook," which, having fallen to decay, the town of Newcastle, in 1671, represented to Governor Lovelace, that it "heretofore appertained to the public, and now is endeavored to be engrossed by some particular persons for private uses;" and proposed that it should be repaired for the public benefit. On which the Governor ordered the mill-stones to be taken out of the mud and preserved, and the mill to be let out to the best advantage. In a special Court held at Newcastle, May 25th, 1675, after the cession of the country to the British, the subject of mills was considered; and as there was a want of corn-mills, and keeping them in repair, the justices were advised to examine, and have them repaired, and others built: the tolls for grinding were to be regulated, and all mills, public or private, were to be encouraged. In 1678, it is recorded in the Upland Court, that "it being very necessary that a mill be built on the Schuylkill, and there being no fitter place than the falls called Captain Hans Moonson's Falls, the Court are of opinion that Mr. Hans Moonson *ought* to build a mill there (as he says he will), or else suffer another to build for the convenience of all parts."[3]

In 1676, seven years before the settlement of Philadelphia, the Court ordered that no grain shall be distilled, unless it be "unfit to grind and boalt:" a measure proposed by the town of New Castle, in 1671, because it consumed "an immense amount of grain."[4] On March 10th,

(1) Hazard's Annals of Pa.

(2) Doc. Hist. N. York, i. 358.

(3) The Manuscript Records of the Court, held at Upland, between the years 1676 and 1681, the first English Tribunal in Pennsylvania, have been recently printed and published under the auspices of the Pennsylvania Historical Society. By the notes of the Editor, it appears that Hans Moonson's "Great Mill-fall" was the present Mill Creek, which empties into the Schuylkill immediately south of Woodlands Cemetery. The "Carcoen's Hook," or creek and mill, above mentioned, were the Amesland Creek and mill of the Swedes, on Cobb's Creek, the Dutch name of Carcoen's being a corruption of "Kacarikonk," the Indian name of the region.—*Records*, pp. 88. 115. 141.

(4) Grain was made payable for taxes, in 1677, at five guilders per scipple for wheat,

1679–80, the Court at Upland granted Peter Nealson, on petition, leave to take up one hundred acres of land on the west side of the Delaware, for the accommodation of a water-mill. The first Grist-mill in Philadelphia County was set up in 1683–4, at Germantown, by Richard Townsend, a Friend, who came over with William Penn. It stood in Church Lane, one mile north-east of Market Square, and was at a late period known as Roberts' Mill. He had also a mill, previously erected on the left bank of Chester Creek, about a mile and a half north-west of Chester, built of materials which he had brought, ready framed, from London. The mill is gone, but the rocks bear traces of its existence. The owners of the mill were William Penn, Caleb Pusey, and Samuel Carpenter, whose initials are inserted in a curious, antiquated iron vane, which was once erected on the roof of the mill, "and is still (1843) engaged in its one hundred and forty-fourth year of its duty, on the top of Mr. Flower's house"[1] Samuel Shaw, before the Revolution, erected a second mill near the place. There were a number of mills in the county in 1695.

Pastorius, who, as the Agent of the Frankfort Land Company in Germany, founded Germantown in 1684, in an account of the Province which he left, says, "Of mills, etc., we had the necessary number;" and speaking of another Company which laid out Frankfort, he says, "they have already established several good mills."[2]

Thomas Parsons owned a Grist-mill at Frankford, in 1698, and Richard Dungworth had a mill not far distant, in Oxford Township, one or both of which were probably on Tacony Creek.[3]

An Englishman, writing of the Province in 1698, speaks of "famous Derby River, which comes down from the country by Derby Town, whereon are several mills, fulling-mills, corn-mills, etc. The water-mills,"

four for rye and barley, and three guilders for Indian corn, etc., "or else, wampum and skins at price current."

(1) Day's Hist. Coll. of Penna., where it is said (p. 4), that Townsend built and superintended the mill, but was not a partner. Mr. Townsend states that the people were accustomed to bring their grist on their backs, save one man who had a *tame bull*, which performed the labor,—that by reason of his seclusion in the midst of the woods, he had but little chance of any supplies of fresh meat, and was sometimes in great straits therefor. On one occasion, while he was mowing in his meadow, a young deer came near him, and seemed to wonder at his labor; it would follow him up while he worked, but when he stopped or approached it, it would skip away; but an accident made him stumble, and so scared the deer, that he rushed suddenly aside against a sapling, and being stunned, he was taken alive and killed, to the great relief of the family These incidents illustrate the value of such pioneer enterprises in those early times, and the privations to which their originators were often exposed. A *mill* far in the woods was often the nucleus around which a village, with other forms of industry, soon collected. Along with the materials for the first mill, Penn also brought one or more houses, ready framed, from England, which were among the first erected in the city.

(2) Memoirs of Hist. Soc. of Penna.

(3) Colonial Records, i. 500.

he elsewhere remarks, "far exceed those in England, both for quickness and grinding good meal, there being great choice of good timber and earlier corn than in the aforesaid place; they are made by one Peter Deal, a Famous and Ingenious workman, especially for inventing such machines."[1]

A number of corn-mills were erected about this time, or soon after, on the Wissahickon, by the German and English families who settled in Germantown and Roxborough. William Rittenhouse and his son Nicholas, previous to 1697, built on a branch of that stream the first paper-mill in this country. Another son, Garret or Gerhard, set up a Flour-mill on Cresheim Creek, which flows into the Wissahickon from the eastward, and was named from that part of the Palatinate whence the family had emigrated.

A Grist-mill and bolting-house were built, by the family of Robesons, on the main stream, near the Schuylkill, in the late borough of Roxborough, not far from the same time, and were known as the "Wissahickon Mills." The Robesons still own mills on the river. Eleven mills were built in that township, (now the twenty-first ward of the city,) previous to 1779, nine of which were on the Wissahickon, and eight of them Grist-mills. Several of these belonged to the Rittenhouses. There has been but one built on that stream, within the same limits, since.[2]

The mill-seats on the Pennepack were early occupied. The inhabitants of Solesbury, and the neighboring parts of Bucks county, were compelled to go to the mill of Morris Guinn, on this stream, or to Trenton, for twenty years, until Robert Heath built a mill at Solesbury. In the fertile and well-cultivated lime-stone tracts of Bucks, Montgomery, Chester, and Lancaster, mills were rapidly multiplied on the numerous confluents of the Delaware and Schuylkill rivers. A tremendous freshet, in June of that year, damaged many of these, and also many in New York. A mill belonging to Robert Hayton, on the Schuylkill, was entirely carried away, and another, owned by Thomas Stockworth, was nearly submerged. The loss in dams, grain, and flour, destruction of bridges, etc., was very great. Much of the flour made in that day was, as before remarked, bolted in separate establishments, which were often connected with the baking business. We have seen how valuable was the monopoly of this business to the city of New York. In Philadelphia, where the flour of the country found a market, that class of machines was numerous about this time. Several were advertised for sale in 1721–22: two by Robert Hobart, baker, "in the Front street," one of them furnished with

(1) G. Thomas' Hist. Penna., Lond., 1698. (2) Genealogical Account of the Levering Family, etc., by Horatio G. Jones.

cloths, and one without; and another, with a granary and other property, by Owen Roberts. The burning of one at Bristol is noticed also. This place was early noted for its fine mills, of different kinds, built by Samuel Carpenter, formerly a Barbadoes merchant. In 1723, the executors of Jonathan Dickinson, one of the first Mayors of the city, advertised for sale his interest in the Grist and saw-mills on Chester Creek, commonly called the Chester Mills. There were at this time, mills at New Castle, in one of the "lower counties," owned by John Evans, probably the same who was Governor a few years before. In 1760, the assessors reported, within Philadelphia county, eighty-three Grist-mill and forty saw-mills.

Vincent Gilpin, in 1772, owned merchant Flouring and saw-mills within two miles of Wilmington, on the main body of the Brandywine. The mill-house was of stone, with bolting-mills, fans, hoistings, etc., carried by water, and was capable of manufacturing twenty thousand bushels or more of wheat yearly.

Philadelphia, at an early period, excelled as well in the quality as the quantity of flour which she exported, and soon became a principal market for the grain of the more southern provinces. The great agricultural capacities of the State, improved by the rapid influx of the Germans, led also to the speedy establishment of mills in the interior.

Mills in Lancaster County.

That thrifty people, who were chiefly intent on agriculture, selected, for the most part with great discrimination, the fertile lime-stone valleys and rich alluvial districts of the State, particularly of Lancaster, Berks, and Northampton, which are still in the hands of their enriched descendants. These and the mill-building New England people, who penetrated still farther north and west, soon distributed corn-mills on the numerous streams in all the inland towns.

Douglass writing, about 1750, of the religious sects in Pennsylvania, speaks of the Dumplers, who, he says, are a small body of Germans, about fifty miles from Philadelphia, men and women professing continency, live in separate apartments, etc., . . . although an illiterate people, they have a very decent chappel, and as craftsmen, are very ingenious; upon a fine stream they have a Grist-mill, a saw-mill, a paper-mill, an oyl-mill, and a mill for pearl-barley, all under one roof, which brings them in considerable profit." He probably refers to the society of Tunkers in Lancaster County, who established mills and several branches of the arts at Ephrata about that time.

In 1786, there were within ten miles of Lancaster, in Pennsylvania, eighteen grain-mills, besides sixteen saw-mills, one fulling-mill, four oil-mills, five hemp-mills, two boring and grinding mills for gun-barrels, etc.

Lancaster lay on the great road or highway to the western settlements, and the teams which returned thence to Philadelphia, conveyed great

quantities of flour and grain to market. The Conestoga wagon, for the conveyance of produce from the interior, and especially flour from the mills on Conestoga and other creeks, was a peculiar feature of the trade arrangements of Philadelphia.

In 1770, we find mention of mills on the Monongahela, Chartier's, Redstone, and other rivers and creeks in "Gist's Settlement," so famous in the border wars of Virginia and Pennsylvania.

Several of the mills in Pennsylvania early adopted the improved machinery of Evans and Rumsey, whose inventions were patronized by the State Legislature, and by prominent citizens. A mill of Rumsey's, (Baker's improved,) in operation near Philadelphia, in 1796, ground and bolted flour, ground chocolate, snuff, hair-powder, and mustard, and pressed and cut tobacco, by water-power.

The following table shows the quantity of flour and other bread-stuffs exported from Philadelphia at different periods:

Year.	Wheat, bushels.	Flour, barrels.	Bread, casks.	Value of Flour, Wheat, and Flaxseed.
1729	74,809	35,438	9,730	£62,473 currency.
1730	38,643	38,570	9,622	57,500 "
1731	53,320	56,639	12,436	62,582 "
1752	———	125,960		
1765	365,522	148,887	34,736	432,615 sterling.
1772	51,699	252,744	38,320	
1773[2]	92,012	284,872	50,504	
1774[3]	182,391	265,967	48,183	

In 1786 the exports of flour were 150,000 barrels; in 1787, 202,000; in 1788, 220,000, and in 1789, 369,668.[4]

5. DELAWARE.—In 1677, there was a mill on Christina Creek, (Wilmington,) which was granted liberty of cutting timber for repairs. The first mill within the borough of Wilmington, Delaware, was built in 1742, by Oliver Canby, near the termination of Orange street. To this mill the Swedes and other settlers brought their grists from New Jersey, and from the inlets along the Delaware, Christina, and other places, in boats. Twenty years after, the plan of constructing a long race and overshot mills was formed—the commencement of the extensive milling operations for which that place has been so celebrated. Thomas Shipley, who owned

(1) This sum includes flax-seed to the value of 42,329 pounds.

(2) These three years, in addition, exported an aggregate of 598,283 bushels of corn.—*Sheffield.*

(3) The Continental Congress, which met in Philadelphia, in September, 1774, prohibited millers from grinding for Tories, and the printers from printing for them. The exports to the West Indies were suspended by the war.

(4) Coxe's View of United States.

part of the old water-power, in a grant to the projectors of the scheme, reserved to himself the sole right to grind all the grist brought from any place within thirty miles of his mill. This circumstance is an evidence of the value to a community, of a mill erected in their midst, and of the little account that was made of the navigation of the creek for large vessels, which were then moreover excluded by a bridge, below the mill. So imperfect were the arrangements of mills about this time, that we are told the meal and flour, ground on the Wilmington side of the creek, were sent over to be bolted at an old mill which once stood on the northeast side of the creek, where a large mill was afterward built by Mr. Thomas Lea. Yet, within thirty years after, there were twelve merchant Flouring-mills, with twenty-five pair of stones, at Brandywine, and sixty within the county, all driven by water. The former were supposed capable of grinding four hundred thousand bushels of grain in a year. About half a million dollars' worth of flour was annually sent at that time to market. The Brandywine was then the seat of the most extensive mills in the country, and had, within forty miles, one hundred and thirty improved mill seats.

The exports of flour from the Port of Wilmington, which owned a number of square-rigged vessels, was in 1786, 20,783 barrels of superfine, 457 of common, 256 of middling, and 346 of ship-stuff.

The manufacture of flour was carried on to a higher degree of perfection in Delaware than in any State in the Union.

Beside well constructed mills on Red Clay, White Clay, and other Creeks of the State, those on the Brandywine, were the most celebrated flouring establishments in the United States.

The great improvements in mill machinery, introduced about this time by OLIVER EVANS, a native of Newport, in Newcastle County, Delaware, constitute a lasting memorial of one of the most ingenious mechanicians this country has produced. These, with the application of steam, have effected a complete revolution in the manufacture of flour, as well in Europe, as in America. His innovations were, however, opposed by the Brandywine millers, and their refusal to adopt them, until several others had established a formidable rivalship by their use, cost the inventor thousands of dollars and several years of labor, to overcome the prejudice which their example had generated among smaller establishments.[1]

(1) It is related of the Brandywine millers that having at length reluctantly agreed to make a trial of the new machinery, in one of the mills, they deputed one of their number to Evans, with the following proposition: "Oliver, we have had a meeting, and agreed that, if thee would furnish all the materials, and thy own boarding, and come thyself to set up the machinery, in one of our mills, thee may come and try; and if it answers a valuable purpose, we will pay thy bill; but, if it does not answer, thee must take it all out again, and leave the mill just as thee finds it, at thy own expense." On another occasion, several of them having visited the mill, and found it attending itself,

6. MARYLAND.—"We may easily estimate," says Chalmers, "the numbers and wealth and power of a people, who think it necessary by general contribution to erect a water-mill for the use of the Colony." This was said in relation to a bill which passed the third Assembly of Maryland, in 1638–9, authorizing the Governor and Council to contract for the erection of a water-mill, provided its cost should not exceed "twenty thousand pounds of *tobacco*," which were to be raised for the purpose by general taxation in two years.[1] A mill is mentioned, however, as having been set up in 1635, "near the town," probably at St. Mary's, the capitol. The sparseness of population, for which hand-mills sufficed, may have suffered this to go down. The other, it is probable, was built in the Isle of Kent, as the other county of the Province was called. Plantagenet, in his account of New Albion, 1648, mentions a mill and fort on Kent Isle, "lately pulled down, and, on account of war with all the Indians near it, not worth the keeping."

Maryland passed several judicious laws for the encouragement of industry and manufactures at an early period. One of these, in 1681, aimed, among other things, to promote tillage and raising of provisions for exportation. It was not until 1729 that the site was laid out for the present city of Baltimore, now one of the largest flour markets in the world. It was late in the Provincial period, before the place entered upon its career of rapid growth. How early mills began to be erected on the Patapsco, Jones's Falls, and neighboring mill streams, so rich in water-power,—we are unable to say. About the earliest, however, was one erected in 1711, by Jonathan Hanson, millwright, on a mill-seat purchased of Mr. Carrol, and of which the ruins were visible in 1854, at the intersection of Holliday and Bath streets.

The Maryland Legislature, about the year 1748, made grants of land to those who would erect water-mills, in order to encourage the manufacture of flour for exportation. Many of the arts were carried into Maryland by people from the more northern Provinces, particularly from Pennsylvania.

In 1762, William Moore, a native of Ireland, removed from the Brandywine Mills, in Delaware, to Baltimore, where he purchased mill property of Edward Fell. The upper mill-seats he sold to Joseph Ellicott, and

cleaning, grinding, bolting, cooling, etc., while the owner was at work in the hay-field,—and having received from him a detailed explanation of the several operations, to their complete approval and conviction of its utility, as he supposed,—what was his surprise to find it reported to neighboring millers, that the whole was a set of "*rattle traps.*" *Howe's Eminent Mechanics.*

(1) Tobacco was the early currency of Maryland, and the quantity named in the text would be worth, according to the prices at a later period, about $333.

John and Hugh Burgess, of Bucks County, Pennsylvania, who built a mill "opposite the site of the jail." Ten years after, Ellicott, with two brothers, John and Andrew, built mills on the Patapsco. In 1769, notwithstanding the general attention to tobacco, there were exported from Baltimore, 45,868 tons of flour and bread. Two years after, an Act of the Assembly, was made to prevent the export of Flour, Staves, and Shingles, which were not merchantable; and to regulate weights and measures, etc. Jonathan Hanson, whose father had erected the third, fourth, and fifth mills on the Falls, was appointed Inspector of Flour, which continued to be sold by weight until after the Revolution. The salutary effect of such ordinances was made apparent in the high reputation of Maryland Flour, which, with that of Pennsylvania, where the same attention was paid to inspection and quality, commanded better prices in the southern Provinces, and the West India markets, than other flour perhaps scarcely inferior.

In 1787, Oliver Evans made an application to the Assembly of Maryland for the exclusive right of using his improved mill machinery, and also his steam carriages, all of which was granted—although the last-named project had been rejected and derided in the Legislature of Pennsylvania early in the same year. The mill improvements of the Patentee were, not long after, introduced into the large establishment of the Ellicotts, on the Patapsco. The saving in the expense of attendance alone thereby effected at these mills, where three hundred and twenty-five barrels of flour were daily made, was estimated at *four thousand eight hundred and seventy-five dollars* annually; and the saving made by the increased manufacture was at least fifty cents a barrel, a gain in that department of *thirty-two thousand five hundred dollars.*

Some important improvements in mill machinery were also made by James Rumsey, a native of the State, about the year 1784.

Frederick County, according to Dr. Morse, in 1796 had 37 Grist-mills on the Monocacy and its branches. The State contained, in 1810, 399 Wheat-mills.

7. VIRGINIA.—This State had in 1649 four Wind-mills and five Water-mills for corn, beside many Horse-mills. What progress was made in the use of these appliances subsequently we have not the means of knowing. Virginia exported to the sister Colonies at an early period considerable quantities of flour and grain. Her capacity for producing grain, and facilities for milling operations, were among the best in the country; although the former were impaired by a defective system of cultivation, and the latter too much neglected for other pursuits. The operations at Richmond, Petersburg, and other places, have since shown the value of

both to the State. Mr. Jefferson, writing to M. De Warville, August, 1786, observes, "Virginia, Maryland, Pennsylvania, Delaware, New Jersey, and New York, abound with large manufacturing mills for the exportation of flour."

The exports from Virginia for ten years preceding the War were, one year with another, 800,000 bushels of wheat, and 600,000 bushels of Indian corn. Petersburgh, during that time, made about 28,000 barrels of flour annually; and the mills in the neighborhood and in the country places furnished for sale about 60,000 barrels annually at that place, in addition to 12,000 barrels of bread, 3,000 barrels of Indian meal, and 60,000 bushels of wheat, and 30,000 of Indian corn.

There were exported from City Point, in 1791, 10,090 barrels of flour; in 1793, 28,877 barrels; in 1794, 5,853 barrels.

8. North and South Carolina and Georgia.—In Carolina and Georgia the introduction of mills was an object of public regard at an early day, as indicated by the Act of Assembly passed in 1691 for the encouragement of the making of "engines for the propagating the staples of the Colony;" and in 1712 for the building of saw-mills and other mechanic engines. Emigrants from New England also introduced these and other useful improvements wherever they settled. About the year 1750, a Colony of Quakers from Ireland settled at Camden, S. C., and built one or more mills on Pine-tree Creek. Colonel Kershaw, from whom the county is named, a few years later also built mills at that place, and his enterprise encouraged the production of wheat there, which had not been much attended to previously. The flour made at the place did not command as high a price as that made from wheat imported from Northern Provinces to Charleston. The defect was probably in the mills. It was, however, shipped to the West Indies, with the brand of Baltimore and Philadelphia; and the fraud, if detected, was not complained of, as the quality was believed to be substantially equal. The Revolution, in which Camden has a prominent history, put an end to the manufacture. A Mr. Broome, of Col. Lee's cavalry, during the campaign, was so impressed with the advantages of the place for mills, that he returned after the peace, and erected there a very complete set of mills; and in 1801, 40,000 bushels of wheat were manufactured at three mills within a mile of Camden. This success led to the erection of other merchant mills in Lauren's district by Thomas Woodworth, and at Greenville, on Reedy River, and in other parts of the State. The cultivation of cotton after the Revolution, as that of rice, indigo, tobacco, tar, pitch, and turpentine had done before, diverted attention from the cultivation

of wheat, and considerable quantities of flour were regularly received from the Northern States.

In *North Carolina* there were, in 1794, three excellent Flour-mills at Fayetteville on Cape Fear River, from which flour and produce were sent down to Wilmington in boats carrying 120 to 500 barrels each. The records before us do not indicate the introduction of mills or the extent of their employment previously in that Province nor in Georgia. In the last-mentioned State, there is one of the few localities in the Union, if not the only one, that furnishes Burr millstones, identical, in composition and geological position, with the French burrs. The manufacture of these was carried on about fifty years ago near Philadelphia, by Oliver Evans, and extensively at the present time in Savannah.

The total exports of breadstuffs from all the Colonies in 1770 was, of bread, flour, and meal, 45,868 tons, or 458,868 barrels, valued at about $2,862,190. The wheat exported in the same time was 851,240 bushels, and the Indian corn, 578,349. This amount Lord Sheffield, after the war, doubted the capacity of this country to exceed. England, up to that time, had usually exported grain, yet had at different times been forced to depend on supplies from the Colonies; and her West India possessions were mainly fed from this country. Hence, in the traffic with the Islands, this branch of Colonial industry was an exceedingly important one. Of the value of the Provinces to England, in this respect, Mr. Burke, in his speech in 1774, speaks in the following expressive imagery:

"For some time past, the Old World has been fed from the New. The scarcity you have felt would have been a desolating famine, if this child of your old age, with a true filial piety, with a Roman charity, had not put the full breast of its youthful exuberance to the mouth of its exhausted parent."

The exports, from the peace of 1783 to the formation of the present government, cannot be known.

The total export of flour from the United States in 1791, was 619,681 barrels, in addition to over one million bushels of wheat.

Among the early improvements which this class of machinery received from native ingenuity, the most important, by far, were those of Oliver Evans, already alluded to. Few, if any, capital improvements have been introduced into the machinery of Flour-mills since his time, although numerous minor changes in the manufacture and running of the stones, and in the bolting apparatus, have been patented and adopted.

His machinery is now in almost universal use in the extensive mer-

chant-mills of this country, and has been very generally adopted in Europe, and particularly in Great Britain.

These improvements, which were completed in theory about the year 1783, consist of the *elevator*, or endless chain, with buckets to raise the flour or meal to any required height; the *conveyor*, to carry the grain or meal from one place to another; the *hopper-boy*, to spread or gather the grain or meal, and thus to dry or cool it, etc.; and the *drill*, to move the grain or meal, in any direction, like the conveyor, but by means of rakes instead of buckets; to which he added, originally, the *kiln-dryer*, to dry and cool the meal as it passed through the elevator and hopper-boy. The apparatus, now variously combined according to circumstances by flour manufacturers, is too well known to require particular description.

The saving effected was fully one-half in the labor of attendance, and the manufacture was better accomplished, with an increase of about twenty-eight pounds of flour to each barrel, above the old method. Yet, it is said, his brother traveled through the States of Pennsylvania, Delaware, Maryland, and Virginia, at much expense, offering the improvements without cost to the first in each county who would adopt them, but with little success.

The Legislature of Pennsylvania, in March, 1787, gave him the exclusive right of making and selling them within the Commonwealth, rejecting at the same time his propositions for making steam-carriages, with which the application was coupled, as too visionary to be patronized. Maryland, the same year, gave him like privileges for both. These inventions were one of the three objects for which patents were granted during the first year that the present Patent Office was in existence. He made an early application of his improvements in steam-engines, to the purposes of mill-work, and published the first practical work on the subject of mill-construction, we believe, by an American author. Steam was early applied by him to mill-machinery, for the various purposes of sawing wood and stone, manufacturing flour, etc.

Some valuable improvements were also made by James Rumsey, in the mode of applying water to work mills, and other machinery, by which a saving of power was effected, especially for undershot wheels. A modification of the principle of the English-mill of Dr. Barker, by which it was rendered more simple and less expensive, effected a considerable saving in that respect. He received exclusive privileges for these improvements in several States, as well as for the application of steam to the purpose of raising water for mills and other uses. An association of influential persons, called the Rumseian Society, of which Dr. Franklin was the head, was formed in Philadelphia, to promote the introduction

of his mechanical inventions, which were numerous. In the third volume of the Transactions of the American Philosophical Society, are three papers on the subject of water-mills, by W. Waring, having relation to the theory of their construction, and to Barker's Mill as improved by Rumsey. Rumsey's own work on steam, as applied to boats and mills, appeared in 1788.

It was about the close of this period that the employment of steam, as a motive agency for mill-work, began to attract attention in this country; and both the inventors, here named, in connection with mills, were identified with the movement.

A letter of Mr. Jefferson to Charles Thompson, dated London, April 22, 1786, mentions a visit to the London steam-mills of the celebrated Boulton, the partner of Watt, in which eight pair of stones were operated by steam-power, at an expense of one hundred bushels of coal *per diem*. It appears, the proprietor, who twenty years before had constructed a steam-engine on the plan of Savery's, for his extensive hardware works near Birmingham, to supply the place of a water-mill, kept the machinery of his Flour-mills a secret. Mr. Jefferson supposed them to be moved by the direct agency of steam, until his visit to similar establishments at Nismes, where steam was only applied to raise water, led to doubts on the subject, which he had not then been able to clear up. It hence appears, that steam was then not commonly used in Europe as a direct motive-power in flour-mills.

The mills of Great Britain, according to Professor Fairbairn, had been little improved, except by a few modifications effected by Smeaton and Rennie, until a comparatively recent period. The most important changes were those of Evans, which were adopted at the beginning of the present century. In France, and on the Continent, their construction was quite rude, forty years ago, and many arrangements long since abandoned here, are still in use in many parts of Europe.

CHAPTER VII.

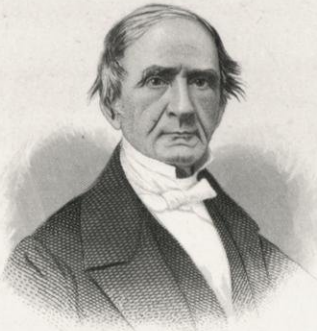
THE ESTABLISHMENT OF THE PRINTING PRESS IN THE COLONIES.

It has been remarked, not without reason, that it is in the strong religious character of the first and early inhabitants of Massachusetts, that we find the chief cause of the efforts they made to promote industry and sobriety throughout the community. At the first Court of Assistants held upon this side of the Atlantic, on board the Arabella, at Charlestown, it is said the inquiry, "how shall the ministers be maintained," took precedence of all others. An order for the erection of houses for their use, and the appointment of their salaries, was the inauguration of the arduous undertaking.

In this desire to lay deeply the foundations of order, industry, and prosperity in the motives and sanctions of sound religious principle, the inhabitants of Massachusetts, were by no means the only exemplars. As early as 1611, it was written of those who, in that year, endeavored to re-model the affairs of Virginia, that "their first and chiefest care, was showed in settling laws, divine and moral, for the honor and service of God." The same testimony may be borne to the religious character of many of the early and later emigrants to the different Colonies. Of these, in many cases, it was no less true than of the Puritans of Massachusetts, that, in seeking a home in America,

"They sought a faith's pure shrine."

Of those who fled from persecution, at different times, the greater number were distinguished alike for their industry and economy, and for their attachment to the principles of civil and religious freedom. The annals of every age amply prove the agency of religious principle in promoting industry. In our own country, the relation between the two has ever been more than an accidental one. As an element in the industrial progress of the country, its influence was very early apparent in many of the classes who have swelled its population. If the laws by which, in some cases, they endeavored to enforce the duties of good citizenship, in conformity with their own views, must be condemned as harsh, or oppres-



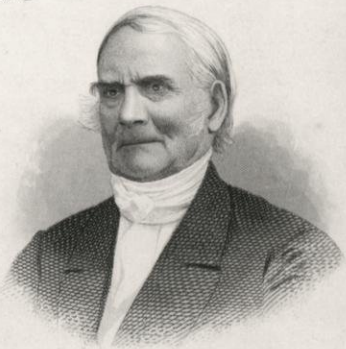
GEORGE BRUCE.
New York

LAWRENCE JOHNSON.
Philad.ª

JOHN FAGAN.
Philad.ª

EMINENT AMERICAN TYPE FOUNDERS AND PRINTERS.

C. SHERMAN.
Philad.ª



JOHN C. CLARK.
Philad.ª

JAMES CONNER
New York

Engd by R. Whitechurch

sive, the motives which prompted them cannot, perhaps, be so easily impugned. Happily, however, other and more efficient means were devised of promoting the future good of their descendants, and through them, of perpetuating the principles they cherished. Those means were more in accordance with the enterprise and spirit of the present day, than the attempt to control, by legislative enactments, the dictates of conscience or the tastes and caprice of individuals.

It will ever be mentioned as the fact most honorable to the intelligence of the first Colonists, and their regard for the welfare of their posterity, that, among their earliest cares, they provided for the interests of Education and the diffusion of Knowledge. Eighteen years only of life in the wilderness, had elapsed since the Pilgrims trod the rock of Plymouth, and less than half that time since other adventurers had settled around Boston Bay, when, in 1638, permanent provision was made for a college at Cambridge; and the first *Printing Press*, in what is now called the United States, was established at the same place. Thus early were established the School and the Press, which have ever stood in close relationship with American Art and Industry.

First Printing Press.

Virginia had, indeed, equally early in her history, provided for a college for the education of European and native youth; and money was, by the King's order, liberally contributed for that purpose in London, some of which was appropriated to the iron-works previously spoken of, with the view of deriving thence a revenue to the general fund. But one of the most fearful massacres recorded in our annals, put an end to all the plans of the Colonists. The character of King James, who took much interest in the effort, however assailed, stands in creditable contrast to that of Sir William Berkeley, who, in June 1671, returned thanks to God that there were neither free schools nor Printing in the Colony. It is said that Lord Effingham, while Governor in 1683, actually prohibited the use of the Printing Press, in Virginia, "on any occasion whatever." The press erected at Cambridge, in 1638, and which went into operation in the beginning of the following year, was brought from England by Rev. Mr. Glover, who had engaged in England a Printer, named Daye, to conduct it for him. Mr. Glover died on the passage out, but the press was set up by Daye, at Cambridge, where, in January, 1639, he printed the "Freeman's Oath," which was the first issue of the Colonial Press.

Of Jos. or Jesse Glover, to whose instrumentality the country owes the introduction of the press, little is known beyond the fact that he was a worthy and wealthy non-conformist minister, and that he was the principal purchaser and owner of the apparatus and stock for printing and bookselling, which he intended to carry on at Cambridge. The enterprise, doubtless, originated in the desire of the large body of educated ministers

and laymen in New England, to associate with their school at Cambridge, —after the manner of the universities of Europe,—the auxiliary labors of the Press. The other names mentioned as patrons of the Cambridge press are those of Major Thomas Clark, Captain James Oliver, Captain Allen, Mr. Stoddard, Mr. Freake, and Mr. Hues.

The first product of Day's press, it is said, exhibited much want of skill and practical knowledge in the printer. The next thing printed was an *Almanac* for the year 1639, "by William Peirce Mariner." The compiler of this pioneer of a class of annuals that fill a curious chapter in literary history, and now far out-number all other issues of the American press, seems deserving of a passing notice. He was called, by the New England fathers, "the Palinurus of our Seas," having repeatedly crossed the Atlantic,—in command of the Ann in 1623, and afterward of the Mayflower and the Lyon, and by his nautical skill, contributed not a little to the peopling of these shores. He subsequently engaged in the opening trade to the West India Islands, in which he acquired a less honorable fame. He was wrecked on the coast of Virginia in 1633, and five years after carried off captive some Pequot Indians to the West Indies, where he sold them, and brought back negro slaves, thus commencing the slave traffic in that quarter. In an attempt of the New England people to settle the Isle of Providence, in 1641, he was shot by the Spaniards, and died within an hour.[1]

The first Almanac.

In 1640, "the Psalms, newly turned into metre," which had just been translated from the Hebrew, with close fidelity to the original, by the Rev. Mr. Weld and Rev. John Eliot, was printed by Day, at Cambridge, and was the first production of the American Press in book form. It was designed to take the place of the prose translation, by Ainsworth, previously in use. The "Bay Psalm Book," as it was called—the first-fruits of that abundant harvest of pleasure and profit which is yearly gathered from this field of American industry—though possessed of little merit as a literary composition, was somewhat typical, in its extraordinary success, of that vast demand which sustains the teeming fertility in book-making and printing of the American Press. It is said to have gone through no less than seventy editions, in about one hundred and fourteen years, during which it maintained its popularity in England and America. The first edition, in England, was printed soon after its appearance in America, and the last in 1754. In 1759, the last of twenty-two editions appeared in Scotland. The original American edition was a crown 8vo., of 300 pages, bound in parchment, and was by no means creditable to the skill of the printer. He is supposed, not without

The first book.

(1) Allen's Biog. Dict.

reason, to have been a descendant of John Day, one of the most eminent and wealthy of early English typographers, the original publisher of Latimer's Sermons, Fox's Book of Martyrs, and of Sternhold and Hopkins' Version of the Psalms. The latter was a clergyman,—as were several of his brothers,—and preached for Fox at Ryegate. He was also a printer, and, by his editions of the Bible and other books, contributed much to the spread of the Reformation, as well as to the improvement of the art of printing. He attempted, among other things, the distinct use of *j* and *i*, *v* and *u*, in typography.[1]

Dr. Watts first published his Hymns in 1707, and the Psalms in 1719. He sent specimens of them to Cotton Mather, but they were not reprinted in America until 1741, when Dr. Franklin published the Hymns; and the Psalms were printed, the same year, in Boston. They did not supersede the New England Psalms till after the Revolution.

Stephen Day's deficiencies as a compositor—indicated by his errors of punctuation and of spelling, by the division of monosyllables, by a hyphen at the end of lines, and similar technical blunders—have led to the presumption that, though probably bred a printer, he had been chiefly accustomed to press-work, in which he better acquitted himself. He printed a number of works, including an almanac yearly; but Thomas was unable to find more than about a dozen of the books printed by him, none of which have his imprint, and he believes it never appeared in one. The principal of these were the Psalms, of which a second edition was printed in 1647, and the Body of Libertys, containing one hundred laws of the Colony, drawn up by Rev. Mr. Ward, of Ipswich, the author of a curious book, entitled "The Simple Cobbler of Agawam." The Laws were printed in 1641, and a second edition in 1648, which were ordered to be sold *in quires*, at 3*s*. the book.

Day was superseded in the management of the Press, in 1649, by Samuel Green, who, with his parents, came from England to Cambridge, at the age of sixteen, with Governor Winthrop's Company, eight years before Day arrived. He has been sometimes called the first printer in North America, but was unknown in that capacity for more than ten years after Day commenced printing. The General Court of Massachusetts, in October, 1641, showed their appreciation of the services of Stephen Day, whom they undoubtedly regarded as the American Caxton,

(1) Ames' Typographical Antiquities.—Allibone's Dict. of Authors, Art. R. Day. John Day died in London, in 1584. The claims of our first printer to be a descendant of that eminent typographer, may be strengthened by a portion of the inscription upon his tomb, which informs us that, having spent his wealth in printing,—

God with gayne returned his wealth agayne,
And gave to him as he gave to the poore;
Two wives he had partakers of his payne,
Each wife twelve babes, and each of them one more.

by granting him three hundred acres of land, as "being the first that sett upon printing." He had not obtained possession, however, in 1655, when the grant was confirmed to him. He died in 1668, at the age of fifty-eight.

The first Original Composition.

The first strictly original composition published in New England, was a volume of Poems, by Mrs. Anne Bradstreet, the wife of Simon Bradstreet, afterward Governor of Massachusetts, and the daughter of Thomas Dudley, who came out as Deputy-Governor, in 1630, in the same ship with the Greens. It was published in 1640, and re-printed in England, where it was quite popular. In the composition and printing of those two volumes, and of Sandy's version of *Ovid*, the first book written in America; of the *Golden Fleece*, a poem, written about the same time, by Dr. George Vaughan, at Newfoundland, and the *Nova Anglia*, the first classical Latin poem descriptive of New England, written at Plymouth, in 1623, by William Morell, of Weymouth,—the American helicon gave early promise of its later copiousness. No reason is known for the tranfer of the Press to the charge of Green, whose first essays exhibit no improvement upon the work of Day. From the general similarity in faults and workmanship, Thomas supposes he was not a printer by trade, and that he was assisted occasionally by Day. It seems probable, however, that being a youth whom he educated, he may have acquired his knowledge and style from Day previous to his undertaking its control. One of the first works printed by him was the *Cambridge Platform*, which was badly executed, both in press and case-work. A new edition of the Psalms, revised and improved by President Dunster and Mr. Lyon, was printed in 1650, which became the standard edition of the work.

In 1654, the General Court made an order for the regular printing of such laws as were ordered to be published, in impressions of from 500 to 700 copies, which the Secretary was to pay for "in wheate or otherwise" at the rate of one penny a sheet, or eight shillings a hundred, and a copy was to be distributed to each freeman in every town.

In October, 1658, Green was granted by the Court, for his encouragement, on petition, three hundred acres of land "where it is to be found." It was subsequently laid out for him at Haverhill.

The second Press in the Colonies.

In 1653, a Catechism in the Indian language, by Mr. Eliot, was printed at the expense of the Corporation in England for propagating the Gospel among the Indians in New England, of which the Hon. Robert Boyle was president. In 1655, the Corporation sent over a second Press, with the necessary furniture and materials for further publications of the same kind. In 1659, a version of the Psalms, in the Indian tongue, was printed by Green. The press was set up in the

same building at Cambridge occupied by Mr. Glover's press—a substantial brick edifice, erected at a cost of between £300 and £400 for an Indian college, and in which all the printing in the Colonies for near forty years was executed. To this establishment, fully equipped with the necessary apparatus, was added by the Corporation, in 1660, another printer, Marmaduke Johnson, of London, with better artistic qualifications than his predecessors.

During the twenty years which had now elapsed since the first press was set up, its publications, although the only one in the Colony, had not much exceeded an average, in books and pamphlets, of one work annually, exclusive of Almanacs.

The second press was designed exclusively for printing the Bible and other books in the aboriginal tongue. It was to assist in this labor that Johnson was sent over. This was so considerable an undertaking as to attract the attention of the chief personages in England, and rendered the Harvard Press for a time as celebrated as those of Oxford and Cambridge in England.

In 1661, the New Testament was issued. In 1663, the entire Old and New Testament, with the New England Psalms in Indian verse, all translated by the Rev. John Eliot, Minister of Roxbury, into the dialect of the Nipmuck or Natick Indians, was printed in quarto with marginal notes, and issued with the joint imprint of Samuel Green and Marmaduke Johnson, and a dedication to King Charles II. The work had been three years in the press, having been much retarded by the irregularities of Johnson, which were a source of annoyance to his employers and of trouble to himself. In the execution of the work, Green was assisted by an Indian whom he had taken as an apprentice in 1659, and named James Printer. His father and two brothers were principal personages in one of the Indian Churches; and he had been instructed in reading, writing, and English, in the Indian school at Cambridge. He was afterward of much service in the Indian publications, and was employed by Green as a pressman. While the second edition was in press, in 1682, Eliot wrote Mr. Boyle: "We have but one man, viz., the Indian printer, that is able to compose the Sheets and correct the Press with understanding." In 1709, an edition of the Psalter was issued, with the imprint B. Green and J. Printer, in the English and Indian languages.

The earliest application of the Book-binder's art in this country, of which we have seen any account, was upon the first edition of this first Bible printed in British America. This was executed by John Ratliffe, who came from England expressly for that purpose. As appears by a letter from him to the Commissioners of New England, August 30th, 1664, he was not well satisfied with the price

First books bound in the Colonies.

paid him for binding, and states that 3*s.* 4*d.* or 3*s.* 6*d.* per book is the lowest price at which he can do it and live comfortably. One Bible was as much as he could do in a day. Out of the price received, he had to supply thread, glue, pasteboard, and leather clasps, all of which would cost him in this country over one shilling. He had to pay here eighteen shillings for what he could buy in England for four, "they being things not formerly much used in this country."[1]

The press-work on a portion of the above was charged as follows: Sheets of the Old Testament, executed by Green alone, £3 10*s.* per sheet; with Johnson's assistance, at £2 10*s.* per sheet. Title sheet, £1; Indian Psalms, £2 per sheet; Baxter's Call, £2 10*s.*; Indian Psalter, £1 per sheet. The paper, which was fine Post, was charged at 6*s.* per ream. Thomas thus sums up the expense of this enterprise, of which the practical details may serve for comparison between present rates and those of two hundred years ago.

"I have made a calculation from the documents I have seen, and find the whole expense attending the carrying through the Press 1000 copies of the Bible; 500 additional copies of the New Testament; an edition of Baxter's Call to the Unconverted; an edition of the Psalter, and two editions of Eliot's Catechism, all in the Indian language, including the cost of the types for printing the Bible and the binding a part of them, and also the binding of a part of Baxter's Call and the Psalter, amounted to a fraction more than £1200 sterling."[2]

On the completion of the work, the Corporation presented the printing materials to the College, and they were afterward used by Green under its direction. They were valued at the low price of eighty pounds. A second edition of two thousand copies of the Bible, revised by Mr. Eliot and Rev. Mr. Cotton, was printed in 1685 by Green. It was six years in the Press, though less expensive than the former one. A letter from Mr. Eliot to Hon. Robert Boyle, in 1685, acknowledges the receipt of nine hundred pounds, in three payments, for carrying it through the Press.[3] Mr. Eliot gave a part of his salary toward the expense of

(1) N. Y. Hist. Mag. for Aug., 1859.

(2) Thomas' History of Printing, i. 243, 245.

(3) The title of this "typographical curiosity," as it most assuredly is, of which few copies now exist, although a new edition with notes by Peter S. Duponceau, and an introduction by J. Pickering, was published in Boston in octavo, in 1822, is as follows: "Wunneetupawatamwe UP-BIBLUM GOD Naneeswe NUKKONE TESTAMENT Kah Wonk WUSKU TESTAMENT." As copies of either edition of this early specimen of book-making are now extremely rare, the following extracts from a review of the work, which appeared a few years ago in the *Boston Transcript*, may not be unacceptable. The one described is the edition of 1685.

"The ancient book is in quarto form, rough and rusty with old age, and hallowed by old associations.

"The language in which it is written is

printing it, and generously remitted another portion in behalf of Mr. Cotton, who assisted him in its revision.

Mr. Eliot's missionary labors among the Indians commenced as early as October, 1646, partly in consequence of an Act of the General Court of Massachusetts for encouraging the propagation of the Gospel among that people, of whom there were between twenty and thirty different nations in New England. His efforts to instruct them, and to encourage industry and the arts of civilized life among a savage people, were attended with remarkable success. Their progress in husbandry and the mechanical arts was such that several towns were built by them; the women had learned to spin, and to engage in other domestic arts; and several laws and municipal regulations, framed for them, were early adopted, and courts of judicature established and obeyed with exemplary submission. Schools and churches were formed, and well attended; and considerable attainments were made by some in English, Greek, and Latin, and other branches of knowledge, in which they afterward became instructors. In 1672, Eliot printed 1000 copies of a logic primer, and prepared little systems of all the liberal arts for their use. There were, in 1687, six churches of baptized Indians, eighteen assemblies of catechumens professing Christianity, and twenty-four native preachers. The

dead—entirely dead; no man living can either read it or speak it.

"This Bible was printed in 1685. The quality of the paper is poor enough, and the type is uneven and unsightly; that of the title-page seems in part to have been cut with a penknife for the occasion. It is bound in sheep, with heavy ribs upon the back.

"The 'illuminations' at the beginning are extremely rude; and the lines are bent and broken. * * *

"The longest word which I can find in this Bible is in Mark i. 40: 'Wutteppesittukqussunnoowehtunkquoh,' and signifies 'kneeling down to him.'

"In translating Judges v. 28—'The mother of Sisera looked out at a window and *cried through the lattice*'—he asked the Indians for the word 'lattice,' and found, when his translation was completed, that he had written, 'and cried through the *eel-pot*,' that being the only object which the natives knew, as corresponding with the object Mr. Eliot described to them.

"The Psalms are translated into that form of verse which is termed in our hymn-books 'common metre;' and nothing can be more clumsy and uncouth than the structure of the rhymes. Sternhold and Hopkins even may be read with exquisite pleasure after perusing a few stanzas like the following, which are from the 19th Psalm—'The heavens declare the glory of God, &c.:'

"'1. Kesuk kukootomuhteaumoo
God wussohsumoonk
Mamahchekesuk wunnahtuhkon
Wutanakausnonk

"'2. Hohsekoeu kesukodtash
Kuttoo waantamonk
Kah hohsekoe nukonash
Keketookon wahteauonk.'"

Dr. Mather states that the entire translation was written with but one pen.

The first American edition of the English Bible was published in 1782, nearly one hundred and twenty years after the first appearance of Eliot's. Sower's German Bible came out eighty years after Eliot's, and nearly forty years before the English reprint.

knowledge of this work was early brought to the notice of the British Parliament, and the subject was referred to the Committee on Plantations, who were directed to prepare and report an Ordinance "for the encouragement and advancement of learning and piety in New England." The Act providing for the formation of a Corporate Society and general contributions to the object, was, with the liberality which that body has ever shown in matters of benevolence, passed in July, 1649. The Universities of the Kingdom, and many of its most eminent men, no less strongly recommended the work. Had the rights and interests of the native race been equally regarded by all who settled upon their heritage, many of the horrors of Indian warfare and Indian degradation had never been recorded upon the pages of American history.

The zealous and unremitting exertions of John Eliot, in behalf of the natives for over forty years, justly entitle him to the appellation given by his cotemporaries, but earnestly disclaimed by himself, of the "Indian Evangelist." His translation and circulation of the Bible, and other works, is alone sufficient to unite the general voice in the emphatic declaration of one, who is himself a conspicuous example of disinterested labor, that Eliot, was "the Apostle—and truly, I know not who, since Peter and Paul, better deserves that name."[1] Mr. Eliot died in 1690, at the age of eighty-six. Johnson, soon after the completion of the first edition of the Bible, was dismissed, but was allowed to retain, at their original cost, the font of types which was sent out with him. With these, he printed several works on his own account, of which Thomas was able to identify, about ten, the latest dated in 1674. He died the following year.

Green continued printing to an advanced age, and died in 1702, aged eighty-seven. He was much esteemed in Cambridge, where he held several civic and military offices. There was no Printing done at Cambridge, for a long time after his death. He had nineteen children, and his descendants were printers, in different parts of the country, for over a century after his decease. Thomas was able to collect a list of nearly one hundred books printed by him in the fifty years he conducted the Cambridge Press, including those issued in connection with Johnson, and for a short time in partnership with his son.

First Censors of the Press.

But the General Court of Massachusetts, jealous of allowing too much liberty to an instrument of so much power as the Press, or modeling its Legislation upon that of England, appointed in 1662, two licensers to watch its operations, and determine what works it would be safe to print. One or two religious publications—a class which chiefly occupied the press for many years—were issued that

(1) Hon. E. Everett's Oration at Dorchester, Mass., July 4, 1855.

year; and being deemed by some of heretical tendency, probably gave rise to the order of the Court. It was repealed, however, in May of the following year. The first licensers were Daniel Gookin, and the Rev. Jonathan Mitchell. In October, 1664, on account of the polemical freedom which the press exhibited, the Court again made an order, that "for the preventing of irregularities and abuse to the authority of this county, by the Printing Presse," there should no Printing Press be allowed in any town within its jurisdiction, but in Cambridge; and, that no person should presume to print anything without a license from the Court, under the hand of its appointed officers. The penalty was the forfeiture of the press, and of the privilege of printing within the jurisdiction in future.

The licensers having permitted the Printing of the "*De Imitatione Christi*," by Thomas à Kempis, the Court, more vigilant than discriminating, in 1668, ordered the Censors to make a fuller revisal of the work, and the press to stop in the mean time. More or less surveillance and interference with the operations of the press, continued to be exercised until after the Revolution.

The first law securing the benefit of copyright, in this country, was enacted in 1672, when the General Court of Massachusetts, granted to John Usher, a wealthy Bookseller, of Boston, the privilege of publishing on his own account, a revised edition of the Laws of the Colony.[1] The right was secured by two orders of the Court, granted on petition of Usher; the first, made in May, 1672, which decreed that no printer should print or sell any more copies than were agreed upon, and paid for by the owner; and the second, enacted in May, 1673, secured to Usher, the copyright for seven years. Hezekiah Usher, previously mentioned as the agent of the Corporation, whose Indian publications he superintended, had been a bookseller in Boston, for about twenty years, and is believed to have been the first in British America, in that business. Several of Green's works were printed for him. One of the earliest of these was an edition of the Psalms, which Isaiah Thomas, who owned a copy, believed, from its superior typography, to have been printed after the arrival of Johnson, and about the year 1664, or '65. It was printed on a handsome-faced nonpareil type; and, he says, is the only specimen of a book printed, either at Cambridge or Boston, in that type, previous to the Revolution. Even brevier types were seldom used by the printers of Boston, previous to 1760.

First Copyright Act.

It was during the same year, that Usher's edition of the laws was printed, that those of the Plymouth Colony issued from the same press.

(1) The first copyright law enacted in England was by 8 Anne, c. 19, which secured to authors the right in literary property for fourteen years. After the licensing act expired, in 1694, authors defended their rights by actions at common law, as they continued to do after the expiration of the copyright.

The following year, the General Laws of Connecticut, previously existing only in manuscript, and publicly read from time to time in the several towns, were printed at Cambridge. This first code was compiled by Roger Ludlow, and a copy was supplied by order of the Assembly, to each family in the twenty-four towns in the Colony.

About the year 1674, John Foster, a graduate of Harvard, received permission to establish a second press at Boston. The same year, the General Court added to the former licensers, two additional ones. These were Increase Mather, and Thomas Thacher, both learned divines. The latter wrote and published in 1677, a treatise on smallpox and measles, the first medical work published in Massachusetts, and probably in America.

The first book known to have been printed in Boston, was issued by Foster, in 1676. He also calculated and printed Almanacs, and a few other small works. Sewall succeeded him in 1681. The printing was executed for him by James Glen, and Samuel Green, a son of the Cambridge printer. He was a book-seller, and a magistrate, and subsequently filled the highest judicial offices in the Colony.

About this period, controversy ran high in England, respecting the Succession. The press which had formerly been controlled by the Court of Star Chamber, was on its removal from that jurisdiction by the Long Parliament placed, contrary to the pleadings of Milton for its freedom, under a board of censors, from whose guardianship it was, for a short time, emancipated in 1679. The Provincial Governors, felt it to be their duty—or were enjoined to control its freedom in the Colonies. Sir William Berkeley, the Governor of Virginia, in 1671, in his answers to inquiries of a Committee of the Lords on Colonies, says, "I thank God we have no free schools, or printing; and I hope we shall not have, these hundred years. For learning has brought disobedience and heresy and sects, and printing has divulged them, and libels against the best Government. God defend us from both."[1] Governor Dongan, of New York, on the renewal of his commission the same year, was instructed "to allow no Printing Press." The independent spirit manifested by the Colonies at this time, according to Evelyn, a member of the Board of Trade and Plantations, formed that year in London, caused some fears that they would "break from their allegiance altogether." Berkeley's successor, in 1683, was instructed to prohibit the erection of a press in that Colony. James the Second, soon after came to the throne, and continued those encroachments upon the liberties of his subjects, which produced serious troubles in England and America. While he was engaged in prostrating

(1) Chalmer's Political Annals, ii, 328.

the borough immunities in England, his Courts were busy in vacating the charters of his Colonial subjects. His agents in America, were equally industrious, in arbitrarily levying imposts, executing writs of *quo warranto*, and controlling the freedom of expression through the press. Andros arrived in 1686, with authority to prohibit Printing. But before his arrival, Randolph, the Collector of Customs, either with or without authority, had interdicted the Printing of an Almanac at Boston, without his permission.

The only other person who carried on Printing at Boston, previous to the establishment of the third Printing Press in the Colonies at Philadelphia, in 1686, was Richard Pierce, who commenced about 1684. He is chiefly entitled to notice as the printer of the first newspaper sheet ever published in the New World. It was started at Boston, in 1690, and was suppressed by the Legislature, because, it was alleged, "it came out contrary to Law, and contained reflections of a very high nature." The first number of this sheet, and the only one known to exist, was recently found in the Colonial State Paper Office in London, bearing the following date and imprint:—"Boston, Thursday, September 25th, 1690, Printed by R. Pierce, for Benjamin Harris, at the London Coffee House, 1690." The Publisher promises that the country "shall be furnished once a moneth, (or, if a Glut of Occurrences happen, *oftener*), with an Account of such considerable things as have occurred unto our Notice; to give a faithful relation of all such things; to enlighten the public as to the occurrents of Divine Providence," the circumstances of public affairs at home and abroad; to attempt the curing, or at least the charming of the spirit of lying, then prevalent; and to aid in tracing out and convicting the raisers of false reports.

First American Newspaper.

It gives a summary of current events, as the departure of about 2500 troops, and 32 sail of ships for Canada, under Sir William Phips, the ravages of the small pox and of a malignant fever in Boston. It informs us that a fire broke out between the 16th and 17th, which destroyed several houses; and, that beside the loss of one life, the "best furnished PRINTING PRESS of those few that we know of in *America*, was lost; a loss not presently to be repaired." It gives an account of the capture of St. Christopher from the French, and of the landing of King William in Ireland, with 140,000 foot and horse, as well as other veritable occurrences in Europe and America. It is, to all intents and purposes, a *Newspaper*, and, as such, the first of its kind in America.

Thomas appears to have had no knowledge of this attempt to start a newspaper. He mentions Pierce as the fifth printer in Boston, several of whose books, printed for booksellers and on his own account, he had seen—the earliest dated in 1684, and the latest 1690. He supposes him

to have been from London, where there was a printer of that name in 1679. Harris, at the date of the above publication, kept a book-store "at the London coffee-house in King's street, but removed two or three years after to Cornhill, where he engaged in printing, chiefly for booksellers. He had a commission from Governor Phips, in 1692, to print the Laws. He was from London, where he had been a printer and bookseller, and, as Dunton, the eccentric English bookseller, who was at this time in Boston, states, had, as "a brisk asserter of English liberties," incurred by his publications the displeasure of the authorities in such a form as to induce him to travel to New England, "where he followed Bookselling, and then Coffee-selling, and then Printing, but continued Ben. Harris still, and is now both bookseller and printer in Grace Church street, as we find by his *London Post;* so that his conversation is general (but never impertinent), and his Wit pliable to all inventions." Dunton adds that, in traveling with him, he found him to be the most ingenious and innocent companion he ever met with.[1] Harris's inventions appear not to have been sufficiently pliable, nor his innocence, in publication at least, so great as to satisfy the authorities on either side of the water.

Bartholomew Green, another son of the Cambridge printer, commenced in Boston in 1690, after the death of his brother Samuel, who, as well as his wife, an active assistant in his business affairs, and a person greatly eulogized by Dunton, died in the small-pox epidemic of that year. B. Green was for about forty years printer for the Government and the leading publisher in Boston. He was at first assisted by John Allen, another London printer, who commenced about the same time, and in 1707 established an independent business.

In April, 1704, Green commenced the printing of *The Boston News-Letter*, the first successful attempt to establish a periodical in the Colonies. It was printed weekly, and published "by authority" for John Campbell, Postmaster, who was the proprietor. It became the property of Green eighteen years after, during fifteen of which it was the only one in the Colonies. From 1707 to 1711 it was printed by Allen, whose premises being then burned in the great fire, it was again printed by Green. The publication continued in the family of Green until the year 1766. The contents of the first number, covering three pages of pot folio, were extremely meagre, and it contained but *one* advertisement, which was that of the proprietor.

First successful Weekly Newspaper.

Indeed, the *Newspaper*, although it was then by no means the indis-

(1) Dunton's Life and Errors, London, 1705; Thomas' History of Printing, i. 282, 287, etc.

pensable thing it now is, may be considered a legitimate offspring of the Colonial mind and action in their due order of development. It seems to be, in some degree, a necessity with every people, when a spreading population and a succession of stirring events render other means of communication too slow or imperfect; hence, in most populous and civilized nations, in ancient and modern times, some expedient of the kind has been found to exist. The Persians had their scribes for copying and their posts for transmitting the knowledge of remarkable occurrences. The Romans dispatched written accounts of victories and public events to distant provinces of the Empire. The Chinese have had their Gazettes, from the earliest times, which were sent into the remotest parts of the country. Even the analogue to the Newspaper was found among the aboriginal Americans in their charts, and the picture-writings by which they transmitted information of a great battle or other event; and of which Thomas, the able historiographer of American Printing, has preserved a beautiful specimen.

And hence it is, that in our own age and country, when many "run to and fro in the earth, and knowledge is increased," when population is stretching over a vast continent, and every day is big with events, the Newspaper has become a first requisite, and the Printing-Press travels beside the wagon of the pioneer, and rests only on the vanguard of the army of emigrants, that it may send back intelligence of their progress.

The parent of the modern Newspaper, and of the right claimed by many governments to control it, is found in the Venetian Gazetta, a government sheet sent out monthly in manuscript, and so named from a small coin called gazetta, for which they were sold. "A jealous government," says Chalmers, in his life of Ruddiman, "did not allow a printed newspaper; and the Venetian Gazetta continued, long after the invention of printing, to the close of the sixteenth century, and even to our own days, to be distributed in *manuscript*." In the Magliabecchian Library at Florence, are thirty volumes of Venetian Gazettas, all in manuscript. "It may gratify national pride," continues the same writer, "to be told that mankind are indebted to the wisdom of Elizabeth and the prudence of Burleigh for the first newspaper in England." The first printed newspaper was the "English Mercurie," printed by authority, by the Queen's printer, in London, on the 23d July, 1588. It was intended by her minister Burleigh to arouse the public mind, on account of the Spanish Armada then threatening the nation. Although several papers, still preserved in the British Museum, appeared during the year, they were only extraordinary gazettes, and were not regularly published. As other nations adopted the example, they retained the name and the control of

the gazettes as government organs, according to the original custom.[1] The first regular newspaper appeared in 1622, and was, we believe, called *The Weekly Courant.* "When," says Hunt, "the reign of James I. was drawing to a close; when Ben Jonson was poet-laureate; and the personal friends of Shakspeare were lamenting his recent death; when Cromwell was trading as a brewer at Huntingdon; when Milton was a youth of sixteen, just trying his pen at Latin verse; and Hampden a quiet country gentleman in Buckinghamshire, London was first solicited to patronize its first newspaper."

The great events in English and Colonial history then transpiring; the abdication of James and the proclamation of his successor; the imprisonment of a Royal Governor in Boston; the resumption of the Charters; the invasion of Canada by the people of New England, to arrest the growing power of France; and other exciting events, had caused the issue, as early as 1689, of a "news placard" in Boston, and the reprint, in the following year, by the order of Governor Fletcher of New York, of a number of the London Gazette. A means of public enlightenment on those momentous topics was an imperious necessity.[2]

(1) London Mirror, vol. v. 198.

(2) The following passages will show forcibly the condition, as to freedom and activity, of the English Press at this date (1685), and explain the source of its embarrassment in the Colonies.

"No part of the load which the old mails carried out," says Macauley, "was more important than the news-letters. In 1685, nothing like the London daily paper of our time existed or could exist. Neither the necessary capital nor the necessary skill was to be found. Freedom, too, was wanting—a want as fatal as that of either capital or skill. The Press was not, indeed, at that moment under a general censorship. The Licensing Act, which had been passed since the Restoration, had expired in 1679. Any person might therefore print, at his own risk, a history, a sermon, or a poem, without the previous approbation of any public officer; but the judges were unanimously of the opinion that this liberty did not extend to gazettes, and that, by the Common Law of England, no man, not authorized by the Crown, had a right to publish political news. While the Whig party was still formidable, the Government thought it expedient occasionally to connive at the violation of this rule. During the great battle of the Exclusion Bill, many newspapers were suffered to appear—the Protestant Intelligence, the Current Intelligence, the Domestic Intelligence, the True News, the London Mercury. None of these were published oftener than twice a week. None exceeded in size a single small leaf. The quantity of matter which one of them contained in a year, was not more than is often found in two numbers of the "Times." After the defeat of the Whigs, it was no longer necessary for the King to be sparing in the use of that which all his Judges had pronounced to be his undoubted prerogative. At the close of his reign, no newspaper was suffered to appear without his allowance, and his allowance was given exclusively to the 'London Gazette.' . . But neither the 'Gazette' nor any supplementary broadside printed by authority, ever contained any intelligence which it did not suit the Court to publish. The most important Parliamentary debates, the most important State trials recorded in our history were passed over in perfect silence. In the capital, the coffee-houses supplied in some measure the place of a journal. Thither the Londoners flocked, as the Athenians of old

Notwithstanding the restraints upon its freedom, some of which were not of long continuance, the presses in Massachusetts continued to be fully occupied, and many manuscripts were sent to England for publication, including the *Magnalia* of Dr. Mather, and other works of considerable size. But, while schools and the press, their great educational ally, were deprecated in the South, and printing was prohibited, or jealously watched in the North, both found a welcome reception in the new Colony which Penn was founding on the banks of the Delaware.

"Within *four* years from the time that our ancestors landed in the wilderness, a Printing Press was at work in Philadelphia, sowing broadcast the seeds of knowledge and morality; and only a few months after the arrival of William Penn, public education was attainable at a small expense."[1]

flocked to the market-place, to hear whether there was any news. . . . But people who lived at a distance from the great theatre of political contention, could keep regularly informed of what was passing there only by means of news-letters. To prepare such letters became a calling in London, as it now is among the natives of India. . . . Such were the sources from which the inhabitants of the largest provincial cities, and the great body of the gentry and clergy, learned almost all they knew of the history of their own time. . . That was a memorable day in which the first news-letter from London was laid on the table of the only coffee-room in Cambridge.

"At the seat of a man of fortune in the country, the news-letter was impatiently expected. Within a week after it had arrived, it had been thumbed by twenty families. . . . It is scarcely necessary to say that there were then no provincial newspapers. Indeed, except in the capital and at the two Universities, there was scarcely a printer in the kingdom. The only press in England, north of Trent, appears to have been at York."

The supply of books, it would appear from the same author, was almost as meagre as that of news—a fact one would not be led to expect from the length of time England had enjoyed the benefits of the Press, and the long roll of illustrious authors that adorned her past and current annals. "Literature which could be carried in a bag then formed the greater part of the intellectual nutriment ruminated by the country divines and country justices. The difficulty and expense of conveying large packets from place to place was so great that an extensive work was longer in making its way from Paternoster Row to Devonshire or Lancashire, than it now is in reaching Kentucky. How scantily a rural parsonage was then furnished, even with books the most necessary to a theologian, has already been remarked. The houses of the gentry were not more plentifully supplied. Few knights of the shire had libraries so good as may now be perpetually found in a servants' hall, or in the back parlor of a small shop-keeper. An esquire passed among his neighbors for a great scholar, if Hudibras and Baker's Chronicles, Tarlton's Jests, and the Seven Champions of Christendom, lay in his hall window among the fishing-rods and fowling pieces. No circulating library, no book society then existed, even in the capital; but in the capital those students who could not afford to purchase largely had a resource. The shops of the great booksellers near Saint Paul's Church-yard were crowded every day, and all day long, with readers; and a known customer was often permitted to carry a volume home. In the country there was no such accommodation; and every man was under the necessity of buying whatever he wished to read."

(1) Memoirs Hist. Soc. of Penn., i, 101.

William Penn landed in his new territory, in October, 1682; and, in December following, a school was opened in Philadelphia. Six years after this, a public school, or seminary, was founded by the Friends, the charter of which declares—in pleasing contrast with the sentiments of Governor Berkeley—that "the prosperity and welfare of any people depended, in a great measure, upon the good education of their youth, etc., * * * * which cannot be effected in any manner so well as by erecting public schools for the purpose aforesaid."

First Printing Press in Pennsylvania.

The third Printing Press in the Colonies, and the first outside of Massachusetts, erected thus early in Philadelphia, was set up by WILLIAM BRADFORD, at Shackamaxon, now Kensington, in the neighborhood of the celebrated Treaty ground, in the year 1686. His earliest publication is stated by some authorities, to have been an Almanac for the year 1687, by Daniel Leeds, "student in Agriculture." A copy of that is extant in the Philadelphia Library. A recent biographer states, on the authority of Mr. Henry Stevens, that a small quarto tract of four or six leaves, printed in 1686, is the first work known to have been printed by him. The title is not mentioned. The following extract, however, from the Council Book, which we find in Hazard's Register, (Vol. i. p. 16), while it is an illustration of the petty annoyances to which the press was subject in that day, seems to indicate the issue of an Almanac as early as the beginning of January, 1686. "1685, 9th, 11 mo.—The Secretary reporting to the Council, that in the Chronologie of the Almanack sett forth by Samuel Atkins, of Philadelphia, and printed by William Bradford, of the same place, there was these words; (the beginning of government here by the Lord Penn), the Council sent for Samuel Atkins, and ordered him to blot out the words *Lord Penn;* and likewise for William Bradford, the printer, and gave him charge not to print any thing but what shall have lycence from the Council."

It was not unusual for a printer first to try his hand upon an ephemeris of that kind, to serve for a general introduction to the public, but religious controversy, which kept the rust from the New England mind in the first years of its history, also gave the first impulse to Literature and the Press in Pennsylvania.

The first who entered this field, was GEORGE KEITH, a clever but disputatious Scotch Quaker, afterward Surveyor-General of New Jersey. He was the first instructor in the Friends' School, previously mentioned, in which he was succeeded at the end of the first year, by Thomas Makin, the author of two Latin poems upon Pennsylvania. In 1689, Keith published against the New England Churches and Divines, by whom his sect was persecuted, a 4to. tract, which Thomas, who owned a copy, states, was the oldest book he could find from Bradford's press. The

following year, Keith threw the gauntlet to the learned Cotton Mather, of Boston, and published one or two more pamphlets in defense of the Quakers. But, having in 1691, quarreled with his own people, whom he charged with a departure from the pacific principles of the Society, by aiding in the capture of a privateer; a feud arose, which is remarkable in the history of the Province for the excitement and bitterness of faction attending it. The zealous polemic was condemned by a large majority in the meetings, including the Lieutenant Governor and the Quaker magistrates, whom he attacked in print, in an "Appeal" to the people. Bradford, who was also a Quaker, in the controversy, took the side of Keith, against the stronger party, and was arrested for printing the seditious and libelous pamphlets of Keith and others. His press, forms, and materials, with the offensive publications, were seized. Refusing to give security, Bradford, McComb the publisher, and others were imprisoned. After considerable delay, they were brought to an unsatisfactory form of trial, in which their judges were their leading opponents in the meetings. According to the accounts of the proceedings, which, however, were drawn up by the accused party, Bradford appears to have managed his cause with tact and judgment. The charge against him was, the printing a paper which was seditious and tended "to weaken the hands of the magistrates." The Court overruled his exception, to two of the jurymen, who had prejudged the subject of the pamphlet, on the ground that the jury had only to find as to the facts of the printing, and that the Court were judges of its tendency.

Against this, Bradford strenuously contended that the jury were judges "of the law as well as of the fact," in which opinion some of the jurors coincided. The Attorney, also, pleaded against him a Statute of Charles II., requiring every printer to attach his name to his books, to which Keith replied, that it was often violated by William Penn, and other Quakers, without complaint. Beyond the seizure of the books, upon the premises of Bradford, the only evidence against him was the frame containing some pages of the pamphlet in type, and this was not produced in Court as requested by the accused. It was sent to the jury-room, however, and a fortunate accident was the occasion of his release. The jury disagreed, and were discharged. But, it is said, that during the examination of the form, being unaccustomed to reading backward, they attempted to move it into a more favorable position, when the types fell from the chase, and in an instant destroyed the evidence of his offense.

Having about this time received an invitation to remove to New York, he, in 1693, established in that city the first press in the Province, where there had been none set up during the Dutch rule. In 1690, Governor Fletcher is said to have caused a copy of the London

First Printing Press in New York.

Gazette, containing the details of an engagement with the French, to be re-printed. But, if done in the Colony, there does not appear to have been any regular printing house in New York, at that time. Bradford, soon after his removal thither, was appointed printer to the Government, with an annual allowance of fifty pounds from the public funds. He retained the situation for about thirty years. During the same period he was also public printer for the Province of New Jersey.

His first labor in New York, was to print a small folio volume of the Laws of the Province, which was issued in 1693. In the imprint, he proclaims his public functions as "printer to their Majesties, at the sign of the Bible." There was an additional printer in that city in 1726, whose place of business was on Smith (now South William) street.

On leaving Philadelphia, where he was part owner of a paper-mill on the Wissahickon, he is supposed to have retained the ownership, or an interest in the press there. In 1699, it was under the management of Reinier Jansen, a Dutchman, who, published the same year, the first literary work upon any other than a religious subject which appeared in the Province. The volume which is now very rare, was by Jonathan Dickinson, and was entitled "God's Protecting Providence, etc.," being a touching narrative of the author's deliverance, with others, from shipwreck on the Coast of Florida. The typography is said to have been "wretchedly executed and disfigured by constant blunders."

How long, before or after the publication of this book, Jansen was a printer in Philadelphia, or whether he was ever the owner of a press or not, Thomas, who could find no other book with his imprint—was unable to determine. Two other books from his press, however, are preserved in the Philadelphia Library, dated the years 1700, and 1705.[1]

(1) Thomas supposes him to have been the ancestor of Roeloff Jansen, for whom a creek in the manor Rensselaer in New York, was named; and, that he had been an apprentice or workman, for Bradford, who entrusted the press to his care, and suffered him to manage it in his own name, in consequence of the difficulties of the proprietor with the Friends. He may have been in Bradford's employment before the removal of the latter to New York. However this may be, he could not have been the ancestor of Roeloff Jansen, who was one of the earliest emigrants to the Colony on the Hudson, nearly seventy years before, being mentioned in the Account Books of Kiliaen Van Rensselaer, the first Patroon, in 1630, among the first Colonists. There is more probability that the descent was in the opposite direction. Roeloff Jansen secured in 1636, a grant of sixty-two acres of land on Manhattan Island, near the present Canal street, a claim to which, has been so long litigated with the wealthy Corporation of Trinity Church, in the famous "Aneke Jan's Suit." The estate was conveyed in 1671, to Governor Lovelace, by his widow—who married Dominic Bogardus, the first Dutch minister of the city—and three of her four sons by Jansen. The fourth, Cornelius, not having signed the conveyance, his heirs, after it had become the property of Trinity Church, brought suit for one-eighth interest. Our printer may have been one of the sons, although there were many of the name among the first settlers in New Amsterdam

In 1712, Jansen was succeeded in Philadelphia by Andrew Soules Bradford, eldest son of the original proprietor, who, in 1708, on attaining his majority, was, as required by the laws of New York, admitted a freeman of the City; and after a short business connection with his father, returned to Philadelphia, and resumed the management of his father's press.

The Assembly of Pennsylvania, about this time, resolved to have the Laws printed; and, on the 9th May, 1712, sent for Jacob Taylor, to treat with him on the subject; and two weeks after appointed a Committee "to treat with Jacob Taylor and the *other printers in the town*," in reference to the cost, which Taylor had previously stated at £100, exclusive of paper. Whether Taylor and Jansen were both printers at that time, or "the others" refer to the Bradfords, who were seeking the contract, is uncertain. The printing was finally given to Andrew Bradford, who printed the laws in 180 pp. folio, the following year, and thenceforward was the leading or only printer in the city until Franklin arrived. In answer to a petition of Bradford in 1714, stating that the repeal by Her Majesty of the Laws printed for the Assembly had stopped their sale, £30 were ordered to be paid to him for fifty bound copies.

Andrew Bradford was born in Philadelphia, and the family, like that of the Greens of Boston, furnished for over one hundred years a succession of native-born printers. His Printing-house was in Second-street, "at the sign of the Bible," where, in addition to Printing, he executed Bookbinding, and sold books, tea, and numerous other articles. A man's talent at that day was often estimated by his ability to carry on several independent callings. He was printer to the Government, and in 1732 was Postmaster of the Province.

The first newspapers published in Philadelphia and New York were started by the Bradfords. Andrew commenced, in connection with John Copson, the publication, at Philadelphia, of the "American Weekly Mercury," December 22d, 1719. The day previous, James Franklin, the brother of Benjamin, issued in Boston the "Boston Gazette," which was the second newspaper in the British Colonies. The Boston "News-Letter," by B. Green, was the first paper known to have gone beyond the first number; and the "*American Mer-*

The Second American Newspaper.

and on the Hudson, as well as in West Jersey and Pennsylvania. In 1674, when New York was finally ceded to the English, Reinier Jansen was the owner of property on the north side of Pearl street, between Old Slip and Broad street, which was ranked in the second class, and valued at $1200. It is probable, that he is the person who succeeded Bradford, of whom he may have received some instructions in Printing in New York, before his removal to Philadelphia.

cury was the third. The elder Bradford commenced the New York Gazette, October 16th, 1725.[1]

When, in 1723, BENJAMIN FRANKLIN, the greatest of American typographers, at the age of seventeen, made his first memorable visit to Philadelphia, he found the Bradfords the only printers in the two cities, with the exception of Samuel Keimer, then about establishing a second press in Philadelphia. With Keimer, a printer from London, of whom Franklin gives no flattering portraiture, he obtained employment, and subsequently constructed for him the first copper-plate printing-press seen in the Colonies. He also executed for him a variety of vignette and other engravings for a lot of New Jersey paper-money, which Keimer had contracted to print, and went with a press to Burlington to do the printing. Franklin found Keimer engaged in setting up in type his first piece, an elegy upon a young printer named Aquilla Rose, which he was mentally composing as he went along. He printed a number of pamphlets, almanacs, and small works, some of which were repudiated by those from whom they appeared to emanate, and thereby possibly contributed to his want of success. The first publication bearing his imprint, of which we have any knowledge, is entitled "The Craftsman," and is to be found in the Philadelphia Library.

Franklin's First Typographical Efforts.

As "a map of busy life," the Mercury conducted by Bradford was but a sorry representative of the modern newspaper. In December, 1728, nine years after its commencement, Keimer issued another, the second in the Province, with a title which would seem imposing even at the present day. It was called "The Universal Instructor in all Arts and Sciences, and Pennsylvania Gazette." During the first nine months, it sustained its title as an "Instructor," by occupying about two columns of each sheet with extracts from Chamber's Dictionary; but its subscription list had not then reached one hundred subscribers.

While Franklin was absent in England, after his first engagement with Keimer, the latter had increased his business, enlarged his establishment, and employed a number of journeymen; and, like many of the early printers, dealt considerably in stationery and small wares. After being compelled to sell out his paper, he became inattentive to business and

(1) Previous to 1758, all newspapers in New York went free of postage. On account of their "great increase," they were then ordered to pay 9*d.* a year for fifty miles, and 1*s.* 6*d.* for one hundred miles. The mail was changed in 1755 from once in two weeks to once a week. Since the Revolution, a boy has carried the whole mail in a saddle-bag on horseback. The exact issue of the Newspaper and Periodical Press of New York City, in every form, was ascertained, in 1849, to be in numbers 158, which issued yearly 69,247,864 copies. The yearly consumption of paper was 147,095 reams, or 5,600,000 pounds at a cost of $600,000.—*Merch. Mag.*, xx. 103.

involved in debt. He then sold his apparatus to David Harry, a former apprentice, and removed to Barbadoes, whither he was soon followed by Harry. At Bridgewater, in that Island, Harry set up his press and employed his former master as a journeyman, but soon resold the types and press to Keimer, who established there the first newspaper in the Caribbee Islands. It was the "Barbadoes Gazette," which he ushered into the world with a poetical address; and it was continued many years after his death in 1738. That it was not destitute of merit, seems probable from the fact that two quarto volumes, consisting chiefly of selections from this Gazette, were published in London in 1741.[1]

Franklin, whose intentions Keimer appears to have anticipated in the issue of his paper, soon after commenced business in company with Hugh Meredith. Foreseeing the course of events, he for a time sustained Bradford's Mercury by his pen, at the expense of Keimer's paper, which he ridiculed. After his return from England, where he acquired a lasting reputation for skill in his profession, the paper fell into Franklin's hands. He purchased it of Keimer for a trifling sum, and managed it successfully, for a short time in connection with his partner, and during the next fifteen years by himself. An editorial in one of the numbers during the year 1736, shows how imperfect were the appliances for printing at that time. The outer form, as it was called, was printed reversely or upside down to the inner form, and was thus apologetically explained: "The printer hopes the irregular publication of this paper will be excused a few times by his town readers, in consideration of his being at Burlington with the press, laboring to make money more plentiful." After having been for a time issued semi-weekly, and undergone several changes in form, from folio to quarto and back to folio, it became an influential journal, and was continued, under the abridged name of *The Pennsylvania Gazette*," to within about thirty-five years of the present time. "I possess," says Brissot De Warville, "one of these Gazettes, composed by him and printed at his press. It is a precious relique, a monument which I wish to preserve with reverence, to teach men to blush at the prejudice which makes them despise the useful and important profession of the editor of daily papers. Men of this profession, among a free people, are their first preceptors and best friends."[2] On the 9th May, 1754, the Gazette appeared with the device of a snake divided into eight

(1) For a list of several of the early publications from the presses of Jansen, Keimer, Franklin, and others, previous to 1750, as well as an interesting and reliable sketch of the subsequent growth and present magnitude of the publishing business of Philadelphia, see "Philadelphia and Its Manufactures in 1857," by Edwin T. Freedley, Esq.: (E. Young, Publisher.)

(2) New Travels in the United States in 1788

parts, with the motto "Join or die," designed to represent New England and the seven other Colonies, and to arouse them to avenge the atrocities of the French and Indians upon the frontiers. The device was adopted by many other papers subsequently; and, with the accompanying watchword, is believed to have had a good effect in a most critical period of our Colonial fortunes.

Franklin's reputation was already great throughout the Colonies; and the Gazette, upon which he bestowed much of his attention, was the means of diffusing widely the wisdom of his counsels. At the Convention of Delegates from all the Colonies, which assembled at Albany the same year, to concert a plan of union against the pretensions of the French—who claimed all but a narrow strip of the continent on the seaboard, and had recently erected Fort Du Quesne and other strongholds in the rear of the Colonies—Franklin presented a scheme for general union and defense, which was adopted by all but the Connecticut delegates, who considered it too favorable to monarchy. The plan, however, was rejected by the Ministry, for the very opposite reason that it was too democratical.

On the 31st October, 1765, his paper was put into mourning for the passage of the Stamp Act, which was to go into effect the next day, and which Franklin, then in England, had labored vigorously to prevent. For three weeks its publication, like that of many other papers, was suspended, hand-bills being issued instead, headed, "Remarkable occurrences"—"No stamped paper to be had," etc. It was renewed the following year, with the name D. Hall, as printer; and, from the year 1766, was conducted by Hall & Sellers. On the approach of the British army in 1777, the publishers retired from Philadelphia, and the paper was suspended, but revived on the evacuation by the army.

In 1750, Hugh Gaine, who served his apprenticeship in the same establishment in Belfast with Andrew Stewart, a cotemporary printer in Philadelphia, set up a press in New York, and commenced the "New York Mercury." In 1764 and '65, he printed the Notes and Proceedings of the House of Assembly from 1691 to 1765, in two large volumes folio, of one thousand pages each, and continued to print to an advanced age. The largest business done in New York, from 1740 to 1770, was by James Parker, the publisher of the Gazette after Bradford's resignation, who had also a press at Woodbridge, New Jersey, where he resided, and was concerned in another at New Haven, conducted by his partner John Holt. Holt subsequently set up in New York, and, as the publisher of the New York Journal in the service of the revolutionary cause, was obliged to quit the city during the war, at

Newspapers in New York.

JOHN F. TROW.
NEW YORK.

GEORGE F. NESBITT.
NEW YORK.

C. A. ALVORD.
NEW YORK.

EMINENT MODERN PRINTERS.

PLATE 11.

GEORGE P. GORDON.
NEW YORK.

EDWARD O. JENKINS.
NEW YORK.

CORNELIUS WENDELL.
WASHINGTON, D.C.

Engd by H.B. Hall Jr. N.Y.

the sacrifice of his property, which was destroyed. He returned after the Peace, and resumed business in New York.

James Rivington, a London Bookseller, who first settled in Philadelphia in that business in 1760, the following year began business in New York, with a branch establishment at Philadelphia and Boston. But about the year 1773, he began a newspaper—The Royal Gazette—which made no small stir for some years, the paper being in the Royal cause. He claimed to have at one time 3000 subscribers; but as the paper acquired the title of Rivington's Lying Gazette, on account of the editor's misrepresentations, some doubt of the assertion was entertained.

The first press in Albany, which was the second place in New York in which printing was done, was erected about the year 1771, by Alexander and James Robertson, in Barrack, now Chapel-street, it is said. In November of the same year, they commenced the Albany Gazette, which was not continued later than 1776, when the brothers joined the Royalists in New York. On the evacuation of the city, they took refuge in Nova Scotia, and at Port Roseway, in that Province, Alexander died in 1784. James died many years after in London.

Having thus traced the commencement of the Art in the three Colonies which were the first to employ it, and which have ever since given it the fullest occupation, we shall more briefly state when and by whom, so far as it is known, Printing was introduced into the other original Colonies and Territories. Our limits do not permit us to follow it out into minute details in all sections of the country, and we shall be content with indicating the leading features of its progress, down to the commencement of our Constitutional history.

A press was established in Connecticut, at New London, in 1709, by Thomas Short, recommended from Boston by B. Green. He printed the following year the celebrated Saybrook Platform of Church Discipline, and several religious tracts and sermons, but died within three or four years after his settlement. He was succeeded by Timothy Green, the son of Samuel Green, Jr., of Boston, who became the Government printer, at a salary of £50 per annum. His descendants were printers in the Colony for nearly a century, and carried the art into some of the other Provinces. The first newspaper in the Colony, was the Connecticut Gazette, printed first by James Parker & Co., at New Haven, January 1, 1755. Samuel, a grandson of Timothy Green, of New London, erected the first press in Hartford, in 1764, and commenced the third paper in the Colony, the Connecticut Courant,—the New London Summary having been the second.

First Press in Connecticut, 1709.

The art was introduced into Maryland, by William Parks, who set up

a press at Annapolis, in 1726. The year after, he printed "a complete collection of the Laws of Maryland." The Printing for that Colony had been previously done by Andrew Bradford, at Philadelphia. In 1727, or 1728, Parks began the publication of The Maryland Gazette. He was followed in 1740 by Jonas Green, the son of T. Green, of New London, who printed for the Government at an annual stipend of £500 currency. The first press at Baltimore, was erected by Nicholas Hasselboct, of Pennsylvania, who had been instructed by C. Sower. He printed in English and German, and contemplated, if he did not actually commence, an edition of the German Bible.

First Press in Maryland, 1726.

The Maryland Journal, or Baltimore Advertiser, commenced in August, 1773, by William Goddard, the first Printer of Providence, R. I., was the first paper at Baltimore, and the third in the Province.

While Goddard was engaged in public affairs, in which he was prominent, his sister, Mary Catharine Goddard, managed with ability the concerns of his printing-house. The paper and books were printed in her name, and she is said to have first printed the Declaration of Independence in 1776, or 1777.

In 1729, William Parks, the first Maryland printer, also established a press at Williamsburg, in Virginia, which was the first regular Printing done in that Colony.[1] He printed at that place the same year, Stith's History of Virginia, octavo, and the Colonial Laws. He was for some time public Printer to both Colonies, enjoying, it is said, an allowance of £200 a year from each. He commenced at the same place in 1736, the Virginia Gazette, the first public journal in the Province.

In Virginia, 1729.

The first press in South Carolina, was set up at Charleston, by Eleazer Phillips of Boston, in 1730. The Government is said to have offered a liberal reward (£1000) to any printer who would settle in the Province. Three printers arrived, in consequence of the offer in 1730, and the year following, Phillips was appointed printer to

In South Carolina, 1730.

(1) Virginia appears to have had a press as early as 1681, and to have been in point of fact the second Province in which the art was introduced, though it was immediately prohibited. W. W. Henning, Esq., of Richmond, while engaged in 1810, in publishing the Statutes of Virginia, from the year 1619, found among the manuscripts in his possession, the following minute of the Governor and Council, which had so long eluded search as to lead to doubts whether printing was ever interdicted there. "February 21st, 1682—John Buckner, called before the Lord Culpeper and his Council, for printing the laws of 1680, without his excellency's license —and he and the printer ordered to enter into bond in £100, *not to print any thing* hereafter, until his Majesty's pleasure shall be known." Chalmers, also mentions, that Lord Culpepper, in 1682, prohibited printing "till his Majesty's pleasure should be known;" and, that Lord Effingham the following year received instructions to disallow the use of a press in Virginia. There is no trace of the Art in the Colony from that time until the arrival of Parks. (Thomas ii. 545, 546.)

his Majesty, but died soon after. Thomas Whitmarsh, his successor, commenced in January, 1731 or 1732, the first newspaper in the Carolinas, the South Carolina Gazette. He also died of the epidemic, there prevalent in 1733. He was followed in the business by Lewis Timothèe, a French Protestant Refugee, who had worked for Franklin in Philadelphia, and was the first Librarian of the Philadelphia Library Company, in 1713.

The first press in Rhode Island, was at Newport, and was established by James Franklin. He had learned the Art in England, and in 1713–14, brought thence a press and types, with which he commenced in Boston, and printed for a time the Boston Gazette. In 1721, he established the New England Courant, the third paper in the Colony. The Courant gave offense to the Clergy and some members of the Government, who denounced and attempted to suppress it. The Proprietor was imprisoned, and an order on the General Court obtained, forbidding its publication until its contents had been submitted to the Secretary of the Province. It continued to appear, nevertheless, without such censorship, but for some time was issued in the name of his brother Benjamin, even after his removal to Philadelphia. In that paper, appeared some of the future philosopher's first essays at composition, which at once excited attention. Not succeeding to his satisfaction in Boston, and unwilling to submit to the requirements of the Assembly, James removed to Newport, Rhode Island, then a place of considerable commercial importance, and the second city in New England, where he set up his press, "under the Town School House." In September, 1732, he commenced the Rhode Island Gazette. He died in 1735, after which the press was managed by his widow, Anne Franklin, assisted by her daughters as compositors. She printed for the Government, among other things, an edition of the Laws of the Colony, of 340 pages folio. She also printed linens, calicoes, and silks, as her husband had previously done at Boston. The press was worked by a servant of the family. Her son James, succeeded about the year 1752, and in 1758, established the Newport Mercury, which is still published, and in the office of which is to be seen the original Franklin Press, at which Benjamin Franklin learned the business with his brother.

In Rhode Island, 1732.

A press was first set up at Providence, in 1762, by William Goddard, afterward a printer at Philadelphia, and later still at Baltimore. He commenced the same year the Providence Gazette and Country Journal, which was long continued, and became an influential journal. For about two years, it was managed by Sarah Goddard & Co., the former being his mother, and the Co., John Carter, who was subsequently the proprietor.

The first resident printer in New Jersey, was James Parker, a native

of Woodbridge, in that Province, then a printer of New York, and at one time of New Haven. He established a press in his native borough in 1751, and the next year printed a folio edition of the Laws of the Province, edited by Judge Nevill, which sold for five dollars a volume. He also published a monthly Magazine, for about two years. In 1765, he removed his press to Burlington, the Capital, where, as already mentioned, Keimer, and Franklin of Philadelphia, had occasionally executed Government work. He returned to Woodbridge, after completing the printing of Smith's History of New Jersey, of five hundred and seventy pages, 8vo.

In New Jersey, 1751.

New Hampshire received the art in 1756, from Daniel Fowle of Boston, who having incurred the displeasure of the Government of Massachusetts, removed in July, to Portsmouth, the Capital of the former Province, where he the same year published a newspaper,—The New Hampshire Gazette. He printed the laws and other work for Government.

North Carolina had two presses before the Revolution in 1775. The first was established at Newbern, in 1754, or 1755, by James Davis. The Public Printing had been previously done at Charleston. In December, 1755, he published first the North Carolina Gazette, and was appointed Postmaster by Franklin and Hunter. He completed in 1773, an edition of the Laws of the Province pp. 580, folio.

In North Carolina.

In Delaware, a press was established in 1761, at Wilmington, by James Adams, who had learned the Art in Londonderry, Ireland. The Printing for the Province had previously been done at Philadelphia, where Adams had the year before set up a press on his own account. He issued proposals for a newspaper, The Wilmington Courant, in 1762. He was the only printer in Delaware, before 1775.

In Delaware, 1761.

Georgia was the last of the old States in which the art was practiced. The Public Printing was done in Charleston, until 1762. In that year, James Johnson, a Scotchman, established a press at Savannah, and printed for Government, by whom he was handsomely rewarded. He published an edition of the laws, and in 1763, commenced a newspaper, the Georgia Gazette, the only one before the Revolution.

In Georgia.

A press was introduced into the present State of Vermont in 1778, by J. P. Spooner, and Timothy Green, printers of Norwich, Connecticut, who first erected a press at Hanover, then claimed by Vermont, but now in Connecticut, where they began a newspaper, but that year removed to Westminster, at the request of the newly organized Government of that State. They published in February, 1781, the first newspaper in Vermont, "The Vermont Gazette, or Green Mountian Postboy." The press was removed in 1783, to Windsor, under new proprietors.

In Vermont, 1778.

In Maine, 1780.

Printing is said to have been first practiced in what is now the State of Maine, in 1780. In 1810, there were newspapers published at six towns, now within that State, including three at Portland.

Early Newspapers in the Western States.

The following facts, from an interesting monograph, by Mr. Moran, of Philadelphia, in a work already quoted, which we insert here for the sake of unity in a subject intimately connected with the progress and prosperity of the country, will show concisely the dates when the "Art preservative of all arts" is believed to have been introduced into the other Territories and States down to the present year. The dates will, for the most part, correspond with the first issue of a newspaper in the several Territories.

The first Press in the territory west of the Alleghanies was in Kentucky, in 1786; the second, in Knoxville, Tennessee, 1793; in Ohio, at Cincinnati,—then only a trading-post,—in 1795.[1] In 1811, the art was first practiced in what is now the State of Indiana; in Louisiana, by the French, in 1794, but little was done there before 1803, when the territory was ceded to the United States, at which time there was but one press there. In 1810, there were about ten. Missouri had a Press in 1810;[2] Michigan, in 1810; Mississippi, in 1809; Alabama, in 1812. There was one in Arkansas as early as 1825. The first in Illinois, was at Kaskaskia, established by Matthew Duncan, in 1815. Printing was introduced into Wisconsin, in 1827, by General Ellis, who, having no Press, used a planer and mallet. He procured a Press in 1833, and printed, the same year, at Green Bay, the first Newspaper in Wisconsin.[3]

(1) It is stated in Hazard's Register of Pennsylvania (i. 181), that the first newspaper west of the Alleghanies was the "Pittsburg Gazette," issued by John Scull, Esq., more than forty years before his death, which was in 1828. That would give an earlier date than that of the Press at Knoxville. An early Pittsburg Directory, gives 1783 as the date of Scull's paper. Dr. Drake, in his View of Cincinnati, gives November 9th, 1793, as the date of the first publication of the Centinel of the North-West Territory," by William Maxwell, in in that city; which paper, he states, was the first published north of the Ohio, and the third or fourth west of the mountains. It was a half sheet, royal quarto size, and, in 1796, was purchased by Edward Freeman, who changed the name to the "Freeman's Journal." It was that year printed on paper made in the vicinity.

(2) In Edwards' "Great West, and her Metropolis, St. Louis," Joseph Charless, whose son was lately shot by Thornton, is stated to have started, in July, 1808, the first paper in St. Louis, and the first west of the Mississippi. It was the Missouri Gazette, now continued in the Missouri Republican of that city. He had previously worked for Matthew Carey, in Philadelphia, on the first quarto Bible published in the United States, in the English language, as he was accustomed to relate. The Laws of Louisiana (Territory), printed in the same year in St. Louis, was the first book printed west of the Mississippi.

(3) The Milwaukie Sentinel gives the names of one hundred and one newspapers, English and German, now published in Wisconsin. Their aggregate circulation is over 80,000, and it said that the three or four million copies, that form the grand total every year, are printed on material made in the State,—four-fifths of all the paper being manufactured in Wisconsin. The circulation just mentioned, is about equal to the entire newspaper circulation of the whole Union, as accurately estimated, in 1788.

The art was practiced in Texas, by the Spaniards, as early as 1760; and by Americans, about 1829.

In Iowa, printing was introduced by W. C. Connell, in 1836. In 1832, Iowa was nearly a wilderness, and the first house was that year built in that part of the State, near Davenport, which is now noted for its commerce, and no less than three daily papers.

Printing was first executed in Minnesota, April 28th, 1849. A newspaper was started in that Territory the year before, when there was not a village in it; but it was printed at Cincinnati, and published at St. Paul, April 27, 1849. Seven years afterward there were four printing offices in St. Paul alone, and three daily journals, while there were no less than thirty-one newspapers in the Territory.

The Mexicans are believed to have attempted printing in California, prior to 1846; but there is no certain evidence of it. The first regular printing executed there seems to have been at Monterey, on August 15th, 1846.[1] The Mormons began printing at Salt Lake, in 1848. It was practiced in Oregon a year or two before that.[2] Nebraska and Kansas each had a Press in 1854. Now (1859) there are no fewer than twenty different newspapers in that Territory. Yet the whole territory west of the Alleghanies to the Pacific, was a dense impenetrable wilderness in 1780; and within the memory of living men, there was not a permanent white settlement north of the Ohio, from the Wabash to the Pacific."[3]

It will be seen, by the foregoing record, how closely, in this country, the Press has followed upon the track of the pioneer, and, in some cases, almost outstripped civilization in its westward march. More recently still, the Printing press has penetrated the defiles of the Rocky Mountains, and having established itself upon the very highest summit of that mountain barrier, now sends forth its weekly intelligence from the remote mining region of Pike's Peak. The *Rocky Mountain Gold Reporter*, published "at Mountain City, in the Rocky Mountains," was commenced in August, of the last year (1859), by Mr. Thomas Gibson. This constant extension of the labors of the Press, with the rapid advance of new settlements, compared with the slow introduction of the art in

(1) The Editor of the New York Tribune states, that there are now between ninety and one hundred periodicals published in California, of which, about one-third are issued from San Francisco. Thirty-one of the forty-five counties in the State have each one or more journals. Three are printed in French, two in Spanish, one in German, and at least one in Chinese. Six are devoted to Religion, two to Agriculture, nine or ten to Literature, Mining, Medicine, etc.

(2) A complete set of the "Oregon Free Press," the first published in that Territory (at Oregon City, from April to December, 1848), was presented by the Editor, Geo. L. Curry, to the N. Y. Hist. Soc., in June, 1851. It was printed on a wooden Press of home invention, and with a font of French type. The type was deficient in the letters *h*, *w* and *y*, which were severally constructed out of *b*, *m* and *x*. The paper was discontinued on the "breaking out" of the mines, and had not, at that date, been renewed.

(3) Trubner's Guide to American Literature. London, 1859.

some countries, is one of the most striking features of American progress. It illustrates the close relationship that subsists between free institutions and the spread of intelligence, and especially the importance of the fullest legitimate freedom to the great instructor, the Printing press.

Examples of the blighting influence of despotism, whether religious or secular, and of revolution, upon the growth of literature, and of the art which is its chief conservator and hand-maid, are numerous. We need only refer to the Spanish colonies on this Continent. In the provinces of Mexico and Peru, printing was introduced and practiced some years before there was a permanent English settlement upon this Continent; but governmental restrictions, religious espionage, and revolutionary changes, effectually prevented any vigorous exercise of the art. It is only the present year, as we are informed, when this great civilizer has rested upon the farther confines of civilization upon this Continent, that the first Arab newspaper ever printed in the Turkish empire, outside of Constantinople, has been commenced at Beyrout. Seventy-five years have elapsed since printing was introduced into the Ottoman Capital, which, long before the time of its invention,—while European art and learning were buried in Gothic darkness, and a Western Continent was undreamed of,—was the magnificent seat of every elegance in manners and the arts. We have already seen how its progress in our country compares with that of printing in England, the only country which has shown a commensurate appreciation of the art, and where the conditions have been comparatively favorable to its development.

There are few names or enterprises connected with the Colonial Press, deserving of more honorable mention than that of the publisher of Luther's German Bible, printed at Germantown, in Pennsylvania, in 1743. It was the first Bible printed for the European population in the American Colonies, and was "a singular achievement of the zeal, industry and perseverance, through good report and evil report, of CHRISTOPHER SAUR, who became a printer with the noble view of supplying his countrymen with copies of the Word of God." Saur (or Sower, as it is in the German and English imprints respectively) was of that valuable class of German Protestants who, at different times since the arrival of Penn, have peopled Philadelphia, Germantown, Lancaster, and other portions of Pennsylvania, and to a firm attachment to their religion, have added an amount of skill and industry in many of the arts, not exceeded by any class in the country.

The first German Bible, by Christopher Sower.

The first paper-mill erected in the Anglo-American Colonies was built by one of these, at a period nearly co-eval with the first manufacture of white paper in England, and others were commenced not long after, which supplied the first printers of Philadelphia with much of the material used by

them. Like many of the early settlers of New England, a number of these, moreover, possessed scholastic attainments which were highly respectable, and they were not likely to overlook the educational advantages of the Press. But printing-types were then altogether imported from abroad. The expense and delay in procuring these for any considerable undertaking, induced Sower, in order to carry out his benevolent purpose of supplying the Scriptures to his countrymen,—many of whom, as he states in a letter to the Governor of Pennsylvania, were ill-supplied with Bibles,—to commence the manufacture of types and of printing-ink for his own use. He cast several fonts of type for himself and others, and the anvil on which he forged the matrices is still shown at Germantown. The first "Jamb-stoves" made in America were, also, cast for him, and were still in use fifty years ago. His manufactory, which produced types of the Gothic or German character, was the first type-foundry in America, it is believed, and has its lineal representative in Philadelphia at the present time. Sower had commenced printing about the year 1735, in which year he began the publication of a Quarterly Journal, in the German language, the first publication of the kind in a foreign tongue in this country. It was afterward changed to a monthly, and, after 1744, to a weekly paper, The Germantown Gazette, and was continued by his son, until the Revolutionary War. A complete file of the first German paper in this country, where they are now so numerous, is still preserved as a precious heirloom by one of the descendants of the publisher. Sower also published the first German Almanac in Pennsylvania, and extracts from the Laws of the founder, translated into German, for the use of his countrymen.

In 1743, after three years labor upon the work, the German Bible in quarto form, of 1272 pages, was completed and published by him. It was by far the heaviest publication which had yet been issued from the press in Pennsylvania, and was not equaled for many years after. This undertaking was worthily concluded by offering the volumes at a moderate price, and by distributing them gratuitously, or at a merely nominal cost, to the poor. "The price of our newly-finished Bible," says the publisher, "in plain binding, with a clasp, will be eighteen shillings; but to the poor and needy we have no price." His son Christopher continued and enlarged the business of his father in its several branches, and in 1762 issued a second edition of the quarto Bible of 2000 copies, and a third edition, of 3000, in 1776. The book manufactory of Christopher Sower the second, was for many years by far the most extensive in the British American Colonies. It employed several binderies, a paper-mill, an ink manufactory, and a foundry for German and English types.

The exclusive privilege, long enjoyed by the Universities in Great

Britain—and we believe not yet annulled—of printing the English Scriptures, had probably deterred the American printers and publishers from engaging in their publication. About the year 1752, intermediate between the first and second issues of Sower's Bible, an edition of the English Scriptures, in small 4to., was privately carried through the press in Boston. It was printed by Kneeland and Green, the former the publisher of the New England Journal, the fourth newspaper in the Colony, and the second undertaken by a printer. Green was the son and afterward the successor of Timothy Green, the second printer of Connecticut. This first American edition of the Bible in the English language was chiefly made for Daniel Henchman, of Boston, the most enterprising bookseller of British America before the Revolution. His place of business was on Cornhill, at the corner of King-street, where he furnished much employment to the Boston printers, and even those of London. He built also the first paper-mill in New England. To avoid the risk of prosecution by those in England, who printed *cum privilegio*, the book had the London imprint of the copy from which it was made, viz.: "London: Printed by Mark Baskett, Printer to the King's Most Excellent Majesty." The edition consisted only of seven or eight hundred copies; and, having a London imprint, and close resemblance in typography to the English editions, the *fact* of its publication has been generally overlooked. But Thomas, who was an apprentice in Boston a few years after, heard the compositors of the work speak of it; and Governor Hancock, a relative of Henchman, owned a copy of it, and related the circumstances.

The First American Bible in English.

A duodecimo impression of the New Testament was soon after printed in like manner for the same parties, by Rogers & Fowle, and, like the Bible, was well executed.[1]

(1) In 1781, Robert Aitkin, by order of Congress, printed, in small duodecimo form and brevier type, what has been called the first American Bible in the English language. The execution of the work having been approved by Doctors White and Duffield, Chaplains, Congress passed the following resolution: "That the United States, in Congress assembled, highly approve the pious and laudable undertaking of Mr. Aitkin as subservient to the interests of religion, as well as an instance of the progress of arts in this country; and being satisfied, from the above report, of his care and accuracy in the execution of the work, they recommend this edition of the Bible to the inhabitants of the United States, and hereby authorize him to publish this recommendation in the manner he shall think proper." The entire work was executed during the troublous times of the Revolution; and, apart from the limited facilities for printing at that period, the printer is said, on one occasion, in the midst of his work, to have been obliged to remove his type and materials out of the city, and to bury them under a barn, to save them from destruction by the British soldiers. "Under all these disadvantages," says the Philadelphia Freeman's Journal of that day, "a complete and accurate and an elegant edition of the Bible was published in this very city, in four years from the time of the evacuation by the British. The very *paper* that has re-

Down to 1740, or about the time that Sower commenced the Quarto Bible, when eight of the older Provinces were in possession of a press, more printing was annually executed in Massachusetts than in all the others together. Massachusetts continued to lead in the publication of books for about twenty-five years longer. In 1769, the publishing business of Philadelphia had become nearly equal to that of Boston; and this equality was maintained until about the beginning of the War of the Revolution.

These two cities, to which belong the credit of having thus led the enterprise of the country in one of the most important of the Arts, also divide the honor of having produced, during the period at which we have glanced, the greatest ornament of the profession in this or any other country. Born in Boston, and taught the first elements of the art in the establishment of his brother James, one of the early printers of that place, Franklin afterward conferred upon Philadelphia the benefits of his industry, inventive talent, and matured wisdom, and founded several institutions which have been a lasting blessing to her population. His own simple narrative of his early life and struggles has proved a most instructive lesson to thousands of young mechanics in every department of business. His firmness, sagacity, and patriotism as a statesman have reflected honor upon his whole country; while his discoveries in Science and his writings are the common inheritance of the race. It has been suggested, by one who labored no less zealously to enlarge the area of popular knowledge, whether mankind at large has been more benefited by his services in any department than by the sententious wisdom of Poor Richard's maxims.[1]

ceived the impression of these sacred books was manufactured in Pennsylvania. The whole work is therefore purely American, and has risen, like the fabled Phœnix, from the ashes of that pile in which our enemies supposed they had consumed the liberties of America."

The heavy importations of Bibles, among other things, which followed the peace, compelled the publisher to *sell* under *cost;* and, in a memorial to Congress in 1789, in which he asks for a patent giving him the exclusive right for fourteen years of printing the Old and New Testament within the United States, but which was laid on the table, he states that he lost by the publication "more than three thousand pounds in specie." Congress, which amid its many burdens had so promptly responded to the call for Bibles, seems to have borne no further share in the enterprise than that of superintending the printing and recommending the volume to public patronage, but manifested throughout its appreciation of the importance of the work.

(1) The incidents of his public career are too well known to require repetition, and do not fall within our province to record. As a printer, he labored sedulously for the improvement of the art; and had his energies and ingenuity been exclusively devoted to the profession, he would doubtless have greatly advanced its interests, and acquired a fame equal to his achievements in other departments. He retained a lively interest in the trade throughout life, and his regard for the dignity of his profession is illustrated by the following incident, which occurred

By the Stamp Act, which received the Royal Assent in March, 1765, a duty of one half-penny was imposed on all pamphlets and newspapers, which were required to be printed, after the first of November, on stamped paper. On a publication not exceeding six sheets, the tax was 2*s.*; on all advertisements, 2*s.*; on all almanacs, 2*d.* a year, if on one side of a sheet; and 4*d.* on all others, etc. It was on the evening following the passage of this Act, that Dr. Franklin, then in London, as Colonial Agent, in view of the results, wrote with a sorrowful heart to Mr. Charles Thompson, "the sun of liberty is set, you must light up the lamps of industry and economy," to which Mr. Thompson is said to have responded: "Be assured we shall light torches of quite another sort." But the Act, in America, and particularly in Boston, was very generally disregarded, except by the most indignant protests from one end of the country to the other; and not only newspapers continued to be printed, but legal documents were executed on common paper, as before its enactment. The Act was repealed in the following year; but another Act in 1767, accompanied by an assertion of the parliamentary right to bind the Colonies in all cases, was passed, imposing a duty on paper and several other articles. This, notwithstanding considerable progress had been made in the manufacture, was calculated to embarrass the operations of the Press, which the non-importation agreement partially obviated, by stimulating the manufacture of that article for a time. In consequence of these manifestations of the designs of Parliament, the Continental Congress met in Philadelphia, in September, 1774; and, among other measures for the public safety, forbade the printers to execute any printing for the adherents of the administration. During the progress of the Revolution, the Press shared in the general insecurity and depression which interrupted nearly every form of industry. It did its full share in arousing the spirit of resistance in the hearts of the Colonists, and in sustaining the fire of patriotism throughout the struggle. "Writers and printers," says Dr. Ramsay, "followed in the rear of the preachers, and next to them, had the greatest hand in animating their countrymen." The cause of the Americans, he farther observes, received such signal aid from

The Stamp Act.

at the outset of his career, and is worthy of repetition: A person having brought a piece for insertion in the Pennsylvania Gazette, Franklin desired that it might be left until the next day for his consideration. Returning at the appointed time, the young printer replied: "I have perused your piece, and find it to be scurrilous and defamatory; to determine whether I should publish it or not, I went home in the evening, purchased a twopenny loaf at the baker's, and, with water from the pump, made my supper; I then wrapped myself up in my great-coat, and laid down on the floor and slept till morning, when on another loaf and a mug of water I made my breakfast. From this regimen I find no inconvenience whatever. Finding I can live in this manner, I have formed a determination never to prostitute my press to the purposes of corruption and abuse of this kind, for the sake of gaining a more comfortable subsistence."

the press and the pulpit, that in 1775, "it was determined to employ these two powerful instruments of revolution, printing and preaching, to operate on the minds of the Canadians. A complete apparatus for printing, together with a printer and a clergyman, were therefore sent into Canada."[1] The Boston Gazette, the third known by that name, since 1719, was regarded as the oracle of the disaffected party. Journals on both sides experienced the hostility of the parties to which they happened to be opposed, and nearly all literature, but that of a political character, was obscured in the gloom and ferment of the times. But the occasion developed more remarkable qualities, and more numerous instances of energy, ability, and patriotism in spheres of private exertion, as well as in the Senate and the Camp, than any equal portion of our history.[2]

It was amid the exciting events which accompanied the proclamation of the Stamp Act in America, that ISAIAH THOMAS, whom an intelligent French traveler styled the Didot of America, the able and diligent historian of this department of American industry, and for many years the most enterprising member of the trade, first entered upon life as an independent printer. His success in business was entirely the reward of his own exertions.[3]

First American Magazines.

The first journal published in the country, which possessed anything of a literary character, was the "General Magazine and Historical Chronicle for all the British plantations in America," a duodecimo monthly magazine, printed and edited by Benjamin Franklin, and first published in January, 1741, at twelve shillings a year. It was continued only about six months.[4] A few weeks after, another monthly of 48 pages 8vo., called the American Magazine, was started in opposition by John Welbe, but did not survive.

Another monthly magazine, with the title of The American Magazine, was begun in 1769, in Philadelphia, by Lewis Nichola, containing forty-eight pages. To this magazine were subjoined the first published Transactions of the American Philosophical Society, founded chiefly by the agency of Franklin, and of which Nichola was a member. He was the

(1) History of American Revolution.

(2) A paper was established in Charleston, South Carolina, in November, 1765, in express opposition to the Parliamentary Stamp Act for the Colonies, and was generally patronized. By an Act of Assembly in that Province in 1784, for the encouragement of the Arts and Sciences, the Copyright of Books was secured for the authors, as the benefits of novel machines were to the inventors. This was the forerunner of the Act of 1790.

(3) A sketch of his life and career may be found in the 2d vol. of his Hist. of Printing.

(4) The first periodical in England, bearing the name of a Magazine, was published in London, in 1731, by Edward Cave. It was the Gentleman's Magazine, so long at the head of the periodical works of that country.

author of two or three treatises on the military art, published in Philadelphia at the time of the Revolution. Only one volume of the magazine was published.

The fourth English newspaper established in Philadelphia, was the Pennsylvania Chronicle and Universal Advertiser, which was the first paper in the British Colonies with four columns to a page.

The first daily paper in America, was the Pennsylvania Packet or General Advertiser, commenced in Philadelphia, November, 1771, by John Dunlap, as a weekly. It was sold in 1783, to D. C. Claypoole, who, about a year after, converted it into a daily, and it became a profitable concern.[1] The year following F. Child & Co. published the New York Daily Advertiser, the first of the kind in that city. A daily evening paper, the Philadelphia Gazette was established in Philadelphia in 1788, by Samuel Relf.

First American Dailies.

In 1775, there were nine newspapers in Pennsylvania, of which six in English and one in German were published in Philadelphia, one in German at Germantown, and one in English and German at Lancaster.

At the beginning of that year, there were seven papers published in Massachusetts, of which five were at Boston, one at Salem, and one at Newburyport. There were four in Connecticut, at the same time, New London, New Haven, Hartford, and Norwich, having each, one. There were two in Rhode Island: one at Providence, and one at Newport. There was also a newspaper at Portsmouth, New Hampshire; making in all, thirteen in New England.

In the Province of New York, there were then published four papers, three in the city, and one at Albany. In Maryland, there were two, at Annapolis and Baltimore respectively. There were also two in Virginia, both at Williamsburg: two in North Carolina, at Wilmington and Newbern; three at Charleston, South Carolina, and one at Savannah, in Georgia; making thirty-seven newspapers in the Colonies now comprised in the United States. There was at the same time a newspaper at Halifax, Nova Scotia, and one at Quebec, in Canada. None of the other Provinces, as yet, possessed a newspaper. The entire number of periodicals which had been commenced in the Colonies between 1704, and 1775, was something less than one hundred, of which about three-fourths were newspaper sheets, and the balance partook more of the character of Magazines. About twenty-two of these were begun in Massachusetts; fourteen in the other New England States; about twenty-two in Pennsylvania; sixteen

(1) To Mr. Claypoole, Washington, at a later period, presented the original manuscript copy of his Farewell Address, which was lately sold in this city by his executors, through Messrs. Thomas & Sons, to Mr. Lennox of New York, for over $2000. (*Philadelphia and its Manufactures*, by E. T. Freedley, p. 168.)

in New York; and twenty-two in the other Provinces now within the Union.

Many of these had but a brief existence, while others attained to a respectable age, and exerted considerable influence upon the popular mind, in literature and politics. Various causes contributed to render the publication of a newspaper one of doubtful remuneration. The scarcity and high cost of materials, such as presses, type, paper and ink, which were chiefly imported, and the high price of labor, were serious obstacles at a time when capital was far from abundant. The circulation which they could secure under the best management was limited, when population was sparse, and taste and leisure for reading, less general. And in regard to newspapers, the great source of present emolument from advertisements was for a long period scarcely depended upon. Its advantages were then neither apprehended by the business community, nor the art of attractive display at all understood by the compositor. The first advertisements were confusedly mingled with the reading matter, from which they were not even separated by lines. Nor were they so separated from one another. Some of the early papers continued to be published for years with the smallest possible advertising patronage.

In September, 1777, Congress ordered Major-General Armstrong to remove "all the printing-presses and types in the city and in Germantown to secure places in the country, excepting Mr. Bradford's press in this city, with English types." After its flight to Yorktown, in the same year, Congress ordered the speedy erection of a printing-press in that place, for the purpose of conveying to the public the intelligence received from time to time. Many of the printers were great sufferers in the general ruin which overtook such numbers during the contest. They were compelled to escape, with their effects and apparatus, to places of security in the country, where they either prosecuted their business at the greatest disadvantage, or abandoned it altogether. Those who were exposed to the hostilities of the two contending parties, were often visited with the resentment which could not reach the writers for whom they printed. Their estates were confiscated, and sometimes personal violence or insult was incurred.

The number of printing-presses in the country before the Revolution is believed to have been about forty. The number of works printed up to that time cannot, probably, be now ascertained. The Philadelphia Library contains as many as four hundred and fifty-nine works printed in that city previous to the Revolution: of these, four hundred and twenty-five are original books or pamphlets, and thirty-four are re-prints of foreign books and pamphlets. As many were, doubtless, printed which were not obtained for the Library, an addition of one-third,—making an

aggregate of six hundred publications for the Province during the whole period,—has been considered a moderate estimate.[1]

After the establishment of Independence, when printing materials began to be manufactured more generally in this country, public journals were rapidly multiplied. A careful estimate, made in 1788, placed the number of newspapers issued weekly at about seventy-seven thousand copies, or upward of four millions annually, worth, at four cents each, one hundred and sixty thousand dollars. Of the weekly issues, upward of thirty thousand were supposed to be printed in New England.[2]

One of the most enterprising printers and booksellers in the country, after the Peace, was MATTHEW CAREY, who—having incurred the displeasure of persons in power, for some publication in Ireland—came to America, and established himself in Philadelphia. The American Museum, a periodical conducted by him with much ability, was highly instrumental in calling public attention to the subject of American Manufactures, as well as to literature and politics. Few men have labored with more zeal to promote the industrial interests of the country. He is entitled, also, to the credit of having been the publisher of the first quarto Bible, from standing type, issued in the United States, and it was principally through his agency that the system of annual book fairs, or *Trade Sales*, was introduced, in imitation of the periodical book fairs of Europe, which have done so much in enlarging the market area for surplus stock and facilitating acquaintance between publishers and booksellers.

Colonial Booksellers.

In the Colonial period of our history, the printers, very generally indeed, combined with their business of printing, that also of book selling, as did Caxton and other early printers, and often that also of book binding. The small occupation, in many instances, furnished for the press, beyond the irregular supply of work for the local government, often compelled the printer to eke out a livelihood by other means, of which a book and stationery shop was the most eligible. Many combined with the proper stock of such an establishment, a small assortment of groceries or fancy articles. Others were extensive dealers also in general merchandise, and imported books, as well as other European goods. Many others, who commenced as booksellers and publishers, as their means enabled them, established Printing-presses in connection with their other business, and, in time, devoted their attention exclusively to printing. The business of the bookseller has ever been a profitable

(1) Mem. Hist. Soc. Penna., i. 150.

(2) Morse's Univ. Geog., ed. 1796, vol. i. p. 340.—The number of newspapers published in the Union in 1810, was 358; in 1828, 802. In 1850, the newspapers and periodicals amounted to 2800, with an average circulation of 1785, and the aggregate of the copies printed annually, was 422,700,000. The newspaper establishments in England, in 1808, numbered 145.

one in America, and many of the early dealers in books, in the principal cities, accumulated extensive stocks for the times in which they lived, and acquired wealth and station. The books imported were seldom of a costly or rare description, but were of the practical and useful class, which best suited the limited means and less profound inquiries of a young country compelled to turn its mental labor to immediate account. Books on law, medicine, history, and the less abstruse branches of science and on general knowledge, constituted the staple of Colonial book stores.

The number of booksellers, whose names are recorded by Thomas as having carried on business in Boston before the year 1775, is ninety-two; and in other parts of New England, during the same time, there were about eighteen engaged in the business. In New York, there were about a dozen whose names are given. In Philadelphia there were thirty-eight, and two at Germantown, and two at Lancaster, Pennsylvania. There was one at Annapolis, Maryland; three at Charleston, South Carolina; and one at Savannah, Georgia. His list of booksellers outside of Massachusetts, he states, however, was not complete. Of those enumerated in Boston and the other large towns, seldom more than two or three carried on the business at the same time. Among the most noted and enterprising of the trade in Boston, was Samuel Phillips (1680), "At the Brick-Shop, at the west-end of the Town-House," who was a large dealer, and the publisher of several books for the Boston Press. Dunton, who acted as his factor in London, and consigned many books to him, says, he was "very just and very thriving—young and witty, and the most beautiful man in the town of Boston." His descendants were booksellers, on Cornhill, until after the Revolution.

We have stated that some of the early Colonial Printers, combined with their business that of BOOKBINDING. The earliest exercise of the art, of which we have seen any notice, was by John Ratliffe, who was employed as mentioned on a former page, upon Eliot's Indian Bible, about the year 1663. He came from England for that purpose. In September, 1661, the Commissioners of the United Colonies wrote to Mr. Usher, who superintended the printing of that work, to demand and receive of Mr. Green, the whole impression of the New Testament in Indian, now finished; "and take care for the binding of two hundred of them strongly and as speedily as may bee with leather, or as may bee most serviceable for the Indians, etc."

Early American Bookbinders.

In the bill of particulars, rendered by Green in the following year, £5 was accordingly charged for binding two hundred Testaments at 6*d.* each. The binding was probably done by Ratliffe, who in August, 1664, wrote to the Commissioners, that the prices he received were too low, and that

he could not afford to bind the Bibles, completed the year before, for less than 3*s.* 4*d.*, to 3*s.* 6*d.* per volume. It appears by the agent's account in 1669, that only 2*s.* 6*d.* each was paid to Green, for binding and clasping two hundred Bibles, which were quarto volumes, of not less size, we may suppose, than an English quarto, if we may judge from the length of the Indian words, which, as Dr. Mather observed, one would think "had been growing ever since Babel."

John Ratcliffe, is mentioned by Thomas as a small bookseller in Boston, in 1682, but no mention is made of him as a bookbinder at that time or previously, as is done in the case of other booksellers. Nor is his connection with the Indian Bible mentioned.

Several volumes of considerable size had been published previous to this. The first edition of the Psalms appeared in 1647, and was bound in parchment. One or two other editions had been issued before the Bible was completed; also two folio editions of the Laws, but by whom they were bound, we are unable to say. Among the early settlers, there were doubtless bookbinders who, like other mechanics, laid aside their former vocation for more profitable pursuits. A Bookbinder named John Sanders, took the freeman's oath in Boston, in 1636, before any printing was done in the Colony.

Of upwards of ninety booksellers who carried on business in Boston, many of them in connection with printing, before the Revolution, over thirty had also binderies attached to their establishments. A number of them confined their attention principally to this branch. The Ushers, who were the first booksellers,—one of them ten years before the publication of the Bible,—may possibly have done something in that way, but we have no evidence of it. The first binder in the list of booksellers mentioned, is *Edmund Ranger*, 1673, who dealt but little in books. Of those who chiefly followed the mechanical branch, the following are the principal:

Book-binders in Boston.

Benjamin Gray, 1719–51 at the "Head of Town Dock." He was prosecuted for publishing a libelous pamphlet. *Joseph Edwards*, 1723, "Cornhill," a respectable publisher and binder, over forty years in business. *Nathanael Belknap*, 1723, "Head of Scarlet's Wharf, North End." *Samuel Robinson*, 1723–71, a native of Dorchester, Massachusetts. *Bennet Love*, 1726, "In Anne street, near the Bridge." *Thomas Hancock*, 1726, Anne street, near the Draw Bridge. *John Eliot*, 1728, at the Great Elms, (Liberty Tree,) South End," a descendant of the Indian Apostle. *Alfred Butler*, 1729–42, "Lower End of King street, near the Crown Coffee House, at the head of the Long Wharf," a native of Boston, and an apprentice of Henchman. *Richard Fry*, 1732, "Stationer, Bookseller, Paper-maker and Rag Merchant, from the City of London, keeps at Mr

Thomas Fleet's, Printer, at the Heart and Crown, in Cornhill, Boston." His advertisement in 1732, assures the merchants of Boston, who had been accustomed to have their account-books from London, that he will sell them all sorts of account-books, done after the most acute manner, twenty per cent. cheaper than they can have them from London. He states that he had printed and already sold 1200 copies of the "most beautiful Poems of Mr. Stephen Duck, the famous Wiltshire Poet," which was "a full demonstration to him, that the people of New England have a fine taste for good Sense and polite Learning." Fry appears to have been about the earliest Blank-book manufacturer in Boston.

Charles Harrison, 1739, "over against the Brazen Head in Cornhill," had a book-bindery in England. *Samuel Eliot*, 1740–45, Corn-Hill. His son, of the same name, was afterward an eminent merchant of Boston, *Thomas Rand*, 1745, Cornhill, and afterward Anne street. *Thomas Leverett*, 1753–78, Cornhill. *Wharton* and *Bowers*, 1761, successors to D. Henchman, Cornhill. *William Lang*, 1760–75, "at the Gilt Bible," Marlborough street, a Scotchman. *John Hodgson*, 1762, "Marlborough street," bred to the art in Scotland, and a good workman. He took, in short hand, the trial of the soldiers concerned in the Boston Massacre on 5th March, 1770.

Alfred Butler, 1764, Cornhill, son of Alfred Butler, before mentioned. *Andrew Barclay*, 1764, "at the Bible in Cornhill," bred a binder in Scotland. *Joseph Snelling*, 1767, "Fish street, corner of Boarded-Ally," *John Langdon*, 1770, "Cornhill." *Henry Knox*, 1771, "Cornhill," afterward Major-General. Langdon & Knox, both served their apprenticeship with *Wharton & Bowers*, booksellers and binders on Cornhill *A. Ellison*, 1771, "Newbury street," brought up to binding in England, removed in three or four years to Newport, Rhode Island.

Beside the above Bulkeley Emerson, 1760, carried on bookselling and binding at Newburyport, and Mascol Williams, (1761), at Salem, Massachusetts.

We find no others mentioned in other parts of New England, though doubtless there were a number.

In New York, among the booksellers, we meet with the following only, who executed binding also: *Robert MacAlpine*, 1769, "in Beaver street. There were two MacAlpines, Walter and William, who did a little in bookbinding in Boston, a few years before. *Valentine Nutter*, 1774, opposite the Coffee House Bridge."

Bookbinding in Philadelphia.

In Philadelphia occur, in the same relation, the names of *Andrew Bradford*, 1718, Second street; *Benjamin Franklin*, 1729, Market street; *Joseph Godwin*, 1742, "Second street, near Black Horse Alley," afterward in the Alley, an Englishman; *J.*

Scuppay, 1743, "at the sign of the Book, in Strawberry Alley." *Black Harry*, 1758, "in Laetitia Court," afterward at the Bible and Heart, in Second street; *William Woodhouse*, 1776, "in Front street, near Chestnut street," afterward in Second street. *John Anderton*, 1768, "at the London Book-Store, in Second street." He was from England, and was a binder, letter-case and pocket-book maker, in which he first began business in New York; *Robert MacGill*, 1771, corner of Laetitia Court."

Of the three Booksellers in Charleston, two at least,—*Wells*, in 1764, and *James Taylor*, 1771, both Scotchmen,—executed binding with their other business.

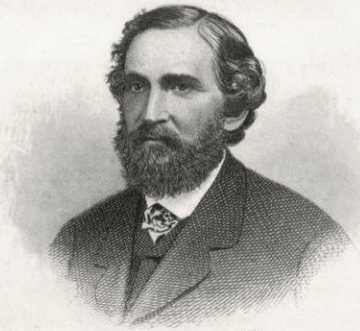
The literary character of the Colonies, was sustained during the early period by many names of considerable repute for learning and ability in several departments of Science and Letters. Of these, many had been educated in the Universities of Great Britain and the Continent, and others not less distinguished, received their education in the infant colleges of this country. Some of these, moreover, were remarkable for prolificacy and voluminousness. Dr. Cotton Mather, who died in 1727, is said to have been the author of no less than 382 books and tracts, some of which were works of great labor. His *Magnalia*, is his greatest work, though another, probably still in manuscript, in the Library of the Massachusetts' Historical Society, is considered by his biographer, sufficient to employ half the lifetime of an industrious man.

But the literary history of the period does not fall within our province. We may mention, however, that the first tragedy written and printed in America, is believed to be "The Prince of Parthia," by Thomas Godfrey, the son of the inventor of the Quadrant, and printed in quarto at Philadelphia, in 1765. The Transactions of the Royal Society of London, as well as those of the American Philosophical Society, of which the first volume was published before the Revolution, bear evidence of the progress of the provincial mind in Science and Philosophy, as well as in Letters, and contain several distinguished names.

In 1789, the *Bibliotheca Americana*, in contrasting the literary condition of North and South America, said: "In South America, little other knowledge is suffered to be propagated than what is conducive to commercial purposes, or tends to increase the ideal enjoyments of unwieldy wealth and false greatness. In North America, the whole circle of science is occupied by ingenious industry, which has for the most part proved itself the successful candidate for literary fame.

"The people of North America, have now professors in every art and science, with adequate salaries; and, whatever they may want to import, men of eminence in literature are not of the number. At the head of

their philosophers and politicians, stands the venerable FRANKLIN. In the first class, the ingenious LORIMER must not be forgotten. In Mathematics, the self-taught RITTENHOUSE. In divinity, WEATHERSPOON. In history, criticism, and policy, the modern Tacitus, (PAYNE.) In poetry, BARLOW, SMITH, and RAY. In painting, WEST. In law and oratory,—how shall I enumerate them? Take the first class. In Georgia, GEORGE WALTON; GERMAN BAKER, in Virginia; JENNINGS, in Maryland; LEWIS, BRADFORD, and CHAMBERS, in Pennsylvania; BOUDINOT in Jersey; HAMILTON and BIRD in New York; JOHNSON in Connecticut, and PARSONS in Massachusetts."



SAMUEL BOWLES.
Springfield, Mass.

ALBERT J. WRIGHT.
Boston, Mass.

ALFRED MUDGE.
Boston, Mass.

EMINENT MODERN PRINTERS NEW ENGLAND AND PHILADELPHIA

T. K. COLLINS.
Philad.ª

ROBERT P. KING.
Philad.ª

NEWTON CASE.
Hartford, Conn.

Engd by R. Whitechurch

CHAPTER VIII.

COLONIAL PAPER-MILLS, TYPE-FOUNDERIES, AND PRINTING-PRESSES.

THE manufacture of Paper was introduced into England about the year 1498, when a person, named Tate, built a Paper-mill at Dartford, in Kent. By reason, however, in part, of the greater abundance and finer quality of linen in use on the Continent, the manufacture of Paper, for a long period, was carried on in greater perfection in France, Holland, and Italy, than in England. During the seventeenth century, England obtained her chief supply of Paper from France and Holland,—very little, except brown Paper, having been made at home previous to the Revolution of 1688. The French Protestants, who fled thither about that time, introduced an improved manufacture. In 1690 the making of white Paper was first attempted; but improvements were made so rapidly, that Great Britain has long since surpassed all other nations in that branch of the manufacture.

In America, Paper was made by several of the demi-civilized nations, especially the Mexicans and Peruvians, in considerable perfection, before the Conquest. The materials employed by them were cotton, silk, mulberry bark, and other fibrous substances, but especially a species of palm called *icxotl*, and the maguey plant. Upon this Paper they preserved, in hieroglyphic and pictorial characters, like those of the Egyptians,—to whose civilization and monuments their own bear so much resemblance,—the records of their laws, institutes, history, and charts of their coasts, and transmitted to their cotemporaries the knowledge of current events.

The manufacture of Paper was not so early introduced into the British-American Colonies as some others; but was one of the first to attain a stable footing, and to meet the demands of the country. Over fifty years elapsed after the introduction of printing, before Paper of any description was made in this country. It was, however, within less than five years after the first white Paper was manufactured in England, according to the generally received accounts, that the first Paper-mill in the English Colonies was erected, by persons who were practically acquainted with the most improved condition of the art in that part of Europe where it had long flourished in the highest perfection.

A mill was built in the late borough of Roxborough, in Pennsylvania, by the immediate ancestors of the eminent American philosopher, David Rittenhouse. The family emigrated, some years before, from Arnheim, on the Rhine, in the Batavian province of Guelderland, where, for some generations, the Paper manufacture had been carried on by them to a considerable extent. The first persons of the name in America originally came to New York, while it was yet a Dutch Province, and subsequently removed to Pennsylvania, where they became the first settlers of a part of the present consolidated City of Philadelphia, which is now included in the twenty-first ward. A gentleman, resident in that part of the city, who has examined the records and papers relating to the first settlement of the place, furnishes the following particulars of this early enterprise, the first of the kind in British America:

First Paper-mill at Philadelphia, in the Colonies.

"This mill was situated on a small rivulet, now called Paper-mill Run, in Roxborough, near the south-western line of Germantown township. It was owned by William Rittenhousen (now spelled Rittenhouse), his son Clause (Nicholas), William Bradford, of New York, and Thomas Tresse, of Philadelphia, each of the latter two owning a fourth part. * * * The precise date of its erection is not known; but, as Bradford was interested as part owner, it was doubtless built before 1693, when he removed to New York. The Rittenhouses are said to have settled in Pennsylvania about 1690, having emigrated from Holland, where their ancestors were engaged in Paper-making. We have positive proof, however, that Paper was made at the Roxborough mill in 1697: for Gabriel Thomas, in his History of the Province of Pennsylvania, written in that year, says: 'All sorts of very good Paper are made in the Germantown,' with which place Roxborough was often identified; and, besides, there now lies before me a MS. lease, dated 'this 24th day of Sept., in ye year of our Lord, 1697,' signed by William Bradford, who is described as 'having one fourth-part of ye said paper-mill, near Germantown.' He rented his share to the Rittenhouses for ten years, upon the following terms:—'That they, the s^d^ William and Clause Rittenhouse shall pay and deliver to said William Bradford, his execrs, or assigns, or their order, in Philadelphia, ye full quantity of Seven Ream of Printing paper, Two Ream of good writing paper, and Two Ream of blue paper, yearly and every year during ye s^d^ Term of Ten Years.'"[1]

This mill was afterward carried away by a freshet, and William Penn wrote to his people, asking them to render assistance in re-building it. William Rittenhouse, the builder and principal owner, was succeeded by his son Nicholas. The family have since been in uninterrupted occupation of mill-seats, on the Wissahickon, near the site of the original mill.

The second Paper-mill erected in the country, appears to have been

(1) H. G. Jones, Esq., in Hist. Mag., vol. i. p. 86.

built at Elizabethtown, New Jersey, sometime previous to the year 1728.

The Second Paper-mill.

We have been unable to ascertain the precise date of its erection or the original ownership. In the year mentioned, it was the property of William Bradford, the Government Printer for that Province and New York, who for some time made the borough his place of residence. About the same date, however, the manufacture was commenced in one or two other places.

The next attempt appears to have been made in Massachusetts, under the patronage of the Legislature of the Colony. On the 13th September, 1728, the General Court of Massachusetts, granted for the encouragement of a Paper-mill, to Daniel Henchman, Gillam Phillips, Benjamin Fanueil, Thomas Hancock, and Henry Dering, a privilege in the nature of a patent for ten years, upon the following conditions:

In the first fifteen months, they were to make one hundred and forty reams of brown paper, and sixty reams of printing paper.

The second year, to make fifty reams of printing paper, in addition to the first-mentioned quantity.

The third and afterward, yearly they were to make twenty-five reams of a superior quality of writing-paper in addition to the quantities beforementioned: the entire yearly product to be not less than five hundred reams.

The mill was erected in Milton, seven miles south of Boston, on the Neponsit River, below the head of the tide, which during six hours out of the twenty-four suspended its operations. The proprietors employed an Englishman named Henry Woodman as their foreman. They furnished the Legislature a sample of their manufacture in 1731, and the mill was probably built early in the previous year.

The Milton Mill near Boston.

Henchman, who appears to have been a principal projector, was the leading bookseller and publisher in Boston at that time, and was a man of considerable wealth for the times. Another bookseller of Boston, whom Thomas supposes to have been concerned in this, the first and only Paper-mill in New England, at the time, was Richard Fry, an Englishman, who, in May, 1732, issued the following advertisement in the weekly Rehearsal, published by Thomas Fleet.

"Richard Fry, Stationer, Bookseller, Paper Maker, and Rag Merchant, from the City of London, keeps at Mr. Thomas Fleets, Printer at the Heart and Crown, in Cornhill, Boston, where said Fry is ready to accommodate all Gentlemen, Merchants, and Tradesmen, with Setts of Accompt books, after the neatest Manner. And, whereas, it has been the Common Method of the most Curious Merchants in Boston, to procure their Books from London, This is to acquaint those gentlemen, that I, the said Fry, will sell all sorts of Accompt

Books, done after the most acute Manner for Twenty per Cent cheaper than they can have them from London. I return the Public Thanks for following the Directions of my former Advertisement for gathering Rags, and hope they will continue the like Method, having received upwards of Seven Thousand weight already.'"[1]

The Milton Paper-mill after having been managed a few years by the original proprietors, suspended operations. It was afterward sold to Jeremiah Smith, who was unable to obtain workmen to carry on the business, a difficulty experienced in many branches of manufacture at that time.

In 1760, James Boies, of Boston, procured a paper-maker, named Hazelton, from a British regiment, then in the town, from which soldiers were occasionally suffered to work on furlough, among the trades-people with whom labor was scarce. For him, Hazleton, aided by Abijah Smith, a native of Milton, who understood the business, set the mill once more in operation. The regiment was soon after ordered to Quebec. The Commander-in-Chief refused to allow Hazleton to remain behind, and like his brave Commander, the gallant Wolf, he received upon the plains of Abraham, a mortal wound, from which he died in a few weeks.

After another short interruption, Richard Clarke, an Englishman, from New York, again set the mill at work. Clarke is said to have had a superior knowledge of the business, and to have made most of the moulds used by him. He was assisted by Smith, who continued in the business to an advanced age, and after a few years by his son George Clarke, also a good workman. In 1796, the town of Milton, in addition to other manufactories, had three Paper-mills, and there were six on the same river, and twenty within the State. The Neponsit, on which this Paper-mill, and also the first water grist-mill in New England, was built at Dorches-

(1) Fleet changed the name of his paper to the *Boston Evening Post*, and in November, 1748, made the following announcement, which is a curious instance of the scarcity of Paper in that day. "Choice *Pennsylvania* Tobacco Paper, to be sold by the Publisher of this Paper, at the Heart and Crown; where may also be had the BULLS, or Indulgences of the present Pope Urban VIII., either by the single Bull, Quire, or Ream, at a much cheaper rate than they can be purchased of the *French* or *Spanish* Priests." It appears that several bales of the Indulgences printed on the face of a small sheet of very good paper, had been taken in a Spanish ship, captured by an English Cruiser, during the war with France and Spain, in 1748, of which Fleet purchased a large quantity at a low price. He made use of them for printing ballads, the back of each bull being sufficient for two songs like "Black-Eyed Susan," etc. Thomas says he saw large quantities of them thus worked up by Fleet. In the early days of Boston, when the Legislature did not think it beneath their dignity to prescribe the cut of ladies' sleeves, Mr. Robert Saltonstall was fined five shillings for presenting a petition on so small and bad a piece of paper.

ter, furnishes excellent mill-sites which have long been occupied by busy factories.

This first attempt of the New England people to make their own Paper, did not fail to attract the notice of the English Paper-manufacturers. Through the Lords of Trade and Plantations, the attention of the Government was called to the subject. The House of Commons, in 1731, directed the Board of Trade, to make a report with respect to the trade and manufactures carried on in the Colonies, "detrimental to the trade, navigations, or manufactures of Great Britain." On 15th February, 1731–2, a report was made in pursuance of this order on which it is said that among the complaints made to the Board against plantation laws was this, that "in Massachusetts, an Act was made to encourage the manufacture of Paper, which law interferes with the profit made by the British Merchants on foreign Paper sent thither." It was feared that, unless an early stop was put to these manufactures, they would in time be carried on to a much greater extent. It is added, that by later accounts from Massachusetts Bay, they were informed that Paper was made "by a mill set up *three years* ago, to the value of two hundred pounds Sterling yearly."

About the same time that the Paper-mill was built at Milton, another was erected on Chester Creek in Delaware County, Pennsylvania, by Thomas Willcox, an early English settler.[1] Writing and printing-paper, and clothiers' pasteboard were manufactured there, and supplied Franklin with much of the paper used upon his press. At the same place was made by the old hand process, bank note paper, used in the old Continental Paper Currency, at one time so abundant in the Colonies. The exact date of its erection is uncertain, but the establishment continued in operation under the original proprietor until his death, in 1779. It was subsequently continued by his son Mark, who improved the manufacture of bank note paper, and also carried on the business to an advanced age. The old mill was demolished in 1829.

One of the earliest Paper-mills built in Pennsylvania, was established by the Dunkers, or German settlers at Ephrata, in Lancaster County, where they also had a German printing-press. During the scarcity of Paper, experienced after the commencement of the Revolution, and a few days before the Battle of Brandywine, messengers were dispatched to this mill for a supply for cartridges. The mill happening to be exhausted, the fraternity who held their property in common, generously placed at the disposal of their country, several two-horse loads of an edition of Fox's

(1) In the Chronology and History of Paper and Paper-making, by Mr. Joel Munsell, Albany, 1714 is assigned as the date of this erection, which the author considered the first Paper-mill in the Colony. A later date is, however, given by several other authorities.

Book of Martyrs, then ready for the bindery. Samples of this "literary ammunition," are still preserved in the neighborhood of the battle-ground. Nearly two hundred of the wounded in the fight lie buried in the village, whither they were sent, to the number of five hundred, to be cared for by the little community.

First Paper-mill in Rhode Island.

In August, 1765, a large and complete Paper-mill, believed to have been the first in that place, and probably in the Province, was completed and put in operation, in or near Providence, Rhode Island. It is supposed to have been at Olneysville.[1] It appears, a few years later, however, to have fallen into neglect,—so confirmed was the habit of dependence upon English manufactures.

First Paper-mill in Connecticut.

In 1768, Colonel Christopher Leffingwell, of Norwich, in Connecticut, erected at that place the first Paper-mill in the Colony, under the promise of a bounty from the Legislature. Two years after, he was accordingly awarded two pence a quire on four thousand and twenty quires of writing paper, and one penny each on ten thousand six hundred quires of printing paper. The awards amounted in all to £81 16*s.* 8*d.* The Government patronage was soon afterward withdrawn.

In New York.

An official letter from Governor Moore, of New York, to Lord Hillsborough, dated May 7th, 1768, at Fort George, in answer to inquiries of the Board of Trade in relation to manufactures, states, that a Paper-mill had begun to be erected within a few days, at a small distance from the town.[2] This is the first of which we have seen any mention in that Province. A Paper-mill was, about this time, erected at Hempstead, on Long Island, by Hendrick Onderdonk and his son Andrew, which is presumed to have been the first built in New York.[3] The precise date is not given. Hendrick Onderdonk, who was an ancestor of Bishop Onderdonk, of that State, was born in 1724, and had, in his early years, built the first grist-mill on that part of the island. But as his son, and also Hugh Gaine, so prominent as a printer and bookseller in New York at this time, were connected with him in the business, it is probably the one referred to in the letter of Governor Moore. The manufacture has been carried on at that place from that day to the present.

In 1769, the following announcement was made in the Boston News Letter :—"The bell-cart will go through Boston before the end of next month, to collect rags for the Paper-mill at Milton, when all people that will encourage the Paper manufactory may dispose of them."

In a country so much less populous than Europe, and the climate of

(1) Staple's Annals of Providence, p. 625.
(2) Documentary Hist. of N. York, i. 735.
(3) Thompson's Hist. Long Island, ii. 58.

which called for much woolen clothing, rags were necessarily scarce, and notwithstanding the amount of cotton now grown and manufactured, they still fall far short of the requirements of the Paper manufacturers. At this date, the Paper-mills in the Provinces of Pennsylvania, New Jersey, and Delaware, had increased to the number of forty. The value of their manufacture was estimated at one hundred thousand pounds annually. Six of these were in the county of Philadelphia.[1]

The increase of the Paper-mills in those Provinces was, in a great measure, due to the enterprise of the printers and publishers of Philadelphia, which was then the literary metropolis of the country. But it was, also, in no small degree owing to the interest taken by Dr. Franklin in that branch of Colonial industry. De Warville, who visited the Province in 1788, says, Dr. Franklin informed him that he had established about eighteen Paper-mills. The same traveler observes, after having visited Boston and New York, "There is no town on the Continent where there is so much printing done as at Philadelphia. Gazettes and book-stores are numerous in the town, and Paper-mills in the State.[2] Franklin himself informs us that one of the first books printed by him and Meredith was on *pro patria* paper. Ever ready to encourage domestic industry, he was particularly interested in the progress of printing and all its tributary arts. His metrical pleasantry on the subject of Paper is familiar to all; but another less known but more important dissertation was entitled, "A Description of the Process to be observed in making large sheets of Paper, in the Chinese manner, with one smooth surface," which was read before the American Philosophical Society, in June, 1788, and published in the third volume of its Transactions, a year or two after his death.

Stamp Acts.

Upon the conclusion of the war with France, in 1763, undertaken for the defense of the Anglo-American possessions, the purpose was openly avowed by Parliament of re-imbursing the enormous expense of that undertaking by a tax upon the Colonies. Resolutions in favor of a Stamp Act, similar to one which had long been in force in England, were passed in March, 1764. In the following year, Mr. Grenville introduced his famous bill declaring all instruments of writing used in the American Colonies null and void, unless executed upon stamped Paper or parchment, charged with a duty by Parliament. The bill, which received the royal assent in March, 1765, at once aroused in the Colonies a storm of opposition, which was but the prelude to the revolt from impe-

(1) Robert Wood, Fifth street, below Walnut, in January, 1772, advertised *parchment*, as made and sold by him, which had for some time previous been used by the principal conveyancers, and was considered "equal or better than the imported."

(2) New Travels in U. States, in 1788.

rial rule made a few years later. The resolutions of non-importation and non-intercourse, by which the Parliamentary legislation was met on the part of Provincial Assemblies, gave no slight impulse to the native industry of the Colonies, while they so materially affected the interests of British commerce and manufactures, that a repeal of the ordinance was as loudly called for by the merchants of England as by all classes in America. The pressure of public sentiment, both in England and in the Colonies, forced upon Parliament the repeal of a statute so obnoxious, which was effected at the expiration of one year from its enactment, accompanied, however, by the assertion of the right of Parliament to tax or bind the Colonies in all cases whatever. In conformity with this alleged prerogative, a bill was, in 1767, introduced into Parliament, by Mr. Charles Townsend, imposing duties in the Colonies upon glass, paper, pasteboard, painters' colors, and tea, which passed into a law, and once more aroused the opposition of the Colonists, in remonstrances, petitions, and non-intercourse Acts. The merchants of Boston, in October, passed resolutions,—in which they were followed by other towns,—not to import, or deal with those who should import, tea, glass, paper, or colors, so long as the duties on those articles remained unrepealed. Resolutions were, at the same time, formed to encourage, by all prudent ways and means, home manufactures; and glass and Paper were especially recommended as deserving of encouragement. The British exports to the Colonies at once fell off again, from £2,378,000, in 1768, to £1,634,000, in 1769, and the repeal of the Act was loudly demanded. Public excitement was once more allayed, temporarily, by the reluctant withdrawal, in 1770, of five-sixths of the duties, leaving but a nominal tax of three pence per pound on tea, as a testimony of the asserted legislative authority of Parliament. Although a horror of taxation had ever possessed the Colonial mind, and this small impost was resisted on the principle that there could be no right to impose taxes without the consent of the taxed, it is difficult to conceive how it was more an infringement of Colonial rights than many other Acts which had been submitted to without complaint from the earliest period. It is not, perhaps, surprising that Parliament found it difficult to understand why a people, now prosperous and enriched, who had submitted to have their national industry crippled by statutes for the aggrandizement of English commerce, should refuse their quota to the expense incurred in their protection, while their fellow-subjects at home sustained, without complaint, the heavy burdens incurred for the common benefit.

The trade Acts were, in many respects, a manifest violation of the rights of the Colonists to make the most of their industry. Unless exemption were guaranteed by their charters, a right to exact from them a contingent for the general expenses of the empire, of which they were an

integral part, seemed to rest upon the same prerogative by which the parent State assumed, in other cases, to legislate for its dependencies. The Legislatures of Massachusetts and New York had, indeed, ten years before, enacted a Provincial Stamp Act; the former granting to his Majesty several duties on vellum, parchment, and Paper, for two years, towards defraying the charge of this Government. That of New York, passed the following year, continued four years in operation. But the impost was now resisted upon the principle that the Colonists were not amenable to a statute which they had no voice in making; and upon this question of prerogative, the empire was at length dismembered.

The Stamp Act probably diminished somewhat the consumption of paper, by restricting the operations of the Colonial press, and by forcing the colonist to resort to arbitration and other non-juridical modes of settling disputes, whereby the use of legal instruments chargeable with the stamp duties was dispensed with.[1]

(1) Apart from the question of prerogative, the stamp duties, which make a formidable list, were calculated greatly to impede the usual forms of business, and the determined opposition was but natural. As our readers may not now be familiar with the details of this memorable Act, we may be excused for presenting the heads of it for their consideration.

3*d.* on all pleas in courts of law.

2*s.* on bail-pieces and appearances on them.

1*s.* 6*d.* on all pleas, etc., in Chancery.

6*d.* on copies.

£2 on all diplomas, certificates, etc., of colleges.

1*s.* on pleas, etc., in Admiralty Courts.

6*d.* on copies.

10*s.* on a certiorari, writ of error, etc.

5*s.* on fines, common recoveries, and attachments.

4*s.* on any record of Nisi Prius, as judgments, etc.

1*s.* on all process, etc., not heretofore included.

£10 upon licenses to practice as attorneys, etc.

4*d.* on all bills of lading.

20*s.* on all letters of marque, etc.

10*s.* upon all grants of offices, except of the navy, army, and of the peace.

6*d.* on all Acts of incorporation.

20*s.* on retailing licenses to sell spirits.

£4 on licenses to sell wine to persons not taking out licenses to sell spirits, etc.

£3 upon those who do.

5*s.* upon guardianships, and letters of administration, above £20; seamen and soldiers excepted; the duty extending to the Continent of America, its islands, etc., Bermuda and Bahama.

10*s.* upon the same in other parts of British America.

6*d.* upon securities for £10.

1*s.* upon securities for above £10, and not above £20.

1*s.* 6*d.* upon securities for above £20, and not above £40.

6*d.* upon warrants of survey for 100 acres.

1*s.* upon the same for more than 100, and not exceeding 200.

1*s.* 6*d.* upon same for above 200, and not exceeding 320.

1*s.* 6*d.* upon all grants, etc., of 100 acres; except leases up to 21 years.

2*s.* upon the same for above 100, and not exceeding 200.

2*s.* 6*d.* upon the same for above 200, and not exceeding 320. These confined to the Continent, its islands, Bermuda and Bahama.

3*s.* on the same for lands above 100, in all other parts of British America.

4*s.* on above 100, and not exceeding 200.

5*s.* on above 200, and not exceeding 320.

£4 upon all offices not before mentioned,

On the other hand, the impulse given to domestic manufactures by the determination not to import or use articles of English merchandise, was a means of increasing the production of paper into the country. Mills were in consequence erected in various parts of the country, and increased from that time more rapidly than they had previously done.

At the commencement of the Revolution, however, there were but three small paper-mills in Massachusetts. There was one in Rhode Island out of repair. In New Hampshire, there were as yet none. The supply of Paper from these mills was far short of the demand. The scarcity of workmen experienced in the business, and the high price of all labor, caused what was made to be prepared very indifferently. The practice of saving rags had not become habitual with the people, and everything of that kind was employed in the manufacture, without the proper care in assorting the qualities. This gave to much of the paper made, while the knowledge of the bleaching process was yet unknown, a peculiarly dark, and often mottled hue, by which the product of that period is characterized.

It was about this time, or in the year 1774, that the eminent chemist, Scheele, made the valuable discovery of Chlorine, the remarkable bleaching properties of which, in combination with water or certain salts, were afterward through the researches of Berthollet and others, rendered so practically useful, as to mark an era in the history of Art, as employed upon the manufacture of vegetable substances. This application of chlorine did not, however, become immediately available in Europe, and was not introduced into the Paper manufactories in this country, until after the beginning of the present century.[1]

except the army, navy, and justices of the peace.

£6 upon all exemplifications of the same.

2*s.* 6*d.* on all contracts, charters, bills of sale, etc.

5*s.* on warrants to audit accounts, passports, policies of insurance, etc.

2*s.* 3*d.* on all bonds, letters of attorney, notarial acts, etc.

3*d.* on all registers of deeds, etc., before mentioned.

2*s.* on all register's of deeds, etc., not before mentioned.

1*s.* on playing cards.

10*s.* on dice.

½*d.* on all pamphlets and newspapers.

1*d.* if larger than a half sheet, and under a whole sheet.

2*s.* not exceeding six sheets.

2*s.* on all advertisements.

2*d.* on all almanacs, etc., on one side of one sheet.

4*d.* on all others. These for one year. If for more years, to be multiplied by the number.

6*d.* on every 200, in sums not exceeding £50, as consideration for apprenticeships.

1*s.* on 20, if the sum exceeds £50.

Double duties on all papers, etc., in other than the English language.

(1) In a communication addressed by Mr. J. Cist, of Wilkesbarre, in March, 1813, to Professor Cooper, of Dickinson College, Pennsylvania, the Editor of the Emporium of Arts and Sciences, it is stated, that the *oxygenated muriatic* acid, as it was then denominated, had not at that time come into use among the paper-makers in America,

In 1776, Watson & Ledyard, who had a Paper-mill at East Hartford, Connecticut, were able to supply paper for a weekly issue of eight thousand papers from the Hartford press, in addition to the greater part of the writing-paper used in that Colony, and by the Continental Army. One of the earliest Paper-mills built in Western Massachusetts, was near the town of Pittsfield, in Berkshire County. In 1779, about twenty-seven years after its settlement, the town instructed its representatives to the General Court, to use their "best endeavors, that any petition which may be preferred from this town, or from any individual of it, respecting the erecting a Paper-mill in this town, be attended to, and espoused by you in the General Court." Paper was made some years later in the adjoining town of Dalton, by Zenas Crane and others. The county now maintains about forty Paper-mills, far outnumbering any other in the State. Lee, where the business began still later, has alone above twenty mills, and is the largest Paper-making town in the Union.

A Paper-mill was, we believe, built at Bennington, Vermont, during the Revolution. So scarce was the supply of raw material, however, that advertisements were sent to Albany that rags were wanted at the printing-office and Paper-mill in Bennington; and the mill is said to have been chiefly dependent upon the cast-off clothing of the Indians for a supply of stock.[1] Paper was brought from the mill through the forests upon

although two or three patents had already been granted in England for its application to that purpose.

A formula prepared by an English manufacturer, for making a bleaching liquor for paper pulp, was sent by Mr. Cist, and with engravings of the apparatus used in its preparation, and remarks, by Dr. Cooper was published in the first volume of the Second Series of the Emporium. In his observations, Professor Cooper, states, that about the year 1790, he, with a Mr. Baker, of Manchester, devised a modification of Berthollet's method of producing oxymuriatic acid, by substituting minium, or red lead, for manganese, and by a direct combination of the materials, produced the acid without distillation, and with considerable saving of expense. He says, he employed it continuously for three years previous to his removal to America, in bleaching cotton goods to the extent of from 800 to 1200 pieces of calico weekly in Manchester. The process was not published in England, but was inserted by Dr. Mease, in his edition of the Encyclopedia, without attracting attention, and was again given to the public in the paper above referred to. A patent was granted in England, in 1792, to a Mr. Campbell, for bleaching rags; and, three years after, John Bigg, obtained a patent for bleaching rags and also the pulp in the vats, by the use of manganese, sea salt, oil of vitriol, and water distilled together. Dr. Cooper appears to have used the gas which is noxious to the workmen, in place of a solution of the oxymuriate or chloride of lime, afterward employed, and hence his method did not prevail.

(1) A commentary on the altered circumstances of the present population of these States, in regard to clothing and the Arts, is furnished in a statement in the California State Register, for 1859, where the existence of a Paper-mill in Marin County is mentioned, as turning out six tons of paper per week. And one of the great benefits ascribed to it, is the "clearing out of the cast-off garments, which for years have carpeted the streets of San Francisco, and every city and town in the State."

horseback, and was so valued, notwithstanding its poor quality, that imperfect sheets were carefully repaired with paste, that none might be lost. Some copies of the Albany Register, printed on paper from the Bennington mill, the nearest to that city, exhibit when held up to the light, this reparative process so dexterously done, as otherwise to elude observation.

So scarce indeed, was paper in New York, in 1781, that the Journal of the Second Session of the Assembly was not printed, on account of the inability of the printer to procure paper.[1]

A Paper-mill was erected in the northern part of that State, at Troy, by Messrs. Webster, Ensign, and Seymour, in 1793, which made from five to ten reams of paper daily. It is said by Mr. Munsell, to have been the first in that part of the State.

In 1785, the Legislature of Massachusetts, notwithstanding the odium attached to the very name of a stamp duty, since the excitement growing out of the Parliamentary Statute of 1765, re-enacted an ordinance which thirty years before, had passed the same body imposing duties on licensed vellum, parchment, and paper, and a tax of two-thirds of a penny on newspapers, and of one penny on almanacs, which were required to be stamped. The law was, however, repealed, before it had become operative. But it was followed soon after by a duty on advertisements, which continued two years in force.

In 1786, a Society at Philadelphia, offered a premium for the best means of protecting Paper against the attacks of insects; and another for the best method of making paper for the St. Domingo Market, capable of resisting the insects of that region. Several plans were offered, accompanied by samples of paper prepared with sizing, mixed with various sharp, bitter or other ingredients fatal to insect life, none of which, however, were deemed worthy of acceptance.

An improvement was made in the following year in London, by a person of the name of Hooper, who received a patent for a new method of making printing-paper, particularly adapted to copper-plate printing. It was about the year 1790, that the practice of blueing paper in the vat, originated in England, in an accident it is said. A paper-maker's wife chanced to drop her bag of powdered blue into a quantity of paper-pulp, and the article when finished, being offered in the London market as an *improved* paper, commanded an advance of four shillings in the

(1) In the library of the N. Y. Hist. Soc., there are 16 folio volumes of the manuscript Journals of the British House of Commons, in Cromwell's time, whose ample margins, had been partially used by a commanding officer of the American Army, on account of the scarcity of paper, while in winter quarters at Morristown, N. J., in 1776, or 1777 — *Watson's N. Y. in the Olden Time.*

price. Out of the increased profits of his sales, her husband rewarded her discovery with a costly cloak.

The Paper manufacture flourished in Pennsylvania, New Jersey, and Delaware, particularly the first-named, to a much greater extent than in any other sections of the Union. In 1787, according to M. De Warville, there were in those three States, sixty-three paper-mills, of which forty-eight were in Pennsylvania.

They manufactured, annually, about two hundred and fifty thousand dollars worth of paper. Connecticut made in that year five thousand reams, worth about nine thousand dollars. Maryland, had also a Paper-mill at that time, and there was one in North Carolina. In 1792, a Mr. Beach, of Danbury, in Connecticut, made samples of paper from the Asbestos, of which fossil, a Jesuit in Europe, named Kircher, had, in 1646, produced paper and other articles, indestructible by fire.

De Warville, mentions a Paper-mill on the Brandywine, a mile from Wilmington, Delaware, belonging to Mr. Gilpin and Myers Fisher, in which the process for grinding the rags, was much more simple than the French, and the specimens of their paper which he had seen both for writing and printing, equal to the finest made in France.

The Paper-mills had at this time greatly increased in number, in New England, and four years later, the Paper made in Massachusetts, was estimated to be worth twenty thousand pounds annually. It was then a yearly increasing production in the State, which in another four years, numbered twenty Paper-mills, where at the Revolution, there were but three. Six of these were on the Neponset, and seven on the Charles' River. There was a very large one at Worcester, and at Sutton, in the same county, was another belonging to the Messrs. Burbank, situated on Mill Brook. There was one at Springfield, and one at Andover.

The Paper-mills of Massachusetts, at that time, had usually two vats each, and employed ten men, and as many boys and girls; and their annual product was about seventy thousand reams of writing, printing, and wrapping paper. A mill with two vats, required a capital of about ten thousand dollars, and was capable of producing from two to three thousand reams annually, of different descriptions of paper. The price of printing-paper, was from three to three and a half dollars per ream. Some of the mills in Pennsylvania were of greater capacity, and had three or four vats each.

Among the first Paper-mills built in the Southern Provinces, was one at Salem, in North Carolina, three hundred miles in the interior, settled in 1766, by a company of Moravians, most of whom were trades-people. The manufacture was, after the War, encouraged by a loan from the State. In South Carolina, some time after, an association for the aid

and instruction of emigrants recommended the establishment of Paper-mills, as a branch of industry likely to be remunerative.

In 1789, Congress, on motion of Mr. Clymer, of Pennsylvania, laid a duty of seven and a half per cent. on Paper, pasteboard, and blank-books imported. Mr. Clymer stated, that the Paper-mills of Pennsylvania then produced, annually, seventy-thousand reams of various kinds of Paper, which was sold as cheap as it could be imported, and that there were already fifty-three mills within the range of the Philadelphia market.

The compiler of the *Bibliotheca Americana*, published in London, in 1789, states that the people of North America manufactured their own paper in sufficient quantities for home consumption. The Report of Secretary Hamilton, in the following year, represents it as one of the branches of manufacture which had arrived at the greatest perfection, and was "most adequate to national supply." Yet Citizen De Warville, a few years previous, believed that, on account of the scarcity and dearness of labor and of rags, the Americans could not, for many years to come, furnish sufficient paper for the prodigious consumption caused by the increase of knowledge and the freedom of their press.

2. PAPER-HANGINGS.—The manufacture of Paper-hangings was a department of the business in which, according to Hamilton's Report, respectable progress had also been made.

The use of this elegant and inexpensive substitute for the costly and elaborate arras and tapestries of former times, was introduced into France and England early in the seventeenth century,—about the same time with that of leather-hangings, which it soon almost entirely displaced. The manufacture was carried on in England, in 1748; and, at a later period, the establishment of the Messrs. Potter, at Manchester, became celebrated, making from eight to ten thousand rolls in a single day. The cylindrical machine was first introduced for the manufacture of long sheets for Paper-hangings. But it was not until after this, that the article began to be generally used in America. The first advertisement of Paper-hangings for sale in this country appeared about the year 1737.[1]

(1) In the first settlement of the Continent the people were generally compelled to forego the ornamental, and content themselves with the essentials of domestic comfort. Their dwellings, mostly of wood, were usually guiltless of paint throughout, which was not felt, however, to be a great deprivation, when a well-scoured and sanded floor was the pride of respectable housewives. The early rulers of Massachusetts, indeed, appear to have discouraged the use of paint, as a useless luxury. The Rev. Thomas Allen, of Charlestown, was called to account, it is said, in 1639, for having paint about his dwelling, but was discharged upon his showing that it was done before his time, and was disapproved of by him. The first church erected in Boston was never painted within or without while it stood. Indeed, a list of mechanics made out by the General Court of Massa-

The Swedish Traveler, Professor Kalm, remarks of New York, which he visited in 1748 :—"The walls of the houses are whitewashed within, and I did not any where see hangings, with which the people in this country seem, in general, to be little acquainted. The walls are quite covered with all sorts of drawings and pictures, in small frames. On each side of the chimneys they usually have a sort of alcove, and the wall under the window is wainscoted, with benches near the window. The alcoves, as well as all of the wood-work, are painted with a blueish-gray color."

Hangings of rich cloth, however, imported from Holland or from India, were, from an early period, to be occasionally seen on the wall of a wealthy merchant, in the principal cities. Paper-hangings, along with carpets, began to come into use in the middle of the last century. They were advertised for sale, in New York, by Garret Noel, the bookseller, and by J. Desbrosses, in great variety of patterns for walls and for window curtains, in 1760. They appear to have been manufactured also in the country, within a year or two of that time.

Paper-hangings of domestic manufacture are said to have been presented, in 1765, to the Society of Arts, Manufactures, and Commerce, instituted in New York, on the plan of the London Society of Arts, which were highly approved and, when offered for sale, were rapidly bought up. Additional samples of several varieties of the same manufacture were produced before the same Society, in 1766, approved and recommended.[1] From this time forward, the use of wall Paper increased throughout the country with great rapidity. The importations of the article were very large from England, and, after the War, from France: so much so, that, in 1787, the French Government removed the export duty upon Paper-hangings, on account of the great consumption of its manufacture in the United States. At that time there were several manufactories of the article in Boston, and others in New Jersey and Pennsylvania.

The manufacture of Paper-hangings increased in the same rapid ratio, and when the first Secretary of the Treasury made his report, was among the well-established branches of home production. Three years after, the manufactories of stained Paper, in Boston, were sufficient, not

chusetts, in 1670, does not contain the name of a painter. In 1705, the Coat-of-arms of Queen Anne, in the Court-House, at Salem, Massachusetts, was ordered to receive "a colored covering," which was the first mention of the art in that quarter. Painters' colors were for sale in Boston, in 1714. But paint was not generally used before the Revolution. An anecdote is related of a thriving cooper who, to excel his neighbors, just previous to the War, painted one of his rooms. The report soon spread. Several acquaintances of the man having met on a wharf, one of them announced the event in these terms :—"Well, Archer has set a fine example: he has laid one of his rooms in oil." The use of paint increased rapidly after the War.

(1) Dodsley's Annual Register, vol. viii. p. 55, and vol. ix. p. 62.

only to supply the State, but furnished considerable quantities to other States.[1] Boston produced, annually, twenty-four thousand pieces of Paper-hangings. At that time there were also two or three manufactories in Boston, and its vicinity, for making *cards*, at one of which large quantities were made. Pasteboard, fullers' paper, sheathing, wrapping, cartridge-paper, cardboard, and all other descriptions, were made to a considerable extent.

A number of patents were taken out, within a few years after the organization of the Patent Office, for inventions and improvements in machinery, and the use of new processes and materials in this branch of manufacture, by John Carnes, of Delaware, John Biddis, of Pennsylvania, Robert R. Livingston, of New York, J. Condict and Charles Kinsey, of New Jersey, and S. Greene, of Connecticut.

Although, for the manufacture of white Paper, none but white rags were used in the early history of the art, the product, as will be evident upon the inspection of books or newspapers printed seventy-five years ago, was coarse, dark-colored, and unsightly, compared with that made from the most refuse materials by modern contrivances. The trituration of the rags for the pulp was performed by beating them in stone or iron mortars, by the aid of a trip-hammer; there was no means of discharging the coloring matter, either before or after the formation of the sheet, and the Paper was sent to market unbleached and uncalendered. By the old process of manufacture, several days were required to produce a sample of dry, finished Paper. At the present time, by the aid of cutting and comminuting machinery, the pulp is prepared in a superior manner in a few hours, having been thoroughly bleached during the preparation; and the whole of the subsequent stages of the manufacture, until the finished article is ready for use, is accomplished in as many minutes. Some idea may be formed of the slow and expensive nature of the early manufacture of Paper, as well as of the effect of the introduction of chemical aids in bleaching, of the Fourdrinier and other machines in moulding and finishing, from the following comparison of the practical results of the methods:—

"Formerly the process was slow and laborious. Each sheet was made separately, and four and a half reams of newspaper, of the size of twenty by thirty inches, was technically termed 'a day's work,' and required the constant labor of three men, with the occasional assistance of two more. These four and a half reams contained two thousand one hundred and sixty sheets, which, if placed close together in a line, would measure five thousand four hundred feet,—a little more than one mile.

(1) Mass. Hist. Coll. iii. 276–277.

"By the introduction of machinery, this part of the process of Paper-making has been entirely changed. The Paper is now run off in one continuous sheet, and, on our best machines, at the rate of forty-five feet per minute. Some of the machines in use being of the width of eighty-four inches, the attention of two men and four girls is required to form paper of the size before mentioned, twenty by thirty inches. Such a machine, working the same amount of time as the old-fashioned variety (twelve hours), will make thirty-two thousand, four hundred feet of Paper eighty inches wide.

"But this is not all. When the the three men with their assistants, under the old plan, had finished their day's work, and made their *one mile* of paper, it was wet, and it became necessary to dry it upon poles. If the weather proved favorable, this might be done, taken down, and finished in *five days*—ten times longer than the time occupied in making it. *Now*, when the two men and four girls have, in twelve hours, made their twenty-four miles of paper, it is dry, and when cut into sheets, is ready for the printer; and this without regard to the weather, be it rain or shine.

"Thus it is evident that formerly it took ten times as long to prepare the Paper for market, after it was moulded into sheets, as is now required to convert it from the pulp—and that the labor of five persons in one day produced for the market only *one twenty-fourth* part now obtained by the use of labor-saving machines."[1]

Over two thousand engines are now employed in producing Paper upon a scale and of a quality at least equal to that of any other country.

3. TYPE-FOUNDERIES.—The earliest of all printing is said to have been made from wooden blocks, engraved with letters in imitation of the chirography of the scribes, who constituted a numerous and skillful profession throughout Europe and the East before the discovery of printing. The impressions from these plates bore so near a resemblance to the written copies, as to be with difficulty distinguished from them. Types of a moveable kind, dexterously cut upon the same material, after a time began to be used, and were followed by metallic types, with faces cut in a similar manner to the wooden ones. The first book printed from cut metal types was the Bible, on six hundred and thirty-seven leaves. It was the Vulgate edition, printed on vellum, between 1450 and 1455. The magical rapidity with which Faust—who became soon after the owner of the types, and kept the secret by which they were produced—multiplied copies of the Bible with exact uniformity, and sold them for sixty, and then for thirty crowns, while the scribes charged five hundred, gave rise to the traditional association in the vulgar mind between "the Devil and Dr. Faustus." But if the effect of moveable types seemed thus magical, the result of the discovery of the method of casting types in metal, which

(1) Transactions of Am. Institute, 1849, p. 412.

was the next step in the improvement in printing, must be deemed still more extraordinary. The merit of this discovery belongs to Schœffer, the partner of Faustus, after the separation of the latter from Guttenburg. He engraved matrices in copper, from which he cast the solid types, and preserved the improvement until the sacking of Mentz, in 1462, dispersed the knowledge of the valuable art throughout Europe. He afterward employed steel punches for the purpose. The next great improvement was that of casting whole pages in metal, a return in form to the original method. This stereotyping process was invented by John Muller, at Leyden, in 1690.

The principal part of the types used in this country before the Revolution was imported from England. There were several Type-founderies, on a small scale, established in the Colonies, however, during that time. The earliest of these, beyond doubt, was that already mentioned, established by Christopher Sower, at Germantown, in Pennsylvania, about the year 1740. He cast the types for a quarto edition of the German Bible, which he completed in 1743, and other valuable books, for the use of the many German people who had already settled in the Province. At this foundery he cast a number of fonts of type, in German and English character, for the use of himself and others, and after his death, the business was extended by his son, Christopher Sower, Jr. The latter conducted the largest book-making establishment in the country for many years. He made his own types and printing-ink, and gave employment to a paper-mill and several binderies. The business afterward descended to the Messrs. Binney & Ronaldson, of Philadelphia, who, about the beginning of this century, cast all the types made in the United States, and introduced a very important improvement, that of the type-mould. In the hands of their successors the business is still conducted on a vast scale.

About the years 1763–66, an attempt was made in New York to print an edition of the Book of Common Prayer, in the Mohawk language, prepared by Messrs. Andrews, Barclay, and Ogilvie, which was said to have been attended with almost insurmountable difficulties, because there was not at the time "a Letter-maker's founding House" in the Colonies. Nine sheets, or seventy-four pages, were completed by Wm. Weyman, the printer, who, in 1768, died bankrupt. Two or three years after, it was completed by Hugh Gaine, another conspicuous printer in that city, and four or five hundred copies were printed.[1]

In 1768, a Type-foundery was commenced in Boston by a Mr. Michelson, from Scotland, who produced types which were said to be equal to

(1) Documentary Hist. N. York, vol. iii. p. 1152.

any imported from Great Britain. But he does not appear to have succeeded in establishing a permanent business.

In the following year, Abel Buell, of Killingsworth, in Connecticut, a gold and silver smith, and ingenious mechanic, who had been engaged in lapidary work and in map engraving, and had recently been pardoned for counterfeiting a Colony note, petitioned the Council to aid him in constructing a foundery for casting printing type, by a new process which he claimed to have discovered. His application was granted, and he afterward erected, at New Haven, a Type-foundry, in the Sandemanian Meeting House, in Gregson street, where he employed fifteen or twenty boys in the business. He received encouragement in the undertaking on account of the difficulty experienced, during the early stage of the War, in procuring types for printing, except occasionally at much risk, from France. The enterprise appears not to have survived the protracted contest. After the war Buell was employed by the State in coining copper money, for which he constructed all the necessary apparatus in such perfection as to be able to make one hundred and twenty coins per minute. He subsequently went to England, where his advice was sought in the construction of iron bridges. His ostensible reason for going to England was to procure a supply of copper, but really, it is said, to obtain a knowledge of the improved cloth-making machinery, which was not allowed to be exported. He died in the almshouse, at New Haven, about 1825.[1]

In 1775, Dr. Franklin brought with him, from Europe, the materials for a complete Type-founding establishment, which he had purchased in France. He erected a house near the site of his first landing, and in a portion of it, fitted up his Type-foundery, and a valuable printing apparatus, procured in London, and employed a portion of his advanced years in the occupation of his early life. The type-making branch was particularly designed for the benefit of his grandson, Mr. Bache, whose future career as a printer he spared no opportunity of advancing. Bache, having engaged in the publication of the Aurora newspaper, made, however, little use of the founding apparatus.

Soon after the War, John Baine, an aged type-founder of Edinburg, sent to Philadelphia, in charge of a relative, the materials for a Type-manufactory. He not long after arrived in person, and established the first permanent Type-foundery in the country. He cast the types for a portion of an edition of the Encyclopedia Britannica, which was republished in Philadelphia, by Thomas Dobson, in eighteen volumes, quarto, the first volume of which consisting of one thousand impressions, was published

(1) Barber's Hist. Coll. of Connecticut.

in 1790. Baine died in 1790, at the age of seventy-seven, and the concern, we believe, was closed.

About two years after, David Bruce came from Edinburg to New York, and established the Type-founding business in that city. The firm, D. & G. Bruce, in 1813, commenced the first stereotype foundery in the United States. G. Bruce was the inventor of the type called secretary or ronde, and the family were the originators of several valuable improvements in these branches. The same ship which brought D. Bruce to America, came from Leith, in Scotland, the following year, with Richard Ronaldson, Adam Ramage, the inventor of the press which bears his name, and the now aged Grant Thorburn, of New York. Ronaldson, in connection with Mr. Binney, revived the type-making business in Philadelphia, devoting themselves exclusively to that branch. They introduced some important improvements, particularly the American type-mould, and conducted the business with enterprise.

4. PRINTING PRESSES.—The earliest form of the Printing-press, is said to have been constructed in imitation of the wine-press, in familiar use in the parent country of the art, and to have been ill-adapted for the purpose of printing. The only valuable modification it received until long after Printing was introduced into America, was given it in 1620, by Jansen Blaew, a joiner of Amsterdam, and afterward a printer, who made several improvements, which were adopted in Holland and soon after in England. Some additional changes were made upon Blaew's models by Baskerville, the ingenious type-founder and printer of Birmingham, about the middle of the last century,—and presses of that kind, imported from England, chiefly, supplied American printers previous to the Revolution.

The Rolling-press for Copper-plate Printing, introduced into England in the reign of James the First, from Antwerp, by one Speed, is supposed to have been first brought to America, about the beginning of the eighteenth century. M. Amisson, superintendent of the Royal Printing House, in the Louvre, at Paris, made some further improvements in printing machinery, late in the same century, and published a treatise descriptive of a new press, and its mode of construction.

Still later, the ingenious Charles Earl Stanhope, of England, becoming interested in the new process of stereotyping, turned his attention to the improvement of that art, and by the aid of a skillful mechanic, completed with much labor and expense, the powerful Stereotype Printing-press, which bears his name. The Stanhope Press, more automatic than any before constructed, and capable of nearly a hundred-fold, the power with the same labor as the common press, was constructed on more scientific principles than any previously in use, and a portion of its mechanism, was applied to the ordinary press.

But these presses, and the cylindrical ones of Nicholson, of London, patented in 1790, were not introduced into this country during the period now under review. The old wooden presses used before the Revolution, were worked by hand, and the ink was also applied by a manual process called *beating*, by means of leathern balls, which gave place to the *roller* only about thirty-five years ago.

About the period of the Revolution, Benjamin Dearborne, who in 1776, became the publisher of the New Hampshire Gazette, established at Portsmouth, in 1756, by Daniel Fowle, with whom he had learned the printing business,—and at this time the oldest paper in the United States,—invented a wheel press, as it was called, which was used for a time at Newburyport. It impressed the whole side of a sheet at one pull of the lever. "The platten turned with the tympan, having a counterpoise to balance it, and the power of the lever had the additional force of a wheel and axle." As in the old hand-presses, two persons could work upon it at the same time. Dearborne, who subsequently removed to Boston, and became extensively known as the inventor of the Dearborne patent steelyards and balances, still in considerable repute with many, some time previous to 1810, devised another press, on an entirely new plan with greater simplicity of contrivance than any then in use, and designed to secure greater power and dispatch in printing. This ingenious mechanician, we believe, was the only one who attempted any innovation in the Printing-press, which it is proper to notice in this place.

A modification of the cylinder-press of Nicholson, which was patented by Dr. Kinsley, of Connecticut, in 1796; the patent circular press of Sawin, the inventions of Adams, Ramage, Dow, and others, and the splendid achievement of Hoe, belong to a ater period, and will receive in another place such notice as their merits shall seem to demand.

CHAPTER IX.

BRICKS, AND THE MANUFACTURES OF CLAY.

ONE of the earliest evidences of an improved social condition in any community is an increased attention to the convenience, elegance, and permanence of the dwellings of the people. Hence, Mr. Hallam has justly observed, that "No chapter in the history of national manners would illustrate so well, if duly executed, the progress of social life, as that dedicated to domestic architecture."

From the extremely rude cabin, first constructed by the emigrant of round or roughly hewn or squared logs or planks, riven from the trees upon the spot where they had fallen, to let in the sunlight upon the nucleus of a rising village, the change to houses constructed with a view to elegance and the highest amount of domestic comfort, in a new country, is usually a slow one. The first habitations of our forefathers, aspired to little superiority over the primitive wigwam of the native, and, in many instances, were constructed, temporarily, in imitation of the aboriginal bark hut of the savage. The tenement of the Colonist was possibly, in some instances, a less comfortable one, by far, than that of his Indian neighbor, with its closely wattled and thatched roof and walls, its plentiful hangings of mats, constructed of flags or reeds stitched with Indian hemp, and its stock of warm furs and skins, which effectually repelled the most inclement cold.[1]

(1) Whether we regard it as a primordial art, transferred at some remote time from the eastern to the western Continent, by the race which first peopled these shores, or as an example of the manner in which the human mind, under similar circumstances, works out the same ends by similar devices, the fact is alike interesting, that, as the use of clay in the different fictile manufactures belongs to the infancy of all nations, so among the American red races, it was one of the most general and perfect of aboriginal arts. Some tribes, particularly the Peruvians and Mexicans, were accustomed, before the Spanish conquest, to manufacture bricks, like the Babylonians and Egyptians, of clay and stubble, which they dried in the sun, and cemented by a kind of mortar, made sometimes of tempered clay and lime, and sometimes by means of asphaltum. These adobes, or sun-dried bricks are extensively made by some of the modern tribes of New Mexico, California, and other parts.

The dwelling of the European settler for many years was but

> "A rude habitation,
> Solid, substantial, of timber rough-hewn from the firs of the forest,
> Wooden-barred was the door, and the roof was covered with rushes,
> Latticed the windows were, and the window panes were of paper,
> Oiled to admit the light, while wind and rain were excluded."

From a dwelling of this description, with its wooden chimney and floor of clay, with one or two apartments only scantily supplied with furniture, wherein the housewife plied her domestic employments by the light of a blazing log-fire, or a light-wood candle,

Urit odoratam nocturna in lumina cedrum,

the transition to the neat and capacious frame house, or one of brick and stone, is only accomplished by years of toil and patience. The substitution, for those materials, of bricks or hewn stone, slates, tiles, sawed and planed boards, sash and glazed windows, plastered and painted or papered walls, with corresponding improvements in the interior decoration and appointments, involves the introduction of many forms of industry, and the appropriation of many valuable materials by processes of art from the great store-house of nature.

The enterprise which, in point of comfort and appearance, most speedily modified the primitive architecture of the Colonies, was the introduction of the saw-mill; which not only supplied materials in an improved form, but also furnished valuable articles of export for the infant commerce of the Colonies. But until a people begin to build for the future, to construct for other generations than their own, architecture can hardly be said to have an existence. The more enduring forms of Brick prompt the inquiry—

> "What the temple we would build
> Now the massive kiln is risen?"

First Brick-kiln in New England, in 1629.

The first Brick-kiln of which we have any account in New England, was erected in Salem, Massachusetts, in 1629, the year following that in which Francis Webb was commended to the patronage of the Governor on account of his saw-mill, as mentioned in a previous chapter. "It is thought," writes the minister of Salem, about July of that year, "here is good clay to make Bricke, and Tyles and Earthen pots, as need to be. At this instant we are setting a brick-kill on worke to make Brickes and Tyles for the building of our houses." He adds, also, "For stone, here is plentie of slates at the isle of slates, in Massathulets Bay, and Lime-stone, Free-stone, and smooth stone and Iron-stone, and mar-

ble stone, also in such store, that we have great Rockes of it, and a harbor hard by Our plantation is from thence called Marble Harbor."[1]

The existence of limestone and marble thus appears to have been early discovered. In the structural economy of the globe and of all its organized inhabitants, as well as in the arts of life, there is, perhaps, no one article more indispensable or more abundantly met with than lime and its compounds. Oldmixon, writing of Pennsylvania, says, "Mountjoy is a Manor that belonged to a daughter of Mr. Pen, and here the first Limestone was dug that ever was found in America."[2] That a mineral so important for building purposes, as a flux for iron, and other uses, so universally distributed in its various forms, should so long remain undiscovered, seems scarcely credible. The discovery of compact limestone referred to took place not long previous to 1681; but this was evidently not the first found in America. Captain Smith, in 1614, inferred its existence from the resemblance of the cliffs of New England to the coasts of Dover. Morton, who lived in the country from 1622 to 1632, speaks of marble "useful for sumpteous pallaces," slate, and other materials; and says chalk was shown him by an Indian, and that limestone existed to his knowledge. Virginia, about that time, was well supplied with lime, but its source is not mentioned. Thomas Graves, who settled at Charlestown, in 1629, was instructed to find limestone, and that and other minerals were probably found by his agency. Yet Johnson relates, that the fort on Castle Island had to be rebuilt in 1644, because "the country afforded no lime but what was burnt of oyster shells," at the time it was constructed. And Jocelyn, also, in 1663, alludes to the absence of stones that would "run to lime, of which they have great want." The earliest mention of its manufacture that we have seen, was in Rhode Island, where, in January, 1662, a Mr. Hacklet, of Providence, applied to the town for liberty to burn lime, and to take *stone* and wood from the commons for that purpose, which was granted him for a limited time. In October, 1665, the town ordered that "those lime rocks about Hacklet's lime-kiln shall perpetually be common, and that no land shall be laid out on the north-east of said kiln, within six poles, or upon the other sides or parts of said kiln within sixty poles, this said kiln being at or near a place called *Scoakequanoisett.*"[3] The lime rocks at that place became, at a later period, a source of large quantities of lime for exportation. Limestone is not abundant in the eastern part of Massachusetts, and, as late as 1724, shell lime, which was the principal dependence in all the Colonies, was in common use, and the authorities

(1) Higginson's New England's Plantation, 1 Mass. Hist. Coll. vi. 118.

(2) Brit. Emp. in Amer. Ed. 1741, i. 303.

(3) Annals of Providence.

then ordered that "Muscles shall not be used for making lime or any thing else, except for food and bait to catch fish."

In 1719, Edward Scull advertised, in Bradford's American Mercury, "very good lime to be sold by him, next the Franklin Tavern, in Front street, Philadelphia, at 15*d.* per bushel, and he will deliver it to any person at Salem, Newcastle, Burlington, or Bristol, at 2*s.* per bushel, or 20*d.* if in quantity."

Notwithstanding the abundance of excellent native building materials, as marble and other stones, and of lime, which could have been made by the calcination of the marble, the houses of the first settlers were for a long time chiefly built of wood, even to the chimneys. These, in conformity with the custom in English cottages of that day, were made of logs, or sticks of wood, placed one above another, at right angles and plastered with clay, or mortar. The roofs were usually thatched with reeds, or flags, obtained from spots of ground reserved in some places for that use, above low-water mark. Great exposure to fire was the result of this style of building, although the chimneys and roofs were subject to frequent inspection by officers detailed for that duty. Jamestown, in Virginia including the fort, storehouse, and all their contents was burned in the first year of the settlement from that cause, as was also the first building and common store-house erected by the Pilgrims at Plymouth, within a month after it was built. The first fire in Boston, occurred on the 16th March, 1631, from the imperfect claying of one of those wooden or catted chimneys, whence fire communicated with the thatch, and destroyed two dwellings. Governor Dudley, in consequence, prohibited wooden chimneys and thatched roofs. A few years later, they were also forbidden in the Dutch Colony, at Manhattan, where in 1635, Fort Amsterdam, which had been two years in building—at much expense—was, almost as soon as completed, destroyed in less than half an hour by the lodgment of a spark from a gun in the reeds with which it was covered. But, notwithstanding prohibitions, those inflammable materials continued long in use, especially in the infant settlements. So prevalent had this custom been down to a late period, that General Washington, in his tour through the Eastern States, in 1789, deemed it worthy of record in his diary, on several occasions, after leaving New York, that no dwelling houses were seen in the villages and small towns through which he passed without stone or brick chimneys. Those in Connecticut, had generally "two flush stories, with a very good show of sash and glass windows."

Stone and bricks—of which last ten thousand were sent from London to Massachusetts in 1629, were first used in the construction of the fireplaces, which were usually of the most ample dimensions.

The first house of Brick erected in Boston, and perhaps in Massachu-

setts, was built, it is said, by Mr. Coddington, one of the fathers of Rhode Island, previous to his removal to that plantation in 1638. In 1643, a brick watch house was built on Fort Hill, in the town of Plymouth, which Dr. Thacher says, is the earliest notice of bricks, by which he probably meant in that town. The bricks were furnished by a Mr. Grimes, at 11s. per thousand.[1] Lime, Brick, and Tile-making are mentioned by Johnson, among the trades that were pursued as independent callings in New England, about the year 1647. Brick-making was then carried on at Mystick, or Medford, whence the product was sent to Boston.

First Brick house in Plymouth.

The first Bricks made in the Anglican Colonies, however, were made in Virginia, as early as 1612, during the administration of Sir Thomas Gates. In the "New Life of Virginia," of that date, when the Colony consisted of seven hundred inhabitants, it was said after the removal of the people to a healthier place, four score miles up the river from Jamestown, "the spademen fell to digging, the brick-men burnt their bricks, the company cut down wood, the carpenters fell to squaring, the sawyers to sawing, the soldiers to fortifying, and every man to somewhat. And to answer the first objection for wholesome lodging here, they have built competent and decent houses, the first story all of bricks that every man may have his lodging and dwelling place apart by himselfe." In 1649, the Colony had lime, it was said, and "store of bricks made, and house and chimneys built of Bricks, and some of wood, high and faire, covered with shingall for Tyle, yet they have none that make them wanting workmen; in that trade, the Brickmakers have not the art to make it, it shrinketh." The first church built in Virginia, was of brick, and was destroyed, during Bacon's rebellion in 1676, by the burning of Jamestown, which was chiefly built of the same material. Mr. Clayton in his letter to the Royal Society in 1688, speaks of the superior quality of the clay he had found there, of which he made a large crucible, which was the best he had ever seen. He speaks of the pipes and pots very handsomely made by the Indians of clay.

First Bricks in America, 1612.

Boston, about the year 1657, is quaintly described as having "large and spacious houses, some fairly set forth with brick, tile, slate, and stone, and orderly placed, whose continual enlargement presageth some sumptuous city." The Massachusetts Court in 1667, appointed

Boston in 1657.

(1) At the first Court of Assistants, held in Charlestown, in 1630, the rate of wages for mechanics was passed by an order, that carpenters, joiners, bricklayers, sawyers and thatchers, should receive no more than 2*s*. a day, on penalty of 10*s*. to giver and taker. This impolitic order was repealed in the following March. As such laws were found to repel labor, already scarce, to other places, all restrictions were removed in 1640. The price of wages and material combined, may assist an estimate of the cost of brick-work two hundred years ago.

a committee to frame a law to regulate the size and manufacture of Bricks. As early as 1677, a brick college edifice was built at Cambridge by subscription, and in 1694, a substantial brick meeting house, the first built of that material, took the place of the old unpainted wooden one on Brattle street, Boston. An order of the General Court, two years before, required buildings above a certain size to be of stone or brick, and to be covered with slates or tiles, because of the "great desolations and ruins" caused by the contiguity of wooden buildings, whence it is probable that the town was no longer dependent upon importations of bricks. In 1700, when Boston contained about 1000 houses, and 7000 people, Dr. Mather says of it, "ten times has the fire made notable ruins among us, but the ruins have mostly and quickly been rebuilt." But a more than usually destructive fire occurred there in 1711, after which, houses were principally built of brick and of three stories in height.

Notwithstanding the abundance of wood and stone, some of the early settlers in Maine, built a brick-kiln, on the east bank of the Sabestacook, a branch of the Kennebec, some time previous to 1675. Sir Bilby Lake, and his partner Clarke, settled on that river in 1660, and one hundred and thirty years after, the owner of land twenty-seven miles from the head of navigation, in digging for clay to begin a brick-kiln, came upon the ruins of an ancient kiln, with decayed bricks and other evidences of the manufacture. The site of the kiln was occupied by a hemlock tree, of more than two feet in diameter.[1]

Buildings of wood principally, however, prevailed in that and the adjacent provinces, previous to the Revolution. Bricks to a small amount were included in the exports from the Port of Piscataqua, in the years 1789–90.

Medford, was in early times, a principal place for the manufacture of Bricks in Massachusetts, and, after the war, produced annually about four millions of them. Boston,[2] Dorchester, Charlestown, and a few other of the older towns, furnished the chief supply of an article too weighty to be transported any distance, when the means of conveyance were imperfect. The old and populous county of Worcester produced, in several places, large quantities of bricks in ancient times, and is still next to Middlesex in the amount of bricks manufactured. The last-named county, now makes over forty-eight millions annually, nearly nine-tenths of which are made in the towns of Cambridge and Somerville.

A few fine buildings excepted, the towns of Newport and Providence, in Rhode Island, were some years after the peace, principally constructed

(1) Sullivan's Hist. of Maine.

(2) The first granite ever used in this country, was in the erection of King's Chapel in Boston, and was furnished by John Hayward, Esq., of Braintree, in 1752.

of wood; and bricks were probably not manufactured to any considerable extent. Lime, however, was now made in different parts of the Province, particularly in the vicinity of Providence, and was exported thence in quantities.

Brick making in New York.

In New York, during the Dutch rule, buildings wholly or in part of Bricks imported from Holland, where the manufacture has long existed in great perfection, early predominated. The yellow color of the bricks, and the style of architecture adopted, gave to New Amsterdam the unmistakable features of a Dutch town. The notched gable end was usually placed toward the street, and was checkered with black and yellow bricks, bearing conspicuously, in iron letters, the date of erection, and the sharp-pointed roof, which in early times was either thatched with reeds or with Dutch tiles, was uniformly surmounted by a weather-cock, whether the building were of wood or bricks.

The manufacture of Bricks was commenced upon the island during the administration of the last Governor Stuyvesant. Previous to his time, the town, wholly absorbed in the Indian fur trade, had made little progress in mechanical industry, and did not much exceed one thousand in population.

The principal public buildings, previously erected on the island, were of stone, including the second church edifice erected in 1642, at a cost of $1000, by John and Richard Ogden, of Stamford, Connecticut, "a fine stone tavern," at the corner of Pearl street and Coenties Slip, afterward the "Stadt huys," which was sold at auction in 1696, for £920, and five substantial store houses for the company, all built about the same time, under Governor Kieft. To encourage the erection of a better class of buildings, clapboards, lime, and stone were placed on the free list in 1648.

A delegation was sent to the Hagne the following year, to complain of the administration of the Company's servants, who were represented to have engaged in several unprofitable and costly enterprises, as ship-building, mill-building, tile-making, etc. The Herr Stuyvesant, they said, had been mostly engaged in building, brick-making, and such like occupations on the Company's account, though little to its advantage, for the profits did not justify the expenditure. There were graver charges against the energetic Director, or such complaints might be received as evidence of the traditional slowness of the Knickerbocker fathers. Tunis Kray, among other public functions of the kind, a few years later, performed the duties of tally-master of the Bricks and Tiles imported from Holland which probably then formed a considerable item in the imports. The price of imported Holland Bricks, was in 1661, £4. 16*s.* per thousand, payable in Beaver skins. At this date, (1664), there were, however, several brick and tile manufactories in the Province. The earliest and largest of these

appear to have been at Fort Orange, or in its neighborhood. The private Colony of Mr. Van Rensselaer, below Albany, sustained by the ample wealth of its proprietor, and the more varied industry of its colonists, seems to have engaged in Brick-making, before the settlers on Manhattan. The account-books of the Patroon show that yellow bricks, the product of the Colony, sold between the years 1630, and 1646, for fifteen florins the thousand. Among a number of mechanics and husbandmen who embarked for New Netherlands, in 1653, was one Johans De Hulter, one of the proprietors of Rensselaerwyck, who is called by the Directors in Holland, "an extraordinary potter," (steenbacker,) and the provincial authorities are requested "to accommodate him in the best manner possible, and to give him every kind assistance in your power. If he resolves to settle on the island of Manhattan, or Long Island, this year, procure him a convenient situation for his settlement, and to establish a pottery, (steenbackery), as he remains satisfied."[1] What encouragement was given him does not appear. He established himself somewhere on the North River. The business appears to have been conducted by him on a tolerably large scale, as the "Steen Backery," or brick-kiln of Madame de Hulter, on the Hudson, was leased about the time the Province was ceded to England, for eleven hundred guilders a year, and a tile-kiln belonging to the same for three thousand seven hundred and seventeen guilders, ($1480.) Those were considerable sums in that day, when a trader worth £500, was considered a substantial merchant. It is probable that potters' wares were made at the same place. Earthenware, said to equal the Delft manufacture, was made in the province on Long Island, some time before that.[2] About the same time that De Hulter was so strongly commended to the patronage of the Provincial rulers, the Company in Holland refused to sanction certain grants in the Province, viz., one for a potash work, (aschbranderije,) one for making Tiles and Bricks, and the third for salt-works. The language of their refusal evinces their views of the policy of encouraging the introduction of new branches of industry by monopolies and special privileges. "The grants," they say, "we not only entirely disapprove, but require that you will not give one single grant more hereafter, as it is in our opinion a very pernicious management, principally so in a new and budding State, whose population and welfare cannot be promoted, but through general benefits and privileges, in which every one who might be inclined to settle in such a country, either as a merchant or mechanic, may participate."[3] Such views may be regarded

(1) Albany Records, Vol. iv. 93, in Munsell's Annals of Albany, iv. 85.

(2) O'Callaghan's New Netherlands, ii. 542. Les Hollandois avoient etablis dans l'Isle Longue des potteries de terre qui n'etoient pas moins estimé que celles de Delft.—*Hist. Gen. de Voy*, xxi., 285.

(3) Alb. Records, vol iv. 99.—*Ut ante.*

as extremely liberal, when we consider the extent to which the principle they condemn was carried in Europe a few years earlier; and, that the Company's own tenure in the Province was but a great monopoly. The practice enjoined differed materially from the custom in the English Colonies at the time, and it may be questioned whether it were the wiser one in "a budding state," during the infancy of the Arts, which then, if at any time, stand in need of a certain amount of encouragement. A tile-kiln was owned at Beverwyck (Albany) about this time by Andries Hubertsen van der Blaes. Bricks were at this period sometimes sent from the neighborhood of Fort Orange, to the Dutch Colony on the Delaware, where bricks and stone were scarce, although they appear to have been made there in 1656.[1]

Governor Andros, in 1678, reported to the Committee of Lords on the Colonies, that New York contained three hundred and forty-three houses, with ten inhabitants to each of the buildings, "most wood, some, lately, stone and brick, good country houses, and strong of their several kindes." An old Dutch writer speaks of the city three years later, as being large, containing about five hundred houses, built with Dutch bricks, and the meanest not valued at less than £100. Madame Knight, describing New York, about the close of the seventeenth century, says, "The buildings are brick, generally, in some houses, of divers colors, and laid in cheques, being glazed, they look very well." Of the interior, which was "neat to admiration," she remarked that the fire-places had no jambs, but their backs ran flush with the walls; the fire-places were of tiles, and extended far out into the rooms, in some instances to the width of five feet. About this time, narrow brick footpaths were laid down in one or two streets. Bricks, pan-tyles, etc., paid, in 1687, a duty on importation of forty shillings on the hundred pounds' worth. At the close of the century, Albany contained a large proportion of brick houses, which were usually covered with tiles. The style here, as in most of the twenty-four

(1) The resources of the country in building material seem not to have been well understood at first. Mr. Van Rensselaer, after twelve years' occupancy, and a personal visit to his Colony, sent out with a fresh emigration in 1642, 30,000 *building stone*, which his commissary begs him not to repeat, as but a part were received, and better could be had at the North. Of 4,000 tiles, and 3,000 bricks, sent at the same time, he says, the tiles were not worth the freight, for they crumbled all away, so that he got but ten or twelve hundred.

In 1637, bricks sold in New Amsterdam for ten florins ($4) the thousand. Reeds, for thatching, were at the same time, one and a half florins for 100 bundles, and at Fort Orange, one florin. Carpenters' daily wages were about two florins; and day laborers', one florin. Nails were eight to ten stivers (16 to 20 cents) per pound, (100 nails to the pound.) A dwelling house, built wholly of oak, even to the doors and window casings, was purchased for the minister at Rensselaerwyck for 350 guilders. —*O'Callaghan's New Netherlands.*

towns and villages of the Province, as far as the frontiers at Schenectady, then just rising from its ashes, was of the same Belgic type that prevailed more or less for a century later. In the construction of these a partiality for brick was manifest,

> "With terraced gable, sharp steep roof,
> Walls iron-lettered, turret vanes,
> Sashes of lead, and diamond panes."

Albany was the principal centre of manufacture of that material. But bricks continued to be imported for some years later. A house was standing about thirty years ago, on the corner of North and Pearl streets, known as the Lydius House, which was erected in 1725, with bricks brought from Holland. The clay banks in Lydius street for a long period supplied numerous brick-yards in the vicinity with material for their manufacture. In 1728, Luykas Hooghkerck obtained from the City Council of Albany, on petition, a lease of two acres of land "upon ye gallohill, adjoining and near a small run of water, for ye term of fifty years, for ye use of a Brick-kiln and plain, provided he and his heirs and assigns pay therefor to the Freemen of the City 12*s.* yearly and every year, and he doth not stop the Roads and passes, etc." Abraham Vasburgh and Wilhelmus V. D. Bergh, with Nicholas Grosbeek, were granted leases of similar lots, near the same place, for a like purpose, for twenty-five and six years respectively, and on the same occasion. The city also in March, 1732–33, granted Lambert Radley and Jonathan Broocks an acre on gallohill, west of Hooghkerck's brick-kiln, for twenty years; for the use of which, and of the run of water and liberty to use the clay, they were to pay the Corporation 20*s.*; "and in case a war happen to break out during said term of years, so that they should be molested in their possession of the same, then, during such time of hindrance or molestation, they shall pay no acknowledgment for the same." The hostilities apprehended were from their New England neighbors. Jan Masse had also, in 1736, a brick-kiln in the western part of the city, south of Foxe's Creek; and Wynant Van der Bergh, on the north side of the same creek.[1]

Brick making in Albany.

The hills around the city, which anciently furnished the clay for these works, have long since been leveled at great expense, and the fine improvements of that ancient town cover the low grounds then occupied by the "plains" of the brickmakers and numerous tan-pits, supplied with water from several considerable runs or creeks now converted into

(1) City Records, in Munsell's Annals of Albany.

sewers. The manufacture has not ceased to be an important industry in Albany.[1]

On Manhattan there were also, at this period, several brick-making and coarse earthen-ware establishments. In the year 1742, Joseph Paulding leased a part of the commons, now the City Park, where he established a large brick-yard. Outside the palisades, just north of the commons, there were, a few years later, two or three pot-baker's establishments, near the Collect or Fresh-water Pond. The city at this time, according to Kalm, rivaled Boston and Philadelphia in its buildings, which were mostly brick of several stories high, the newer ones being no longer built with the gable-end to the street. Tiles, or shingles of white fir, were the coverings of the roof. The present post-office building was built in 1729. The houses of Albany at that time, he says, conformed much to the old style, but the houses were very neat. Neatness everywhere characterized the Dutch population. Of many of the houses, the gable-ends facing the street were of bricks, while the other walls were of wood, —a peculiarity which he also noticed in New Jersey. The covering was chiefly white-pine shingles. The clay of the neighborhood was not considered suitable for the manufacture of tiles. The city, on the other hand, was a great market for pine shingles, from the extensive white-pine plains north of it. Neither in that town, nor elsewhere in North America, had the writer ever seen houses covered with "lime or mortar."

The letters of Gawen Lawrie and other proprietaries and settlers of East New Jersey, in 1684, represent the poorer class of houses to have been quite primitive in style, viz. : of trees split and set up, one end in the ground and the other nailed to the "rising." They were covered with shingles, and plastered within. Barns were built in the same way. The cost was about £5 each. Some used pantiles, in the Dutch manner. "We have good brick-earth," writes Lawrie, "and stone for building, at Amboy and elsewhere. The country farm-houses they build very cheap; a carpenter, with a man's own servants, builds the house; they have all materials for nothing, save nails. The chimneys are stone." Bricks were used by some. A quaint and enthusiastic description of West Jersey, some thirteen years later, speaks of "stately brick houses" at Salem and Burlington," especially at the last-named place, which was the Seat of Government, and had "many fair and great brick houses on the outside of the town, which the gentry have built there for their country houses, besides the great and stately palace of John

Early Buildings in New Jersey.

(1) For fifteen years preceding 1847, about sixteen millions of Bricks were annually made at Albany. The price that year fell to $2.50 per thousand, and but half the quantity was made. The city now contains nine Brick-yards.

Tatem, Esq., which is pleasantly situated on the north side of the town."[1]

A Brick meeting house was built at Salem, by the Friends, in the year 1700, at a cost of £415 13*s*. It does not appear whether the bricks were imported or not. Thirteen years later, a large brick house was built at Haddonfield, of bricks brought from England by Elizabeth Haddon, whose father had purchased four hundred acres of land at that place in 1710, and sent his daughter, at the age of twenty, to make a settlement, which took his name.

Free-stone was first quarried at Newark, in 1721, and was thenceforward an increasingly valuable article of export to neighboring provinces.

First Dwellings in Pennsylvania.

The first dwellings erected by the Swedes in Pennsylvania and Delaware, were of a somewhat rude description, chiefly of wood, one story in height, with a single room, the doors being very low, and the windows merely small apertures in the wall. They were of the kind common in Northern Europe, for a century or two previous. On Tinicum Island, Christina Creek, and in other places, they built strong, rude forts of hemlock and hickory logs, filled in between with sand and stone, and some churches also of wood and stone. They built one of brick at Wicaco, in the year 1700. This antiquated little house still remains, and was considered a fine building when it was erected. Better dwellings were erected by their neighbors and successors, the Dutch, —who brought bricks from New Netherlands for the purpose. At New Amstel (New Castle), bricks were made in 1656,—as appears by a petition of Jacobus Crabbe to the Court at that place, respecting a plantation "near the corner where brick and stones are made and baked."[2]

Ferris states that he had seen in his youth, at New Castle, the house in which Governor Lovelace entertained George Fox, in 1672, built of brick and hewn timber, the mortar and cement, made of oyster-shell lime,—lime-stone not having been yet discovered. It was standing about the beginning of this century.

The house at Chester, or Upland, in which was held the first Assembly in the Province after the landing of Penn, was also of brick.

Although the first English settlers in the Province were compelled to find temporary lodgings under the friendly shelter of forest trees and in caves, or huts erected for present defense, they were, very shortly after the laying out of the future Capital, in possession of some substantial brick edifices.[3] In the centre of the city plot, "far out Market street, at

(1) G. Thomas' Hist. Penna. and West New Jersey.

(2) Hazard's Annals of Penna., 209.

(3) John Key, the first child born of English parents in Philadelphia, was born in a cave, in the bank, near Race street.

Centre-square," embosomed in the forest, was erected, in 1684, the first Friend's meeting-house, "a large, plain brick building." William Penn's instructions to his agent in that year were, to build principally of Bricks, for which end he had sent a person qualified to make them. Whether the honored founder intended the city to conform in material, as it has been supposed to do in design, to the ancient Babylon, or not, his injunction appears to have been duly followed by its builders to the present time. Dean Prideaux, remarking on his plan of the Assyrian Capital, says, "Much according to this model hath William Penn, the Quaker, laid out the ground for his city of Philadelphia, in Pennsylvania; and were it all built according to the design, it would be the fairest and best city in all America, and not much behind any other in the whole world."

Penn's own Manor-house of Pennsbury, a few miles above Bristol, in Bucks County, which, he says, cost him over £5,000, was built of bricks, —the materials having been principally brought from England. Besides this palatial edifice, many other private houses, of a superior class for that day, were built of the same material within a few years after the Landing.

Robert Turner, whose "great and famous house," on the north-east corner of Front and Arch streets, is mentioned by Gabriel Thomas, in 1698, facing the stone arch which gave the name to the street, built two three-story brick houses, and several smaller ones, as early as 1685. Near Front and Green, was a large brick house of Daniel Pegg. This pleasant residence, surrounded by meadows watered by Pegg's Run, and also the fine brick edifice of Thomas Fairman, opposite the Treaty tree at Shackamaxon, built in 1702, and occupied by several Governors of the Province, were each desired by William Penn as a town residence, for which their size and tasteful surroundings adapted them.

Surpassing all in size and in rural embellishments, was the splendid mansion of Edward Shippen, the first Mayor of the City, built about the same time, on Second, between Spruce street and Dock street, or creek, as it then was, toward which his lawns sloped, with a greenness to which that part of the city has long been a stranger.

The old State House, or Independence Hall, was commenced in 1731, and, with its historic associations, still remains as a favorable specimen of early Provincial architecture. Clay, sand, gravel, and other materials were abundant within the city, and fuel abounded on the banks of the Delaware and Schuylkill.

It is probable that some of the early houses, of which the town contained, in 1684, over three hundred, were built of imported bricks. But Pastorius, who founded Germantown in the following year, in his posthumous history of "the lately-discovered Province of Pennsylvania, situated on the frontiers of the Western World," records that, when he wrote,

they had a sufficient number of mills, brick-kilns, and tile-ovens. The English, at Frankfort, had also a pottery in operation. Four-fifths of the buildings in Philadelphia, at the close of the last century, were built of brick. The city had, at that early day, a high reputation for the manufacture of that article.[1] In many of the older country towns, the first houses were of stone, to which brick succeeded in due time. In the newer ones, framed houses, with shingled roofs, were more common, after the log-cabin of the pioneer gave place to permanent habitations

Another branch of the fictile art was early established in Philadelphia. A card in Bradford's Mercury, in May, 1719, mentions "good, long Tayern Tobacco-pipes, sold at 4*s.* per gross, by the single gross, and 3*s.* for a larger quantity, by Richard Warden, Tobacco-pipe maker, living under the same roof with Philip Syng, goldsmith, near the market place; where, also, any that have occasion may have their pipes burnt for 8*d.* per gross." This is the earliest mention we have seen of that manufacture among the white inhabitants. Tobacco-pipes were made by the natives with great skill, of clay, wood, and stone, curiously wrought or carved with various figures.

Brick-making in Baltimore.

Baltimore, which of late years has produced superior bricks in large quantity, appears not to have made them in sufficient number for its own use for some years after its settlement. Charles Carrol, an original proprietor of lands now covered by the city, in 1754 erected, "at the Mount," buildings of bricks imported for the purpose. Two years before it had but four brick houses, and only twenty-five in all, the others very primitive in style. A pottery was erected in the town ten years after, by John Brown, from New Jersey, who had learned the business at Wilmington, Delaware. The town, at that date, contained about fifty houses. Thirty-two years after, it contained one thousand nine hundred, and was the fourth in the Union, having more than half the number of New York. This unparalleled increase in building, the elegance of the buildings at the Capital, Annapolis, and of Fredericktown, which was chiefly built of brick and stone, must have made Brick-making a considerable manufacture.

Wooden buildings predominated in the Carolinas until some years after

(1) The Bricks made in Philadelphia were mostly burnt in clamps, containing forty to fifty thousand, consuming about half a cord of wood per thousand, and employing a week in the burning. The method was described in the third volume of the Archives of Useful Knowledge. Before the discovery of sea-coal, the want of breeze or coal cinders between the strata of bricks, required more time and fuel than in England. In 1857, there were fifty Brickmaking establishments in Philadelphia, which produced, according to a careful estimate of one of the principal manufacturers, a total of one hundred millions of common Bricks, worth about seven hundred thousand dollars, in addition to about eight millions of fine pressed Bricks, worth $14 per thousand, or $112,000.

the Revolution. Twenty or thirty spacious brick houses, according to Dr. Ramsay, were built in and near the city of Charleston, about the beginning of the last century, by the more wealthy first settlers. As late as 1731, it was said, there was not a potter in the Province, nor any glass-maker. The clay for pottery was of a superior quality. The manufacture of potter's wares was commenced at Camden, about thirty years after, by an Englishman named Bartlam. After the year 1740, when a great fire laid in ashes a large number of the wooden buildings of the "Queen City of the South," brick and stone were more used than before.

Brick-making in the Carolinas.

As late as 1795, however, the Society formed to aid and instruct emigrants recommended the manufacture of bricks as a profitable industry. Their price was then nine dollars per thousand, and the supply fell short of the demand. About this time, Bartholomew Carroll introduced in Charleston a new description of houses, wholly of clay. "Seven houses thus built in Charleston," says Dr. Ramsay, "have hitherto answered very well, and they are as elegant, comfortable, and as free from moisture and all other untoward accidents as any brick houses, though they cost much less. They stood the hurricane of 1804, which exceeded anything of the kind which had taken place since the year 1752, yet the example has not been followed by a single citizen." Subsequently, in July, 1796, Henry Walker patented, in England, a similar method of erecting houses in one entire mass, even to the floors, stair-cases and roof, by applying fire by means of flues to the different parts of a clay house constructed on Carroll's plan. General Washington described Charleston, in 1791, as having a number of very good houses of brick and wood, but most of the latter, the whole number being about one thousand six hundred.

Newbern, the largest town in North Carolina, had, six years later, about four hundred houses, all of wood, except the palace built by Governor Tryon before the War, and then going to ruins, one church, the jail, a market-house, and two dwelling-houses, which were of brick.[1] Bricks

(1) This palatial edifice of Governor Tryon, of which a cut is given in Lossing's Pictorial Field Book of the Revolution, from the original drawings by the architect, John Hawks, Esq., in the possession of his grandson, Rev. Dr. F. L. Hawks, was considered the grandest structure in America. A grant of £25,000, and another of £50,000, was obtained from the Assembly, through the blandishments of Lady Tryon and her sister, Esther Wake. It was contracted for in January, 1767. The main building was to be of brick, eighty-seven feet front, fifty feet deep, and two stories high, with suitable buildings for offices, and was to be completed by October, 1770. The salary of the architect was to be £300 per annum, proclamation money. The interior was elegantly finished. The chimney breasts and cornices, etc., of several apartments were of white marble. Don Francisco de Miranda, who visited it in 1783, said it had no equal in South America. The people complained much of its cost.

were then coming into use, and were made of very good quality at Fayetteville, and sold for five to six dollars the thousand.

The manufacture of Bricks, coarse Tiles, and Potter's-ware were among the branches enumerated by Hamilton, in 1790, as having grown to be most considerable. The production of bricks, at least, appears to have been fully equal to the consumption. The only importations made were, probably, in the shape of ballast. There was a small annual export of bricks from that time forward. New Hampshire exported, in 1789, 129,000 to the West Indies, and the whole country, in 1790, 787,764, and 157 crates of yellow Queen's-ware, and 55 dozen of stone-ware. The exports of bricks in 1791 were 743,000, of which Massachusetts and New Hampshire were the largest exporters. The product, at six dollars per thousand, would exceed the value of bricks and lime together exported annually from 1827 to 1833, and probably went chiefly to the West Indies, which still receives a large part of our exported bricks. A duty of fifteen per cent. was laid on foreign bricks in 1794. A number of improvements in the manufacture were patented after 1790,—the first, by David Ridgway, in 1792, and the first machine for Brick-making, by George Hadfield, in 1800. Twenty-two labor-saving projects were offered before 1810.

STATE HISTORICAL SOCIETY OF WISCONSIN 1846

CHAPTER X.

GLASS-WORKS IN THE COLONIES.

THE production of Glass, combining as it does in a high degree, both elegance and utility, is, to a new country, an important step in the line of progress. The art is a very ancient one, having ministered to the luxury of the Sidonians, its first manufacturers, and, as the collections in the British Museum prove, it was nearly perfected by the Egyptians over three thousand years ago. Conspicuously encouraged by the Venetians as a medieval art, and received with nearly equal favor in France, it passed into England in 1557. In 1623, when the settlement of Massachusetts was taking place, Sir R. Mansell received the first patent recorded in England for the manufacture, and substituted the use of mineral coal for wood fuel. The monopoly, at the same time accorded him, of importing the fine Venetian drinking-glasses, is an evidence that the finer articles of Glass-ware were not yet made there.

Glass-making, as has already been stated, was one of the earliest manufacturing attempts in this country. Artizans were sent to Virginia, for that purpose, in 1609, and an essay was made in the business immediately after. The advantages of the country for a profitable introduction of the art, were probably inferred from the abundance of fuel existing for the supply of the furnaces. Wood was, at that time, becoming scarce in England, and the supplies of sea coal were as yet but limited; while, in America, the soil was encumbered with forests, and the same labor that prepared it for cultivation, could supply abundant fuel, with pot or pearl ashes as material in the proposed manufacture. The net proceeds of the sale of those articles, it was said at a later period, reimbursed the expense of felling and burning the wood in the process of clearing the land for agricultural purposes.

First attempts, 1609.

The great cost of its importation, on acount of breakage, may be supposed to have been a further inducement to its domestic production. And still another circumstance, to say nothing of the extreme convenience of Glass-ware, appears to have invited the Virginia adventurers at least to make an early attempt at its production. This was the manufacture of

beads and other trinkets of Glass, which formed a considerable part of the currency in the early Indian trade, and were exchanged, at prices altogether beyond their intrinsic value, for furs, peltry, and even the lands of the natives. In 1621—twelve years after the first glass-house, as related in a previous chapter, was built in the woods, about a mile from the infant settlement of Jamestown, and an humble experiment made in the art—an effort was made to promote farther colonization, and the permanent good of the Colony. Wives were provided for the settlers, in order to give stability to the population by the formation of domestic ties. To promote so popular a measure, a roll or subscription was opened the following year to send others, and, at the same time, another was formed to raise funds for the erection of a glass-furnace, to make beads for the Indian trade. The subscribers to these rolls, or lists, were to participate in the proceeds of the sales of the articles. One Captain Norton, with some Italian workmen, was sent over to conduct the business of glass-making.[1] Other rolls, of a similar kind, were subscribed to. But the investment which proved most profitable to the adventurers, and by far the most useful and acceptableto the plantation, was that first named. The price of maids rose from one hundred and twenty to one hundred and fifty pounds of tobacco each, and the list was readily disposed of.

The cheapness of fuel and of a portion of the alkaline salts required, was probably found, by the first Glass-makers, to be more than counterbalanced by the greater price and scarcity of labor in the Colonies, the principal cost of Glass consisting of the labor employed in its production.

First Glass-works in Mass.

The first manufacture of Glass in Massachusetts has been stated to have been at the village of Germantown, in Braintree. Glass bottles alone were made there. The proprietors failed some years before the Revolution, and the house, having burned down, was never rebuilt.[2] The earliest Glass-works in New England to which we are able to assign a date, were commenced in Salem, Massachusetts, about 1639, in which year there "were granted to the glass-men severall acres of ground adjoyning to their howses," in Salem, for the purpose of promoting the manufacture of glass. The persons engaged in the undertaking were Ananias Concklin, Obadiah Holmes, and Lawrence Southwick, each of whom received two acres of land. The year following, John Concklin, of the same business, was allotted five acres more, bordering on the previous grants. In December, 1641, the General Court, for the encouragement of the enterprise, authorized the Town of Salem to lend the proprietors thirty pounds, which was to be deducted from the next town-rate, and the glass-men were to repay it, "if the work

(1) Stith's Hist. Virginia. (2) Mass. Hist. Col. vol. iii. 276.

succeeded, when they are able."[1] The works having been neglected for three years, the Concklins, in 1645, received permission from the Court to form a new company to carry on the business.[2] Glass was, for a considerable time afterward manufactured at that place, which is mentioned in the Records, in 1661, as the Glass House Field. In this, as in the one previously mentioned, and those which succeeded for many years, it is probable that nothing more was attempted than the manufacture of bottles and other coarse descriptions of Glass. The most valuable improvements made in the manufacture in Europe took place at a later date. The article had then received scarcely a moiety of its numerous adaptations to the purposes of domestic convenience, and of use in the various arts. The great increase in New England population and prosperity at the date last mentioned, and the improvements already taking place in the construction of the dwellings, would have rendered the domestic manufacture of window-glass a special boon to the country. But its fabrication is altogether a more difficult and expensive matter than that of bottles and the coarser household wares. Hence we find that the first dwelling-houses of the Colonists, in all parts of the country, were very generally—with the exception of those of some the wealthier emigrants—destitute of glass windows. Indeed, although window-glass is believed to have been made at the first English Glass-factory, glazed windows, mirrors, and utensils of glass were by no means common there fifty years before the settlement of Massachusetts. A Glass-manufactory was set up in Scotland, in 1610, and the importation of glass was prohibited ten years after. Yet, in 1661, the country houses in that part of the kingdom were still unglazed, and the royal palaces were only partially supplied with glass. Window-glass was not made in France until four years later, when the art was brought from Venice by French artizans, one of whose descendants, Thenard, afterward discovered the art of casting plate-glass. The Duke of Buckingham, in England, about the same time, by the introduction of Venetian workmen, greatly improved the manufacture of Flint-glass; for which, however, a patent was granted in 1662, followed, in 1679, by one for Normandy window-glass. Plate-glass was first made in England, at Lambeth, in 1673. While the production and use of window-glass were thus limited in England, in the beginning of the 17th century, it cannot surprise us to find a prominent member of the Plymouth Colony, in 1621, counseling his friends in England to "bring paper and linseed oil for your windows, with cotton-yarne for your lamps." Mr. Higginson, writing from Salem, about eight years after, advises emigrants to bring *glass* for their windows, which is regarded as an evidence of improvement in domestic comforts. Although glass windows were not

(1) Felt's Annals of Salem. (2) Colonial Records, vol. i. 344; ii. 137.

deemed indispensable, and in some places were not attainable a century after, another ten years, which saw our glass-men at work in Salem, had effected considerable changes in the ability, if not in the tastes of the people. Their houses were already improved in structure and accommodations, insomuch that strangers were urged to come and share their plenty, as they had "spare rooms or good houses to entertain them in, and they had built faire townes of the land's own materials, and faire ships, too, some of which are here to be seen in the Thames." The requirements of twenty thousand people, supposed to have arrived in New England up to this time, many of them possessed of means, and the advanced ability of all, would not long, we may suppose, tolerate so dim a substitute as greased paper for windows, or the still more comfortless expedient of a lattice or wicker. We find, therefore, the houses of the more opulent a few years later, to contain beneath their deeply-projecting roofs, according to the style of the days of Elizabeth, two ample windows in each story, with white or stained rhombic-shaped glass, set in leaden frames, opening on hinges, while the two sharp gables received each another, admitting abundant light to fitting accommodations within. The windows in the humbler dwellings of the first settlers were exceedingly diminutive compared with the size they have since attained. The diamond-shaped panes were usually three to four inches in length, and the windows two and a half to three feet long, by one and a half to two feet wide, sometimes made in halves opening inwardly or outwardly.

The General Court of Massachusetts, in December, 1752, passed an Act granting Isaac C. Winslow, and others, the sole privilege of making Glass in the province.

Among the early settlers on Manhattan was a Glass-maker, Jan Smeedes, who is supposed to have been about the first to receive allotments of land on the present South William street, between Wall and Pearl. He resided on the east side, just north of Hanover Square, where he owned considerable property, and probably carried on the business of making Glass. The street anciently bore, within the above limits, the name of "the Glass-maker's street," and afterward Smee street (Smith street), from its original occupant. On De Witt's Farm map of the City, an estate which, about the year 1732, belonged to Sir Peter Warren, situated between Eighth and Eleventh avenues, and north of Thirty-fourth street, was called the "Glass House Farm," indicating the site of another establishment of the kind.

Glass-making in New York.

The only other notice of Glass-making during the seventeenth century that we have met with, is of one or two attempts made in Pennsylvania, under the auspices of the proprietary and the Free Society of Traders. In a letter to the Society, in 1683, he alludes to their

In Philadelphia.

tannery, saw-mill, and glass-house,—the last two "conveniently posted for water-carriage." The mill was on Chester Creek, in Delaware County, and proved highly useful. We are unable to say where the glass-house was; but it proved unsuccessful, as did several other efforts of Penn to introduce manufactures. A Glass-house and Pottery was established at Frankfort, near Philadelphia, soon after, by the English Friends who settled there.[1]

Notwithstanding these attempts in different quarters to manufacture Glass, and the existence of good material, from which the purest glass is now made, the business was not as early or fully developed as some others. No great progress was made before the Revolution.

In Carolina, in 1731, there was neither potter nor glazier of any kind, and no earthenware but what came from England, and a potter's establishment and Glass-house, it was thought, would certainly succeed.[2]

A Glass-manufactory was very early established in New Jersey, about two and a half miles from Allowaystown, in Salem County. It was known as Wistar's Glass-works, and, about the middle of the last century, employed quite a number of German workmen, who settled at Freasburgh, in the vicinity. The great scarcity of skilled mechanics, and the temptations to artizans to abandon their trades to become agriculturists and land-owners, stood in the way of the introduction of such branches, and created constant difficulties when attempted. In January, 1767, Sir Henry Moore, Governor of New York, writing to the Lords of Trade, in obedience to their Circular letter of August, in the preceding year, requiring the Governors of the several Provinces to give a particular account of all manufactures that had been set up in their respective governments, dwells on this tendency of labor to desert the factory for the field as an antidote to all successful attempts at manufacture in the dependencies. Even servants, imported from Europe for different trades, so soon as their indentures expired, quit their occupations, and obtained a small piece of land. The satisfaction of being landholders, prompted them to endure every privation for a few years, in preference to a comfortable subsistence easily attainable in their trades. He informs their Lord-

(1) Pastorius, in Mem. Hist. Soc. Pa.—The author says, that just before he laid out the site of Germantown, in October, 1685, he built in Philadelphia a small house, thirty feet by fifteen, the *windows* of which, for want of glass, were made of *oiled paper*. Over the door he placed the following inscription: *Parva domus sed amica bonis, procul esto profanis*, at which the Governor, on visiting him, laughed heartily, and encouraged him to build more.

(2) At this date it was announced in the Pennsylvania Gazette, that Edward Bradley, "near the Post Office, in Front street, Philadelphia," *silvered* Looking-Glasses, and sold window-glass by the box. An Iron mill for grinding clay, and other appliances of the Potter's art were offered for sale also.

ships that the master of a Glass-house, set up in the Province a few years ago, then a bankrupt, assured him that his ruin was attributable to no other cause than being deserted in that manner by his workmen which he had imported at great expense. Many others had suffered equally with himself from the same cause.[1]

In May, of the same year, Mr. Townsend introduced in the British Parliament his scheme for drawing "a revenue from the Colonies, without giving them offence," which the Stamp Act had failed to do. His bill laid sundry duties upon Glass, Painters' Colors, Teas, Paper, Pasteboard, and Paper-hangings imported into the Colonies, the revenue from which was to be appropriated to the support of the Civil Government in the Colonies. The bill, which passed the seals in June, provoked, as in the former case, retaliative measures in the several Provinces, in which Boston set the example, in town meeting, in October. The inseparability of representation and taxation was strongly enunciated. Retrenchment in the use of all superfluities was again resolved upon; and to give efficacy to the non-importation agreement, it was determined, "by all prudent ways and means, to encourage the manufactures of British America, and more especially those of this Province." The articles Glass and Paper were particularly designated as deserving of domestic encouragement.

After a tardy and reluctant assent of most of the Colonies to this severe expedient, and ineffectual efforts of the ministry to enforce its revenue policy, the decline in the amount of exports,—especially to the Northern Provinces,—and the manufacturing spirit aroused in America, forced the Premier, in March, 1770, fourteen months after the adoption of the non-importation agreements, to bring in a bill for the repeal of the duties on glass, paints, painters' colors, paper, and pasteboard, retaining only that on tea, and restoring the drawbacks allowed on the exportation of China-ware to the Colonies, which had been repealed by the Act of 1767. It passed the House in April, but the assertion of the right to bind the Colonies in all cases, made at the same time, admonished the people not to relax their efforts to foster their own infant manufactures.

Steigel's Flint Glass Works, near Lancaster, Penn.

Previous to its repeal, a Flint Glass manufactory was established at much expense, and on a larger scale than any before attempted in the Colonies, by an enterprising and wealthy German gentleman of Philadelphia. The attempt, it was hoped, would prove a saving to the Province of thirty thousand pounds annually. The proprietor was a German baron, Henry William Steigel, who, in 1762, laid out the village of Manheim, about eleven miles northwest of the borough of Lancaster, near which he erected several iron furnaces

(1) Doc. Hist. of New York, vol. i. 733.

and the Glass Works. The latter was in operation in the beginning of the year 1770. Mr. David Rittenhouse, in a letter to Mr. Barton, on 4th February in that year, speaks of the little curiosity lately introduced by Dr. Franklin from Germany, and called by him the pulse glass, and his intention, when he next visited Lancaster, to have some of them and other things he wanted made there. The quality and workmanship of the glass made at that place seem to have been of a good description, as appears from another letter, written in the following summer, acknowledging the receipt of a barometer tube made at the factory. "I am obliged to you for the glass tube; it will make a pretty barometer, though the bore is somewhat too small. I have compared it with an English tube, and do not think the preference can with any reason be given to the latter."[1]

But the enterprise did not prove successful. The owner, who possessed both artistic skill and means, was somewhat visionary and ostentatious in his projects. He erected one or two castles in the country, mounted with cannon, whose discharge announced his arrival, and summoned his workmen from the furnace and the foundery in baronial style, to attend, with music and other service, on the guests whom he entertained in feudal magnificence at the castle. The war cut off his receipt of funds from Europe; embarrassment ensued, and the Glass Works fell through; while his iron works passed into the hands of Mr. Coleman, by whom and his successors they were successfully managed.

Other efforts were at the same time made in Pennsylvania to promote native manufactures. There were three potteries in Lancaster in 1786. A manufactory of China-ware was commenced in Prime street, near the present Navy Yard in Philadelphia, about the same time the Glass Works were established. A saving of fifteen thousand pounds, it was thought, might be yearly effected by the manufacture of that article. But the measure was not permanently successful.[2] There were three manufacturers of common pottery in the borough of Lancaster in 1786.

Notwithstanding attempts made in several quarters to supply the in-

(1) Barton's Memoirs of Rittenhouse, p. 206.

(2) In Franklin & Hall's Penna. Gazette, for January, 1772, is an Advertisement of "The Glass Facture, Northern Liberties, next door to the sign of the Marquis of Granby, in Market street, where the highest price is given for broken flint-glass and alkaline salts." Whether this was another manufactory, or an agency for the Lancaster factory, we are unable to say. In the same number, the proprietors of the Southwark China Factory advertise for broken flint glass, and for contracts for five to fifty wagon-loads, whole flint stone, to be delivered at the manufactory by 1st May. The greatest encouragement was also promised to all painters either in blue or enamel, by which it would appear that the decorative branch was attempted in connection with the manufacture.

creasing demand for this perishable article, which had then become one of universal necessity, Glass was exceedingly scarce during the war of Independence. The voluntary disuse of English Glass had now become a compulsory one, and it was equally impracticable to obtain the article from other countries.[1] Lord Sheffield, writing in the year of the peace, remarks on this manufacture: "There is no article of Glass in any part of Europe but the British which will answer in the American market. There are Glass Works in Pennsylvania. Bad glass is made in New Jersey for windows, but there is not any quantity of glass made in America as yet except bottles. Hitherto these manufactures have been carried on there by German workmen; a considerable Glass manufacture at Boston failed several years ago. The want of flint in America will be always a great disadvantage in the manufacture of this article. There has been no earth yet discovered in America proper for making the pots used in the manufacture of glass. What has hitherto been used in America, at least in the Northern Provinces, for that purpose, has been imported from Great Britain."

The New Jersey window-glass manufactory above referred to, was probably at Gloucester, where a Glass-house existed a few years later; and the factory spoken of at Boston we suppose to have been the one at Braintree, before mentioned, a few miles from Boston. His lordship's statement, as to the absence of silicious material for the manufacture of Flint Glass in America, arose from the fact that before the war no attempt was made to discover it, because abundant quantities of gun-flints could be imported at a very low price. Considerable quantities of flint were also imbedded in the chalk which was brought in ballast from England, and the kind of glass attempted required little pure flint. Congress, during the war, ordered the commissioners in France and Spain to purchase large quantities of gun-flints, and to send also persons acquainted with the manufacture of those articles. Hence, the British Ministry also labored under the impression that the United States was destitute of flint rocks, and, in the second war, caused vessels ballasted with chalk to discharge the same, lest "flint stones" should be found among it. But in addition to vast quantities of silicious sand, feldspar, quartz, and other minerals, there exist ample supplies of pure *silex*, in nearly every State. Large masses of silicious rock exist in Northampton and Berks counties, Pennsylvania, and greater or less quantities stratified with carbonate of lime in various parts of the country, while the white sand plains

(1) In Groton, Massachusetts, glass could not, in 1779, be purchased in private stores to repair the School and Meeting-house, and the Town was forced to petition the Court for an appropriation from the public depository.—*Felt's Annals.*

and pine forests of New Jersey sustain immense manufactories of green glass-ware.

In consequence of the increased attention given to the subject of domestic manufactures about the year 1786, when the evils of inordinate importations from abroad were seen and felt, several further attempts were made to produce Glass, of which the manufacture had as yet been of a trifling amount. In April of the following year, specimens of white glass, made at a Glass-house lately erected near Albany in New York, were presented to the American Philosophical Society. Mr. Elkanah Watson, of Revolutionary memory, in his Reminiscences of Albany in 1788, says it was erected by John De Neufville, a former correspondent and a resident of Amsterdam. He was the negotiator of the treaty between Holland and the American Congress, which produced the war between England and Holland in 1781. Having sacrificed, in his attachment to the cause of American Independence, an hereditary fortune of a half million sterling, with which he had commenced business in Amsterdam, living in the highest affluence and splendor, he invested the fragment of his estate in Glass-works eight miles west of Albany. Mr. Watson found him there in solitary seclusion, the tenant of a miserable log cabin, furnished with a single deal table and two common arm-chairs, destitute of the ordinary comforts of life. The enterprise, like that of Mr. Steigel in Pennsylvania, was one of the numerous instances in which enterprising foreigners, ignorant of the requirements of a new country, and of the best mode of adapting their efforts to the circumstances of the times and place, were tempted by flattering prospects to their individual ruin.

Glass Works in New York.

In January, 1788, the proprietors of the Glass Factory, which was situated at Dowesborough, in the midst of a well-wooded pine forest, and then owned in part by Leonard De Neufville, Jan Heefke, and Ferdinand Wolfa, appealed to the patriotism of the State to sustain their undertaking. They represent the State to be annually drained of thirty thousand pounds for glass, which they were able to manufacture of any size, superior to English glass. In 1793, the Legislature of New York voted a loan of three thousand pounds for eight years to the proprietors, three years without interest, and five years at five per cent. The owners at this time were McClallen, McGregor & Co., of whom James Caldwell, the proprietor of extensive tobacco and other mills in the neighborhood, and Christopher Battemar constituted the *Co.* They in that year offered a reward of fifty dollars for the discovery of a bank of sand suitable for their use within ten miles of the Works. Having, in 1796, formed the design of consolidating and extending their operations, the village of Hamilton, ten miles west of Albany, was laid out as a manufacturing

town, and so named in compliment to the distinguished citizen of that State, Alexander Hamilton, who was an active promoter of that and other efforts to advance manufactures. In the spring of the following year, the association was incorporated as "The Hamilton Manufacturing Company," by the Assembly of the State, and the company and its workmen were exempted from taxes for five years. The proprietors were at this time Jeremias Van Rensselaer, John Sanders, Abraham Ten Eyck, Elkanah Watson, Frederick A. De Zeng, K. K. Van Rensselaer, Thomas and Samuel Mather, Douw Fonda, and Walter Cochran. The establishment at Hamilton now presented an example of the highest degree of enterprise hitherto exhibited in the country in connection with manufactures. They had two Glass-houses, a saw mill, pounding mill, and cross-cut mill. They employed three large furnaces, and about thirteen glass-blowers, and made on an average twenty thousand feet of glass per month, besides bottles and flint glass. They substituted kelp for pearl-ash in the manufacture. Their Glass was in good repute, and the business was carried on for some time with much activity. It is said to have been suspended in 1815 for the want of fuel.[1]

In Boston.

About the same time that this manufactory was established in New York, a spirited effort was made to recommence the business in Boston. A Company was formed in that city, and, in July, 1787, received a charter from the Legislature of the State, with the exclusive right of manufacturing Glass for fifteen years. A penalty of £500 was attached to any infringement of their right by making glass in the town, to be levied for each offense. The capital stock was exempted from taxes for five years, and the workmen employed, from all military duties. A pyramidal factory of brick was erected on a large scale at the foot of Essex street. Being found ill adapted to the purpose, it was afterward taken down, and a wooden one, lined with brick, differently constructed, was put up in its place. Its dimensions were 100 feet in length by 60 in width. On account of difficulties in procuring workmen, and other embarrassments, operations were not fully commenced until November, 1792. The corporation commenced with the manufacture of crown window-glass, which they produced of a quality equal or superior to any imported. Materials were found to be abundant; and some six years later, they produced about 900 sheets per week, worth $1.75 per sheet, or $76,000 per annum. Some hints to manufacturers, communicated to the first volume of the American Museum, the same year that the Glass Works in Boston were commenced by Mark Leavenworth of Connecticut, state that labor was twelve to

(1) Munsell's Annals of Albany. Morse's Univ. Geog.

twenty per cent. higher in Connecticut than in England. He conceived it to be a great error in the glass-makers to attempt the production of crown window-glass, which was the most difficult of all, and only understood by a few in Europe. It could, moreover, be purchased in his State for a little more than in Bristol, while other kinds were double the European price. A box of window-glass worth three or four pounds paid but 3*s.* or 3*s.* 4*d.* freight, and there was little loss by breakage compared with other kinds. As many quart bottles as would amount to £4, would cost in freight fifteen or twenty dollars. The expense of making the latter description of glass was also much less, and workmen more easily obtained. All descriptions of white glass, as decanters, tumblers, chandeliers, sconces, phials, and wine glasses, paid a freight beyond all proportion greater than window-glass, and were more liable to fracture in the transportation, and any of them could be attempted with better prospect of success than it. Junk bottles, moreover, were a desirable manufacture for the exportation of their cider to the West Indies and Southern States, where it was more highly esteemed than British cider. They could be made, it was probable, for 2*s.* 4*d.* (Connecticut currency) per dozen; their cost in Bristol was 1*s.* 4*d.* sterling per dozen, the excise duty, though drawn back on exportation, increasing the cost. The want of a sufficiency of black bottles was represented by Tench Coxe, Governor Bowdoin, and others, at this time, as obstructing the manufacture of malt liquors for exportation. A Glass-house was in operation in Hartford, Connecticut, a few years after.

In Virginia.

There was also a manufactory of Glass at Alexandria, in Virginia, which, according to M. De Warville, who visited the State in the autumn of 1788, exported, the previous year, glass to the amount of ten thousand pounds, and employed five hundred hands. In the work by that writer and M. Claviere, on the Commerce of America with Europe, the importance of the glass manufacture to these States was strongly insisted upon, as a means of clearing the wood from the soil, which at the same time supplied cheap materials in the process. The discouragement of such manufactures in France was regarded as of national importance, on account of the scarcity of fuel, in which America possessed advantages in her forests, and England,—whose glass, with the exception of bottle glass, was superior to their own,—in the fossil wealth of her coal mines.

The General Government, at its outset under the present Constitution, in 1789, manifested a disposition to give special encouragement to certain branches of manufacture, by the imposition of higher duties than on others. In adjusting the tariff, therefore, in July of that year, window-glass was one of the objects thus discriminated. On motion of Mr. Carroll, of Maryland, who stated that a manufactory of glass had been suc-

cessfully commenced in his State, a duty of ten per cent. ad valorem was laid on window and other glass, with the exception of black quart bottles imported from foreign countries. The Legislature of Maryland had previously encouraged the manufacture of glass in that State by a considerable loan. The works were established at Tuscarora Creek, four miles above Fredericktown, and were known as the Etna Glass Works. Like most of the glass-factories heretofore established, it was the property of an ingenious and enterprising German, John Frederick Amelung. It was equal to any in the country. The manufacture of window-glass was first commenced west of the Alleghanies, we believe, by Albert Gallatin, Mr. Nicholson, and the Messrs. Kramers, Germans, at New Geneva, in Fayette County, Pennsylvania, where Mr. Gallatin purchased lands in 1785, and named the place after his native city in Switzerland. The works were on a large scale.

In Pittsburg.

The first glass-factory in Pittsburg, which has since acquired so much eminence in the manufacture, was not commenced until about the year 1795. In January, 1784, the first sale of lots was made on the present site of the city by the Proprietaries of the Manor, John Penn, Jr., and John Penn, to Isaac Craig and Stephen Bayard. The laying out of the town was finished in June. In 1795, a small window-glass manufactory had been set up and was in operation, having one eight-pot furnace. It was situated on the west side of the Monongahela, at "Scott's," now called Glass-house Ripple. Wood fuel was employed, and three boxes were made at a blowing. But Pittsburg is chiefly indebted for this valuable branch of its industry to the enterprise and perseverence of Gen'l James O'Hara, who, with Mr. Craig, made preparations the following year for the manufacture, and employed Mr. Peter Wm. Eichbaum, of Philadelphia, to erect the works.

The first furnace of the same capacity as the one above mentioned, was below Jones' Ferry, nearly opposite the Point, where other glass-houses now stand. Green glass was made at this factory, which went into operation in 1797. A memorandum was found among Gen'l O'Hara's papers, after his death, to this effect: "To-day we made the first bottle at the cost of thirty thousand dollars." Flint-glass and window-glass were soon after added to the manufactures, and the proprietor and others were induced by his example to engage in the business, which soon became a principal industry in that place. The abundance of coal, which was mined at the very doors of the furnaces, gave it unequaled advantages, which were increased by the facilities for obtaining other materials by water, either from above or below the town.

The substitution of soda for potash in the Glass manufacture, has more recently much reduced the cost of manufacture and increased the consumption of that article.

CHAPTER XI

BREWING AND THE MANUFACTURE OF BEER.

WINE and Beer were among the early products of industry in the colonial period of our history. At the time of the settlement of the American Colonies, tea, coffee, and chocolate were almost unknown in England, their place being supplied by fermented liquors. From the earliest Anglo-Saxon times, whence we have probably derived the names of our malt liquors, Ale and Beer, or Wine, had been the principal beverages in England, as Mead had been with the ancient Britons and the Irish. According to an ancient Saxon dialogue, wine was with them the drink of the "elders and the wise," while the common people drank "ale if they had it, water if they had it not." The brewer of bad ale was by them consigned to the ducking-chair or mulcted for his neglect. Nearer the times of which we write, a quart of Beer and a quart of wine always formed a part of the breakfast of my lord and lady of Northumberland. Ale and Beer were first made without hops, which were not raised in England until about 1524. An old writer says:

> *Hops*, reformation, bays, and beer,
> Came into England all in one year

The price of Beer in the thirteenth century was regulated according to that of corn and wine, and its cheapness in the sixteenth favored an enormous consumption. The extent may be inferred from the fact that it was then seldom absent on any occasion, from the courtly banquet to the humble repast of the cottager. No less than twenty-three thousand gallons were drunk at a single entertainment given to Queen Elizabeth at Kenilworth. English beer was reputed to be the best in Europe. It was brewed in March, and by persons of consequence was not used until a year old. The monasteries in early times brewed the best ale, as they made the best wine. Even the halls of science were not less celebrated for their ale than for their learning. As late as the year 1748, when in England and America tea began to displace the use of malt liquors, the laureate Warton, in his Ode to Oxford Ale, laments the declining popularity of a beverage which he is not alone in representing to be the salvation of the British nation.

Thus initiated, the brewery became an early requisite with our ancestors in America. The Court of Assistants, in 1629, were not unmindful of the hereditary tastes and habits of the emigrants to Massachusetts Bay, who could not readily forego their accustomed beverage. Among the outfits to New England, in that year, in addition to four hundred-weight of hops, were forty-five tuns of Beer, to go in the *Talbot*, provided she had one hundred passengers and eighty-five mariners. Soon after, in the *Lyons Whelp*, were sent thirty quarters of malt, at a cost of £25 15*s*. Less generous beverages, however, appear to have fallen to the lot of their predecessors at Plymouth, where, in 1623, the best they had to offer their friends lately arrived from England was "a cup of faire spring water." But if there were none among them who had

"Learned the noble secret how to brew,"

they were not without expedients, and tradition says they were accustomed to sing with commendable fortitude,

"If barley be wanting to make into malt,
We must be content, and think it no fault,
For we can make liquor to sweeten our lips,
Of pumpkins, and parsnips, and walnut-tree chips.'"[1]

John Jenny, who came to Plymouth in 1623, was a brewer by trade. He has been elsewhere mentioned as the proprietor of a corn mill, and was an enterprising person in other pursuits, but we have seen no evidence that he ever followed the business of Brewing at Plymouth. The early hardships of their first settlement compelled the Pilgrims to forego all but the most needful provisions for comfort.

The business appears, however, to have been commenced soon after the settlement of Boston. In November 1637, the General Court, for the protection of common brewers, who seem already to have constituted a trade there, ordered that "No person shall brewe any beare, or malt, or other drinke, or sell in gross or by retaile, but only such as shall be licensed by this Courte, on paine of £100; and whereas Capt. Sedgwick hath before this time set up a brewe-house at his greate charge, and very comodious for this part of of the countrey, hee is freely licensed to brewe beare to sell according to the size before licensed dureing the pleasure of the Courte." The "size" was before ordered to be not stronger than could be sold at eight shillings the barrel, under penalty of £20. This seems to be the earliest mention of a brew-house in the Colonies. Ten years later, however, they had six public brew-houses in Virginia

First Brewery in the Colonies.

(1) The Forefathers' Song.

Among the trades in New England, at the same date, mentioned as having "fallen into their ranks and places to their great advantage," are "brewers, besides divers sorts of shopkeepers, and some who have a mystery beyond others, as have the vintners."[1] In 1641, John Appleton, one of the first settlers at Watertown, Massachusetts, who was frequently elected a representative to the General Court, and was distinguished by the respectable title of "Mr.," received permission to set up a malt-house in that place. He is said also to have been a cultivator of hops. Samuel Livermore followed the same business there in 1667. Many years elapsed, in some parts of the country, before barley was raised in sufficient quantity for the production of malt and Beer, and a considerable importation of malt annually took place for the use of the brewers. This was subject, in Massachusetts, to a duty on importation. Whether an increased supply of the article was deemed important, or the domestic manufacture of it had diminished the profits, the principal importers of malt, and other merchants of Boston, in 1655, petitioned the Assembly for a reduction or a repeal of the tariff, as "piuditiall to this comonwelth and also a discoridgm[t] to marchants." One of the petitions of those early Boston advocates of free trade in the handwriting of Thomas Broughton, and signed only by him and Robert Pateshall, represents that "the well-known advantage accrueing by freedome of ports and hindrance of trade proportionally according to largeness of customs imposed, that this seeming good may not bring upon this countrey a reall evell, and from customs upon one thing grow to custome on another, till, step by step, under specious pretences, we are insensiblie brought under taxes for everything, as the woful experience of other nations well known unto us showeth," therefore "for the good of the present, and to prevent this evell in future ages, we are become your humble petitioners to remove the customs upon malt, that after ages may remind you as fathers of their freedome, and the present may bow before you for their experience of your care of theire wellfare," &c.[2] Ten years before this, the Brewers of New Amsterdam, with whom New England had now held commercial intercourse for over thirty years, had vigorously resisted a tax on malt, justifying their recusancy on the ground that the taxed were not represented in the enactment of the law. These examples show how early manifested was the spirit of resistance to every form of taxation, and the "specious pretences" of indirect subsidies levied through the customs were clearly seen. They little apprehended, while deprecating so

(1) Wonder-Working Providence.

(2) Drake's Antiquities of Boston. The people of Watertown, in the first year of its settlement (1630) refused to pay the first tax levied upon them, alleging it was without authority, &c.

dangerous a precedent, that a persistent opposition to taxation would become the ostensible cause of a dismemberment of the empire. This first free-trade movement, however, seems not to have been successful, as the Court, instead of repealing the duty, merely referred the petitioners to a former order of the Court on the subject.

During the year 1662, the younger Winthrop, of Connecticut, read several papers of a practical character before the Royal Society, in London. In December of that year, the first of its corporate existence, he was requested by the society to institute some experiments in the manufacture of Beer from barley and maize. In the following March, he accordingly presented to the society some bottles of Beer brewed from Indian corn. Two years previous to that, a duty of 2*s.* 6*d.* a barrel on strong beer, and of 6*d.* a barrel on small beer, had been imposed for the first time in England. The increased price of Beer which, as the favorite beverage, was consumed in enormous quantities, may have suggested the possibility of finding a cheaper article than barley in the new American staple, and thus, through the well-known ingenuity of Mr. Winthrop, of leading to results valuable both to England and her colonies. It is more probable, however, that Mr. Winthrop or others had communicated to members of the society a knowledge of the custom which had long obtained in America of brewing Beer from Indian corn; and not without a practical aim, doubtless, he was solicited to furnish an illustration of its feasibility. Most of the cereals possess the property of being malted. Campanius, in his description of New Sweden, cites a passage from Sir Richard Grenville's relation of his voyage to Virginia in 1585, in which he states that very good bread may be made out of the maize when ground; "the English have prepared it in the same manner as corn, and have brewed with it a kind of small beer." He gives also the testimony of Peter Lindstrom, an engineer of New Sweden, about the year 1654, who observes that "Maize, or Indian Corn, grows there of various colors, white, red, blue, brown, yellow, and pied . . . . out of the white and yellow maize they make bread, but the blue, brown, black, and pied, is brewed into Beer which is very strong but not remarkably clear." The women, he tells us, brewed excellent drink, as in Sweden, and a very cooling beverage was made from water-melons.

Beer from Indian Corn.

This practice of malting Indian corn was doubtless of American origin, and may have been derived from the Indians, who made artificial drinks from several native products, including maize. Von Humboldt remarks that a chemist would have some difficulty in preparing the great variety of spirituous, acid, or sugary beverages made from the maize by the natives. The ancient Peruvians made sweet syrups from the stalks of the plant. They also understood the effect of germination in developing the

saccharine principles of the grain, which they infused in water, after which it was mashed and boiled in the same water, and in due time it was drawn off and set aside to ferment. This drink, which was called *vinapu*, possessed intoxicating qualities, and was in consequence forbidden by the Incas. The juice of the maize, mingled with that of other fruits, chewed and then deposited in a vessel and left to ferment, constituted another disgusting drink of the natives of the southern continent, called *chica*, and by the Indians of the same countries, by whom it is still prepared, *kawa*. In its preparation, it is said, that made from materials ground between the molars of withered and half-toothless crones was preferred, for no other reason, we may suppose, than that the difficult and protracted labor of mastication excited a more copious effusion of the salivary ingredients in the nauseous compound. These, like the former, were highly intoxicating.[1] The North American tribes, however, are believed to have had no knowledge of any intoxicating beverages previous to the arrival of Europeans.[2]

A paper by Mr. Winthrop, on the culture and uses of maize in America, where its employment in Brewing was thus ancient and aboriginal, was published in the twelfth volume of the Transactions of the Royal Society A. D. 1678, two years after his death. It describes the Indian mode of raising the plant, and the use by the Indians of the stalks and leaves in making baskets, and also the great improvements made in its cultivation by the use of the plow. The method of making malt and Beer from the grain is there described. Good malt, it is stated, could

(1) Humboldt's Essays. McCulloch's Aboriginal Researches.

(2) According to Heckewelder, there is no tradition of the race better supported than that which ascribes a scene of intoxication to the first interview between the Dutch and the Indians on Manhattan Island, of which he received a curious account from the Delawares. The name of the island, he says, is but an abbreviation of that given it on the occasion, and commemorates and substantiates the story, meaning "*the place where we all got drunk.*" The Iroquois are said to hold a similar tradition as to what occurred when they were first made acquainted with the use of gunpowder. In the Pandora's box of varied and swift-destroying evils brought by the Europeans to the Indian race, none has been more baneful than the fatal gift of "*fire water.*" Hudson is said, on the occasion above referred to, to have first offered them brandy to elicit more of their character and designs by the artifice. Mainly through the consequence of that act we see the whole race now rapidly melting from the face of the earth. It recals the words of Horace, who finds a parallel to the wickedness of the first navigator in the sin of Prometheus and its dire consequences to the human family. Upon the natives of this Continent the act of the first voyager to their shores, with his metaphorical "fire water," has been, in its fatal effects, almost a literal realization of the Roman poet's description,

Audax Japeti genus
Ignem *fraude malâ* gentibus intulit:
Post ignem æthereâ domo
Subductum macies, et nova febrium
Terris incubuit cohors;
Semotique prius tarda necessitas
Lethi, corripuit gradum.

only be made from maize by peculiar management, and the barley malt-masters had in vain employed their skill to make it in the ordinary way. It was found by experience that the corn, before it was fully malted, must be more completely germinated, both as to the root and blade, to the extent of a finger-length at least. The plan found most effectual was to remove the surface soil to the depth of two or three inches, throwing it up each way; then to spread the corn thickly over the ground thus excavated, and cover it with the earth previously removed. Left thus until the plot looked like a green field with the sprouting corn, which would require ten to fourteen days, according to the season, it was then taken up, the earth shaken from it, and dried. The Beer made from it after this management was wholesome, pleasant, and of a good brown color.

Another mode of making Beer from maize, more practiced, he says, because better understood, was from the corn bread. This was broken into large lumps the size of the fist, then mashed and treated as malt. The bread, thus treated, yielded a beer fine-colored, wholesome, and which kept better than that made from the grain. Hops were added or not, as desired. A syrup, made from the juice of the jointed stalks of the kind cultivated by the natives north of New England, is also mentioned by him. A Paper by Dr. Murray, in the same volume, states that Barley alone was used in Scotland for malting at that time.[1]

The price at which the best quality of Beer was sold in New England, in 1667, was 1½*d.* per quart. The General Court had previously ordered that Beer should be made with four bushels of good barley malt at least to a hogshead, and that it should not be sold above 2*d.* the quart. It was now ordered that Beer should be made only of good barley malt, without "any mixture of molasses, coarse sugar, or other materials instead of mault, on penalty of five pounds for every offence." The prices of Barley, Barley-malt, and rye were fixed for that year at 4*s.* the bushel; wheat, at 5*s.*, and Indian corn, at 2*s.* 8*d.* the bushel. The value of silver was then about 6*s.* 8*d.* sterling the ounce.

In May, 1673, the Court, taking into serious consideration "the necessity of upholding the staple commodities of this country, for supply and support of the inhabitants thereof, and finding, by experience, the bringing of malt, *which is a principal commodity* of this country, from foreign parts, to be exceedingly prejudicial to the inhabitants of this Colony," imposed a duty of 6*d.* a bushel on malt imported from Europe, in addition to the rate of one penny previously laid. The protectionists appear to have been still the most numerous class in the Assembly.[2]

(1) A patent was granted, in 1801, to Alexander Anderson for a method of Brewing with Indian corn, by employing a portion of *unmalted* grain in the process which was then considered a valuable discovery.

(2) Records of the Col., vol. iv. 344. 552.

The shipping business of Boston, and several other of the maritime towns of New England, promoted the manufacture of Beer, which, in Colonial times, was always a considerable item in the provisioning of vessels. Beer and distilled spirits were made and exported from these parts early in the last century. It was sent to the West Indies, Newfoundland, and other of the continental Colonies. Among the imports of the Island of Barbadoes, with which the Colonies had much trade, in the first eight weeks of the year 1731, are mentioned seventy-five tuns of Beer and Ale; one hundred and fifty casks, mostly hogsheads, of bottled Beer and Ale, and nine and a half tuns of Cider, much of which was probably from the continental ports. The Assembly of Rhode Island, during the year, passed an Act, levying a duty on Strong Beer, Ale, etc., imported into that Colony from neighboring governments. New York and Pennsylvania, as well as Massachusetts, at this time, were exporting beer to that and other Provinces, as well as to foreign ports.

The enormous importations of molasses from the sugar Colonies, and the extensive distillations of rum from it, in which business Rhode Island was very active, interfered with the less harmful business of Malting and Brewing. A high prohibitive duty upon molasses was consequently recommended about this time as a desirable measure. The Province raised and exported barley in considerable quantity. It produced at a later period very superior cider for exportation.

Connecticut was also celebrated for the amount and quality of its cider, and at Middletown, a few years after the peace, porter was made at an extensive brewery, which was considered equal to London porter. A small village near Boston, of forty houses, made, in 1721, nearly 3,000 barrels of cider. Some of the western counties also produced much cider.

The art of Brewing was indigenous as well to Holland as to England, for the German nations made Beer as early as the days of Tacitus. It was very soon carried over to the Dutch possessions in America. In 1633, the West India Company, through their Director, Van Twiller, caused the erection of mills and other buildings, including a Brewery upon Farm No. 1, extending from the present Wall street westward to Hudson street. Its site was the north side of what is now Bridge street, between Broad and Whitehall. From that time forth the place continued well supplied with the national drink. The distillation of Brandy commenced there as early as 1640, which was probably the first instance of that manufacture in the Colonies. In the following year, drunkenness had become so alarmingly prevalent that, to abate the disorders arising from it, and to secure a better observance of the Sabbath, the municipal authorities of the town, in April of that year,

First Brewery and Distilleries in New York.

prohibited the tapping of Beer during divine service, or after ten o'cloc at night, under a penalty of twenty-five guilders, or ten dollars, for each offense, beside the forfeiture of the Beer for the use of the "Schout Fiscaal," or Attorney General. The offender was not allowed to tap Beer again for three months. The preamble to this early ordinance for restraining the sale of spirituous liquor, shows the sense then entertained of the magnitude of an evil which still baffles the wisdom of the successors of the Burgomasters and Schepens of that day. "Whereas," they say, "complaints are made that some of our inhabitants have commenced to tap Beer during divine service and use a small kind of measure, which is in contempt of our religion *and must ruin the State*, &c." The first tavern on the Island for the accommodation of strangers, of whom there were many already from New England, was erected in 1642 near the head of Coenties' Slip.

Although the administration of its affairs by a privileged commercial company, whose object was the prosecution of trade and its own emolument, was unfavorable to private enterprise in many departments of industry, on account of numerous monopolies established, and the onerous and arbitrary taxation resorted to, many prominent citizens early engaged in the manufacture of Beer in the Dutch Province. A tax on Beer became at a very early day a source of much trouble in the Colony. In 1644, when it was much harassed and impoverished by wars with the Indians, when the Treasury was empty, and the West India Company was already verging toward bankruptcy, and therefore unable to assist, the Director General Kieft and his Council determined, contrary to the advice of the people's representatives, to resort to taxation, as a temporary expedient for the clothing and maintenance of the soldiers. In June, therefore, proclamation was made that there should be paid "on each half vat (or barrel) of Beer tapt by the tavern keepers, two guilders, half to be paid by the Brewer and half by the tapster—the burgher who does not retail it to pay half as much; on each quart of Spanish wine, four stuyvers; French wine, two stuyvers, to be paid by the tapsters; on each beaver hide brought to the port and purchased within our limits, one guilder, triplets and halves in proportion. All on pain of forfeiting the goods—one-third for the informer, one-third for the officer, and the remainder for the Company. All this provisionally, until the good God shall grant us peace, or that we shall be sufficiently aided from Holland" This scheme, combining an excise and additional export duties on certain articles, but especially the liquor tax "establishing for the first time in this country an excise on wine, beer, and other liquors," produced much dissatisfaction, especially among the traders. Later in the year, some Dutch soldiers, destitute of clothing, arrived from Curacoa to the great

relief of the Province. But as these had to be clothed, the Director renewed the impost on Beer by ordering that every tun should pay three guilders ($1.25). Every brewer was at the same time to make a return of the quantity made by him before he could make any sale. A receiver was appointed to collect the revenue from this source, and was entitled to five per cent. for his trouble. This indefinite renewal of a tax imposed for a temporary purpose produced intense excitement, and was firmly resisted by the Brewers, both on account of its object and the mode of its enactment. It was the duty, they urged, of the Company to maintain its troops and defend its subjects from foreign and domestic enemies. The duty was not imposed by the eight men who represented the commonalty, and who, as well as their constituents, would be offended should they submit to the imposition, but it was levied by the Company's paid servants, who had no such prerogatives. They were therefore determined to resist. The "Schout Fiscaal," on the other hand, was directed to enforce the payment by the strong arm of the law. Numerous prosecutions followed. This early invasion of the popular rights and determined opposition to it, produced much recrimination and ill feeling between parties, and added greatly to the troubles with which the Province was afflicted. It contributed to the ultimate recall of an arbitrary Governor.[1]

Several of the first Brewers in New Amsterdam were men of considerable note, and filled some of the highest civic offices in the community. Their establishments were chiefly situated in the vicinity of the Fort, within which the first was built. The street occupied by them was from that circumstance called the "Brouwer Straat," or the Brewers' street, and corresponded with the present Stone street between Broad and Whitehall. It was one of the first streets occupied in the future commercial capital, and received its present name from being the first paved with stones, which was done by an ordinance made in the year 1657. One of the principal brewers in this locality was Isaac De Foreest, who came to the country in 1636, and in 1645 received a grant upon the above street, then one of the best in the town. He was also the owner of a farm at Harlaem, and of the "Old Kirk" or church on Pearl street, and for many years a magistrate. In acknowledgment of his services in improving the town and in public office, he was privileged with "the great citizenship."

Jacob Wolfertsen Van Couwenhoven erected a large stone brewery on the north side of the same street, on land granted him also in 1645, at the corner of Stone and Broad street. He was not successful in business,

(1) O'Callaghan's New Netherlands.

and entailed mortgages upon his property, of which, however, he held possession until his death in 1670. The same premises were occupied as a brewery subsequently by John Van Couwenhoven.

Peter, a younger brother of Jacob just referred to, was also a prominent person at that day, and carried on business as a brewer and trader. He was six years a "Schepen" of the city. He was unpopular both with the English after they came in possession and with his Dutch neighbors. Having been arraigned on a charge of extortion, he refused to give bail, and was imprisoned and fined. He left the city and resided awhile at Elizabethtown, New Jersey, of which he was one of the earliest settlers; but in 1665 was still a resident of the city at the north-west corner of Pearl and Whitehall streets. His brewery at the head of the present Broad street became, in 1670, the property of Isaac Van Vleck, who, for the remainder of his life there conducted a prosperous business in Brewing. He was several years an alderman, and died in 1695.

The Bayards, also, Nicholas and Balthazar, step-sons of Governor Stuyvesant, were among the most conspicuous and opulent citizens at that time. They were both engaged in the manufacture of Beer. An extensive district of the city, long afterward and, to old residents of New York, still known as the "Bayard Farm," was the property of their wealthy descendants. It extended along each side of Broadway, north of Canal street for the distance of many blocks, and from the Bowery to beyond McDougal street, on the west side of the city.

Another wealthy Burgomaster, who was one of the early brewers of the rising Dutch metropolis, was Oloff Stevensen Van Cortlandt. He came to the city in 1637, on military service, which he quit the same year for a civil office as Commissary of Cargoes, at a salary of thirty guilders ($12.00) per month. He resigned his office to the Company in 1648, to engage in the Brewing business. His premises were on "De Brouwer Straat," now Stone, adjoining those of Isaac De Foreest, where his property was one of the first class, and valued, on the final cession of the city to the English, in 1674, at $30,000. He was an influential politician, and, in 1650, the President of the citizens' representatives called the "Nine Men," who were opposed to the administration of the last governor, Stuyvesant, and were by him turned out of their pews in church, and their seats torn up. He had a valuable property on the west side of Broadway, adjacent to Cortlandt street, which still perpetuates his name. He held several prominent offices. His son, Stephanus, was the first native-born Mayor of New York, to which he was appointed at the age of thirty-four. Another son, Jacobus, was, like the last-mentioned, a wealthy merchant and a Mayor of the city. Jacob Kip, a son of one of the oldest settlers, in 1658 resigned the secretaryship of the city

magistracy, to which he was appointed five years before, while quite a youth, on the first organization of the city, and engaged in the Brewing business. He afterward resigned it for mercantile pursuits. His property on Broad street, partly acquired in the business, and partly by marriage with the wealthy widow of Guleyn Verplanck, was estimated in 1674 at $8,000. Daniel Verveelen, a Brewer, who originally settled at Fort Orange, resided about this time on "De Prince Straat," now Beaver, east of Broad. There are many of the name now in the State. On the same street lived also Jan Jansen Van Bresteede, a cooper, who was appointed in 1658 the marker of beer barrels, and in 1667 inspector of pipe staves. Jan Vinjé is mentioned as a Brewer in the town in 1653. He was one of the heirs to the property between Wall street and Maiden Lane, and extending from river to river, known as the Damen Farm. In 1654, Thomas Hall, an Englishman, who had joined the New Englanders some years before in the attack upon the Dutch Colony on the Delaware, where he was taken prisoner and sent to Manhattan, became the purchaser of a farm on what is now Beekman street. He there established a Brewery, which, after his death in 1670, with the farm, a large and valuable tract from Pearl street to Park Row, was purchased of his widow by William Beekman. Beekman, who came to the Province in 1647, and was the first of that name, carried on for many years the Brewing business at the corner of Beekman and William streets, which conjointly still bear his name. Mr. Beekman was at an early age a Schepen of the city, and held other municipal offices at different times. He was Sub-Director of the Colony on the South River from 1658 to 1663, and after that was Sheriff of Esopus. He was held in high esteem until his death in 1707, at the age of eighty-five. His property on the present Pearl street, between Franklin Square and Ann street, was in 1674 valued at ten thousand dollars. It was long known as Beekman's Swamp, and is still spoken of among the leather manufacturers, to whose use it has been for a great while appropriated, as "the Swamp."

In 1630, a settlement was made at Rensselaerwyck, in the neighborhood of Albany, under the charter of Patroons. Among the first persons sent to colonize the place was Rutger Hendrickson Van Soest, as superintendent of the Brewery, for which capacity he had been engaged in Holland by the proprietor, receiving in advance of his earnings sixty florins, including five florins as a present from the Patroon. The Brewery was built for the use of the Colony sometime previous to 1637. An addition was made to the settlement in 1642 by the Company of the Rev. Mr. Megapolensis, among whom was Eveert Pels, a brewer, who afterward erected a Brewery in the Colony. Between two and

Breweries near Albany.

three hundred bushels of malt for his use were sent in the ship with him.[1] Joan La Battie was, after the building of Fort Orange, permitted to build a house in the fort and to use it as a Brewery, and remain in possession of the soil so long as the Company shall retain possession of the fort, provided the Company's affairs and interests were not neglected by him, and that he annually paid six merchantable beavers for the privilege.[2]

In erecting a Brewery, however, for the use of his little feudal dominion, the Patroon reserved to himself the right of manufacturing Beer for the retail dealers, but permitted private persons the privilege of brewing for the use of their own families. This seems to have been sometimes unlawfully invaded. In December, 1646, a peremptory order, under the hand of the Secretary of the Colony, Antonie De Hooges—whose name is perpetuated in that prominent feature of the Highlands known as Anthony's Nose—was served by the magistrates upon one of the offenders. "Whereas their Honors of the Court of this Colonie find that Cornelis Segersz, notwithstanding former placards and prohibitions, has still presumed to meddle with what is not his business—with Beer-brewing—directly contrary to the grant and authorization given to the brewery of this Colonie; Therefore, their Honors expressly forbid the said Cornelis Segersz, to brew or cause to be brewed, or otherwise to manufacture any Beer, except so much as shall be required by him for his own housekeeping, on pain of forfeiting twenty-five Carolus guilders, besides the brewed Beer. The said Cornelis Segersz is further warned that no cloak or idle excuse shall hereafter avail, but that this ordinance shall be maintained and executed on the spot without Court process, if he shall make any mistake. Let him therefore prevent his loss. Actum Rensselaerwyck, 26 Oct., 1646."

The Patroon's Brewery was rented in 1649 to Rutger Jacobson, in partnership with Goosen Gerrittsen Van Schaik, both magistrates of the Colony, at 450 guilders per annum, with an additional duty of one guilder on every tun of Beer brewed by them. This duty amounted in the first year to 330 guilders, which therefore represents the quantity of Beer made. The next year they consumed fifteen hundred schepels (about 1120 bushels) of malt. Jacobson rose by industry to wealth and respectability. His daughter was the maternal ancestor of the respectable family of Bleeckers. Wolfert Gerritsen, probably a near relative of his partner, was the superintendent of the Patroon's farms, and the stepfather of the two eminent New Amsterdam brewers, Jacob and Peter Van Couwenhoven.

(1) O'Callaghan's New Netherlands. (2) Munsell's Annals of Albany, iv. 56.

Another early official of Rensselaerwyck, Arendt Van Curler, was in 1661 the proprietor of a Brewery at Beveryck, the present site of Albany. He was held in high esteem both by the English and French Governors, who sought his friendship and counsel. He was prominent in the affairs of the Dutch Province. Daniel Verveelen, an early settler at Fort Orange, afterward carried on his business of Brewing at Manhattan. Some years previous to this, there were fears of hostilities with New England, and certain persons at Fort Orange were warned not to waste grain in brewing strong Beer at so critical a period. The City Records of Albany contain an order of the Common Council, made in August, 1695, that, for the payment of £10 13s., current money, due for charges and expenses, "care shall be taken that ye County shall procure corn so much to brew three pipes of table Beer, and Benn. V. Corlaer and Albert Ryckman are to brew it, thinking it will amount to ye complement." Kalm mentions, in his account of the Province in 1747, that he noticed large fields of barley near New York City, but that in the vicinity of Albany they did not think it a profitable crop, and were accustomed to make malt of wheat. One of the most prosperous brewers of Albany during the last century was Harman Gansevoort, who died in 1801, having acquired a large fortune in the business. His Brewery stood at the corner of Maiden Lane and Dean street, and was demolished in 1807. He found large profits in the manufacture of Beer, and as late as 1833, when the dome of Stanwix Hall was raised, the aged Dutchmen of the city compared it to the capacious brew kettle of old Harme Gansevoort, whose fame was fresh in their memories.[1]

The general neglect in New Netherlands of every branch of agriculture, except the cultivation of Tobacco, in the pursuit of the fur trade, caused a frequent scarcity of breadstuffs. It rendered the Colony, at times, dependent upon the husbandry and charity of the Indians for the means of subsistence. The prospect of a deficiency from this cause, and the great influx of emigrants then taking place, in addition to a war between England and the States General, caused, in 1653, a prohibition of the exportation of bread-corn, and an order that equal attention should be given to the cultivation of corn as of Tobacco, by planting a hill of the former for every one of the latter. As a conservative measure, at the same time, the consumption of grain by brewing and distilling was strictly forbidden. The distillation of grain was again forbidden in 1676, and on numerous other occasions, in that and in other Provinces, as well for

(1) Munsell's Annals of Albany. Pleasantries at the expense of Albany Ale and its Brewers are not a recent thing. It was related by the old people sixty years ago of this wealthy Brewer, that when he wished to give a special flavor to a good brewing he would wash his old leathern breeches in it.

the preservation of bread-stuffs as to abate the growing evils of intemperance among Indians and European settlers.

Among the Laws established by the Duke of York, in 1664, for the Government of the Province after its surrender to the English, was one relating to the manufacture of Beer. It was ordered, "That no person whatsoever shall henceforth undertake the calling or work of Brewing Beere for sale, but only such as are known to have sufficient skill and knowledge in the Art or Mistery of a Brewer. That if any undertake for victualling of ships or other vessels, or master or owner of any such vessels, or any other person within this Government, do prove unfit unwholesome and useless for their supply, either through the insufficiency of the Mault or Brewing or unwholesome cask, the person wronged thereby shall be and is enabled to recover equal and sufficient damage by action against that person that put the Beer to sale." By the alterations and amendments of the laws confirmed by the General Assizes in the following year, "Inn-keepers and ordinary-keepers are not to be obliged to put any particular quantity of malt in their Beer, but are not to sell Beer above two pence per quart, nor any liquors above 12*s.* the gallon, under penalty of 20*s.* for each gallon sold."[2]

The importance of Beer for victualing ships in all the seaport towns, as well as for export, rendered an attention to its quality a matter of public interest.

Such were a few of the first attempts to manufacture Beer in the early years of the Colony, near the place where it has ever since been an important industry, and where some of the largest establishments of the kind on this continent now combine the skill, machinery, and enterprise which the last fifty years have developed in the business.

In New Jersey, barley was very early raised in quantities sufficient for exportation. Its price was, in 1668, 4*s.* per bushel, and in 1678, it was 3*s.* 6*d.* In 1684, Deputy Governor Lawrie states the price of barley to have been only 2*s.* currency; which price, as the currency was one-fifth more than sterling, was highly favorable to the manufacturers of Beer. There appear, however, to have been none, as yet, in the eastern Province, as letters from the early settlers of East Jersey, of the same year, to their friends in England and Scotland, state that a malt-house was set up that year at Perth Amboy, but there was no Brewer in the place. A Brewer and Baker were much needed. Tradesmen of all kinds were scarce. As an inducement to emigrants, it was represented

Brewing in New Jersey.

(1) We are largely indebted for the foregoing facts to the valuable Histories of New York, by D. T. Valentine; of New Netherlands, by Dr. E. B. O'Callaghan, and to Munsell's Annals of Albany.

(2) Documentary History of New York.

that laborers had not above one-third the work to do that was required in England, while they fared much better, living on beef, pork, bacon, pudding, milk, butter, with good beer and cider for drink. Their wages were 2*s.* to 2*s.* 6*d.* per day. The cider of New Jersey was, in Colonial times, said to be the best in the world. Large quantities of it are mentioned, thus early, as the produce of the Province, of which, that made "at one town called Newark," surpassed in quality the cider of New England. At Burlington, in West Jersey, brew-houses, malt-houses and bakeries are mentioned in 1698. A large house and lot on the main or High street in the town, with Malt-house, Brew-house, Mill-house, brewing-vessels, kiln, a large copper which would boil ten barrels, coolers, tuns, backs, malt-mill and mill-stones, etc., were offered for sale, in 1730, by William Bartoft, of Philadelphia.[1] Beer, as well as Barley and other grain, is named among the exports from Amboy, in 1750.

An early law of the Province (in 1668) required each town, under penalty of 40*s.* for each neglect, to provide an ordinary for the entertainment of strangers. It did not permit the retail of liquors in less quantity than two gallons, which was afterward reduced to one gallon. In 1683, ordinary-keepers were debarred from collecting debts for liquor sold. Notwithstanding these and other safeguards of the public morals, made at different times in reference to the retail of liquors, stringent laws were often found necessary. The Fairs held for the free sale of goods in Burlington, Salem, and other towns, in May and October, became occasions for much disorder, and it was found necessary to prohibit visitors from the neighboring provinces from retailing liquors in Salem, and at length to do away with the Fairs.

Brewing in Pennsylvania and Delaware.

The Swedes, who were the first permanent settlers in Pennsylvania and Delaware, made tea from the sassafras, and beer and brandy from the persimmon. They also brewed small beer from Indian corn, as before mentioned. The brewing, according their countryman, Kalm, was done by the women, as in Sweden and other parts

(1) The County Records of Salem contain the following Rule of the Court, made in 1729: "That each respective public-house keeper within this county take for their several measures of liquors hereafter named, as followeth, and no more, viz.: For each nib of punch, made with double-refined sugar and one gill and a half of rum, nine pence; for each nib made with single-refined sugar, and one gill and a half of rum, eight pence; for each nib made of Muscovado sugar, etc., seven pence; for each quart of tiff made with half a pint of rum in the same, nine pence; for each pint of wine, one shilling; for each gill of rum, three-pence; for each quart of strong Beer, four pence: for each gill of brandy, or cordial dram, six pence; for each quart of metheglin, nine pence; for each quart of cider, four pence. Eatables for men—For a hot dinner, eight pence; for breakfast or supper, six pence. For horses —Two quarts oats, three pence; stabling and good hay, each night, six pence; pasture, six pence."

of Europe. The Dutch had several breweries in the settlement about the year 1662. In the deliberations of the first Assembly held under the Proprietary Government, about the year 1682, the question was debated whether Malt Beer should be rated at 2*d.* per quart and molasses beer at one penny, which it was decided in the affirmative should be the selling prices. The new settlers reaped their first crop of barley in May, of the following year.

At his manor of Pennsbury, a few miles above Bristol, in Bucks County, Penn soon after caused the erection of a splendid mansion house, attached to which was a Malt-house, Brew-house and Bakery, all under one roof. The dwelling fell into early decay, and was demolished before the Revolution; but the ancient frame Brew-house, of which a cut is given in Day's Historical Collections of Pennsylvania, was standing a few years ago near the farm-house of Mr. Crozer, the sole memorial of the departed wealth and power of its original owner. The cash-book of the establishment shows the cellar to have been well supplied with beer, cider and wines, all of which he sought to produce himself. Those liquors were, at that day, especially to one obliged to entertain, relatively more important than at present.

Coffee, tea, and chocolate, were then comparatively little used. Penn's accounts show that coffee, in the berry, was sometimes procured from New York, at the cost of 18*s.* 9*d.* the pound. Tea is supposed to have been procured direct from England, as none is charged, though a tea-pot is upon the inventory of his goods. Good Bohea tea is advertised, in 1719, by the printer, Bradford, and others, at from 22 to 50 shillings per pound, Pennsylvania currency.[1]

In 1684, a tax for the support of the Governor was proposed in the Assembly, by Samuel Carpenter, to be laid on different liquors, including Beer, Mum, and Spanish Wines, on which 5*d.* per gallon was proposed. It was decided that strong Beer and cider should pay 2*d.* per gallon. Penn generously remitted the revenue from this excise, which act he afterward regretted. During his absence in England, in 1687, he proposed that the custom on liquors should be revived, as the most equitable way of sustaining the government. But he did not afterward find the Assembly so well-disposed on the subject of taxation for that purpose. Several Acts were passed, at the same session, to restrain the inordinate use of intoxicating liquors. "Three or four spaacious malt-houses, as many

(1) The first Coffee House in London was not opened until about the year 1657, and out of that originated the house in St. Michael's Church-yard, known, until a late day, as the "Virginia Coffee House." De Warville says that, in 1788, there was no Coffee House in Boston, New York, or Philadelphia. One house in each, called by that name, served as an Exchange.

large brew-houses, and many handsome bake-houses for public use," in Philadelphia, are spoken of by Thomas, in 1698. The brewers sold ale equal in strength to the London half-and-half,[1] for fifteen shillings per barrel. It was in more esteem, he tells us, and brought a higher price in Barbadoes than English Beer. If this writer is to be credited, the reputation and exportation of Philadelphia malt liquors were very early established. One of the brewers of the town at that time, and probably one of the first to practice the art there, was Anthony Morris. His brew-house was near the draw-bridge, at Dock Creek, and was, for several years previous to 1707, the place of worship of the first Society of Baptists in this city. The family was prominent in the business for several generations.

In 1704, some of the inhabitants of Philadelphia, less anti-tariff than those of Boston a few years before, petitioned the General Court to impose a duty on all foreign hops imported. A bill was ordered accordingly, and the impost laid, with a view, probably, of promoting the cultivation of the hop plant, which had, as early as 1657, been made the object of legislative encouragement in Virginia. In December, of the following year, the vintners of the city presented a petition praying for a bill to restrain the abuses committed against them by the Brewers in their measures. Leave was granted them to bring in a bill for the purpose. The price of malt that year was 4*s.* 6*d.*[2] The duty on hops was renewed in 1721, when the impost on liquors was also extended. Hops were, at this time, imported from Massachusetts. Beer was shipped, previous to this date, from Philadelphia to Georgia, and other southern provinces, by George Campion, a brewer of the city. A brew-house was, at this time, for sale at Marcus Hook. Samuel Carpenter, another principal Brewer, probably the person before mentioned as a member of Assembly,

(1) *Porter* is quite a modern beverage, having been first brewed since 1730. Previous to that, ale, beer, and twopenny, were the malt liquors in use, and persons were accustomed to call for "half and half," that is, half of ale and half of beer, or of beer and twopenny; "three threads" was next used, which was a third of each; and to avoid the inconvenience and waste of drawing from three casks, a brewer named Harwood invented a liquor with the united flavor of the three combined, which he called "entire butt." As it was strengthening, and much used by porters and working people, it received the name of *porter*.

(2) By an Act of the Assembly of that year, licensed tavern keepers, etc., were required to sell Beer and ale by wine-measure to those who drank it on the premises, and by beer-measure to those who carried it away. The seller of adulterated rum, brandy or spirits, forfeited the same and three times its value. An Act of May 31, 1718, made in consequence of the excessive rates charged by tavern keepers, etc., for wine, beer, cider and other liquors, empowered the justices throughout the province, four times in the year, to fix the prices of such liquors, which were to be proclaimed by the crier at the close of the sessions, and to be affixed to the Court-house doors; and twenty shillings was the penalty for exceeding the rate. For the third offense, five pounds, and loss of the privilege of selling for three years.

and a highly influential citizen, apprised the public, in April, 1732, that he sold strong Beer for 24*s.* the barrel, or 12*d.* the gallon ; good ale for 16*s.* the barrel, or 8*d.* the gallon ; and middling Beer for 8*s.* the barrel, and 4*d.* the gallon. Those who would send "clean bottles, with good corks," could have the best beer for 4*s.* the dozen, and middling Beer for 2*s.* Another Brewer of the city, at that time, was Mr. Badcock.

The manufacture of barley into malt, and of malt into Beer for exportation, is named by Dr. Douglass as one of the established branches of Pennsylvania production in 1750. The exportation of strong Beer from Philadelphia, in 1766, amounted to 1288 barrels, worth £1 10*s.* per barrel. The shipments of Beer, in 1772, were 1236 ; in 1773, 1798, and in 1774, 1394 barrels.[1] After the Peace, considerable quantities of English Beer were poured into Philadelphia and other ports with the flood of British manufactures. Mr. Tench Coxe, in an address to the Friends of American Manufactures, in August, 1787, stated that the breweries of Philadelphia, nevertheless, in their infant state, required forty thousand bushels of barley annually, and predicted an increase when the foreign stock was consumed. The consumption of Beer was much diminished by the general use of distilled spirits, which was made and imported in great quantities. In addition to its more pernicious effects, a thousand hogsheads of rum, worth £20,000, mixed with water, would make as much strong drink as would require one hundred and twenty thousand bushels of grain to make its equivalent in Beer. The loss to the country, in addition to that on other articles employed in brewing, was great in proportion. The importation of ardent spirits, in Philadelphia alone, was ten times the above sum. In March, 1788, the Assembly of Pennsylvania laid a duty on foreign barley and malt imported into the State. The Barley grown in the State was, however, insufficient for the support of the breweries, and nearly one-half the quantity consumed was derived from the Chesapeake. Malt was also imported from New England. In the following May, it was found that the manufacture of Beer and porter at Philadelphia, had been more than doubled within a year. The Brewers were only circumscribed in their business by the want of Barley. The attention of the farmers was, in consequence, strongly turned to the cultivation of that grain. The quality of Philadelphia Beer was still equal to its early reputation. The porter made in the city was considered scarcely inferior to the English, and was in repute throughout the country. A sample of Beer from Philadelphia is said, about this time, to have made

(1) On the manifest of the ship *Astrea*, of Salem, Massachusetts, by E. H. Derby, with an assorted cargo for Canton, in 1789, are 24 hhds. of 2 barrels each, and 24 barrels of 40 gallons each, of Philadelphia Beer, of which it is said in the letter of Instructions, "The Philadelphia Beer is put up so strong that it will not be approved of until it is made weaker. You had best try some of it first."

the voyage to China and back without detriment to its quality. The price, in Philadelphia, of American Beer was, in 1790, 30*s.* the barrel, and bottled, 8*s.* 4*d.* per dozen. It was shipped to all parts of the world from that and other domestic ports. The shipping of the city took off considerable quantities, and the domestic consumption, favored by several ordinances designed to promote its use in preference to distilled liquors, was large. The exports of Beer, cider, and porter from Philadelphia was, in 1791, only 18,510 gallons, and 249 dozen bottles. But much went abroad under the general name of liquors, and other portions through the ports of Maryland. A year or two later, Mr. Coxe, Commissioner of the Revenue, stated that the breweries of Philadelphia exceeded, in the quantity of their manufactured liquors, those of all the seaports in the United States.[1] The importation of malt had then (1793) ceased. About 16,500 bushels of barley were imported that year. The exportation of Beer, Porter, and Cider was much limited by the scarcity of black glass bottles, the manufacture of which was yet inconsiderable, and the importation expensive. *Lancaster* had, in 1786, three Breweries, and Pittsburg, Washington, and Brownsville were provided soon after.

Brewing in Maryland and Virginia.

In Plantagenet's description of New Albion, which corresponded with portions of Delaware and Maryland, a letter from Master Evelin, who had lived there, says the people had (1648) more choice drinks than in England for "pumpion drink, hopped, is good beer; and ale we have for you and Mault for you, and in summer rock cold water, with an eighth of good Peach Vinegar, is the best beaverage." The peach vinegar and brandy here mentioned, was a considerable article of domestic production in Pennsylvania, New Jersey, and the more southern provinces, both for home use and for exportation. Maryland and Virginia produced good crops of barley at a later period, much of which was sent to Philadelphia. An Act of the Assembly, in 1699, empowered commissioners to grant licenses for the retail of liquors, for which were to be paid within the port of Annapolis, or two miles of it, or at any County Court House, 1200 pounds of tobacco, and in other parts 400 pounds, and no more. By the same Act, the County Commissioners and the Mayor of the City of St. Marys were, in January and August of each year, to fix the rates or prices of liquors, and 500 pounds of Tobacco was the fine for exceeding those rates. The price of small Beer

(1) View of the U. States. The Federal procession, in 1789, numbered ten master brewers, headed by Reuben Haines, and followed by seventy-two journeymen. The mottoes were—"Proper Drink for Americans;" "Home-brewed is best," etc. The census of 1810 returned forty-eight brewers in the State, of which eleven were in Philadelphia City, and seventeen in the county.

was then established at 10 pounds of tobacco, and of strong beer, 20 pounds per gallon.

Breweries were erected in Baltimore soon after it was laid out. About the first in that place was set up in 1744, by Messrs. Leonard and Daniel Barnetz, from York, Pennsylvania, who built a brewery at the southwest corner of Baltimore and Hanover streets. They were among the first of the German settlers in the town, which benefited by the capital and industry of that thrifty people. Several other branches of the arts were carried thither by them. William Smith and James Sterret, from Lancaster, in Pennsylvania, removed to Baltimore in 1761, where Sterret erected another Brewery, on the corner of Gay and Water streets. It was afterward burned and re-built, and burned again after the Revolution. A distillery was erected, about the same time, on the southeast corner of Water and Commerce streets, by Samuel Purviance, from Philadelphia. Only about fifteen hundred gallons and a few dozens of bottled beer were exported in 1791.

Virginia had, in 1649, six public Brew-houses; but, it was said, "Most brew their own beer strong and good." Hops were large and fair, and thrived well. "The Maize or Virginia corne," says a tract of that date, "maults well for Beer, and ripe in five moneths, set in April or May." Good metheglin, or mead,—a very ancient beverage, and formerly in Great Britain double the price of the best beer,—was made from honey. By one planter, at this time, twenty butts of cider, and, by another, forty or fifty of perry, were made in a year from the produce of their own orchards, some of which were very large.

Another account of the Province, of the same period, speaks of the maize as not less commendable for bread than for malting, and of an "extraordinary and pleasing strong drink" made from the West India (sweet) potato. The malting of Indian corn thus appears to have been common then. Hops were then cultivated with success, and eight years after, received legislative patronage. It was an early and pretty general custom in some places for families to brew their own Beer. This practice in Europe, and particularly in England, was almost universal, until late in the last century, when the exorbitant tax on barley, malt, and hops, and the increased use of tea and coffee, changed the habits of the people in that respect. In those parts of Virginia where this custom prevailed, beer was the common drink. In others, it was said, in 1656, nothing could be obtained but water, or milk and water, or "beverige." This was laid to the negligence of the "good wives" of Virginia, who were admonished that they would be judged by their drink what kind of housewives they were.[1]

(1) Hammond's Leah and Rachel.

The old English custom of leaving the brewing to the women of the household appears also to have been brought over by the colonists. The practice was, however, never very general in America, and for domestic use, various fermented liquors, from fruits and saccharine substances, supplied the place of small Beer. Peach brandy, of an excellent quality, was, during Colonial times, a household manufacture of considerable value, and more or less of it was regularly exported. It was, after simple fermentation, distilled into strong spirit. The cultivation of tobacco and a few other crops, employed the planters of Virginia and the other southern Provinces, rather than barley or wheat, and constituted the currency of the Province. Three hundred and fifty pounds of that article, including the cask, was, by an Act passed in 1662, the price of a license, to sell liquors by retail, a bond being given not to sell above the rates fixed by the Commissioners in each county twice a year. The number of ordinaries or tippling-houses was, six years after, limited to "one or two near the Court-house, unless in public places and great Roads for the accommodation of travellers." The manufacture of Beer was probably never very great in Virginia.

"The habit of the Carolinians," says Dr. Ramsey, in 1808, "is in favour of grog (a mixture of ardent spirits and water) when water is not deemed satisfactory. * * Hence breweries are rare, while distilleries are common." There was, however, a growing fondness for Beer at that time. A Brewery was erected at Camden, in that Province, by Mr. Kershaw, about the year 1760, which proved useful.

Fayetteville, in North Carolina, thirty years after, had more trade than any town in the Province, and had one or two large distilleries and Breweries, long situated in the midst of a Scotch settlement. Wine was more an object of domestic production in these Provinces; Beer, cider, etc., being imported from the northern Colonies to the Carolinas and Georgia. From the little attention paid to the production of malt liquors, strict temperance was not one of the distinguishing features of the inhabitants in early times. A large Brewery was established by Oglethorpe, in Georgia, about the year 1740, which furnished Beer for all the troops in great abundance. His efforts to keep out the use of ardent spirits were found impracticable, and, it said, his Scotch settlers and officers would withdraw from his presence to quaff their favorite whisky, at the smell of which he would denounce woe to the liquor, and which, if it came to his sight, he always destroyed.

Several circumstances stood in the way of a more extended manufacture of malt liquors in the American Colonies. Malting was not generally conducted as a separate business, as in Europe. The household brewing of small Beer was consequently not favored, and the taste for such

liquors was not formed. The heat of the summers, and the great scarcity and high cost of strong bottles for preserving good effervescing Beer, was another impediment to its manufacture, particularly for exportation. But the large quantities of vinous liquors of a pleasant quality made in families from native fruits, such as cider, perry, apple and peach brandy, currant wine, etc., of metheglin and mead from honey, of molasses and spruce beer, of distilled spirits from molasses and grain, in addition to the large importations of rum, brandy, and wine, from the West Indies and wine countries, rather formed the popular taste to these beverages, than to the more wholesome ones of Beer, ale, and porter. Pale ale and porter were first made in this country about the year 1774.

CHAPTER XII.

ESSAYS IN THE MANUFACTURE OF WINE IN THE COLONIES.

THE attempts made during our Colonial history to introduce the culture of the grape for the manufacture of Wine, were far more numerous and expensive than they were successful or encouraging. That strong efforts were made to render it a principal industry in several of the Colonies, is not surprising. Since the day when Noah "began to be a husbandman, and planted a vineyard, and drank of the wine, and was drunken," it is doubtful if any gift of the Creator has been more esteemed than the grape, or any device of man more abused, than the beverages extracted from it. The cultivation of the vine has been an object with every civilized nation of ancient or modern times.

The first explorers of this Continent found vines growing wild in the woods, and climbing upon the loftiest trees. Even the Gothlandic narratives of ante-Columbian adventures had bestowed the name of "Wineland the Good" upon some portion of the North American Continent, or its islands, which they are supposed to have visited. A large proportion of the first Colonists were familiar, in their own country, both with the use and the manufacture of Wine. Even in England the culture of the grape had existed from the earliest times, and long before the introduction of foreign Wines. Though few vineyards are now to be found in that country, they once covered large tracts of land, and furnished abundance of Wine. Although the importation of French Wines, after the Norman conquest had caused the vine to be neglected in England, the use of Wine in the beginning of the seventeenth century, was probably far more general with its population, relatively, than at present.

The hopes of profit from the manufacture in America were great, as well with the English as with the German, French, and other emigrants from Continental Europe, in proportion to the glowing descriptions given by the early writers of the abundance and luxuriance of the native vines, of the fertility of the soil, and the favorable temper of the climate. The several associations and private adventurers who at different times made settlements upon American soil, with scarcely an exception, there-

fore, either attempted, recommended, or encouraged the cultivation of the vine. In some instances the attempts involved a considerable amount of unrequited expense. It is only in our own day that a prospect has arisen of making this a Wine-producing country. The first abortive efforts to cultivate the vine with profit arose from no failure of nature to fulfill her early pledges, for her indications are seldom delusive. Late experience has shown that both soil and climate are fitted for its successful propagation. The plants, moreover, whose cultivation is now becoming a profitable business in several States of the Union, are those indigenous varieties that first trailed their rich clusters in wild luxuriance along the valleys and fertile bottoms, or clasped with fruitful embrace the tree-trunks on every sunny hill-side throughout the land. These are nearly the only ones that have been found on trial to be altogether suitable to the soil and climate of the country, and their assiduous cultivation would probably have better rewarded the attempts of the early vine-growers, than the foreign kinds which they endeavored to acclimate.

This appears to have been a principal error with the first cultivators. To this may be added a want of experience on the part of many, which was imperfectly supplied in the hireling assistance of foreign vine-dressers; ignorance of the peculiarities of American soil and climate, as well as of the habits of the native grape; and, more than all, the premature nature of the attempt. However alluring in the prospect to the Colonists two hundred years ago, Wine-making is only adapted to an advanced state of society, with accumulated capital.

As early as 1610, soon after colonization had got an effective foot-hold in Virginia, mention is made of the French, sent over for that purpose, making preparation to plant vines, which were as common as brambles in the woods. A sample of Wine from native grapes was sent home in 1612. A vineyard, as mentioned in a former chapter, was planted in that Colony by the London Company before the year 1620.

First Vineyards in Virginia.

In the following year the Company also sent thither a number of French vine-dressers, with a supply of plants or cuttings from European vines. Their favorable report of the climate and productions of the country, it is said, was highly advantageous to the cause of emigration. They represented that it "far excelled their own country of Languedoc, the vines growing in great abundance and variety all over the land; that some of the grapes were of that unusual bigness that they did not believe them to be grapes, until, by opening them, they had seen their kernels; that they had planted the cuttings of their vines at Michaelmas, and had grapes from those very cuttings the spring following; adding, in the conclusion, that they had not heard of the like in any other country."[1] The state-

(1) Beverley's History of Virginia.

ment of the Frenchmen as to the early maturity of the vines, is vindicated by the historian whom we have quoted, who avers that he had seen the experiment made both with foreign and native vines. Their want of success—for they are said to have ruined the project—renders questionable the fidelity either of their report or of their services. They had, however, succeeded in making, previous to the massacre in 1622, a small quantity of Wine, of which a sample was sent to England that year. The attention of the Virginia settlers to that industry was enjoined by the terms of their grants of land, by which means it was vainly hoped to divert them from the all-absorbing cultivation of tobacco.

Wine of good quality was made in Virginia in 1649, or earlier, by Captain Brocas, a member of the Council, who had traveled much, and pronounced the country as well adapted to Wine-making "as any in Chrissendome." But capital and skilled labor were wanting. A Tract, already quoted, was published in London, in 1650,[1] in which the author, E. Williams, elaborately argues in favor of "the dressing of vines for the rich trade of making Wines in Virginia." He states that Wine had already been made there from the wild grapes, and with his customary enthusiasm, declares that if the Candian, Calabrian, or other European grapes of the same latitude were cultivated in Virginia, it would enrich the province, excite the envy of France and Spain, and afford the finest Wines for the markets of northern Europe, China, and the West India islands. He advises that every planter be required at once to plant a nursery, and, as soon as possible, a vineyard; that European vine-dressers be employed, and encouraged by a participation in the profits of the vintage; and that, for their security, written contracts should be made whereby the planter might be prevented from violating his engagement, and compelling the vignerons to labor in the capacity of slaves, which had been a cause of previous failures in Wine-making; that well-digested instructions in all parts of the business should be prepared and printed for circulation among the planters, to give "competent knowledge in the mystery." Had all this been done, as intended, the "country had not hung down its desolate head as of late, nor had the poor planter (who usually spends all the profits of his labor in forraigne wines) been impoverished by the want of it." In the following year premiums were offered in the Colony to encourage renewed attempts in the vine culture.

The more rugged but virgin soil of New England was found teeming with a like abundance of native grapes; and Governor Winthrop was thence induced, almost as soon as he landed, to begin the cultivation. "Excellent vines are here up and down in the woods," it was said, in 1630; "Our Governor hath already planted a vineyard,

Vineyards in N. England.

(1) Force's Collection, vol. iii. No. 11.

with great hope of increase."[1] Master Graves, "Engynere," declared the grapes were the largest he had ever seen, some of them "foure inches about." Mr. Winthrop seems so far to have succeeded as to look for an annual yield, however small, from his vineyard. The rental of Governors Island, in Boston Harbor, granted to him in 1632, on condition that he should plant thereon a vineyard or an orchard, was, in 1634, a hogshead of Wine yearly.

It is not probable that attempts to manufacture Wine in New England were long persevered in. Within a very few years its increasing foreign commerce afforded a cheaper and readier means of supply. Its exports of fish, lumber, pipe-staves, bread-stuffs, and other produce, to the West Indies, to Portugal and Spain and the Wine Islands, had, by the year 1645, become so considerable as to furnish the principal supplies to some of them, and to enable the traders to be amply supplied with the peculiar products of those countries as profitable return cargoes. The importation of Wine, in particular, had recently become excessive, and the General Court of Massachusetts, in that year, deemed it proper to impose a duty of ten shillings upon every butt of Spanish Wine landed there. The revenue was for the support of government, fortifications, and the harbor defenses. In the following spring several ships arrived, bringing eight hundred butts of Wine. Having lost much by leakage, and meeting with a bad market, they refused either to pay the impost, or to give an account of a portion which had been already landed; in consequence of which, the latter was forfeited. As the importation had been made in ignorance of the tariff, the Court, on petition, remitted the forfeiture and one-half the duty. But the merchants still refused to submit to the impost, and their best Wines were seized to satisfy the demands of the law. This act they conceived to be a gross wrong, as the balance of the invoice became unsaleable by the withdrawal of the better qualities, and they threatened to obtain redress in some other way, but with what success we are not informed.

"But too much indulgence in that way," says the historian, "opened a door to encouragement to Wine merchants, who have since filled the country with that commodity, to the overflowing of luxury and other evils; whereas, had there been a greater impost laid thereon, it might have turned the stream of traffic into another channel, that might have been much more beneficial to the place."[2]

(1) Higginson.

(2) Hubbard's New England.—The evils here hinted at very early disturbed the good order and enfeebled the industry of all the colonies. It was not repressed by the terrors of the Puritan Code, which decreed that "drunkenness, as transforming God's image into a beast, is to be punished with the punishment of beasts; a whip for the horse, and a rod for the foole's backe." It was greatly

Vines were sent in 1642, to New Netherlands, by Van Rensselaer, for the use of his Colony on the Hudson, where he wished to introduce the cultivation of that plant and of madder. The vines, as his commissary wrote him, were all killed by the frost, "like others brought to the country."

The propagation of the grape-vine was also enjoined upon Colonel John Printz, who arrived the same year, with a commission from Queen Christina, as Governor of the Swedish Colony on the east side of the Delaware, for the support of which she made large appropriations out of her revenue from tobacco. Campanius mentions a number of places in that Colony where native grapes, white, red, brown, blue, and black, grew in great profusion, and that the inhabitants only needed to be informed how to press them.[1]

A letter in Plantagenet's Description of New Albion (in Delaware), from Robert Evelin, who had resided several years in the country, describes (1648) a valley, called Uvedale, where the vines ran upon the mulberry and sassafras trees, and bore four sorts of grapes, which he quaintly describes as follows:—"The first is the Thoulouse Muscat, sweet-scented; the second, the great Foxe and thick grape, after 5 moneths reaped, being boyled and salted, and well fined, it is a strong

increased by the peculiar nature of their first commercial pursuits. The Indian and African trade, on the one hand, required, as they were conducted, large quantities of Rum. The commerce with the West India islands and the Wine countries, on the other, gave them facilities for obtaining rum, brandy and Wine, and molasses, which they converted into rum. Many efforts were made to circumscribe the use of these articles by confining their sale to licensed dealers, restricted by certain limitations. In 1639, John Charles, of Norwich, Connecticut, was forbidden to draw Wine, "because there hath been much disorder by it." The present arts of adulteration seem to have been quite early known. Johnson, in 1645, numbers among the trades of New England "divers shop-keepers, and some who have a mystery beyond others, as have the vintners."

(1) Campanius is believed to have had no personal knowledge of the country, and is prone to relate extraordinary things. He says, the Swedes found, at Christina, a grape vine two ells in thickness, which thickness had not been found in a grape vine any where else. Among the gigantic vegetable growths of California, however, a vine is said to exist near Santa Barbara, in Los Angelos, the main stock of which is ten feet in diameter. Seven thousand clusters of grapes were counted upon it. That State promises soon to be the most productive in Wines of any other in the Union, and to equal her gold mines in the value of the product of her vineyards. The increase of vines, for the last few years, has been over fifty per cent. annually, and at its present rate, will, in twenty years, produce Wines of the value of fifty millions of dollars a year. The largest vineyards are in the county above mentioned, where some already contain over forty acres. Los Angelos produced, in 1857, 350,000 gallons of Wine. The number of grape vines in the State, in 1856, was 1,540,134; in 1858, 3,954,548, of which 1,650,000 were in Los Angelos alone. The aggregate, this year will exceed, it is supposed, six millions.

red Xeres; the third, a light claret; the fourth, a white grape, creeps on the land, maketh a pure, gold-color white Wine. Tenis Pale, the Frenchman, of these four made eight sorts of excellent Wine; and of the Muscat, acute-boyled, that the second draught will fox a reasonable pate four moneths old, and here may be gathered and made two hundred tun in the vintage moneth, and replanted will mend." He speaks of two other valleys above Uvedale, likewise abounding in the same grapes. A duty of 3*d.* per gallon was, in 1715, laid on Wine and rum imported into Maryland, except from England, and such as was imported in vessels built and owned in the colony.

Vineyards in the Carolinas.

The cultivation of the Wine-grape was a prominent object in the settlement of Carolina, about the year 1670, under the grant from Charles the Second to the Earl of Clarendon and others. The proprietaries, four years after, sent over vines and other plants, with persons qualified to manage them. But there are few records preserved of the first settlement in the province.

In 1679, a second unsuccessful, because—like all others at that period—a premature attempt was made by the King to introduce into that province the manufacture of wine, oil, silk, and other southern productions. Two vessels were fitted out, in which were sent a number of French Protestant Refugees. The present city of Charleston was founded the following year.

The commencement of the attempt to make Wine seems to have been encouraging. "Some of the Wine," says a writer in 1682, in reference to it, "has been transported for England, which, by the best palates, was well approved of, and more is daily expected. It is not doubted, if the planters as industriously prosecute the propagation of vineyards as they have begun, but Carolina will, in a little time, prove a magazine and staple for Wine to the whole West Indies." The vines sent by the proprietors, he states, embraced the Rhenish, Claret, Muscadel, Canary, and other kinds. Additional emigrations of Dutch, French, and other European people, some of whom were skilled in the grape culture, engrafted their industry upon the Colony. Sir Nathaniel Johnson, who settled in the Province in 1689, made an essay in vine-growing, and succeeded in making some small quantities of Wine. About the year 1690, King William sent large numbers of the persecuted French refugees into Virginia. Others of the same class, possessing both property and industry, purchased land of the proprietors of Carolina, and settled, some on the Santee river, and others, who were mechanics, in Charleston. Renewed efforts were made by them to manufacture Wine, in which they were partially successful. In 1696, they were naturalized by an Act of the Carolina Legislature, as were those of Virginia by a law passed in 1680. In

intelligence, industry, and good conduct, these exiles were among the most valuable accessions made to the population of the Province. But Carolina now bears, in her family names, ampler traces of the Huguenot race and lineage, than she does in the richness or the antiquity of her vintage. Her fertile savannahs were destined, ere long, to furnish a more valuable staple than even Wine and oil for the food of mankind, and her uplands, in process of time, to whiten with a richer product than silk for its clothing. Had success attended the early efforts to cover the country with vineyards, to the extent which the present shows to be practicable, it is impossible to say how far it might have affected the economical condition, not only of Carolina and the South, but of the world, by retarding the introduction of rice and cotton, which were then considered of little value in comparison.

Wherever the Huguenots settled in America they bore along with them their country's vine, and sought to clothe the fertile bottoms and sunny slopes of their wilderness-home with the purple of their ancestral vales. Between eleven and twelve thousand acres, in the township of Oxford in Massachusetts, was, in the year 1684, set apart for the use of thirty families of that people, who had escaped from the persecutions of Louis XIV. Here they set up mills, planted vineyards and orchards, of which traces still remain, and were invested with the elective franchise by an Act of the Legislature. But the settlement was broken up in 1696, by the Indians, and some of them settled in Boston. The names of Boudinot and Faneuil appear among the number, and rank with those of Laurens, in South Carolina, and Jay, in New York, as public benefactors; while not a few among the less distinguished are still recognized throughout the country. The tribute of Mrs. Sigourney, a name of the same respectable origin, to the memory of the Huguenots of Oxford, on visiting a vine of their planting, was merited by the virtues of a people to whom

> "Full many a son
> Among the noblest of our land looks back
> Through time's long vista, and exulting claims
> These as their sires."

By William Penn, the hope of successfully introducing the manufacture of Wine, appears to have been warmly cherished. The following extracts from his description of the Province, addressed to the "Free Society of Traders," in London, dated 16th of 8th mo., 1683, and from his other correspondence, will show his ideas on the subject:—

Penn's attempts to manufacture Wine.

"The great red grape (now ripe) called by ignorance the fox grape, because of the relish it hath with unskilful palates, is in itself an extraordinary grape,

and, by art, doubtless may be cultivated to an excellent Wine, if not so sweet, yet little inferior to the Frontinac, as it is not much unlike in taste, ruddiness set aside, which in such things, as well as mankind, differs the case much. There is a white kind of Muscadel, and a little black grape, like the cluster-grape of England, not yet so ripe as the other, but they tell me, when ripe, sweeter, and that they only want skilful *vignerons* to make good use of them. I intend to venture on it with my Frenchman, this season, who shows some knowledge in these things. . . . . It is disputable with me, whether it be best to fall to fining the fruits of this country, especially the grape, by the care and skill of art, or send for foreign stems and sets already good and approved. It seems most reasonable to believe that not only a thing groweth best where it naturally grows, but will hardly be equalled by another species of the same kind that doth not naturally grow there. But, to solve the doubt, I intend, if God give me life, to try both, and hope the consequences will be as good Wine as any of the European countries of the same latitude do yield." * * * *

"Whatever tends to the promotion of the Wine, and to the manufacture of linen in these parts, I cannot but wish you to promote; and the French people are most likely, in both respects, to ensure that design. To that end I would advise you to send for some thousands of plants out of France, with some able vignerons, and people of the other vocation."

The French, of whom he speaks, were probably from Carolina, where they had long been bitterly persecuted by the Anglican population. It was not until 1696, that their singular forbearance and worth to that Colony, procured, from the Assembly, in answer to their petition, the tardy justice of an Act of incorporation with the freemen of the province.

The soundness of Penn's reasoning upon the habitudes of plants, and the doubtful expediency of attempting to supplant the indigenous vine by the acclimation of foreign species, has been almost uniformly attested by the subsequent experience of vine-growers in different parts of the country. French, German, and other experienced and skillful cultivators of the vine, have repeatedly failed to introduce, on any extensive scale, the culture of the European plant; and the conclusion to which science and observation seem equally to have led is, that American vines only can be profitably cultivated on American soils.

To the Marquis of Halifax he writes, 9th, 12th mo., 1683,—"The Germans are fallen upon flax and hemp; the French, on vineyards. Here grow wilde an incredible number of vines, that tho' savage, and so not so excellent, besides that much wood and shade sower them, they yield a pleasant grape, and I have drunk a good clarett, though small and greenish, of Capt. Rappe's vintage of the savage grape."

His intentions were afterward carried into execution upon his Springetsbury estate, in Penn Township, in the northwestern part of the present City of Philadelphia, toward the Schuylkill, where a vineyard was planted

by his direction, upon an eminence afterward known as "Vineyard Hill." To conduct the business, he sent to France for a person qualified, and sustained him at considerable expense. He subsequently wrote, in reference to it, as follows:—"I writ that regard should be had to Andrew Doze about the vineyard. I know it is a charge, but if Wine can be made, it will be worth the Province thousands by the year, for many Frenchmen are disheartened by the Carolinians. In seven years there would be hundreds of vineyards, if the experiment takes; and I understand, by Patrick Lloyd and Dr. More, that he produced ripe grapes the 28th of the 5th month, '86, when the roots were but fifteen or sixteen months planted. 'Tis an high character of the country, and Andrew Doze, I am told, say'd he deserved the place, paying me only an acknowledgement in Wine." He afterward writes, "All the vines sent in this vessel are intended for Andrew, on the Schuylkill, for the vineyard. I could have been glad of a taste last year, as I hear he made some." It is not known how long he persevered in the enterprise; but it is believed not to have been rewarded by any success, and to have been abandoned as early as his second visit, in 1695. The vintage probably never warranted the advice of Pastorius, who, in view of the attempt, wrote his friends that they had better send along a supply of Wine-barrels and vats of various sizes.

In the absence of the proprietor from the country, it is not very surprising that an undertaking beset with difficulties should have failed notwithstanding the pecuniary ability of the projector to sustain it.

An English writer, sometime resident in the Province after this time, speaks of several excellent native grapes, from which good Wine had been frequently produced by skillful vignerons, and of the encouraging prospects of ample supplies of Wine, for their own use and for exportation. The Wines, as being more pure, were more wholesome, and the trade of sophisticating liquors, as practiced in England and Holland, he vainly believed, would, from the native honesty of the people, long remain, as it then was, unknown in the Province. The excellent cider of Pennsylvania and New Jersey, which then sold at from ten to fifteen shillings per barrel, is also mentioned. Peach brandy and perry were made in both Provinces.

The amount of Wine and spirituous liquors consumed in the Province, within twenty-five years after Penn's arrival, may be inferred from the importation of those articles. In the first ten months of the year 1711 upwards of 68,000 gallons of Wine,—of which 59,000 gallons were direct from the Wine countries, and 383,000 gallons of rum were imported into Philadelphia. The rum was chiefly from the West Indies, and was mainly for the support of the contraband trade with the Indians, and shows the

extent to which the Province was already engaged in both species of traffic.

On the settlement of Georgia, the last colonized of the original thirteen States, in 1732, similar attempts were made to produce, at the outset, Wine, silk, and oil. Foreign vine-dressers were sent thither by the trustees of the Province, who attempted the cultivation of vines and other southern products. The injudicious restrictions imposed by its humane founder upon the industry and trade of the Colony, long operated unfavorably to the progress of improvement, notwithstanding the liberal appropriations of the British Parliament in aid of their enterprise. The spot selected for the experiment, near Savannah, called the Trustees' Garden, was also unwisely chosen. The soil proved too dry and sterile, and notwithstanding the care of an experienced cultivator, Thomas West, both vines and mulberry trees proved a failure. The project was abandoned, and the settlers sought homes under fewer restraints in neighboring Provinces.

Abraham De Leon, a Jew, who had acquired experience in the business in Portugal, cultivated grapes in his garden, in Savannah, where he was a freeholder. The Oporto and Malaga grapes were raised with great success by him. He solicited a loan from the trustees in England of two hundred pounds sterling, without interest, for three years, pledging himself to employ it and an additional sum of his own in bringing from Portugal vines and vignerons, and to return the money within the time mentioned, and to have growing in the Colony forty thousand vines, which he would supply to the freeholders at a moderate rate. The proposal was accepted, but the remittances were never made, and the project was abandoned.

In 1764, two ship-loads of Palatines were sent to America by George III., and were landed at Charleston. The Assembly of the Province voted five hundred pounds to be distributed among them, and assigned them lands adapted to the culture of silk and Wine, with which they were acquainted, and, it was hoped, would attempt.

The efforts to introduce successfully the Wine-manufacture in the Colonies was, at this period, when her dependencies had become of immense value to Great Britain, regarded with much interest. It was a favorite policy of the nation to become, by means of the Colonies, as independent as possible of all foreign countries in regard to articles she was compelled to import. The vast sums yearly paid to France for Wines and liquors, were paid reluctantly. All the valuable staples of the American Provinces were, moreover, secured to her markets by the provisions of her Commercial Code. The Navigation Act gave England the exclusive right of supplying Wines, among other articles, to the Colonies. But the

right of exporting non-enumerated articles to ports south of Cape Finisterre, enabled them to obtain Wines from the place of growth, in contravention of the trade Acts. The heavy duty on Wines imported direct from England, only a part of which was drawn back, still further diminished the trade in Wines between England and her Colonies. On the termination, in 1763, of the old French War, during which the officers found an almost universal taste for Madeira Wine in the Provinces, all the duties were allowed to be drawn back, except £3. 10s. per tun,—on all but French Wines, which it was not advisable to encourage,—on exportation to the Colonies. Madeira, Fayal, and Lisbon, Teneriffe and Sherry, were the kinds principally in use, therefore, before the Revolution.

In 1766, the Society instituted at London for the encouragement of Arts, Manufactures, and Commerce, offered a list of premiums for the advantage of the North American Colonies, upon such articles as it was hoped might be produced there. Among these, were premiums of £300 sterling to the person who should be in possession of a vineyard or plantation in any of the Colonies on the Continent of North America, southward of the Delaware, consisting of the greatest number of vines (not less than fifty) actually producing the true Malaga grape for raisins; and £50 for a vineyard of not less than twenty-five of the same kind of plants. The Society, at the same time, offered a premium of £200 for the greatest number (not less than five hundred) of the plants of the vines which produced those sorts of Wines then consumed in Great Britain; and £50 for the next greatest number, not less than one hundred plants. These last were offered to any of the Colonies north of the Delaware considered as one district, or south of the Delaware considered as one district, and to the Bermuda islands.

Whether these bounties had the effect which often followed the Society's announcements of rewards in other branches, we are not aware. We have seen no account of any awards made in that branch. The attention of many intelligent persons was, however, called to the subject, among whom were some of the American Philosophical Society. Hon. Edward Antill, a member, and one of His Majesty's Council for the Province of New Jersey, prepared an essay on the cultivation of the vine and the making and preserving of Wines, suited to the different climates of North America. It embraced full, practical details on the subject of the vineyard, and the manufacture of Wines, and, after his death, it was communicated by Mr. C. Thompson to the Society, and published in the first volume of its Transactions, in 1771. The same volume contains a memoir on the distillation of Persimmons, by Isaac Bartram, and a letter from Bethlehem, Pennsylvania, on the manufacture of currant Wines, which had been for some years carried on at that place, quite successfully, by the Mora-

vians. Its cost was about 6*d.* the quart. Red currants were considered preferable to the white. In the domestic manufacture of currant Wine from the red, white, and black currant, which was made to a considerable extent, Mr. Coxe, in 1810, considered each family in the United States could on an average, easily make two barrels, or sixty-three gallons, annually, which would yield sixty-three millions of gallons, or nearly twelve times the quantity of wine imported, and twenty-three times the amount consumed in the country. It was recommended as a more profitable business, to be pursued on a large scale north of the Chesapeake, than the cultivation of the European Wine-grape.

The early French writers gave exaggerated accounts of the vines of Louisiana, and two valuable varieties, the *Vitis æstivalis* and *V. riparia*, are indigenous to the banks of the Ohio and the Mississippi. In 1769, the French on the Illinois river made one hundred and ten hogsheads of well-tasted and strong Wine from the native grape of that region. In the same year, Richard Henry Lee, of Virginia, sent a cask of Wine of the last year's vintage, with a few bottles of older Wine, "from our native grape," as a present to Dr. Fothergill of London. Some of the French people who had settled in Virginia and Carolina at an earlier period, kept up the manufacture of Wine on a small scale, until the Revolution put an end to the business, which gave promise of becoming increasingly valuable. A red Wine, little inferior to Burgundy, was mentioned by a writer, in 1774, as the product of Carolina. The first overt act of the revolutionary drama was the seizure, in June, 1768, of the sloop Liberty, belonging to Mr. Hancock, in the Harbor of Newport, Rhode Island, for a violation of the revenue laws, in landing a cargo of Wines from Madeira without having entered the whole. A large part of the Wines consumed in the Colonies—except those from Madeira, which for a long time came free, but then paid about £7 per tun duty—had been thus obtained by evasions of the customs. But Government was now vigorously enforcing the Trade Acts, and American merchants deemed it their duty as resolutely to resist them.

A few years after the Peace, a joint-stock company was formed in Pennsylvania to cultivate the grape, for Wine, on a more extended scale than had been done before. The society was incorporated in 1802, with a president, treasurer, and secretary, and five managers, and a stock of one thousand shares of twenty dollars each. They purchased land and planted a vineyard at Spring Mill, on the Schuylkill, thirteen miles from Philadelphia, where, in 1811, they had thirty thousand vines growing with good prospect of success.

CHAPTER XIII.

THE MANUFACTURE OF SALT IN THE COLONIES.

As common Salt, like iron, is an article of prime necessity, being, in its various dietetic and economical relations, almost as indispensable, and one as widely diffused throughout nature, its production was very properly an object of attention with the first colonizers in different parts of the country, as it has been with all nations ancient and modern.

The object for which this industry was mainly undertaken and prosecuted was to supply the fisheries which it was designed to carry on in the bays and on the coasts of America.

The deep-sea fishery on the coast of Newfoundland had been commenced as early as 1517, by French and Spanish ships from Biscay and the coast of Normandy. In 1578, the former nation had one hundred and fifty vessels there; the Spanish, about one hundred and twenty to one hundred and thirty, and the English from thirty to fifty sail. The first Act of the British Parliament which had any reference to America, was made in 1548, for the protection of English fishermen on that coast from the exactions of the Admiralty. At the time of the New England colonization, the British fisheries were rising into some importance. In 1622, about thirty-five English ships sailed for the coast of New England, to engage in the fishery; and in 1624, about fifty sail. In 1675, about twenty-five thousand six hundred tons of cod were obtained from the American fishery. The early voyagers to the new territories also reported the rivers, harbors, and bays to abound in fish of every description, and of remarkable excellence, inviting the line and the net of the emigrant, and promising ample returns for his labor. The first voyage of Captain Smith on the coast of New England, in 1614, was converted from an abortive search for gold into an essay in the fishing business, in boats constructed on those shores for the purpose. He then recorded the observation: "Salt upon Salt may assuredly be made, if not at the first in ponds, yet, till they be provided, this may be used,"—by which he probably meant the making it by boiling of sea water. The fisheries thus first commenced in our waters were a principal resource in the feeble years of the Colonies, and that branch of

the national industry has steadily grown to the present day. Plymouth early engaged in the business, so far as the limited means of the Colony would permit. Isaac Allerton, one of the original emigrants, and afterward a merchant among the Dutch at Manhattan, is commended by the early historians for his enterprise in the fishing business at Marblehead, which has ever since been a nursery for that hardy and useful class. The business, however, is represented by Governor Bradford, as "a thing fatal to that Colony." The Assembly of Massachusetts, in 1639, exempted from all duties and public taxes men and property employed in catching, curing, or transporting fish.

As an auxiliary to the fisheries, therefore, the Plymouth Colony, and about the same time, a fishing settlement on the site of the present city of Portsmouth, in New Hampshire, commenced the first manufacture of Salt in the Northern Colonies.[1]

First Salt-works.

This business was first begun at Cape Charles, in Virginia, sometime previous to the year 1620. But having, from some reason, been suffered to fall into decay, the works were that year, under the new hopes inspired by the grant of a Constitution, ordered to be restored upon a scale which it was hoped would not only serve the Colony, but, in a short time, the "great fishings" on the American coast. It was ordered to be made "in abundance, and after the manner of those hotter climates which may prove a great helpe to enrich the plantation." In 1633, Salt appears to have been exported from Virginia to Massachusetts.

Under a grant, made by the Council of Plymouth, in 1621, to Captain John Mason, the partial colonization of New Hampshire was two years after commenced, for the purpose of prosecuting the fur trade and the fisheries. Salt-works were accordingly erected by a company which settled at the

(1) Notwithstanding its universal use as a condiment and an antiseptic, Salt appears to have been little, if at all, used in either way by the North American Indians until they were taught by the Europeans. The tribes of South America, with a few exceptions, it is said, on the authority of Herrera, Humboldt and other travelers, preserved their meat and fish without its aid, by slicing and drying the flesh in the smoke and heat of their fires. From them is derived the method, still employed in South America, of preparing the *jerked beef* of that country. The pemmican of the northern Indians is prepared in a similar way: sometimes without the use of fire. Salt was, however, made by several tribes of the natives, and was an article of trade among them. The Peruvians made and ate Salt prepared from Salt-springs near the ancient city of Cuzco. The Florida Indians made Salt near the banks of the Arkansas, from the waters of saline springs, which they evaporated in earthen pans made for that purpose. The historians of De Soto's expedition frequently allude to the Salt thus made and moulded in earthen moulds, into small square cakes, which they exchanged for skins and mantles. Salt was brought by the Indians of Western New York from the Salines of Onondaga to Albany and Quebec, with their furs, long before the manufacture was commenced by the white settlers in 1788. Beverly relates that, in place of salt for seasoning, the Indians used the ashes of hickory, stickweed, and other plants yielding a sapid ash.

mouth of the river Piscataqua, on its southern bank, which was the commencement of the present city of Portsmouth. In the following year Salt-making was attempted in the Colony of Plymouth, whither a Salt-maker was sent from England for that purpose. A letter, of which he was the bearer, from one of the company, says: "The saltman is a skilful and industrious man; put some to him that may quickly apprehende ye misterie of it." He seems, however, to have scarcely possessed the qualities or the knowledge of the "misterie" with which he was accredited, for Governor Bradford says of him: "But he whom they sent to make salte was an ignorante, foolish, self-willed fellow; he bore them in hand he could doe great matters in making salt works, so he was sent to seeke out fitte ground for his purpose; and after some serche he tould ye Governor that he had found a sufficiente place, with a good bottome to hold water, and otherwise very conveniente, which he doubted not but in a short time to bring to good perfection and to yeeld them great profit, but he must have eight or ten men to be constantly imployed. . . . . But he was after some triall so confidente as he caused them to send carpenters to rear a great frame for a large house to receive ye salte and such other uses. But in ye ende all proved vaine. . . . . For he could not doe any thing but boyle salte in pans, and yet made them y^t^ were joyned with him beleeve there was so grat a misterie in it, as was not easie to be attained, and made them doe many unnecessary things to blind their eys till they discovered his subltie. The next year he was sent to Cape Ann, and ye pans were set up there, where the fishery was, but before somer was out he burnte the house, and the fire was so vehemente as it spoyld the pans, at least some of them, and this was the end of that chargeable business."[1]

In the more extended and efficient scheme formed in 1629 for the settlement of the colony of Massachusetts Bay, a judicious intermixture of the most needful classes of trades-people was secured, by the attention of its managers. Among these were a number of fishermen, furnished with a supply of salt and outfits for the business, and several whose business had an especial relation to that industry.[2] The company after-

(1) Bradford's History of Plymouth.

(2) Among these may be mentioned, as being some of the earliest at their trades, James Edwards, who united the callings of sailor, cooper, and cleaver, whose wages were to be, for three years' service at Salem, ten, fifteen, and twenty pounds respectively. Sydrach Miller, in the same business, was engaged with his man for £45 the first year, and £50 the second and third years, "to be at charges withal." A regard for the good order and industry of the community of which they were the guardians, caused them to dismiss two fishermen for immorality before the sailing of the ship. In their letter of instructions to Governor Endicott, they direct semi-annual reports to be made of the labor of each person; and for the prevention of idleness and irregularity, it was recommended that a house of correction be

ward sent out Thomas Graves, an engineer, as one skilled in salt works. The action of the Court of Assistants, at their meeting in March, 1628–29, was as follows: "Touching making of salt, it was conseued ffytt that commodetty should be reserued for the general Stocks benefitt, yeet with this proviso that every planter or brother of the company should haue as much as he might aney way haue occasyon to make use of, at as cheape rate as themselves could make it: provided, if the company bee not sufficiently provided for themselffs, their particular men may haue liberty to make for their own expence and use aney way, but not to transport nor sell."[1]

The manufacture of Salt has now become, through the aid of modern science and skill, so much improved and extended, and its supply so constant, abundant, and cheap, that we are scarcely prepared to understand why so much importance was then attached to it, and its manufacture and sale inhibited to private enterprise. But in the fiscal and commercial regulations of most nations of ancient and modern times, Salt has held a very prominent place. In many it has been the subject of monopolies, duties, and taxation, often of a most injurious kind. The salt works of Ostia, at the mouth of the Tiber, were established about 130 years after the founding of Rome; and a hundred years later, on account of the high price demanded for salt, the right of vending it was transferred from private hands to the Roman State.[2] The manufacture and the duty levied upon salt is supposed to have been an important source of the revenue and commercial power of Rome. Much of the maritime influence of Venice, in more recent times, has been ascribed to her salt works. One cause of the revolution in France, in the last century, is believed to have been the oppressive nature and enforcement of the salt code formerly existing in France. The commercial prosperity of both England and France has been stated to bear a constant relation to their salt-producing capabilities. In the last named country, in Austria, and some other countries, the manufacture of Salt is at this day a government monopoly, as are the Saline Springs of the State of New York. The amount annually paid by the United States for imported salt—which, notwithstanding its constantly increasing production for many years past, and the ample facilities which exist for meeting the entire home demand,

set up. They afterward renew their counsels against idleness, in these prudent terms: "We may not omitt, out of zeal for the generall good, once more to putt you in minde to bee very circumspect in the infancie of the Plantation, to settle some good order whereby all persons resident upon our Plantation may apply themselves to one calling or other, and noe idle drones be permitted to live among us; which if you take care now at the first to establish, it will be an undoubted means to prevent a world of disorder, and many grievous sinns and sinners."

(1) Felt's Annals of Salem, 152.

(2) Livy, lib. i. 33, ii. 9.

and a large export trade in addition, still amounts to more than half the total consumption of the country—renders it deserving of more attention than it receives. The manufacture, moreover, offers an inviting field for the employment of capital and of invention.

Exigencies have repeatedly arisen, in the history of this country, through the constraints of trade and the privations of new settlements, when the want of this great essential has been severely felt. Its price has occasionally risen to three, five, and even twelve dollars per bushel. Any general interruption of the foreign trade of the country would even now cause much distress, by suddenly arresting the supply of Salt. Considerably more than one-half of that imported into the United States is derived from Great Britain, where the Salt manufacture and trade is very extensive.

At the time of which we are writing, mines of rock salt had not been discovered in that country. The principal supply of salt was obtained by boiling sea-water, which was commenced at Lyme over 800 years before; but the product was, until a comparatively late period, quite impure. A better article was obtained from France, where the making of salt by solar evaporation was earlier practiced. This process, as conducted on the opposite coast of France, enabled the manufacturers, about the middle of the last century—according to Dr. Campbell[1]—to make, in two weeks of a dry summer, a sufficiency of salt for the supply of the home and foreign markets of the kingdom. In England the article was subject to a duty, which formed a branch of the Royal revenue. The amount of this duty in 1694 was 3s. 4d. per bushel of 56 lbs. But by numerous statutes regulating its manufacture, sale, and taxation, it was increased in 1798 to 5s., and eventually to 15s. a bushel, or forty times its original cost. This exorbitant tax at length, in 1823, procured its total repeal.[2]

This branch of industry which the government of Massachusetts reserved for the future emolument of the Company, appears to have been placed, after the transfer of authority from London to the Colony, upon the same footing as others. It was commenced in the town of Salem, in 1636, apparently by private enterprise, under leave from the General Court. In June, 1631, some French people arrived, as mentioned in Prince's Chronology, in an English ship, at Piscataway, to carry on the salt-making. This we suppose to have been at the mouth of the Raritan, in New Jersey, although there was a place anciently of the same name in Maryland.

Samuel Winslow, in June, 1641, obtained from the General Court of

(1) Campbell's Political Survey of Great Britain.

(2) McCulloch's Commercial Dictionary.

Massachusetts, the exclusive right for ten years of making salt by a new method, provided he set it up within a year. The same year John Jenny, an enterprising citizen of Plymouth, was allowed, at Clark's Island, "the first land that received the footsteps of the Pilgrims," certain privileges to make salt, which he was to sell to the inhabitants at two shillings per bushel. With him were associated four partners, and the grant embraced thirty acres of land and the sole privilege for twenty-one years.

These attempts were inadequate to the supply of the community, and the scarcity of salt in Massachusetts, and the outlying settlements a few years later, was a cause of much anxiety. It could scarcely be otherwise, so long as the country was dependent upon distant and foreign sources for the supply of an article so important, and liable to all the contingencies of mercantile speculation and uncertain navigation. Hence we find Governor Winthrop writing in November 16th, 1646, to his son at Fisher's Island, near Pequod River: "Here arrived yesterday a Dutch ship of three hundred tons, with two hundred and fifty tons of salt, sent by Mr. Onge, from Lisbon, so as salt was abated in a few hours from thirty-six to sixteen a hogshead. We look to it as a singular providence and testimony of the Lord's care of us."[1]

The importance of an increased domestic production of salt, induced the younger Winthrop, soon after to come forward with a proposition to manufacture the article by a new method. It was therefore enacted by the General Court, in March, 1647–8, that "upon treaty with Mr. Winthrop, touching the making of salt out of meer salt water, for the use of the country, it is apprehended and assented by both parties, that for incouragment of the said worke, being of so general concernment, it is enacted by authority of this Court, that for so many families or households as are resident within this jurisdiction, Mr. Winthrop shall be paid after the next harvest, so many bushels of wheate or of other corne and wheate to the value of wheate, yet so as the one half of it be in wheate certaine upon the delivery of so many bushels of good white salt at Boston, Charles Towne, Salem, Ipswich, and Salsbury, to be received and paid for by the Commissioners for public rates upon two months' notice given by Mr. Winthrop—the constables shall have power to levy it. The second year the commission shall receive and pay for two bushels of salt for each family, at the price of 3*s.* a bushel, and for other two years, the commission shall take of, and make payment for two hundred tons of salt at 2*s.* per bushel, at such Salt worke as said Mr. Winthrop shall appoint, and he shall have leave to erect works in any place or places in the jurisdiction not appropriated, etc." In the following May, the Court granted Mr. Winthrop three thousand acres of land at Paquatuck, the

(1) Savage's Winthrop Appendix.

grant to be void, "provided that he set not up a considerable salte worke, we meane to make one hundred tun per annum of salt between the Capes of Massachusetts Bay, within three years next coming."[1]

We are not informed what success attended this enterprise. It was probably encouraging, since the same authorities in May, 1656, granted the proprietor for twenty-one years, the exclusive privilege of making Salt "after his new way."

Again, in May, 1652, Salt-works were ordered to be set up at Cape Ann, which had been included in the grant to Mason, but was now reunited to Massachusetts. A proposition was made by Edward Burt, to manufacture Salt at that place by a new method, for which he asked and received permission of the Court, "provided he make it only after his own new way." His grant was made for ten years.

He was at the same time refused the use of two islands near Salem for that purpose, "as prejudicial to the town in divers regards."[2]

It was about this date that the rich Salt Springs of Western New York, one of the principal sources of domestic supply at the present time, were first brought to the knowledge of European settlers through the French Jesuits, who were prosecuting their perilous missions in the country of the Onondagoes and the Iroquois. Father Lallemont is believed to have been the first to mention them. But, on the 16th August, 1654, ten days after his arrival among the Onondagoes, they were observed by Pere Le Moyne, who carried back to the Governor of Canada, a sample of the curious product of the Springs. His discovery is thus recorded in his journal of that date: "Le 16, Nous arriuons a l'entrée d'vn petit lac, dans vn grand bassin a demy sèche; nous goustons de l'eau d'vne demon qui la rend puante; en ayant gousté ie trouvay, que c'estoit vne fontaine d'eau salee, et en effet nous en fismes du sel aussi naturel que celuy de la mer dont nous portons une montre à Quebec. Ce lac est tres poissonneaux en truites saulmonnees et autres poissons." Father Le Moyne, four years after, communicated a knowledge of the existence of these salines to the Rev. Mr. Megapolonsis at New Amsterdam, who, in conveying the intelligence of so strange a discovery to his classis at Amsterdam, reservedly adds, "whether this be true, or whether it be a Jesuit lie, I do not determine."[3] Though previously used by the Indians, to a small extent, the springs were not turned to any account in the manufacture of Salt by the white population until near a century and a half after they were first noticed by the French. About the time of this discovery also (1657), during the Directorship of Stuyvesant, Salt-

Discovery of Salt Springs in N. York.

(1) Colony Records, ii. 229.
(2) Colony Records, iii. 275.
(3) O'Callaghan's New Netherlands, ii. 303.

works are mentioned as existing in the Dutch Province within a day's sail of New Amstel (New Castle), on the Delaware, at which ships stopped to complete their lading. As early indeed as 1649, it was charged against the West India Company's servants, by delegates sent to the States General, that they had made useless expenditures of the public money, by the erection of Salt works and in other manufacturing enterprises in the Province. In 1661, Dirck de Wolff, an Amsterdam merchant, obtained for seven years the exclusive right of making Salt in New Netherlands. In aid of the undertaking, he received a grant of Conyen (now Coney) Island from the Dutch authorities. But the island being claimed by the English inhabitants of Gravesend, on Long Island, who were then in rebellion against the Dutch sovereignty, the agents of De Wolff had no sooner erected their pans and commenced operations, than all their improvements were laid waste by the Yankees. Their threats of as summary punishment of the intruders in case they attempted to restore them, were only silenced by the presence of a military force. The outlays of the proprietor were lost, and his project was not revived.[2]

Salt was in 1654, subject to a duty in New Netherlands of twenty stivers (forty cents) per bushel, but the duties on imports were the next year reduced to ten per cent. Its price between the years 1630, and 1646, in the patroonery of Van Rensselaer on the Hudson, as shown by the account books, was seven florins thirteen stivers per ton for imported white Salt, or two florins twelve stivers per half barrel, the florin of twenty stivers being equal to forty cents. In 1660, William Beekman, Vice-Director on the Delaware, in a letter to Stuyvesant, complains of the price of Salt being "exceedingly tough, asking three to four guilders for a single schepel," (three pecks.)[3] The year following was one of great scarcity in New Netherlands, and Salt was sold at twelve guilders (four dollars and eighty cents) the bushel at New Amsterdam. The high price of the article was probably the inducement which De Wolff found to attempt the manufacture in that year.

In the Navigation Act of 1663, which prohibited the importation into the Colonies of any of the manufactures of Europe, except through the ports of Great Britain, an exception was made in favor of Salt intended for the fisheries of New England and some other places, and of wines from Madeira and the Azores. These might be carried direct in ships navigated according to the laws of trade. The provisions of this clause were afterward, by an Act of Parliament, in 1727, extended also to Pennsylvania, and subsequently to New York.

(1) Hazard's Annals of Pennsylvania, 239.
(2) O'Callaghan's New Netherlands, ii. 452.
(3) Hazard's Annals of Pennsylvania.

The General Court of Virginia, in 1662, enacted that, after the first September, 1683, no Salt should be imported into the county of Northampton, "under penalty of confiscation of ship and goods, to the end that E. S., who hath erected a Salt-work in those parts, may be encouraged in his endeavours to promote the good of the country." The works were the property of Colonel Scarborough, and were situated at Accomack, on the eastern shore of the Chesapeake, where the manufacture of Salt had been commenced over forty years before. But not answering the public expectation, the Act was repealed four years after, and the free importation of Salt permitted.

The climate of the United States, from its warmth and dryness, and the clearness of the atmosphere, is peculiarly adapted to the manufacture of Salt by solar evaporation. This hygrometric adaptation was early inferred and stated, from the fact that the fishermen of Cape Cod, in 1629, brought back from the sea-shore portions of good Salt spontaneously produced by the evaporation of water left by the tide upon the rocks and in the marshes. The latter were so encrusted that the salt adhered to the shoes of the fishermen as they crossed them.[1] "Here," writes Plantagenet, in 1648, "the glorious ripening Sunne, as warm as Italy or Spain, will bring rare fruits, wines, and such store of Aniseed and Licoras, as well as Bay Salt, made without boiling, only in pans with the Sun, that each laborer may make six bushels a day, worth in these three, twelve shillings a day."

The Swedish Government, which, in 1642, resuscitated its expiring colony on the Delaware, instructed Governor Printz to engage in the manufacture of Salt by evaporation.

In 1671, a Committee, appointed in October of the previous year, by the Court of Massachusetts, to confer with Richard Wharton, of Boston, respecting his mode of making Salt *by the sun*, reported favorably, and advised the Court "to encourage a Company for that purpose, which return the Court approved."

Salt was, in early times, made by the solar method on the shores of Long Island, by exposing sea-water in shallow vats to the action of the sun and wind. Mines of Rock Salt, of which valuable fossil deposits have of late years been found in some of our western States, were about this time (1670) first discovered in England. The following description, based on the Papers of the Royal Society, will enable us to judge of the state of this manufacture in England about the period of the revolution of 1688:—

"Tne first bed of Rock Salt had been discovered not long after the

(1) Higginson's New England Plantation.

Restoration, in Cheshire, but does not appear to have been worked in that age. The Salt, which was obtained by a rude process from brine-pits, was held in no high estimation. The pans in which the manufacture was carried on exhaled a sulphurous stench; and when the evaporation was complete, the substance which was left was scarcely fit to be used with food. Physicians attributed the scorbutic and pulmonary complaints which were common among the English, to this unwholesome condiment. It was therefore seldom used by the upper and middle classes; and there was a regular and considerable importation from France. At present, our springs and mines not only supply our own immense demand, but send, annually, seven hundred millions of pounds of excellent Salt to foreign countries."[1]

The several grants which we have mentioned of exclusive privileges for Salt-making in Massachusetts, emanating from the same legislative body, and covering the same periods, must be supposed—although the specifications have not come down to us—to refer to processes sufficiently distinct from each other and from that of Mr. Winthrop, as not to conflict. They are, at the same time, an evidence that a spirit of enterprise and of improvement was already awake in regard to the supply of an important commodity.

Mr. Winthrop, at least, may be supposed to have been acquainted with all the latest improvements in the Salt manufacture, both in England and on the Continent, where he had traveled much. He was a man of learning and genius, of an active and inquisitive mind, and beside being himself a chemist, was the intimate friend and correspondent of Robert Boyle—then engaged in investigating the properties of sea water and kindred subjects—and of many of the first chemists, naturalists, and philosophers of the age. With several of these he was associated, in 1660, in the formation of the Royal Society, of which, the published Transactions contain several of his contributions. His enterprise and love of experiment, as well as many other considerations, would lead him to adopt, in the new home of himself and family, such recent improvements as belonged to a manufacture in which he was interested. The encouragement given him by the local authorities was a judicious one. But of the nature of those improvements we have now no means of judging.

About the year 1689, Sir Nathaniel Johnson, who had been several years Governor of the Leeward Islands, "being fond of projects," as we are informed, took up his residence in South Carolina, as having a climate favorable to his views. In addition to the cultivation of silk, rice, wine, etc., he there turned his attention, also, to the

Salt-works in South Carolina.

(1) Macauley's Hist. England, ch. iii.

THE STATE HISTORICAL SOCIETY OF WISC. shs 1945

manufacture of Salt. He named the place selected for his experiments on the Sewee Bay, the "Salt Ponds." But what success attended his efforts is not known. The Legislature of that Province, in 1725, enacted two laws to encourage the making of Salt in the Colony.[1]

In 1746, John Jerom and Stephen Jerom, Jr., proposed to set up "evaporating pans for the making of Salt in Connecticut."

Similar attempts continued to be made in different parts of the country, with more or less encouragement from local authorities, to produce a supply of this great essential, until after the Revolution. Small Salt-works were erected, and existed for a time, along the seaboard, for boiling sea water, which the cheapness of fuel rendered more common than that of evaporation by solar heat. The consumption of Salt was always large in the country. The extent of the fisheries, the large amount of salted provisions consumed and exported, and the practice of dispensing it to cattle, created a large demand.

The principal supply of Salt, before the Revolution was obtained by the numerous lumber, provision, and tobacco ships, which traded to Spain, Portugal, France, the Wine Islands, and other Salt-producing countries in Europe, and to the West Indies. The provincial exports being bulky, and the return cargoes much less so, Salt, for the fisheries, was usually taken in as ballast, or as a part lading. Although the article did not pay as a full cargo, its high price, and its supposed benefit to the ship timbers, rendered it acceptable and profitable as part freight. Fine Salt, of a higher price, for culinary use, was obtained in small quantities from England, but was not well suited to the fisheries. For some time preceding the War much was brought from Liverpool in sacks of four bushels each. Some of that obtained from the American islands appears to have been of a very inferior quality. The Legislature of Massachusetts found it necessary, in order to sustain the character of the fish sent from the Province, to decree, in May, 1670, that "fishing, being advantageous and likely to be impaired by using Tortudas Salt, which leaves spots on fish by reason of shells and trash in it, that no fish salted with Tortudas Salt, and thereby spotted, shall be accounted merchantable fish." Much of the Salt obtained from these islands was the product of spontaneous crystallization, and was gathered and sold in its impure state at a low price by the inhabitants, or was collected by American crews without other expense. Nor had the domestic manufacture, at this date, made any progress toward supplying a better article, at least by the solar method. Randolph, the Collector of Customs in 1673, reported that in

(1) Ramsay's Hist. S. Carolina.

New England there was "no Allum, nor Copperas nor Salt made by their sun."

The interruption of the foreign trade by the War of Independence occasioned a distressing scarcity of Salt, and called into existence many small establishments along our shores from Cape Cod to Georgia. In these the water was pumped from the sea by hand or by the aid of wind-mills, and was boiled in large kettles, often in the open air, yielding an inferior article of Salt, imperfectly purified from the lime and other foreign constituents of the brine. The apparatus was ill-constructed for its purpose, and two hundred and fifty gallons of water were required to make a bushel of Salt.

The expense of labor, time and fuel, was great, and the product crystallized in fine grains, was small and defective in quality. About the year 1774, or 1775, an observation similar to that which has been mentioned, of saline particles left by the sun and air in the clam shells, lying upon the beach, was made by the salt-boilers at Harwich, on the Peninsula of Cape Cod, where one of the first essays in Salt-making in Massachusetts had long before been attempted. This hint, led to some experiments, and soon after to the first attempt, in this country, on any extended scale, to make Salt by solar evaporation. Mr. Ammiel Weeks, of Harwich, succeeded in making a sufficiency for his own use, and about the same time the manufacture was attempted without success at the Isle of Shoals. A year or two after, John Sears, a mariner, conceived the idea of making Salt more economically than by the boiling process, and in association with Edward Sears, Christopher and Edward Crowell, erected Salt-works on Quivet Neck, in the town of Dennis, in Barnstable County. They constructed a vat one hundred feet in length and ten in width, with a flooring of white pine on oaken sleepers, with planked sides and ends, and a curiously constructed roof. The "bottom," originally all on the same level, was afterward divided to obtain a crystallizing vat. For two years, all the water was conveyed to the works in buckets from the sea shore. Toward the close of the war, Mr. Sears obtained from the British ship of war, Somerset, stranded on the Cape, a pump, which he set up and used until 1790, when he erected a wind-mill for the purpose. This mill he is said to have constructed in secret, upon the plan then in use, on account of the ridicule with which he was assailed. The manufactory of the ingenious and enterprising owner, which was the original of those now generally in use, was denominated "John Sear's Folly," so often does the fancied wisdom of his cotemporaries withhold from its author, the full credit or the benefit of a sagacious innovation.

At this time there were many small manufactories in that and other parts of Massachusetts for making Salt by artificial heat. It was carried

on in Harwich, for about twenty years, by Messrs. Obed E. Smith and Job Chase, and throughout the Revolution. In Falmouth, Barnstable, and other parts of the Peninsula, were similar establishments. The example of Mr. Sears, however, induced others to construct works upon his plan. At Broad Point, in Brewster, Mr. Scott Clark, and Rev. Mr. Dunster, before the termination of the war, erected works of that kind with three vats. They had no pump for several years, but were afterward provided with a hand-pump. In the same town, Nathaniel Freeman had Salt-works about the same time; and in 1779, the first on the new plan were built in Barnstable, by Messrs. Hinckly & Gorham.

Salt at that time sold for six dollars per bushel. Its high price, and the proximity to the fisheries, led many others into the manufacture upon Mr. Sears' method; but on the revival of foreign trade, after the peace, a large number of the works were abandoned. The business has ever since been conducted upon the shores of the bay, and the numerous wind-mills for raising the brine, which thickly lined the beach in almost every town on the Peninsula, twenty years ago, gave it quite a unique appearance. In 1799, John Sears took out a patent for a machine for manufacturing Salt, and the following year another was given to Hattil Killey for a method of covering Salt-vats from the weather by the plan adopted on the Cape. This contrivance, by which the roofs of two vats were connected by a strong beam turning upon a upright post in the centre, enabling them to be easily removed and replaced, was an essential improvement upon the old system of making Salt in uncovered boilers or vats. The Salt made by this system was of a good quality, white and pure, and weighed from seventy to seventy-five pounds per bushel. The process being conducted by the use of three or four rooms on different planes effected the separation of the various sulphates and other contaminating impurities of the bittern, and was more economical, by yielding Epsom and Glauber's Salts, as residual products of the operation—the latter being crystallized during the winter.

An abortive effort to make Salt by the sun was made by General Palmer, on the Marshes in Boston Neck, about this time. The manufacture of Salt was also carried on, in small establishments, in many places along the shores of New Jersey, Delaware, and the more southern States, during the Revolution. A number of those in New Jersey were burned or demolished by the British troops during the war. Several Salt-works on the south side of Squam Inlet, in Monmouth County, were thus destroyed in 1778. A large Salt-making establishment was owned by a Dr. Harris, near Townsend's Sound, in Cape May County, which was threatened with a like fate, because the proprietor was in the habit of selling gun-

powder.[1] The manufacture being carried on near the sea shore was more exposed to hostile attacks than operations conducted in the interior. So insecure were the owners of such works that, in September, 1777, David Forman and partners memorialized Congress for a guard of one hundred men to protect a Salt-works they proposed erecting. The extreme scarcity of this article induced the Continental Congress, on June 3d, of the same year, to appoint a committee of three to devise ways and means of supplying the United States with Salt; and, ten days after, acting upon their report, passed a resolution advising the several States to offer such liberal encouragement to persons importing Salt for the use of the said State, as should be effectual. Each State was also recommended to employ, at the public charge, one or more vessels to import Salt for its own immediate use. The agents of the United States in Europe and the West Indies were to be directed by the Secret Committee to effect the importation of Salt in all vessels bound to America on account of the United States; all masters of vessels taking in cargoes for America on account of the United States, were to be instructed, if possible, to ballast with Salt; and the several States were recommended to erect, and encourage in the most liberal and effectual manner, proper works for the making of Salt.[1]

But the scarcity and high cost of Salt, produced in the Atlantic towns by the suspension of foreign trade; by the absorption of labor into the army; and the insecurity of capital invested in such works, was rendered the normal condition of the frontier settlements, by the imperfect means of communication between them and the seaports. After the termination of the old French war, in 1763, emigration took up its march toward the fertile regions of the West, and, in different directions from the principal

(1) The following is related in Thatcher's Military Journal, 1st January, 1780, during the cantonment at Morristown, New Jersey, the darkest period of the conflict, when the army seldom had six days' provisions on hand, and the Continental money was so depreciated that "four months' pay of a private would not procure for his family a single bushel of wheat." "We have nothing but the rations to cook, sir," said Mrs. Thompson, a very worthy Irish woman and housekeeper, to General Washington. "Well, Mrs. Thompson, you must then cook the rations, for I have not a farthing to give you." "If you please, sir, let one of the gentlemen give me an order for six bushels of salt." "Six bushels of salt!—for what?" "To preserve the fresh beef, sir." One of the aids gave the order, and the next day his Excellency's table was amply provided. Mrs. Thompson was sent for, and told that she had done very wrong to expend her own money, for it was not known when she could be repaid: "I owe you," said his Excellency, "too much already, to permit the debt to be increased, and our situation is not, at this moment, such as to induce very strong hopes." "Dear sir," said the good old lady, "it is always darkest just before daylight; and I hope your Excellency will forgive me for bartering the salt for other necessaries which are now on the table." Salt was eight dollars a bushel, and could always be exchanged with the country-people for articles of provisions.—*Barber & Howe's Hist. Coll. of N. J.*

centres of population, pushed across the Alleghanies to the basin of the Ohio and the great lakes. Lands were appropriated and laid under cultivation, and population augmented with unexampled rapidity. But for more than twenty-five years, during which they renewed the scenes of privation and suffering, through which the first colonizers had won a foothold, communication with the older settlements was most tedious and perilous. By one or other of the two principal routes through Pennsylvania, by Lancaster and Chambersburg, or through Virginia, by way of Winchester, and Hagerstown, and Cumberland, the settlements beyond the mountains were reached. From Philadelphia and Baltimore, or those intermediate places, all the Salt, iron, sugar, and other necessaries, were "packed" by rough and precipitous pathways, at an expense of three dollars per hundred-weight, and much risk, to their destination beyond the mountains. The furs, ginseng, and other returns, were transmitted in the same expensive way. Ten or twelve horses, tied one to another in single file, carrying each about two hundred pounds' weight slung on pack-saddles, traveled the tedious route in charge of a single driver, and several companies of these, combined for mutual protection, made up a caravan with merchandise for the western posts. The first *wagon load* of goods is said to have crossed the southern route, through Virginia, to Brownsville, Pennsylvania, in 1789. With four horses, the wagoner took twenty hundred-weight, and made the trip from Hagerstown and back, about one hundred and forty miles, in a little less than a month, receiving three dollars per hundred, freight. Under the packing system, a horse could take but two bushels of alum salt weighing eighty-four pounds per bushel, and the price, in consequence, was usually, at an early period, a cow and calf per bushel. The salt was measured into the bushel by the hand, as lightly as possible, and a heavy footstep was not allowed upon the floor during the operation. Being one of the great essentials of life, Salt could not be dispensed with, however difficult to obtain. But although, in numerous places, saline fountains gushing from the hidden reservoirs of that substance, early attracted notice in the western valleys, and the wild deer resorted to their favorite "licks," to taste the grateful brine, skill, capital or enterprise was wanting to turn the discovery to account. A Salt-works is said to have been erected somewhere on Big Beaver River, about the year 1784, by an association of Pittsburg and Philadelphia merchants. But many years elapsed before a cheaper source for their supplies was found in the product of the Onondaga springs, and still longer before a nearer provision was made by boring the alluvium of the adjacent valleys of the Kiskiminetas, Alleghany and Kanawha rivers.

The manufacture of Salt was commenced at the Onondaga Salines

about the year 1787, when about ten bushels were made in a day. In that or the following year, the lands of that part of the State were ceded to New York by the Oneida Indians, and the portions including the Salt-fountains were reserved by the State. The boiling process was first employed in the manufacture near the present city of Syracuse, and much the larger proportion of the Salt since made there has been produced in the same way. Coarse or solar Salt, of better quality than the fine salt made by boiling, is also manufactured there to a less extent, in long, shallow vats, upon the plan early adopted at Cape Cod, and around New Bedford, in Massachusetts. In 1797 the State first legislated upon the subject of Salt-works. It now opens and keeps in repair all the wells, builds and keeps in repair the pump-houses, reservoirs, and distributing aqueducts, by which it is conveyed to the lessees, who pay a duty of one cent per bushel of fifty-six pounds, and a nominal rent for the land. The duty was formerly twelve cents per bushel. The manufacture at once proved an immense benefit to the whole western country, and the extent of territory to be supplied, including Canada, with the extensive water communication of the region, soon caused the saliferous marshes to be pierced in different directions, and an active business to be carried on in the production and distribution of Salt. In 1791, Salt from Onondaga could be purchased at the distance of sixty miles westward for half a dollar, where, a few years before, it had cost many dollars. The product of the springs in 1797, when lots were first leased by the State, was 25,474 bushels. In 1858, it was 7,033,219 bushels, produced at an average cost, we believe, of 6 cents per bushel. The yield of the various wells is a bushel of salt for every 30 to 50 gallons of brine evaporated—that of sea water being a bushel for about 300 to 350 gallons.

Beginning of Onondaga Salt-works.

The following illustration of the manner in which access was opened up to these salt regions from other portions of the West, and a new market furnished for the article, is from a communication by Judge Wilkins to the American Pioneer. It is a conspicuous example of early and sagacious enterprise, and of the benefits of improved means of transportation throughout an extended territory, which has done so much for the country.

"Among others whose attention was drawn to the new field of enterprise opened on the Lakes, after Wayne's treaty, was General James O'Hara, a distinguished citizen of Pittsburg. He entered into a contract with the Government to supply Oswego with provisions, which could then be furnished from Pittsburg cheaper than from the settlements on the Mohawk. General O'Hara was a far-sighted calculator; he had obtained correct information as to the manufacture of Salt at Salina, and in his contract for provisioning the garrison, he had in view the supplying of the Western Country with Salt from Onondaga.

This was a project that few men would have thought of, and fewer undertaken. The means of transportation had to be created over the whole line; boats and teams had to be provided to get the Salt from the works to Oswego; a vessel built to transport it to the landing below the falls; wagons procured to carry it to Schlosser; there boats constructed to carry it to Black Rock. There another vessel was required to transport it to Erie. The road to the head of French Creek had to be improved, and the Salt carried in wagons across the portage; and, finally, boats provided to float it to Pittsburg. It required no ordinary sagacity and perseverance to give success to this speculation. General O'Hara, however, could execute as well as plan. He packed his provisions in barrels suitable for Salt. These were reserved in his contract. Arrangements were made with the manufacturers, and the necessary advances paid to secure a supply of Salt. Two vessels were built, one on Lake Erie and one on Lake Ontario, and the means of transportation in all the various sections of the line were secured. The plan fully succeeded, and Salt, of a pretty fair quality, delivered at Pittsburg, and sold at four dollars per bushel,—just half the price of the Salt obtained by packing across the mountains. *The vocation of the packers was gone.* The trade opened by this man, whose success was equal to his merits, and who led the way in every great enterprise of the day, was extensively prosecuted by others. A large amount of capital was invested in Salt; trade and the means of transportation so greatly increased, that in a few years the Pittsburg market was supplied with Onondaga Salt, at twelve dollars per barrel of five bushels."

This enterprise commenced in 1796, and the chief supply of Salt for the country west of the mountains was obtained in the same way until about the year 1810, when the Kanawha Salt began to compete with that from New York, which was wholly cut off by the war of 1812. In that year, or the following, William Johnston succeeded in reaching a strong body of salt water, at the depth of two hundred feet, by boring near the Kiskiminetas, or Conemaugh, a navigable branch of the Alleghany. Salt-boiling immediately commenced, and has since extended until Pittsburg has become the centre of a large Salt-trade. About the same time, other perforations were made, and saline springs were discovered communicating with the great reservoirs that underlie the valley of the Ohio and its tributaries, and Salt was produced for the supply of the lower Ohio and Mississippi and the North-west. In Kentucky and Tennessee, on the Illinois and Wabash, on the western side of the Mississippi, Salt was made and sold at moderate prices before the close of the last century. The Wabash Salines—which produced, in 1809, one hundred and thirty thousand bushels—had been used in the manfacture of Salt for more than half a century, by the French and Indians, before those of New York were employed by Europeans. The United States Salines, thirty miles below the Wabash, were in operation in 1812, and many smaller works near the same time. So active was the competition that, in the West, the price,

in the last war, averaged only eighty-seven and a half cents, while it was five or six dollars on the seaboard.

The manufacture has received many improvements, and its extent and economy have been much promoted by the progress in collateral branches, as the manufacture of soda-ash, and other articles used in agriculture and the arts, and has more than kept pace with the progress in population, but still falls far short of an adequate supply for the country, and of the maximum profit attainable in the business.[1] The first Congress, for the encouragement of this industry, and for purposes of revenue, laid a duty, in 1789, of six cents per bushel on imported Salt, which was increased to twelve cents in the following year, and, in 1797, to twenty cents. It was made free of duty in 1807. The imports of Salt, in 1790, amounted to 2,337,920 bushels.

(1) In September, 1794, James Fennel took out a patent, the first in this branch, for a new mode of making Salt, which we believe he afterward unsuccessfully attempted to put into practice. In 1798, he published, in Philadelphia, a treatise descriptive of "the principles and plan of proposed establishments of Salt-works, for the purpose of supplying the United States with home-made Salt." This eccentric character, who was, by turns, a student of law, an actor, a writer of plays and other works, a preacher, manufacturer, and spendthrift, was from London, and was probably a descendant of Fennel, a plate of whose Salt-works was given in the Theatrum Machinarum Universale, published in Amsterdam in 1734. He once figured extensively in Edinburg and Paris, and also in Philadelphia, where he still has descendants. He published an apology for his life, in two volumes. In addition to those of Sears & Killey, before mentioned, one or two other patents were given before the close of the century, including one to John Nazro, in 1797, "for making alkali from marine Salt and kelp."

CHAPTER XIV.

OF THE MANUFACTURE OF CLOTH AND MATERIALS FOR CLOTHING.

During the twenty years which followed the settlement of Plymouth, and the ten years succeeding the more vigorous beginning around Boston Harbor, the increase of population and the formation of new settlements had proceeded with wonderful rapidity. The same spirit of religious persecution that drove the first emigrants beyond the reach of intolerance continued to operate. Numbers of ships were yearly fitted out in the ports of England, freighted with the families and effects of Puritan nonconformists, and steered in the wake of the May-flower and the Arabella, for the shores of New England.

New patents were obtained and colonies were planted in other parts of the country, and were quickly reinforced by fresh arrivals from abroad. Not less than four thousand two hundred and fifty families and twenty-one thousand two hundred souls had already arrived in New England. These had employed in their transportation nearly two hundred ships, and the whole cost of the conveyance of themselves, their goods, and live stock fell little short of one million of dollars. As lands were desired by all, settlements were speedily formed at the most inviting points. The Puritan Fathers, unfortunately practiced, in turn, the religious coercion from which they had fled, and thus drove numbers from their midst, to make settlements in places remote from the arm of power. Towns and villages were in this way multipled over an extended surface of territory. A profitable trade in furs had been carried on with the Indians. The manufacture of ships and of lumber, the production of grain, and some foreign trade, had secured a good measure of prosperity. The reports of their brightening prospects were not lost upon the multitudes in England who watched with interest the fate of their friends in America, and longed for the civil and religious freedom there enjoyed. The constant departure of useful and influential citizens, and the evasion of royal authority by emigration, led to one or two ineffectual attempts on the part of the King to stop the transportation of passengers to New England. This end was, however, brought about in quite a different way. It has been fre-

quently asserted that Oliver Cromwell and John Hampden had embarked for the new world in a ship whose sailing was prohibited in 1637. Their subsequent efforts, however, led to the subversion of the misused power of the King, and secured that liberty at home which so many had been compelled to seek beyond the seas. On the assembling of the Long Parliament, in 1640, persecution ceased, and many who had prepared to emigrate, found the occasion removed, and their prospects more inviting at home. Either from this cause, or, as Chalmers supposes, from the effects of an ordinance passed in 1637, "which enacted with signal folly, 'that none shall entertain any stranger who should arrive with an intent to reside, or shall allow the use of any habitation without liberty from the Standing Council,'" but probably from the two causes combined, emigration now entirely ceased. The tide even set in an opposite direction, and, for twenty years after, the emigration to America did not more than equal the numbers who returned to enjoy their estates and former privileges in England. This arrest of the influx of population had an important influence on the future welfare of the Colonies.

During this time, the French had been gradually extending their settlements on the north and east, and the Dutch, on the west, were menacing the plantations on the Connecticut river. The Indians, moreover, whose friendship had never been reliable, exhibited symptoms of a general conspiracy to exterminate the entire English population. In view of these circumstances, and the small accession of strength to be looked for from abroad during the civil war, and the general insecurity arising out of the dispersed situation of the towns, the four principal Colonies—Massachusetts, Plymouth, Connecticut, and New Haven—in 1643 entered into articles of confederation for mutual aid and protection, under the name of THE UNITED COLONIES OF NEW ENGLAND. This league, which had been proposed several years before, marks an important epoch in the history of the Colonies, and has been regarded as an early step toward their ultimate independence.

But other consequences grew out of the check given to the tide of emigration, which had a favorable effect upon the industry of the Colonists, and contributed to lessen their dependence upon the parent country. The New England people had now arrived at a prosperous condition, through incredible hardships surmounted in the beginning. They had been harassed by the Indians, had encountered famine, and had been nearly decimated by disease. But their energy had conquered the greatest difficulties, and they were now enjoying, in some measure, the fruits of their industry. This consisted principally in agriculture; and the fisheries and the rearing of cattle was an important branch of their husbandry. Live stock were even exported to the West Indies, with which trade had

already opened, and was fostered by their enterprise in ship-building. While emigration continued active, cattle were wanted for stocking new farms, and rearing them was a source of much profit. It is stated, by Governor Hutchinson, that, as early as 1632, "no man now thought he could live except he had cattle, and a great deal of ground to keep them; all striving to increase their stocks." About the same time, we are told, a quart of milk could be bought for a penny. He afterward informs us that cows rose to the price of twenty, twenty-five, and even twenty-eight pounds, cow-calves to ten pounds, and milk-goats to three and four pounds each. At these rates they continued for several years, which enabled many of the old planters to grow rich. For some reason or other, cattle, at the same time, bore an unusually high price among the Dutch, in New Netherlands, and both there and in New England, other products were correspondingly dear. A fall in the price of stock had been feared for some time; but it came more suddenly and with worse effects than had been anticipated. It was "greatly to ye damage of many, and ye undowing of some." The stoppage of emigration caused an immediate decline in the price of cattle—which had become extremely numerous—to less than half their former prices, and as suddenly cut off a principal source of emolument.

The diminished intercourse with England which at the same time ensued, caused the greatest difficulty and uncertainty in the supply of clothing and other necessaries for which they were wholly dependent upon that country. Through impaired means of purchase, and an interrupted supply of clothing for the twenty to thirty thousand people who inhabited New England, the attention of the Colonists was turned to the manufacture of their own linen and woolen cloth. To this determination they were also strongly urged by the opportunity which their traffic afforded of obtaining a cheap supply of cotton from Barbadoes. The manner in which "necessity at first introduced what their jurisprudence afterward cultivated," is thus narrated by Hubbard:—

"Now, the country of New England was to seek a way to provide themselves with clothing, which they could not obtain by selling cattle, as before, which now were fallen from that huge price forementioned, first to £14 sterling and £10 sterling a head; and presently after—at least within the year—to £5 sterling a piece; nor was there, at that rate, a ready vent for them neither. Thus the flood which brought in much wealth to many persons, the contrary ebb carried all away out of their reach. To help them in this, their exigent, besides the industry that the present necessity put particular persons upon, for the necessary supply of themselves and their families, the General Court made order for the manufacture of woolen and linen Cloth, which, with God's blessing upon man's endeavour, in a little time stopped this gap in part, and, soon after, another door was opened by way of traffic, first to the West Indies and

Wine Islands, whereby, among other goods, much *cotton wool* was brought into the country from the Indies, which the inhabitants learning to spin, and breeding of sheep, and saving of hemp and flax, they soon found out a way to supply themselves of (cotton) linen and woolen cloth."

From that day to the present, throughout this country and British America, it has been the custom, in the farm-houses and rural districts, for the people to manufacture a portion of their coarser clothing, and, at some periods and in some places, nearly the whole of their apparel and household linen in their families, from cotton, flax, or wool, either separately or combined, according to the taste or wants of the family.

The earliest order of the Court which we find on the subject, was made by the Massachusetts Assembly, on May 13th, 1640, when the matter was taken up in a determined spirit. It appears to have had reference only to the manufacture of linen and cotton cloth, or the product of those materials combined.

First Linen or Cotton Cloth.

"The Court," they say, "taking into serious consideration the absolute necessity for the raising of the manufacture of linen cloth, doth declare that it is the intent of this Court that there shall be an order settled about it, and therefore doth require the magistrates and deputies of the several towns to acquaint the townsmen therewith, and to make enquiry what seed is in every town, what men and women are skilful in the braking, spinning, weaving, what means for the providing of wheels; and to consider with those skilful in that manufacture, and what course may be taken for teaching the boys and girls in all towns the spinning of the yarn, and to return to the next Court their several and joint advice about this thing.—The like consideration would be had for the spinning and weaving of *cotton wool*."[1]

The description of Cloth, for the manufacture of which this action of the Court was designed to prepare the way, was, as will presently appear, the kind which then formed the principal apparel of the English people, a mixture of linen and cotton, under the name of fustians, dimities, etc. On the seventh of October, in the same year, an order, previously made, offering a bounty of three pence on every shilling's-worth of linen, woolen, and cotton Cloth, "according to its valewation for the incuragment of the the manufacture," was declared to apply only to Cloth made in that jurisdiction, and of yarn spun there from materials raised within the same, "or else of cotton." This was to continue for three years. The order was, however, repealed on the 2d June following, "because too burthensome to the country." But, previous to its repeal, there was granted, April 29, 1641, to Goodman Nutt, Martin Vaderwood, John Whitney,

(1) Records, i. p. 294.

Henry Kimball, and John Witheridge, allowance for eighty-three and one-half yards "valewed" at 12*d.* per yard.[1] This appears to have been the first sample of Cloth made in the country of which there is any mention. It was probably a coarse description of linen.

On the 8th February, 1640, nearly three months before the above award, and about nine months after the Court of Massachusetts had first moved in the matter, the General Court of Connecticut turned its attention to the same subject.[2] It ordained that skins should be preserved, attaching a penalty to the neglect of it; and hemp and flax were ordered to be sown by each family, to preserve seed, "that we might in time have supply of Lynen Cloath amongst ourselves." Another order of the same date—at which time the Colony of Connecticut consisted of the three towns of Hartford, Wethersfield, and Windsor, and the New Haven Colony of the like number of towns—provides, also, for the introduction of cotton for the manufacture of clothing. "Whereas it is thought necessary for the comfortable support of these plantations, that *a trade in cotten wooll* be sett uppon and attempted, and for the furthering thereof it hath pleased the Governor that now is (Edward Hopkins, Esq.) to undertake the finishing and setting forth a vessel with convenient speed to those parts where the said comodity is to be had, if it be phesable, etc." The plantations were ordered on his return, to take each its proportion of the cotton, to be paid for in English corn and pipe-staves; and for the better preservation of timber for pipe-staves, as an article of exchange for cotton, it was ordered that no timber should be felled outside the plantations without licence from the Court, nor any pipe-staves sold out of the river without permission. To maintain their marketable quality, no pipe-staves were to be exported until they had been inspected. These ordinances show that some importance was thus early attached to the providing of cotton for the use of the Colony. Over eighteen months appear to have elapsed before a supply of cotton was received. It was agreed, on the eighth of September, 1642, that the towns should take of Mr. Hopkins' cotton wool in the following proportions:—Windsor, ninety pounds' worth: Wethersfield, one hundred and ten pounds' worth, and Hartford, two hundred pounds' worth, with liberty "to proportion it if the first two within a month desire it." In June, 1644, two inspectors of linen and woolen yarn were appointed, in each town in Connecticut,

(1) Records, i. p. 316.

(2) Colonial Records of Conn., i. p. 61.—This order is entered February 8, 1640, and thus, according to the new mode of reckoning time, antedates the order of the Massachusetts Court by three months, whereas it really took place several months after, and in the following year, as will be apparent by remembering that the legal year then began on the 25th March.

with power to judge and determine the rate or price the weavers should receive, by the yard, for yarn. Weavers were, at the same time, empowered to retain their work until they received pay for it.[1]

The spinning-wheel and the loom thus appear to have been already domesticated in two of the future States, and were fostered by the care of the rulers.

Although a tolerably regular communication was kept up between the parent country and its dependencies, the state of navigation at that time sometimes caused disappointment in the arrival of supplies. In a climate so rigorous as that of New England, any protracted delay of the usual consignments of materials or clothing would be severely felt. All the miseries of such a situation had been already experienced by the old Colony of Plymouth. From their first landing, sick and destitute, in December, 1620, to midsummer of 1623, owing to the non-arrival of supplies which were captured by the French, the burning of their common store-house, and the failure of their crops, the Pilgrims were left in almost utter destitution both of food and clothing. Their only food during much of the time were the scanty gleanings of the forest and the sea shore, and their small supply of clothing was exhausted. The meeting with their wives, children, and other friends who, on their arrival, found them in this condition, was a painful one. "It is impossible to describe that strange composition of chagrin, sorrow, sympathy and joy which, at this meeting, presented themselves in the most lively colors. The first planters had received no supplies of clothing since their arrival, they were, therefore, not only pale with famine, but they were miserably clothed. When the passengers came on shore and saw their extreme poverty, they were filled with sadness and dismay. Some burst into tears, and passionately wished themselves again in their native country. In the poverty and distress of this poor people, they imagined they foresaw their own future miseries." There were those among the settlers of Plymouth, from the first, who were acquainted with the arts of the clothier; but the materials, and the opportunity for their exercise, were altogether wanting. Neither sheep nor neats cattle had been then introduced, and their knowledge of the Cloth-manufacture, which some of them obtained in Holland, was exchanged, as in the case of later adventurers, for the practice of other occupations.[2] The Colony was visited, in 1627, by a deputation from the Dutch

(1) Colonial Records, i. p. 104.

(2) The American Minister at the Hague has recently furnished some particulars of the personal history of the Pilgrim Fathers, from the Records at Leyden, in which it is shown that Mr. Bradford, who is generally represented to have learned the silk business in Holland was a fustian maker of Austerfield, England. Samuel Fuller, the future physician of the Colony, and Stephen Tracey were *say* or silk makers also. William White, Robert Cushman, and Richard

Governor of Manhattan, with overtures for trade; and for several years the people were supplied from that quarter with linen and other stuffs, in exchange for tobacco, etc., to the mutual advantage of both Colonies. Isaac Allerton afterward became a prominent merchant at New Amsterdam. Under these circumstances, therefore, the industry of the country was wisely directed to an ultimate independence of supplies so precarious.

In apprehension of the scarcity of clothing likely to be experienced during the next winter, the General Court of Massachusetts, in June, 1641, following the award of premiums for linen, directed, as a means of present supply "till *cotton* may bee had," that wild hemp should be gathered and improved.[1] The heads of families were to be instructed in the method of gathering and using this article "growing all over the country," which the natives employed for various purposes, as for making

Masterson, were wool-combers or carders, and Isaac Allerton, a tailor. Mr. Winslow was a printer, John Jenny, a brewer, Moses Fletcher, a smith. Many others of the early settlers were weavers from Yorkshire, Nottingham, etc., and brought their looms with them. (See Hist. Mag. for Sept., 1859.)

Their sufferings, on the occasion referred to in the text, inspired one of those lyrical effusions in which a primitive people, when touched by a common calamity and a common sentiment, so often find expression, and which sometimes contain more of the genuine ore of history than any elaborate statements, because they are the spontaneous language of the popular mind and heart. The traditional verses known as "The Forefathers' Song," taken down some years before the Revolution from the lips of a centenarian female, and preserved by the widow of Governor Bowdoin, commemorate their early hardships. If the rhymes have somewhat of the uncouthness they describe, they have also much of the moral comeliness of an heroic patience which enabled men like Bradford, and Winslow, and Standish, to bear unusual privations with cheerfulness, and to transmit their iron energy and example to a posterity called in the hour of the country's greatest need to sustain similar hardships in its defense.

"And now, too our garments begin to grow thin,
And wool is much wanted to card and to spin;
If we can get garments to cover without,
Our other in-garments are clout upon clout.
Our clothes we brought with us are apt to be torn—
They need to be clouted soon after they are worn—
But clouting our garments they hinder us nothing;
Clouts double are warmer than single whole clothing."

(1) The wild hemp here mentioned was doubtless the *Apocynum Cannabinum*, or Indian hemp, an indigenous plant growing in all parts of the United States, from Canada to Carolina. Its tough, fibrous bark affords, when macerated, a tolerable substitute for hemp. The Indians made much use of it for summer clothing, and for cords, whence it derives its popular name. It is a very different plant from the Indian hemp which furnishes the intoxicating *hasheesh* of the Arabs. The latter, like the common cultivated hemp (*Cannabis sativa*), of which it is only a variety, is a native of the elevated plains of central Asia, and the flax-plant is from the same regions, or from Egypt. The Indian hemp of America is mentioned by many of the early writers as a valuable native commodity, and its cultivation has been recommended as a substitute for flax and hemp. It is probable that it might be rendered valuable by careful cultivation, but we are not aware that it has ever been attempted.

clothing, nets, mats, lines, etc. From them, the people first learned the use of this material. It was further "desired and expected that all masters of families should see that their children and servants should bee industriously implied, so as the mornings and evenings and other seasons may not bee lost, as formerly they have beene, but that the honest and profitable custome of England may be practiced amongst us; so as all hands may be implied for the working of hemp and fflaxe and other needful things for clothing, without abridging any such servants of their dewe times for foode and rest and other needful refreshings."

In the same year the town of Salem was called together on the subject of the hemp culture, the seed of which was first sent in 1629. An acre of ground was set apart to Samuel Cornhill for its cultivation. The ponds in which the early cultivators rotted their flax we believe still bear the name of the Flax Ponds. The manufacture of cordage was, the same year begun in Boston, by John Harrison, and, in 1662, John Heyman, of Charlestown, received liberty to make ropes and lines.

In March, 1642–3, a memorable Act, intended as a special favor to the New England plantations, passed the House of Commons. It exempted from duties, subsidies, and taxation, all merchandise intended for their use, and all Colonial produce thence exported to England. Although this ordinance had its intended effect in stimulating the industry of the colonists, it probably rather obstructed than promoted the domestic manufacture of clothing and other staple articles of English export. It furnished facilities for a cheap and constant supply of English manufactures, and rendered the colonists simply producers of raw materials. The confirmation of the law, in a modified form, became a few years after, the foundation of the famous Act of navigation.

In the following year, the first regular or systematic attempt at an improved manufacture of Cloth—particularly of woolen—was made by a company of Yorkshiremen, who, in 1638, settled at Rowley, in Massachusetts, nearly midway between Ipswich and Newbury. They consisted of about twenty families of industrious and pious people, under the direction of their minister, Rev. Ezekiel Rogers, one of the proscribed non-conforming ministers of England, and a descendant of the first Protestant martyr, John Rogers, who suffered at Smithfield, in the reign of Queen Mary. The town was incorporated in 1639, and the people soon after commenced the manufacture of Cloth, which had been the occupation of many of them in England. Here they built the first Fulling-mill erected in the North American Colonies. The mill is said to have been erected by John Pearson, about the year 1643.[1] It stood

First systematic attempt to manufacture woolen goods.

(1) Merchant's Mag. vol. xxxiii. p. 501.—In several cotemporaneous and later writers,

just above the head of the tide on Mill river, where it was still in operation in 1809, and a cedar tenter-post, brought by them from England, still remained perfectly sound.[1]

This appears to have been the first place at which woolen Cloth was made in New England. Flax, hemp, and cotton had previously been wrought into Cloth, but whether by the weavers of Rowley, or in families generally, under the stimulus applied by the Legislature, which, as we have seen, produced two years before several claimants for the bounty, does not appear. The author of "New England's First Fruits," writing at Boston, September 26th, 1642, speaks of their providential help, among other things, "in prospering hempe and flaxe so well that it is frequently sowen, spun, and woven into linen cloth, (and in short time may serve for cordage); so cotton wooll (which we may have at reasonable rates from the islands) and our linen yarne, we can make dimittees and fustians for our summer clothing; and having a matter of 1000 sheep,[2] which prosper well to begin withal, in a competent time we hope to have woollen cloth there made. And great and small cattel being now very frequently killed for food; their skins will afford us leather for boots and shoes and other uses; so that God is leading us by the hand into a way of clothing."

Although the people of Rowley were from the woolen districts of England—especially the seat of the broadcloth manufacture—flax and cotton, as well as wool, appear, at first, to have formed a considerable part of their raw materials. But although after the introduction of fulling-mills, much of the woolen Cloth of household manufacture was worn in its unfulled and unfinished state, the mention of Mr. Rogers' people as the first Cloth-makers, must be understood to imply the first manufacture of fulled and dressed Cloth, or Cloth wholly of wool, of which none was previously made, as we may infer from the last cited passage. The industry of the Rowley weavers is frequently commended. "These people being very indus-

who refer to this as the beginning of the Cloth-manufacture, we do not find the precise date of the erection of the fulling-mill stated. But it could hardly have been earlier than 1643.

(1) Compendious Hist. of N. Eng. by Drs. Morse and Parrish.

(2) Hutchinson gives the number of sheep in Massachusetts, in 1640, as three thousand. Sheep were first introduced into the Colonies by the London Company, at Jamestown, in Virginia, in 1609, where, in 1649, they had increased to about three thousand. They were first brought to Massachusetts about the year 1633, and were kept on the island in Boston Harbor, to protect them from the wolves and Indians. Charlestown, in 1652, had four hundred sheep, and Lynn had considerable flocks, which were kept on Nahant under a common shepherd. The Dutch West Indian Company, in 1625, first introduced sheep into New Netherlands, and others were imported in 1630. But in 1643, there were not over sixteen sheep in that Colony, and ewes were worth eight and ten dollars each.

trious every way, some built many houses to the number of threescore families; and were the first that set upon making Cloth in this western world; for which end they built a fulling-mill, and caused their little ones to be very diligent in spinning cotton wool, many of them having been clothiers in England, till their zeal to promote the Gospel of Christ caused them to wander." Governor Winthrop also mentions their use of cotton:—"Our supplies from England failing much, men began to look about them, and fell to a manufacture of cotton, whereof we had store from Barbadoes, and of hemp and flax, wherein Rowley, to their great commendation, exceeded all other towns."

The woolen manufacture, to which they were bred, was at this time immeasurably the most important branch of English production, and was the greatest support of British commerce. It had long existed, and had been encourged by numerous statutes, some of which were rather an evidence of the public regard for it than of any real advantage. The export of wool and the wearing of foreign woolens were prohibited as early as 1261. But a century later, English wool, which was the best in Europe, formed fourteen-fifteenths of the entire exports of the kingdom. The first considerable impulse was given to the woolen manufacture by Edward III., who, in 1331, invited over weavers, dyers, and fullers, from Flanders. A fulling-mill and a mill for dyers existed at Manchester in 1322. But, for a long time after that, woolens were sent across the Channel to be dyed and dressed. The manufacture made no great progress until the time of Elizabeth, when great numbers of skillful artisans fled from the Low Countries to England, where they were welcomed, and some oppressive statutes were modified to favor them. From this time the woolen manufacture of England first became really important

> "Our day arose
> When Alva's tyranny the weaving arts
> Drove from the fertile valleys of the Scheld."

A remonstrance to the Hanse Towns, in 1582, represented to the Diet of the empire that England exported two hundred thousand pieces of cloth. In the reign of James I. woolen goods were supposed to constitute nine-tenths of the commerce of the kingdom, and the Dutch to gain £700,000 yearly, by dyeing and dressing the raw cloth. The exportation of undyed cloth was now prohibited, which the States General met by prohibiting, in turn, the importation of English-dyed Cloth. The trade fell off, and the proclamation was recalled. But an effect of these measures was the introduction of mixed or medley Cloths of different-colored yarns dyed in the wool, which much extended and improved the English manufacture. In 1622, a Board of Trade was formed "to remedy the low

price of wool, and the decay of the manufacture." Two years after the monopolies of exclusive companies and corporations, which previously controlled it, were legally abolished. About the same time, the fine woolen manufacture began in Holland; and, in 1646, it was commenced in France. In 1662, the exports of English white Cloth had fallen off, as represented by the merchants, from 100,000 to 11,000 pieces; whereupon the export of wool and fuller's earth was stringently forbidden, and was even made a felony. It was now that the growing importance of the American Colonies as a market for English woolens and other manufactures, to supply the place of that lost on the Continent, began to be felt, and the policy arose of preserving that market exclusively for the mother country, both by the exclusion of foreigners, and by the discouragement of Colonial manufactures.

Religious intolerance, so fatal to the prosperity of the industrial arts, has ever been next, perhaps, to commerce, the chief instrument in causing their migration from place to place. The annals of every nation furnish evidence of this truth. And it is remarkable that, from the very land in which these arts had repeatedly found the most secure asylum, and a cordial welcome for their multiform benefits, the same cause should have again expelled them to Ireland and to America, to become in a very short time, as will appear, an object of national jealousy and of repressive legislation.

The Antiquity of Cotton.

This very early effort of a young community to become self-dependent in the manufacture of clothing derives additional interest from the fact that it involves the earliest instance of the use, by the European population in America, of a material whose growth and manufacture now affects, more powerfully than any other article, the commercial and industrial relations of the whole world, and constitutes one of the strongest bonds of amity between two of the greatest of modern nations. The earliest use of Cotton in textile manufactures, as well as the origin of the name, seems from its remoteness, to be involved in some obscurity. But its history in this country may be traced with more distinctness than in any other. Here, as in England, during a like period, its very limited use throughout the first century and a half, was but preparatory to a remarkable change of economy at the end of that time. This valuable plant, of which there are several species and numerous varieties, is a spontaneous production of large sections of Asia, Africa, and America, and has been, from very early times, employed by the natives of each in the manufacture of clothing. The birth-place of the cotton-manufacture is assigned to India, and its origin to a date anterior to the dawn of authentic history. It is mentioned in the sacred writings of the Hindoos, written nearly three thousand years ago. The Chinese have employed

it in the manufacture of paper from time immemorial. It is mentioned by Herodotus, in the fifth century before Christ, and plain and figured cottons, by Nearchus, a century after. Its cultivation and manufacture in Persia are spoken of by Strabo, and in Egypt by Pliny, early in the Christian era. That calico-printing by blocks, and even by the use of mordants, or mineral dyes, was known to the Egyptians, there remains scarcely a doubt. In the beginning of the Christian era, cotton stuffs from India are first mentioned as an article of commerce, and it is remarkable that modern travelers give nearly the same description of the business as was given in the Periplus of Arrian at that day. It still flourishes in the same districts, and the "webs of woven air," which the Hindoos fabricated with the simplest and rudest instruments, are still made there with nearly the same machinery, of a delicacy and beauty of texture which all the appliances of modern invention cannot surpass. So true it is, as affirmed by a Hindoo writer, that "the first, the best, and the most perfect of instruments is the human hand." Modern machinery has rather served to multiply the power of production than to excel the native cunning of that divinely contrived machine. The Saracens introduced the culture and manufacture of cotton into Europe—especially into Spain—where Bacelona was famous for the extent and excellence of its cotton stuffs. A degree of sacredness, attached to cotton fabrics by the Mohammedans, is supposed to account for the late introduction of the use of cotton among the Christian nations, who abhorred the customs of the infidel. From Spain it gradually spread, however, through Italy, France and Flanders, and also entered Europe, by way of Turkey, into Greece, Germany and the Venetian States, arriving, latest of all, in England.

The recent explorations of Dr. Livingston in the interior of Africa have discovered large tracts of country under cultivation with cotton, which is extensively manufactured into cloth by the natives. Columbus and the Spaniards who first visited America found cotton growing wild in several of the West India Islands—whence our first spinners obtained it—and our Southern cultivators, more recently, the seed. In the hotter regions of America both continental and insular, cotton at the time of the Spanish conquest constituted the principal clothing of the natives. The more civilized tribes of Mexico and Peru through the matchless skill which habit gives to manual execution, aided by even ruder implements than were used by the primitive Gentoo, spun and wove textures which are represented as little inferior in beauty and fineness to the product of oriental looms. Some garments sent home by Cortez after his conquest of Mexico were remarkable for the excellence of the workmanship. Herrara said of the Nicaraguan women "they spin as fine as hair." The tribes of Central

America even drove a considerable trade in Cotton, raw and manufactured. And the modern Indians of the same countries fabricate cloth of the same material with looms much resembling the Aztec machinery figured in the collections of Mendoza.

"It can scarcely be doubted," says Mr. Baines,[1] "that the Cotton and Indigo plants are indigenous in America as well as in India, but the arts of spinning and weaving were probably carried over by the wanderers, whoever they may have been, by whom that continent was first peopled. The manufacture of Cotton must therefore be supposed to be coeval with the original settlement of America, but learned men are much divided as to the date of this event, some carrying it nearly as high as the deluge, and others contending for a much later period. The American manufacture may, at all events, claim a high degree of antiquity." There seems to be no necessity for supposing the textile arts to have been originally imported into America. The general operations of the human mind are uniformly analogous. There is ample evidence that the ingenuity of man in its lowest state of development is capable of devising means for the relief of pressing wants, which, under like circumstances, are everywhere strikingly similar. The operations of spinning and weaving involve the same principles whatever may be the machinery adopted, whether it be the simple spindle and rude loom of the Hindoo or the Camanche, or the complicated mechanism of a modern factory. The implements used by the aboriginal Americans were sufficiently different from those of the Eastern continent to entitle the art to be considered of indigenous growth.

The precise date of the introduction of the Cotton manufacture into England, whence America received it again under new auspices, is not known. Its existence there was at first overlooked in the general attention to the woolen manufacture. Cotton was first used, and for a long time almost exclusively, for the making of candlewick, in which use it is mentioned in the records of Bolton Abbey in 1298. The earliest authentic mention of its use in the manufacture of cloth in England is by Lewis Roberts, in his "Treasure of Traffic," a small book published in 1641, when the manufacture is supposed to have been in its very infancy. "The town of Manchester, in Lancashire, must be also herein remembered and worthily for their encouragement commended, who buy the yarn of the Irish in great quantity and weaving it, return the same again into Ireland to sell. Neither doth their industry rest here; for they buy *cotton wool* in London, that comes first from Cyprus and Smyrna, and at home work the same and perfect it into *fustians*, *vermillions*, *dimities*, and other such stuffs, and return it to London, where the same is vented and sold and not seldom

(1) History of the Cotton Manufacture in Great Britain.

sent into forrain parts, who have means at far easier terms to provide themselves of the said first materials." Mr. Baines is of the opinion that the manufacture of cotton had obscurely commenced and had been insensibly and slowly growing up for some time before its first distinct recognition in the work of Roberts. The "fustians," "cotton velvet" and fabrics called "Manchester cottons" mentioned by earlier writers, like the Kendall and Welch "cottons" of a later period, he states were wholly made of wool, and he adverts to the curious circumstance "that a manufacture, destined afterward to eclipse not merely the glory of the old 'Manchester cottons' but that of all other manufactures, should thus have existed in name long before it existed in fact." The term *fustians*, which denoted a species of woolen and worsted goods made at Norwich and in Scotland, he believes to have been adopted from the foreign *Cottons*, of which they were an imitation in woolen. "Fustians and other woolens" had long been spoken of among the manufactures of Norwich. But Mr. Baines, whose inquiries led him to the conclusion that the Cotton manufacture was probably introduced about the close of the sixteenth century, cites a passage from Fuller's "Worthies of England," written in 1662, in which he speaks of Manchester as the seat for some time past of the Cotton manufacture, and Bolton in the same country as the chief market for fustians, which were "then in almost general use throughout the nation." The fustians here spoken of are understood to belong to the manufactures of *Cotton* referred to by Lewis Roberts. However this may be, it is certain that the first humble essay of our spinners and Cloth-makers required Cotton, which it was the care of the rulers to provide for their use. Many of the early tradespeople of the colonies, as in the case of the Rowley people, were from the principal manufacturing centres in England, and not a few from Norwich; they were doubtless instructed in the manner of making the fustians and similar fabrics then in general use among the English people. The fustians and dimities made by them as before mentioned were doubtless composed in part of Cotton. As linen warp, mostly imported, continued for more than a hundred years to be used in England in the fabrication of Cottons, no muslins or other goods wholly of Cotton, and none but strong, coarse fustians and dimities of any kind having been made there previous to the year 1760,—we may assume from the testimony before adduced that the use of Cotton in textile fabrics has existed in this country from nearly as early a date as in England. The system pursued in the two countries also and the description of cloth made were not dissimilar. Until the introduction of improved machinery toward the close of the last century the weavers were accustomed to provide themselves with the linen warp and the raw Cotton each on his own account. It was then carded and spun by their wives and children and afterward

woven by the head of the family, who plied his loom during a part of the day, the remainder being employed in gardening or other affairs. After it was woven it was carried to the nearest market when it was finished and exposed for sale. A species of household manufacture thus grew up among the spinners and weavers scattered widely over the country in the manner which appears to have been contemplated in the early orders of the Massachusetts Assembly. A modification of the system introduced about 1740, by which the merchants sent agents throughout the country to supply the weavers with linen yarn and raw Cotton at stated times and receive their cloth in exchange, has been regarded as so great an improvement as to mark an epoch in the history of the business, and to procure for England the title of the second birth-place of the Cotton manufacture. It was little imagined, however, at that time, either in England or America, that Cotton clothing would ever become, to the extent it has done, a substitute for woolen, linen, and silk. While Cotton therefore was not overlooked, and silk received early and marked encouragement, the cultivation of hemp and flax, and especially—as the climate demanded,—the growth and manufacture of wool was systematically enforced or recommended by the fathers of New England.

On the 14th May, 1645, two years after the erection of the first fulling-mill, the General Court of Massachusetts made the following order, which exhibits a becoming sense of their responsibilities as legislators, both to the rising and to future generations. It is also interesting as showing that even then they looked to a supply of something more than their own immediate wants. "Forasmuch as woolen cloth is so useful a commodity, &c., by reason of the cold winters, and being at present scarce and deare, and likely soon to be so in parts whence we can expect to get it, by reason of the wars in Europe destroying the flocks of sheepe, and killing and hindering the trade of those whose skill and labor tend to that end, and as for want of woolen cloth many poor people have suffered cold and hardship and impaired their health, and some hazarded their lives, and those who had provided their families with cotton cloth, (not being able to get the other) have by that means had some of their children much scorched by fire, yea, divers burnt to death; this Court, therefore, (taking into consideration our present condition in that particular, *as also having an eye to the good of posterity*, knowing how useful and necessary woolen cloths and stuffs would be for our more comfortable cloathing and how profitable a merchandize it is like to be *to transport to other parts;*) doth hereby desire all towns in general, and every one in particular within the jurisdiction, seriously to weigh the premises, and accordingly, that you will endeavour the preservation and increase of such sheepe as they have already, as also to procure more with all con

venient speed into the several towns by all such lawful ways and means as God shall put into their hands, and for the better effecting thereof, we thinke meet it be appointed to each several town, being assembled together to know who will buy ewe sheepe at the rate of 40s. apiece, under three years ould, &c.; and appoint one in each town to take the names and return them by the 7th next month to Mayor Gibson, his house in Boston, and further it is desired that those having friends in England desiring to come, would write them to bring as many sheepe as convenient, with them, which being carefully endeavoured, we leave the successe to God." In further aid of this object, an order was made in 1648, for the pasturing of sheep upon the commons, and another offering bounties for the killing of wolves, which were exceedingly destructive of the live stock of the farmers. For every wolf killed during the next four years an Englishman was entitled to receive at least 30 shillings, and an Indian 20s. Premiums of less amount had been previously offered and paid for several years, and were renewed at different times down nearly to the present century.[1] Six years after, the Assembly prohibited the exportation of sheep, and even the killing of any for food under two years of age, save for the use of the owner's family. In 1675 it adopted the more questionable policy of prohibiting also the exportation of wool, of which some had already been sent to France from Nantucket, where sheep husbandry was very early and successfully practiced.

Among several regulations for the encouragement of manufactures, made by the same authorities in 1656, was one passed in May of that year in regard to spinning, which, in some respects, is one of the most important of any relating to the subject, on the colonial statute book. It was systematic in the enforcement of that industry, and left no class of the community at liberty to neglect it. In view of the present scarcity and probable decrease of supplies from abroad, and "for the improving as many hands as may be in spinninge woole, cotton, flaxe, &c.," it ordered "that all hands not necessarily employed on other occasions, as

(1) In 1783, Massachusetts was compelled to offer four pounds for every wolf's head, and one pound for every whelp brought to the selectmen of any town. Nearly every one of the Colonial Assemblies found it necessary to give large premiums for the destruction of wolves and other animals which made dreadful havoc among their herds and flocks. No less than 3125 guilders ($1250) were levied in the little Dutch Colony on the Delaware, in 1677, as bounties on wolves' heads. Many towns in addition, paid premiums for the same purpose. In some of these, captured wolves' heads were in early times required to be nailed to the meeting-house, and notice given to the constables before the bounties were paid. A mode of capture early practiced in Massachusetts, was by binding the shanks of four fish hooks together with the barbs outward, then wrapping them in raw cotton, and dipping in melted tallow until a ball was formed the size of an egg, which was greedily swallowed by the hungry vermin.

women, girls and boys, shall and hereby are enjoined to spin according to their skill and ability, and that the selectmen in every town do consider the condition and capacity of every family, and accordingly to assess them as one or more spinners. And because several families are necessarily employed the greater part of their time in other business, yet, if opportunities were attended, some time might be spared, at least by some of them, for this work; the said selectmen shall therefore assess such families at half or a quarter of a spinner, according to their capacities. Secondly: and that every one thus assessed for a whole spinner, do after the present year, 1656, spin for 30 weeks every yeare 3 pound per week of linen, cotton, or woolen, and so proportionally for half or quarter spinners, under the penalty of 12*d.* for every pound short; and the selectmen shall take special care for the executing of this order, which may be easily effected by dividing those several towns into 10, 6, 5, to take an account of their division, and to certify the selectmen if any are defective in what they are assessed, who shall improve the aforesaid penalties, imposed upon such as are negligent, for the encouragement of those that are diligent in their labour. And it is further ordered that the selectmen in all towns within this jurisdiction shall have power to make such orders in their respective towns for the clearing of commons, for keeping of sheep, as also for the time of putting rams to their flocks, as they shall judge meet; and it is hereby ordered that the deputies in the several towns impart the mind of this Court to their inhabitants concerning the sowing of seeds both of hemp and flaxe."[1] Though scarcely compatible with our ideas of the largest freedom, so decided an expression of the legislative will was likely to turn the public attention strongly in the direction of the home manufacture of clothing. Several of the towns appear about this time to have made efforts to introduce the weaving arts into their midst. The first weaver in Chelmsford, William How, was the same year admitted an inhabitant and was allotted by the town twelve acres of meadow, and eighteen of upland, "provided he set up his trade of weaving, and perform the town's work." The next fulling mill probably, after that at Rowley, was soon after built at Watertown. In May, 1662, Thomas Agar, a fuller of Roxbury, purchased of Timothy Hawkins three-fourths of an acre of land for the erection and maintenance of a fulling mill at Watertown. He sold the mill and land in December of the following year to Thomas Leveran, a cloth-worker from Dedham, in the county of Essex, in England. It was the second mill in that place, and in 1669–70 was conveyed to Hawkins, the original owner of the land, and Benjamin Gar-

The second fulling mill.

(1) Records, vol. iii, p. 396.

field. A second fulling mill was built in the town on Mill Brook, adjoining the first water mill erected about thirty-five years before by Edward How and Mr. Cradock, and which was now owned by How, Thomas Danforth, and others, who erected the fulling mill previous to November, 1686. A fulling mill was built in Dedham in 1681, by Messrs. Draper and Fairbanks. It stood on Mother Brook, an artificial canal, 3½ miles long, which conducted a considerable portion of the waters of Charles river into the Neponset, and has long furnished water power to numerous factories. It was constructed for that purpose in 1639 by the enterprise of the town, and like the Mill Brook at Watertown, is claimed to be the oldest canal in this country.

Few attempts appear as yet to have been made in other parts of New England to produce their own clothing. Connecticut had, as early as 1640, made some useful orders respecting the cultivation of hemp and flax for cordage and clothing, the importation of cotton from Barbadoes, and the improvement of sheep. In 1660 those animals were freed from the taxes paid by other cattle, and grounds were the same year ordered to be cleared for their pasturage. Ten years after, every male over fourteen years of age was required to work one day in June of each year in clearing away the underwood for that purpose. The Town Book of Waterbury in that colony contains an order passed Jan. 20, 1692–3, stating that "thare was sequesterd the great brook from edman scots lot down to samuell hickox, Jr. lot for to build a fulling mill." There is no evidence, however, that such a mill was built there before the year 1728 or 1730.[1] A fulling mill was built on Nahantic River in 1693, by Peter Heckley, of New London, which was the first in that town. The same town in 1713 granted Lt. Col. John Livingston of that place, what right it had to Saw-mill brook to erect a saw mill and fulling mill thereon; and in 1721 Thomas Smith obtained leave to erect fulling and grist mills at Upper Alewive Cove.[2] Until near this time manufactures had made but slow progress in Connecticut. Dr. Trumbull states that in 1713 there was but one clothier in the colony, and the most he could do was to full the cloth which was made. Much of the cloth was worn unsheared and unpressed. In this statement, derived from the official reports to the Lords of Trade, the venerable historian is believed by a late writer to have been in error, and that there were probably many clothiers and fulling mills at that date. Some particulars respecting the colonies, furnished to Edward Randolph, the parliamentary collector of customs in New England, include the statement that about the year 1673, "all cordage, sail-cloth and nets came from England. No cloth is made there

(1) Bronson's Hist. Waterbury. (2) Caulkin's Hist. New London, p. 404.

worth four shillings a yard, and no linen above two shillings and sixpence."[1]

The encouragement of the useful arts was not a primary object with the mercantile company which first *planted* under exclusive privileges in New Netherlands. The extensive manufactures and vast commerce of Holland furnished ample supplies of merchandise in exchange for the furs and peltry of the colony, and took away the stimulus to domestic manufactures. Yet the characteristic industry of the Dutch, prompted them to a very general household manufacture, particularly of linen and hosiery in which branches their native country had long excelled. The flax and the wool of their farms were thus wrought up, and it was the pride of the Dutch matrons on fitting occasions to display their ample stores of strong, smooth, and nicely bleached home-made linen, and stockings of blue, red and green worsted. Denton, the earliest writer on that Province says (1670) "Every one make their own linen, and a great part of their woolen cloth for their ordinary wearing." The natives gave them the name of *Assyreoni*, or the cloth makers, as being so much their superiors in the art. An attempt was made in 1657 to introduce the culture of silk there, and Mulberry trees were two years after sent thence to Curacoa. Wild Indigo was planted near Fort Orange by Julian Van Rensselaer and near New Amsterdam by Angustus Heerman.

By the proprietaries of New Jersey, after its transfer to the English, artisans and tradespeople were invited to settle, especially in the eastern section of the province, by special inducements held out to them. A number of Scotch who settled there introduced the culture and manufacture of hemp and flax. Letters addressed to their friends in Scotland speak of a plenty of material for linen about the year 1684. Flax twice heckled sold for nine pence the pound, and wool was cheap, but labor exceedingly scarce and dear. Smiths, carpenters, masons, weavers, tailors, and shoemakers were especially needed. The Quakers from Yorkshire and London, who, about the year 1677, settled Salem, Burlington, and other parts of West Jersey, soon commenced the manufacture of cloth. "Very good serges, druggets, crapes, camblets (part hair) and good plushes with several other woolen clothes besides Linnen," are mentioned among their manufactures in 1697 by an English writer who professed to

(1) Chalmers in Holmes' Annals, A. D. 1673. These facts are scarcely more in contrast with the present than others with which they stand in juxta-position, as for example that there were no beggars; not three persons put to death annually for theft; there were no musicians by trade; that a dancing school had been set up but put down, but that a fencing school was allowed in Boston. Among the solid men of the town were 15 merchants worth about £50,000; or £500, (probably should be £5000) one with another; 500 persons with £3000 each.

speak from personal knowledge. English hemp and flax was successfully cultivated, and wild hemp was used to some extent. Fairs were held two or three times in the year in each town, and were well attended. In February, 1703, John Clarke received a grant of twenty acres of land on the Southern branches of the Rahawack "for his encouragement in fitting a fulling mill" in that part of the province. It is the first erection of the kind of which we find any mention in that province.

The charter granted by the Court of Sweden in 1640, for the establishment of a colony on the Delaware, permitted the company to engage in all manufactures, and in all commerce, domestic and foreign. Printz, who was sent out soon after as Governor, was instructed to encourage the propagation of sheep, with a view to a large export of wool to the parent state, and also to make trials as to the practicability of raising silk. A letter to a Swedish official in 1693, after they came under the proprietary government of Pennsylvania speaks of their happy condition; they were exporters of bread, grain, flour, and oil; "our wives and daughters employ themselves in spinning wool and flax, and many of them in weaving, so that we have good reason to thank the Almighty for our daily support."[1] They had 80 sheep in 1663, and were now, probably, well supplied with wool. Among the first branches of industry that Penn sought to engraft upon his new colony was the manufacture of linen and woolen cloth. One of his first legislative acts after his arrival in 1682 was to invest with all the rights of citizenship, the Dutch, Swedes, Finns and other foreigners—amounting to about 3000—then in possession of the country. The proclamation of similar privileges and full religious freedom to all others not of ill fame who should arrive, induced numbers of the industrious and persecuted classes from different parts of Europe, and from other colonies, to settle in the province. Indeed, the wisdom and liberality of the laws framed by the founder in England, and regularly enacted after his arrival, are universally conceded to have been honorable to the legislation of the period and to have been favorable to emigration and that character for industry which the State has ever maintained. To furnish a ready market for the domestic products of his people especially woolen and linen, fairs were at once established to be held at stated times, in several of the towns, where the people were brought together for the purposes of trade. The first appears to have been held about the year 1686, when, owing to the scarcity of money only about ten dollars worth was sold.[2] His charter to the city in 1701 provided for holding

(1) Campanius, chap. ix.

(2) Pastorius. Fairs were early established in New England, and for the sale of cattle, by the Director and Council of New Netherlands in 1641. But those in Philadelphia appear to have been the earliest designed principally or exclusively for the disposal of manufactured articles.

two markets in each week, and two semi-annual Fairs on the 16th and two following days of May and November in each year. These afterward became famous occasions for the exhibition and sale of every description of domestic goods, the excellence of which attracted visitors from distant provinces. Their influence was favorable to the industry of the community. These periodical gatherings were at that time popular in England, and originated in the Church festivals or wakes held upon the anniversaries of certain Saints, when it was customary to make merry with ale, whence that termination became synonymous with festival, as Whitsunale, bridal or bride-ale. But it was only a few years previous to this time that they had assumed that gross and riotous feature, and the commercial character which caused them to be banished from the sacred precincts in which they were originally held, to the village green where they were more completely given up to the purposes of trade. Several of the early laws of the province against the drinking of healths and drunkenness, may have been in part designed to countervail the tendency of these popular gatherings to promote excess and irregularity.

In a letter to the Free Society of Traders in 1683, Penn bespeaks their favorable attention to his project for the production of wine and the manufacture of linen, both which branches he hoped the French attracted thither from Carolina would be a means of advancing. His expectations in this respect were not realized. But the liberal character of his government and his personal repute, induced a considerable number of Germans from Cresheim, in the Palatinate, to settle in his principality, and also a number of Welsh, Irish and Dutch, all of an industrial class. The Germans principally settled at Germantown near the city, which they founded soon after Philadelphia was laid out, and were presently joined by other Palatines, including the ancestors of the American Philosopher, David Rittenhouse, Christopher Saur, and others whose names are identified with the early enterprise and science of the country. So great indeed was the influx of Germans during succeeding years, that Governor Keith, in 1717, recommended Parliament to prohibit any from coming without a license from the English or colonial governments, lest so many should endanger the allegiance of the province. A tax of 5 shillings per head was indeed injudiciously laid by the Assembly in 1729, but was soon after canceled. The Germans who first arrived soon became noted for their linen and hosiery, and were the first to introduce in this country some branches of industry noticed elsewhere. Penn wrote to the Marquis of Halifax in Feb. 1684, that the Germans had already fallen upon flax and hemp, and the French upon vines. To quicken their exertions in the production of Cloth, he appears about the same time to have offered a premium for the first piece. On the 17th 9th mo., 1686, the petition of

Abraham Opdengrafe was read in the council "for the Governor's promise to him who should make the first and finest piece of linen cloth."[1] Wigart Levering, one of the Germantown settlers, and soon after one of the first settlers of Roxborough, was a weaver by trade and his descendants are among the most enterprising manufacturers of the present day. Matthew Houlgate, who purchased land in 1698 of one of the original patentees of Roxborough, erected upon the Wissahickon, between that year and 1720, a fulling mill, the ruins of which were lately visible. A variety of linen and woolen stuffs are mentioned as the manufactures of these and others in the province in 1698, as druggets, serges, camblets, etc., which daily improved in quality. Among the tradesmen who had remunerative employment were dyers, fullers, combmakers, cardmakers, weavers, spinners, etc. The price, in 1688, for spinning worsted or linen, we are told, was usually two shillings the pound, and for knitting coarse yarn stockings, half a crown a pair. The price for weaving linen of half a yard in width was ten or twelve pence per yard. Wool combers or carders received twelve pence per pound, the pay of journeymen tailors was twelve shillings per week and "their diet." The first in this line mentioned in Philadelphia was Charles Blackman, who enjoyed the governor's patronage. Fulling mills are mentioned as in operation on Darby river, near the town of that name, about five miles from Philadelphia. The German linen of the Province is described to be "such as no person of quality need be ashamed to wear."[2] The progress in the arts of the clothier, if the writer may be credited, appears to have been considerable for so short a time.

In respect to Clothing, as in some other things, the first settlers of America were content to receive from the customs of their barbarous neighbors suggestions which were not without use to them in their peculiar circumstances. The principal Clothing of the rude northern Indians, before they became acquainted with the woolens of Europe, were the furs and skins of the wild animals. These they dressed in different ways and formed into garments variously ornamented and often with remarkable skill. Elk and deer skins in particular were much valued for that purpose, being converted into good untanned leather, which, according to an early emigrant, they made "soft and plume, and as white as milk." They were worn in cold weather with the hair next the person. They were even traded off for furs to more distant tribes, where these animals were less plentiful; and until the purchasers had learned the relative value among the Europeans, of their finer peltry, two, three, and even four beaver skins, worth several pounds each in the towns, were given for a good fallow deer skin killed in the proper season. The colonists made much

(1) Hazard's Register of Penna., i. p. 16. (2) G. Thomas, Hist. Penna., Lond. 1698.

use of these materials, which comported well with their rugged mode of life and the severity of the climate. Indeed they were not unaccustomed to the use of similar materials in their native country, for in England at that day leather, dressed as buff and in other styles, and worn as doubletts, breeches or vests, formed no inconsiderable part of the Clothing of some classes, and for hunting, riding, or traveling costumes, of even the nobility. The Puritan severity of the New England fathers, which frowned on all redundancy and variety of dress, doubtless contributed to the currency of this style of Clothing and material as more suited to American life than the velvets, silks, and lace of England, under Charles the Second, and his successors.[1] These sober and frugal materials continued in use until after the era of independence, and garments wholly, or in part, of buckskin or other kinds of leather, could be found in the wardrobes of many of the wealthiest men of that day. That style of dress was conspicuous in the camp, and the title of "the Buckskins" was no less significant to the enemies of the country of the tough and sturdy valor, than of the homely exterior of American soldiery. Beauchamp Plantagenet, supposed to have been regal in lineage as in name, writing of New Albion in 1649, recommends this semi-aboriginal dress as all that was desirable. "But surely," says that extremely quaint writer, "we may easily grow rich if we will buy no clothes, for a good weaver brought hither will make us of our flaxe nine sorts of Linens, tufted Hollands, velures, velvets, Tuftaffetaes and Plushes, and for winter a good Glover, with some onely of our own elk skins maketh the best buffe coats; our own stag and deer skins make best gentile and soldiers' clothes, fittest for our woods; a doeskin breeches with the fur inside in our short winter is better than two broadcloths and warmer, so we need no English Cloths." The soil, he says, would yield a half ton of flax, and a ton of hemp, worth

(1) The austere principles of the New England fathers sometimes led them to disfigure the statute book with sumptuary regulations like the following: In October, 1633, it was "ordered that no person, either man or woman, shall make or buy any slashed Clothes, other than one slash in each sleeve, and another in the back; also all cutt works, imbroidered or needle-workt caps, bands, vayles, are forbidden hereafter to be made and worn under the aforesaid penalty—also all gold or silver girdles, Hollands belts, Ruffs, *beaver hatts*, are prohibited to be bought or worn hereafter under the aforesaid penalty." In 1639 it was ordered that ladies' dresses should not be made with short sleeves; that the arm should be covered down to the wrist, and that women's sleeves should never exceed half an ell in width. (Felt's Salem. Thacher's Plymouth.) In 1653 the wife of Hugh March, of Newberry, was prosecuted (with two other women) for wearing a silk hood and scarf, but was discharged on proof that her husband was worth £200. (Coffin's Hist. Newberry.) The year previous the wife of Joseph Jynks, Jr., of Lynn, was presented for wearing silver lace along with Robt. Bridges for bad corngrinding, and others for wearing great boots and silk hoods, &c. (Lewis' Hist. Lynn.)

£12 to the acre and a profit of 6*s.* a day to the laborer. He mentions *Cotton* River "so named of Six hundred *l.* of cotton wild on trees growing," which article there was no doubt would thrive well. Of another portion flax was one of the staple products, the others being corn, rice and tobacco. We may infer from his remarks that in that part of the country, which corresponded with a portion of Delaware and Maryland, and contained already 8000 people and a trade employing 140 ships, there was yet no home manufacture of Cloth. A further evidence that the arts were not yet introduced in Maryland, is the passage of a law the same year "providing for *the* Smith," one of the first requisites of a new community. There was little attempt at manufactures for nearly fifty years after, the supplies—except homespun, of which most families made more or less—being derived from England in return for tobacco, or from New England in exchange for grain and provisions. A murrain among the stock in 1694–5, which cut off over 25,000 neat cattle and upwards of 62,000 hogs, and proportionally diminished their resources, together with an increasing difficulty in getting supplies for England, threw the colonists, in a measure, upon their own abilities for Clothing. An effort was made in 1697 to introduce the manufacture of linen and woolen Cloth in the counties of Somerset and Dorchester. But the attempt appears to have had no permanent success, but nevertheless occasioned some complaints in England. The mineral riches of the province more successfully attracted the industry not already absorbed in agriculture.

Textile Manufactures in Virginia, 1650.

In Virginia, in 1650, there was a sufficiency of materials of wool, flax, and hemp, as well as of the native silk-grass, regarded by many as of nearly equal value with the cultivated flax. But it seems to have been little used, although, as mentioned in a previous chapter, its textile qualities had been tested and approved in England, and even a suit for royalty had been made of it. A Captain Matthews, over thirty years a resident, and now a member of the Council, is highly commended at this period for his enterprise in manufactures. He was a great cultivator of hemp and flax, which he also manufactured, having a large household of weavers and other tradesmen employed in different branches, and many slaves also trained to mechanical pursuits. Silk and cotton had already been attempted there, and recommended to the attention of the planters. Madder, indigo, and several other native vegetable dye-stuffs, had also been tested. Abundance of cotton might have been obtained by the exportation of cattle and other produce, of which the former were already so numerous as to be suffered to run wild in the woods. But these facilities were disregarded for the cultivation of tobacco, which it was now hoped, by those who favored a wiser policy, would soon yield to that of silk. This article, the culture and manufacture of which had been slowly

extending in England for upward of a century, had been especially encouraged in Virginia from its first settlement. The supposed fitness of the climate, as evidenced by the abundance of native mulberries and silk-worms, turned the attention of the English people, at this time, strongly toward the cultivation of silk in Virginia and Carolina. The art of weaving it was introduced in England some years before. The Silk-throwers of London were incorporated in 1629, and the trade now employed many thousands, while the manufacture in France was deemed worth between three and four millions sterling annually. Several writers, therefore, now discussed the subject of its cultivation in Virginia, some of whose papers were printed in the Philosophical Transactions, and were circulated in manuals. Williams, the author of a tract on Virginia, in 1650, labored to show the profits of silk and wine-growing. Two or three years later, Samuel Hartlib, an enterprising merchant of London, to whom Milton dedicated his Treatise on Education, published two works on the Virginia silk-worm. Governor Edward Digges, of Virginia, Mr. John Ferrar, and others, also did much to excite an interest in the subject among the planters, by instructions in the business, the distribution of silk-worm seed, and by showing the great profits of the culture. Mr. Ferrar, in particular, pointed out a means of overcoming the gummy hardness of the Virginia cocoons, by steeping them in strong soap-boiler's liquor, instead of warm water, which sufficed with European kinds. He also recommended the use of lettuce for feeding the worms. By a comparison of the profits, it was shown that silk-worms would yield the planter, for about two months' labor in the year, £60; while tobacco, at 2*d.* per pound, as it then sold, would return but £14 for the same amount of labor during nine months. These efforts were so far successful that some small lots of Virginia silk were sent to England. As a mark of his favor for the staunch loyalty of the Province, Charles II., a few years after, added Virginia to the title of his dominions, and particularly recommended the Governor of the Province to encourage silk-growing, stating that he had formerly—at his coronation, as the tradition is—"worn some of the silk of Virginia, which he found not inferior to that raised in other countries."

The Assembly of Virginia, in 1662, enacted several laws for the promotion of industry, and particularly in relation to Cloth and its materials.

Laws for encouragement of Manufactures in Virginia.

Flax-seed was ordered from England, to be distributed to each county, and bounties offered for raising that and hemp-seed. Two pounds of tobacco were offered for every pound of flax or hemp prepared for the spindle, three pounds for every yard of linen Cloth a yard wide, and five pounds for every yard of woolen Cloth made in the Province. Every tithable person was required, under a penalty of fifty pounds of tobacco, to produce, yearly, two pounds of

dressed flax or hemp. Premiums were also offered of ten pounds of tobacco for every good hat made of wool or fur, and for every dozen pair of woolen or worsted stockings. A liberal bounty of fifty pounds of tobacco was declared due for every pound of wound silk produced, and for every hundred acres of land owned in fee, the proprietor was required to plant and fence twelve mulberry trees. The exportation of sheep from the Colony had been prohibited five years before, and it was now ordered that no wool should be exported under a penalty of fifty pounds of tobacco for every pound so exported. The bounty on silk was, two years after, claimed by several persons engaged in producing it. One of these was Major Walker, a member of the Assembly, who then had growing upwards of seventy thousand mulberry trees. All acts for the encouragement of silk were repealed in 1666, along with that for planting mulberry trees, "which now every one voluntarily propagates." In that year the commissioners were required by the legislature to establish, within two years, a loom and a weaver in each county in the Province, except Rappahannock, Northampton, Westmoreland, and Stafford, which were allowed four years wherein to effect it. Each county was to bear the expense of its own establishment, and the erection of a private loom did not excuse the county. The law was repealed in 1684.

Governor Berkeley in his answers to the Committee of Plantations in 1671, states that "of late we have begun to make silk and so many mulberry trees are planted, that if we had skilful men from Naples or Sicily to teach us the art of making it, in less than half an age, we should make as much silk in a year as England did yearly expend three-score years since." The demand for that article in England, where it was then supposed to employ forty thousand persons, and the bounties and other legislative measures in the province, gave a temporary impulse to the business. But it declined again on the withdrawal of the premiums. The cultivation of hemp and flax was again enforced by heavy penalties in 1673. About the year 1684 another law was enacted in Virginia for the encouragement of the manufacture of linen and woolen Cloth, and "for the advancement of manufactures of the growth of the colony," which Chalmers says "was disallowed by the Committee of Plantations because it was deemed contrary to the Acts of Navigation." "And thus," he adds in relation to this and other useful regulations made during the same session, "did the Assembly sow the seeds of future prosperity which Virginia reaped abundantly at a happier period."[1]

The first fulling mills in Virginia were built about the year 1692, during the Administration of Andros, who was an encourager of manufac-

(1) Political Annals, i. p. 346.

tures, and particularly recommended the cultivation of cotton, which was afterward much neglected. His successor, Governor Nicholson, who succeeded him in 1698, opposed all attempts at manufactures, and even advised Parliament to prohibit the making of Cloth in the colonies.[1] This appears to have been the earliest recommendation of that policy on the part of a colonial Governor, and perhaps warrants the presumption that at this time the amount of domestic manufacture in the colonies was such as to affect considerably the importation of English goods. Both the imports and exports of Virginia and Maryland together, were at this time greater than of all the others combined. In 1698 the two provinces imported to the value of £310,135 from Great Britain, a larger amount than they received during any of the next forty years.

These efforts for the advancement of manufactures were the direct result of the restrictions upon the Virginia trade, and of the duty upon tobacco. The price of that article had fallen so low as to be a cause of real distress to a people who had made it nearly their sole dependence. Many planters were, at this time, unable to clothe themselves from the proceeds of their crops. The customs collected in England, in 1676, upon Virginia tobacco (that of Maryland probably included) amounted to £135,000 sterling. The whole customs' duties, in the reign of Elizabeth (1590), amounted to only £50,000. They had now increased to about £700,000 sterling. If a considerable part of this increase was due (as many believed) to the Colonial trade, which chiefly centred in London, causing a corresponding growth of that city, it is scarcely surprising that the nation desired to keep the control of so profitable a commerce.

Silk, Indigo, Cotton, etc., in Carolina.

In the settlement of Carolina, which was taking place at this time, an attempt was made to cultivate silk, hemp, indigo, and cotton. Wilson, in his account of the Province in 1682, says, "Cotton of the cypress and Smyrna sort, will grow well, and plenty of the seed is sent thither." Very good indigo had also been made. The recent renewal of the Protestant persecutions in Europe, which drove so many to England to give an immense impulse to the manufactures of that country, also supplied large numbers of merchants, husbandmen, and artificers to the American Colonies. They brought a knowledge of the linen, silk, wine, and other branches of industry, and in Carolina, where a large body of the French settled, through the generous aid of the British Government, they invented, as the Abbe Raynal informs us, a new kind of stuff, by mixing the silk of the Province with its wool.[2] The cultivation of silk, in Carolina, was early attempted, without much success, by the King. About the year 1693, it was again

(1) Beverley.

(2) Philosoph. and Polit. Hist. of the British Settlements and Trade in America, i. p. 213.

introduced by Sir Nathaniel Johnson, upon a plantation in the parish of St. Thomas, which, one hundred years later, still bore the name of "Silk Hope."[1] He made considerable quantities of raw silk, and induced many others to engage in its production. But Hewatt, who blames the proprietors of the Province for not giving suitable encouragement to silk, cotton, and other crops, which would have proved more profitable than rice, observes that Governor Johnson, "after all his pains, rather showed what might have been done toward the cultivation of silk in that Province, than made such progress in it as to render the commodity of national advantage."[2] Indigo was somewhat later introduced, from Antigua, and, while encouraging trials were being made with it, attention was drawn to the wild plant found there, which was immediately cultivated with such success that, upon the export of a considerable quantity to England, in 1747, the attention of Parliament was attracted to an article so important to her manufactures. In the following year, a bounty of 6*d.* per pound was offered upon plantation indigo, and the manufacture was prosecuted with profit until it eventually gave place, like other crops, to the cultivation of cotton. This plant had for several years been occasionally cultivated in gardens, and after the year 1702, "cotton patches" became common in Carolina. Tobacco, rice, indigo, and stock-husbandry chiefly employed the Southern Provinces at this time, and skillful workmen were too scarce, and, their labor too dear, to admit of much progress in the mechanic arts.

Why Manufactures were neglected.

The quantity and quality of labor in all stages of society and of the arts, govern in a great measure the amount and kind of production. This was more particularly the case at a period when manual labor was the chief dependence. Its scarcity always operated as a hindrance to manufactures in the Colonies. While other forms of industry afforded the means of purchasing foreign merchandise on easy terms, few inducements existed to undertake them. While emigration was brisk, the Colonies were well supplied with English goods, and its arrest supplied the first motive for home manufactures. During the civil wars, also, the commerce and industry of the Northern Colonies were left perfectly free to seek their most profitable channels. The sympathy of New England with the Republican cause even, produced special marks of favor from the Protector, by an exemption from all customs. The Colonies had, consequensly, engaged in the most lucrative branches of business, sought the most profitable markets, and procured their supplies in such ways as they deemed most favorable to their interests. They had progressed in wealth and influence with a rapidity quite unexampled in

(1) Ramsay's Hist. of S. C., ii. 475. (2) Hist. S. C. and Georgia, i. 157.

so short a time. Agriculture employed the majority of the people. Abundance and cheapness of land, the great increase yielded by a virgin soil, the extent of pasturage for cattle, and the profits arising out of the export of the various products of husbandry, of naval stores and other products of the forest; and of the fisheries, to British, Colonial and foreign markets, had constantly withdrawn nearly all labor from mechanical pursuits. This they long continued to do, and kept up the price of labor by enabling the humblest emigrant to aspire to the position of an independent planter. Before the close of the first half century of their history, the older Colonies were rich and prosperous to a degree scarcely exceeded during the time they continued as de endencies of Great Britain. But agriculture, commerce, and the fisheries were the arms of their strength. The Mechanic arts and manufactures were a very subordinate interest, and their system of commercial exchange, so long as trade remained unrestrained, kept them so. But the enactment, or subsequent enforcement, of the laws of trade, by restricting the choice of a market, and limiting the profits of commerce and the value of Colonial productions, forced a portion of the labor and capital heretofore employed in other branches, into the neglected field of domestic manufacture. From the time, therefore, when the enforcement of her commercial statutes became the settled policy of Great Britain, we shall find an increased attention to the subject of home manufactures, and efforts of the national Government to check their development.

Effects of Restraints on Trade.

The assertion of the right of the parent State to a monopoly of the Colonial trade, was as old as the days of James I., who attempted to prevent the exportation of Virginia tobacco to Holland, where the Colony had established warehouses and factors, partly to evade the duties levied on tobacco in England, and partly to obtain a more extended market for its staple, which more than sufficed for the consumption of England.

The increasing use of tobacco, despite the King's hostility to it, rendered the duty, prospectively, at least, an important source of revenue; and in the attempt to prevent its exportation to a foreign country, it was declared that all Colonial productions should, by right, be landed in England, to which the trade of the Colony belonged, a principle quite in accordance with the doctrines and practice of all mercantile nations of that day. Virginia, however, claimed the right to export tobacco to a foreign market, in virtue of the privilege conceded by her charter, that of carrying on a direct intercourse with foreign States. A monopoly of the tobacco trade, enjoyed by the King, ceased on the occurrence of the civil wars. But the fiscal value of the duty thereon induced Parliament to encourage its cultivation in Virginia, by excluding tobacco of foreign

growth, and by imposing a duty on tobacco grown in England, so as to render its cultivation there unprofitable. The Navigation Acts of 1650 and 1651, by confining the plantation trade to British ports and British shipping, extended this exclusive policy to the whole of the now valuable trade of the Colonies and all Colonial productions whatever. As a compensation to Virginia for this limitation of her market, tobacco was, in 1652, forbidden to be cultivated in England, and the Act was confirmed on the Restoration, when all tobacco plantations in England were ordered to be destroyed. By the Act of 1661, no sugar, tobacco, cotton-wool, indigo, ginger, or woods used in dyeing, of the growth or manufacture of the Colonies, could be shipped to any other country than to England. All other articles were left free, but these embraced the most important Colonial products. To these *enumerated articles* others were added, from time to time, as they severally became of importance in the Colonial trade, as, for example, coffee, hides, skins, iron, corn, lumber, etc. This monopoly of the Colonial commerce was completed by the Act of 1663, which prohibited the importation of any commodity, the growth, production, or manufacture of Europe, into the British plantations, but what was laden in England, and in vessels navigated according to previous Acts. The Preamble to this Act avows the motive to its enactment and the prevailing policy of European countries to be—"the maintaining a greater correspondence and kindness between the subjects at home and those in the plantations; keeping the Colonies in a firmer dependence upon the mother country; making them yet more beneficial to it in the further employment and increase of English shipping and seamen, and in the vent of English woolen and other manufactures and commodities; rendering the navigation to and from them more safe and cheap; and making this kingdom a staple not only of the commodities of the plantations, but also of the commodities of other countries and places for their supply; it being the usage of other nations to keep their plantation trade exclusively to themselves." Salt, wines, and a few other articles, were excepted, and drawbacks were allowed of the duties on goods shipped to the Colonies. Though doubtless favorable to the growth of English commerce and navigation, at the expense of the dominant maritime power of Holland, their injurious effect upon Colonial prosperity, by fettering the freedom of trade in respect both to buying and selling, was an unfavorable issue—by no means intended, but rather overlooked or postponed—to the more vital consideration of the commercial interests of the parent State. The Acts were regarded with the highest dissatisfaction in America, particularly in Virginia, the value of whose staple was ruinously affected by them. The first statutes were oppressively enforced in that Colony by the agents of Cromwell, on account of its disaffection to his government, while New

England, for political reasons, was suffered to disregard them altogether. Resistance was organized in Virginia, and after the imposition of duties, and the appointment of Colonial revenue officers, the resentment against this return for its loyalty rose to open rebellion in that Province and in Maryland. To the Act of 1663, Beverly ascribes the destruction of the trade and navigation of the Colony, and its inability to add to its industry any foreign products, as olives, cotton, and vines, or to procure any skillful men for their hopeful commodity of silk, or to export a pipe-stave or bushel of corn to any place out of the King's dominions. The Acts were soon after enforced in all the Colonies. The wars with Holland, France, and other continental powers, growing out of the maritime code, produced great insecurity of trade, and, aided by domestic revolutions, pointed out to the Colonies the need of a closer union of interests among themselves, and of an ultimate independence in regard to all necessaries the cost and supply of which was alike subject to the caprice of mercantile legislation and the contingencies of internal revolutions and of international warfare. They were the immediate occasion of the order made in Virginia, in 1666, in relation to spinning, and of similar efforts in other Provinces.

By the erection, in 1696, of a new Standing Council, or Board of Trade, under the denomination of "The Lords Commissioners for Trade and Plantations," the interests of British commerce and the affairs of Colonial trade and government were confided to that body, which thenceforward became the repository of all official intelligence upon those subjects, and the medium of communication with the several governors and Assemblies of the Colonies. Yearly reports of the state of the Provinces were required from the Governors, in answer to queries addressed to them by the Board.

New Standing Board of Trade created, 1696.

An Act of Parliament of the same year, still further restricted commercial intercourse, by limiting trade between England and her Colonies to English, Irish, and Colonial built vessels, and by prohibiting Colonial produce from going to the ports of Ireland or Scotland. All laws, by-laws, usages, or customs in practice or pretended to be in force in any of the plantations, which were in any wise repugnant to the laws of England relating to the plantation trade, were declared to be illegal, null, and void. A pamphlet appeared the same year, recommending a tax upon one of the Colonies, although no such design had yet been exhibited on the part of the Ministry, and was answered by two others denying totally the power to tax where there was no representation.

But the feeble attempts of the Colonists to make a portion of their own clothing from their abundant materials had not been unnoticed in England. Three years after—the Board of Trade having received complaints

from English merchants and manufacturers, that the wool and woolen manufactures of Ireland and the North American plantations began to be exported to foreign markets formerly supplied by England—an Act passed the British Parliament, in which the existence of such a manufacture in the Colonies is, for the first time, recognized in the Statute Book. This statute (10 and 11 Wm. III. c. x.) was dictated by that sleepless vigilance which guarded the staple manufacture of England. It prohibited the exportation of any wool or woolen manufacture from Ireland, except to certain ports in England; but, by way of compensation, virtually surrendered to Ireland the linen manufacture, then little regarded in comparison with the woolen interests. In reference to the Colonies, it was enacted that "After the first day of December, 1699, no wool, woolfels, yarn, cloth, or woolen manufactures of the English plantations in America shall be shipped in any of the said English plantations, or otherwise loaden, in order to be transported thence to any place whatsoever, under the penalty of forfeiting ship and cargo, and £500 fine for each offence; and the Governors of the Plantations and Officers of Customs and Revenue there, are to see this Act, as it relates to the plantations, duly executed."[1]

Woolen-manufacture first recognized and prohibited, 1699.

The population of the American Colonies, at this time, was estimated at about two hundred and sixty thousand.

This prohibition, under which they were laid, was a violation of the plainest rights of the Colonist to employ his industry in such way as he might find most profitable. But it was probably less instrumental in checking the disposition to manufactures at that time than it would have been in an advanced stage of the business. On account of the remoteness of the Colonies from the sovereign state, and the great extent of their sea coast, it would have proved no more effectual in preventing an exportation for which they were prepared, than the laws of Parliament then were against the exportation of wool from Great Britain. It was thought, a few years later, that about five-eighths of the entire English wool crop, in defiance of the laws, found its way, surreptitiously, into the markets of France and the Continent. There is little doubt that the liberality of Great Britain toward her Colonies, in permitting one-half and often the whole of the duties paid on foreign linens and other goods imported into England to be drawn back upon their exportation to the Colonies; and still more, the giving of large bounties for the importation thence of naval stores and certain materials of manufacture, had more influence, at this period, in diverting them from manufactures with a view to exportation, than any prohibitory enactments. The system of draw-

(1) Abridgement of the Statutes, vol. iv. p. 314.

backs, which was continued until the year 1763, favored large importations, and many kinds of foreign goods could consequently be purchased in the Colonies as cheap, and sometimes cheaper than in England. By the Acts of Navigation, English merchants had the monopoly of the Colony trade, and both English manufacturers and the customs' revenue suffered by an indulgence which furnished the Colonial market at the cheapest rate possible except by direct exchange with the producing countries. By an Act passed in 1704, "For encouraging the importation of Naval Stores from her Majesty's plantations in America," bounties were offered, for the first time, of four pounds per ton upon tar and pitch; three pounds upon turpentine, and six pounds upon water-rotted hemp; and upon all masts, yards, and bowsprits, one pound per ton of forty feet. These bounties, modified from time to time, and similar ones upon other products, had a tendency, by raising the price of timber, and rendering profitable the branches so encouraged, still further to turn the labor and capital not employed in agriculture from manufactures to those more remunerative channels, and to open facilities for an augmented importation of English and European goods. The bounty on hemp secured some attention to its culture, particularly in Virginia and Carolina, and the hemp of the former Province was, a few years after, said, by Joshua Gee, to be equal to the best of European.

Official Reports and suggestions, 1705–1715.

The remarks of Lord Cornbury, in his report upon the state of the Province of New York, made in the following year, are instructive, as showing the views of British statesmen and officials, and perhaps the source of many of the ideas entertained by the ministry at that time in regard to Colonial manufactures and the means of suppressing them. They exhibit not less distinctly the spirit and temper of the Colonists on the subject of Parliamentary interference, and furnish some information upon the state of manufactures in that Province. He strongly urges that the Colonies should be encouraged to furnish naval stores—flax, hemp, and similar productions—as a means of making returns for the large purchases of English manufactures in the manner contemplated by the statute already referred to. As a further reason, he observes, "besides the want of wherewithall to make return to England, puts them upon a Trade which, I am sure, will hurt England in a little time; for I am well informed that upon Long Island and Connecticut they are setting upon a woollen Manufacture, and I myself have seen Serge made upon Long Island that any man may wear. Now, if they begin to make Serge, they will, in time, make coarse Cloth, and then fine; we have as good fullers' earth and tobacco pipe clay in this province as any in the world;' how far this will be for the service of Eng-

(1) The fullers' earth, so valuable in the fulling process, on account of its detersive

land, I submit to better judgments; but, however, I hope I may be pardoned if I declare my opinion to be that all these Colloneys which are but twigs belonging to the main Tree (England) ought to be kept entirely dependent upon and subservient to England, and that can never be, if they are suffered to goe on in the notions they have, that, as they are Englishmen, soe they may set up the same manufactures here as people may do in England; for the consequence will be, if once they can see they can cloathe themselves, not only comfortably, but handsomely too, without the help of England, they, who are already not very fond of submitting to government, would soon think of putting in execution designs they had long harbourd in their breasts. This will not seem strange, when you consider what sort of people this country is inhabited by."

In August, 1708, previous to the arrival of Cornbury's successor, Col. Heathcote, a member of the council, and an applicant for the contract to supply naval stores, wrote to the Board of Trade that he had labored to divert the Americans from going on with their linen and woolen manufactures. He says they were already so far advanced, that three-fourths of the linen and woolen used was made amongst them, "especially the coarse sort, and if some speedy and effectual ways are not found to put a stop to it, they will carry it on a great deal further, and perhaps, in time, very much to the prejudice of our manufactories at home. I have been discoursed with by some to assist them in setting up a manufactory of fine stuffs, but I have, for the present, put it by, and will, for my own part, never be concerned in it, nor any other of that nature, but will use all the little interest and skill I have to prevent it." Governor Hunter, in 1715, recommends the same means as his predecessors, to divert the people from the manufacture of Cloth, of which the country people chiefly wore the product of their own looms; but, as it was well known that imported goods were accounted cheap, at an advance of one hundred per cent. on the cost, to compel them to wear such would be too severe an expedient. He had never known the homespun to be sold in the stores. A letter from New England to the Board of Trade, on the same subject, and in the same year, reiterates the necessity of employing the New Eng-

properties, was long regarded as almost exclusively the production of England, and as one of the most precious of her fossil treasures. The exportation of that and pipe-clay was, therefore, prohibited, along with that of wool and other materials used in the woolen manufactures, as early, at least, as 1630, and by several later statutes. Dodsley, in his "Agriculture," written many years after the date in the text, claims that this

"Oil-imbibing earth,
The fullers' mill assisting, safe defies
All foreign rivals in the clothier's art."

And after remarking (in a note) that it was found in no other country, cites the opinion of Dr. Woodward, that it was of more value to England than the mines of Peru would be. It is mentioned among the native productions of Maryland and Virginia, in 1669.

land people in producing naval stores, to turn them from manufactures. It mentions that six thousand barrels of tar, pitch, and turpentine were sent home that year by one fleet. But that nine years before, the great scarcity and dearness of woolen goods, which sold at two hundred per cent. advance, had forced them to "set up a very considerable manufactory, still in being, for Stuffs, Kerseys, Linsey-woolseys, Flannels, Buttons, &c., by which the importation of these Provinces has been decreased fifty thousand pounds per annum." To avert an issue so unfavorable to British interests, care was taken that the occasion should not again arise, and the American market was ever after kept well supplied with English goods. The discouragement of American manufactures, from this time, became the settled and avowed policy of the government, and three years later, the Bill prohibiting the erection of forges and iron mills was introduced, and declared that the erecting of Manufactories in the Colonies "tends to lessen their dependence upon Great Britain."

The descriptions of cloth made at this time in America, were chiefly those mentioned above. They were almost exclusively the stout and coarser kinds of mixed fabrics, into which linen or hempen thread largely entered as a material. Cotton was regularly imported in small quantities chiefly from Barbadoes, but occasionally also from Smyrna and other places to which trade extended, and was made into fustians and other stuffs with linen thread.

Kinds of Cloth made.

But linen then subserved nearly all the purposes for which cotton is now employed, and hence the attention given to the cultivation of the flax and hemp plants. The linens made at that time were for the most part of quite a coarse texture. The kerseys, linsey-woolseys, serges, and druggets, consisted of wool variously combined with flax or tow, and formed the outer clothing of a large part of the population during the colder seasons. Hempen cloth and linen of different degrees of fineness from the coarsest tow-cloth to the finest Osnaburg or Holland, constituted the principal wearing apparel outward and inward at other times. The inner garments and the bed and table linen of nearly all classes were almost entirely supplied from the serviceable products of the household industry. As the implements of manufacture were then comparatively rude, and many modern processes of manufacture and finish were as yet unknown, the fabrics made, whether woolen or linen, were more remarkable for service than for elegance. The material was mostly grown upon the farms of the planters and the breaking and heckling being done by the men, while the carding, spinning, weaving, bleaching, and dyeing, were performed by the wives and daughters of the planter, the beauty and abundance of the stores of household linen were an object of laudable pride and emulation with all thrifty families.

The dress of apprentices and laborers, early in the last century, almost invariably comprised shirts of this home manufactured "Ozenbrig," made of hemp or flax, and varying in price from one to one shilling and sixpence per yard, and vests and breeches of the same, or of coarse tow-cloth. Coats, or doublets, and breeches of leather, or enduring buckskin, and coats also of kersey, drugget, duroy, frieze, etc.; felt hats, coarse leather shoes, with brass buckles, and often wooden heels; and coarse yarn or worsted stockings, were the common outer habiliments of that class, and were principally of home manufacture. The distinctions of rank were pretty clearly defined, and the dress of the middle and wealthier classes corresponded to the tastes and abilities of each.

With the former, domestic fabrics were much worn, particularly the finer kinds of Osnaburgs and Hollands, and Cloths of mixed or unmixed wool, such as they possessed the means of making, or of purchasing. They also made considerable use of imported broadcloths, which, however, were often worn white or undyed. With the rich, imported goods were used almost exclusively, and consisted of the woolen manufactures of England, and the linens of Ireland, Scotland, and the continent. Even silks and velvets, then much in vogue in England for male as well as female attire, formed a considerable part of their clothing, where it was permitted, and the price of a good farm was sometimes given for a fashionable outfit.

India cottons were first brought to England in 1630, and in 1690 the art of printing them was introduced there, after which they found their way to America. Cottons, or calicoes, were for a time rendered very cheap in this country by an Act of Parliament, passed in 1721, at the instance of the woolen manufacturers, prohibiting the wearing of printed or dyed Cotton goods, except blue calicoes, muslins, or fustians. The English fabrics of cotton and linen, since called "Unions;" and still larger quantities of woolens, helped to swell the enormous amount of British manufactures regularly imported.

About the year 1719, a considerable improvement was made in the linen manufacture in this country, by a number of Protestant people from the North of Ireland, who introduced a better knowledge of the cultivation and manufacture of flax and the linen or foot wheel for spinning flax. To those people, called Scotch Irish, from having originally emigrated from Scotland to Ireland, with the art, to escape persecution which once more drove them to America, we are said to be indebted also for the common Irish potato, the most valuable esculent of their native or adopted country. The principal body of these immigrants, who were from Londonderry, in Ireland, settled to the number of sixteen families in New Hampshire, at a place which they

Scotch Irish introduce the Linen manufacture.

called by the same name, where they soon after commenced the raising of flax and the manufacture of linen, and induced others to follow their example. Their descendants, who in 1842, numbered over twenty thousand, were the first settlers of many towns in New Hampshire, Massachusetts, Maine, and Nova Scotia, and carried with them the industrious habits of their fathers.[1]

In New Hampshire, and in Boston, where a number of the Scotch Irish settled, and engaged in the linen manufacture, to which most of them had been brought up, they made rapid progress in that industry, and soon acquired wealth and importance, the excellence of their linen procuring a large demand for it. Their superior knowledge of the art, and the improved implements with which they came provided, gave an impulse to the business, and the flax wheel thenceforward became an appendage to almost every farm-house and cottage in the country. The foot wheel was for many purposes, and especially for flax, much superior to the long wheel, the other form of the old one-thread spinning-wheel, which only about ninety years before the settlement of Massachusetts, was invented in Germany, to supersede the ancient spindle and distaff, and no material improvement in spinning apparatus was made until Hargreaves, about the year 1767, introduced the Spinning Jenny.[2] The other implements then in use in America, were mostly of a rude kind, and consisted of an antique form of the common hand-

(1) Twenty families from this stock, through the exertions of Mr. Alexander McNutt, settled in 1761, at Londonderry, in Nova Scotia, where they received a grant of one million acres of land, much of it still occupied by their posterity, who are among the most industrious and wealthy in that Province.

(2) We have been surprised to meet with nothing more than a rhetorical allusion to the use of the distaff and spindle among the first settlers in America. Those primitive and idyllic instruments were far from being out of use in that day, and were quite recently, if they are not still, to be found in parts of Spanish Peninsula. For the same reason that Theocritus, two thousand years ago, pronounced the distaff "friend to warp and woof," the author of "The Fleece," published in the same year, that the Jenny came into use, and 137 years after the New England settlement, speaks of its continued use in Norwich, and the county of Suffolk, England, whence many of the Colonists came:

And many still adhere
To th' ancient distaff, at the bosom fixed,
Casting the whirling spindle as they walk;
At home or in the sheepfold or the mart,
Alike the work proceeds. This method still
Norvicum favors and the Icenian towns;
It yields their airy stuffs an apter thread.

But if the New England matrons did not lay their hands to the spindle, or hold the distaff, it was not that they did not look well to the ways of the household, for the paternal regard of their rulers made that their care, as we have seen. There can be little doubt that those implements were considered too slow for their use, and the spinning-wheel was used with better effect. The flax spinning-wheel, was such a gain in speed over the primitive mode as to be represented in Anglo Saxon and Irish traditions as a supernatural gift. Dr. Taylor, of Dublin, in his Hand Book of the Silk, Cotton, and Woolen Manufactures, has given an interesting version of the Irish legend as he took it from the lips of an Irish peasant woman, and which he printed, as he says, for the first time.

loom; and after its invention, about the year 1670, probably of the Dutch or weaver's loom in its present form; hand-cards and combs for preparing the material, and a primitive form of the shuttle. Stock cards, the drop box, and flying-shuttle, and the whole series of later improvements in carding, spinning, and weaving, were not then invented.[1] Nearly all the processes of manufacture were manual operations, and the appliances few and imperfect. Even the dressing of woolen Cloth, with a tolerably good supply of fulling-mills, was imperfectly, and laboriously performed. Gig-mills for raising the nap, so saving of labor as to have been twice jealously prohibited in the reign of Edward the Sixth, were scarcely used here at the close of the last century; and the operation was accomplished by the use of hand-cards. Much of the woolen Cloth was worn without shearing, pressing, or other finish.

Implements used in early times.

The example of the Scotch Irish led to a public effort in Boston, where some of them settled to establish a linen manufactory. A public meeting was called, at which Judge Sewall presided, and a committee of seven was appointed to report on the propriety of establishing "a spinning school or schools, for the instruction of the children of the town."

It resulted in the erection on the east side of Long Acre, now Tremont street, near the present Hamilton place, of a large handsome brick building, bearing on its front wall the figure of a woman holding a distaff, as emblematic of its future use. The general enthusiasm which sometimes takes possession of the public mind when a new hope dawns upon it, appears to have pervaded the town on this occasion. At its opening, an immense concourse assembled, and the women of Boston, rich and poor, appeared on the common, with their spinning-wheels, which were the hobby for the time, and vied with each other in the use of the instrument. Subscriptions were raised for the support of the project, and an Act of the Assembly, was obtained in 1737, laying a tax on carriages, and other luxuries for the maintenance of the institution. It was spiritedly conducted for a few years, but was soon abandoned, and the building which stood until after the Revolution, was afterward used as a manufactory for worsted hose, metal buttons, etc.[2] The Hon. Daniel Oliver, a principal merchant of Boston, also erected about the same time, at an expense of £600, a "Spinning School," for the employment of the poor, which he bequeathed at his death, in 1731, for the education of the children of that class. This

(1) Charles Lawrence "lately come from Carolina," notified the public of Philadelphia in May, 1721, that he made at his place in Chestnut street, very good *sleys*, *tombles*, and *shuttles*, for weavers. The fly-shuttle appears to have been first introduced in this country at Providence, Rhode Island, in 1788, by a Scotchman, Joseph Alexander. About the year 1793, the manufacture of these was commenced at Kensington, (Philadelphia,) but did not meet with support, and the manufacturer removed to Nova Scotia.

(2) Drake's Antiquities of Boston.

appears to have been at that time a favorite mode of providing for the poor. In 1734, the city of New York made its first public provision "for the relief and setting on work of poor needy persons, and idle vagabonds, and sturdy beggars, and others who frequently commit great depredations, and having lived idly become debauched and thievish." An ordinance was passed for the erection of a poor-house, fifty-six by twenty-four, and two stories high, which was built on the commons, where the courts are now held, and was furnished with four spinning-wheels, leather and tools for shoemakers, knitting-needles, flax, etc., for the employment of the inmates.

In 1722, the General Court offered a premium for sail-duck and linen, made in Massachusetts, of domestic material. In January, 1726, John Powell of Boston, presented a memorial to the same body representing that he had found the flax and hemp of the country as well adapted to the manufacture of sail Cloth, as that of Great Britain, or Ireland. He engaged, if suitably encouraged, to have twenty looms at work within fifteen or eighteen months; and to send home by the first ship for workmen and utensils, which would require an outlay of £500 for each loom, to produce fifty pieces of Duck, per annum, from each. A committee was appointed to consider the petition, and reported in June, recommending a bounty of twenty shillings to be paid out of the public treasury for each piece of duck or canvass of "thirty-six yards long and thirty inches wide, a good even thread, well drawn, and of a good bright color, being wrought wholly of good strong water-rotted hemp or flax, of the growth of New England, and that shall weigh between forty and fifty pounds, each bolt, and for fourteen years, as is usual in Great Britain and elsewhere, and the memorialist be allowed £3000, he giving such security as your Court may appoint, £2000 in hand, and the other one thousand when he has perfected five hundred pieces of canvas, that shall pass the survey." The extent of the shipping interests of the Provinces at this time, rendered the attempts to manufacture sail Cloth, and to cultivate flax and hemp for duck and cordage, worthy of encouragement, which they received from several of the Assemblies. Newport, Rhode Island, was then next to Boston in her commerce, and the Assembly of that Province, in August, 1722, granted William Borden, a bounty of twenty shillings for each bolt of duck manufactured by him of hemp grown in the Province, and equal in quality to good Holland duck. He was to have the exclusive enjoyment of the bounty for five years, and at his request, it was in October extended to the term of ten years. In May, 1725, he also received on petition, a grant for three years, of £500 from the general treasury, "if there be so much to spare." He was again an applicant for assistance in 1728, and the General Court, ordered £3000 in bills of credit, to be struck at

his expense, and loaned to him without interest, on his giving sufficient security to repay it at the expiration of ten years. He was required to manufacture every year one hundred and fifty bolts of good merchantable duck. Still unable to carry on the business, without further aid, the legislature, determined if possible to sustain it, confirmed the grant in 1731, and relieved the petitioner from the obligation to produce the stipulated quantity, while it continued the bounty upon such quantities as he might make. Bounties, which in 1728, had been paid to several persons for hemp raised according to a previous Act, were this year renewed for hemp and flax; and again, by a special Act, in 1735, premiums were allowed for flax raised in the Province. Legislative patronage, whether judiciously bestowed, or really beneficial to the industry, appears not to have been wanting to the linen branch in New England.

The Assembly of Connecticut was also appealed to in 1724, by Richard Rogers of New London, who asked for the exclusive right of making canvas for shipping, of which he produced excellent samples. A patent was given him the following year, and in 1735, he applied for like privileges for making "fine linen Cloth," and a bill authorizing a bounty upon every yard of fine linen made in the Province was introduced, but the measure did not pass. In view of the general want of such an article, John Bulkly, of Colchester, Connecticut, proposed to import a flax-dressing machine from Scotland. In consequence of the interest which had for several years been taken in the subject, Daniel Henchman, a principal bookseller of Boston, about the year 1735, reprinted a work published in Dublin, in 1724, entitled "Instructions for the Cultivating and Raising of Flax and Hemp, in a better manner than generally practised in Ireland, by Lionel Slator, Flax and Hemp Dresser." So general was the cultivation of these articles, that two years after they were ordered to be taken at the public treasury in payment of taxes, hemp at 4*d.*, and flax at 6*d.* per pound. The excise on carriages, was in 1753, renewed in Massachusetts, for the support of spinning schools, and each town was allowed to send at least one person to be instructed in the art free of expense. In 1762, public notice was given that the spinning school in the "Manufacturing House," was again opened, where any who felt disposed might learn to spin, gratis, and after the first three months, be paid for their spinning. A premium of £18, (old tenor), was at the same time offered to the four best spinners.

The cultivation of hemp and flax was much attended to in Pennsylvania, where they were wrought up by the German and Irish population, and a duty was very early laid on their importation. Flax-seed was always a considerable article of export from the Province to Ireland and Scotland. In 1729, as stated by a Committee of the Assembly on the State

of Trade and the Paper Currency, which reported in July, 1754, two hundred and fifty-five hogsheads of seven bushels each, and worth £1 13s. per cask, were exported. The amount yearly increased, and, in 1750, amounted to 6,361 hogsheads, worth, at £3 10s., £22,263. In the following year, 9,895 hogsheads were exported; and, in 1752, Dr. Franklin, one of the above committee, stated, before the House of Commons, that ten thousand hogsheads of flax-seed had, that year, been exported from Philadelphia, making 70,000 bushels, and that all the flax that grew with it was manufactured into coarse linen. The increase was ascribed to the paper-money issues, to which a similar committee, in 1752, attributed also the great increase in the importations of British manufactures which had taken place since the first emission of bills of credit in 1723, when they amounted to £15,992. In 1747, they were £82,404. Thirty thousand laborers were estimated to have come in within twenty years. Yet, owing to the facilities for procuring land, wages were as dear as before; "while they continue so," say the committee of which Franklin was also a member, "we can never rival the artificers or interfere with the Trade and Manufactures of our mother country.'"

The Assembly in 1730, passed an "Act for continuing the encouragement for raising hemp, and imposing penalties on persons manufacturing unmerchantable hemp into cordage." In addition to the bounty allowed by Parliament on hemp, three half-pence per pound was granted by the General Court. The farmers were supposed at this time to make nine-tenths of their own wearing apparel from the hemp, flax, and wool of their farms. A description of the Province in Latin hexameters, written in 1729, by Thomas Makin, represents the farmer to be in the happy condition of one fed and clothed from the products of his own fields:

> Esurias dulces epulas depromit inemptas,
> Et proprio vestis vellere texta placet.

The Irish made considerable quantities of linen for sale. Wool and flax were also brought from Virginia and Maryland.

In the last named province, subscriptions were taken up in 1731, to encourage the manufacture of linen. The mayor and council of Annapolis, promised £5 as a reward to the person who would bring the finest piece of linen of the growth and manufacture of Maryland, to the next September fair; £3 for the second, and 40s. for the third best pieces; the cloth to remain with the owner. Like rewards were offered in Baltimore county, and it was thought the effort would become general. Flax

(1) Votes of the Assembly, vol. iv. p. 274.

and hemp were grown in the back settlements of Maryland, and the provinces south of it in considerable quantities; upward of sixty wagon loads of flax-seed came into Baltimore from the country parts for shipment in October, 1731. The first exportation of hemp from the American Colonies was made in the previous year, and consisted of fifty hundred-weight raised in New England and Carolina, and three hundred-weight from Virginia. These shipments, though small, along with three hundred-weight of raw silk, some iron, copper ore, and beeswax, from Virginia, some iron from St. Christopher, and seventy-two bags of wool also from the West Indies, are represented by Anderson, as entirely new, and mostly unexpected products.

The Act of Parliament granting a bounty on hemp, which expired in 1741, may, in part, have caused an increased attention to its cultivation, although, probably no great amount was ever exported, the domestic consumption being equal to and even beyond the supply. The Act, passed for the benefit of the merchants and manufacturers of England, who dictated much of the commercial policy of the government, had the three-fold object of securing a cheap and permanent supply of raw material, independent of foreign powers, of furnishing the Colonies with linen and other fabrics in exchange, and above all, of diverting them from attempts to manufacture for themselves. The linen manufacturers of the kingdom, obtained a bounty for the exportation of British sail Cloth. This by a later statute, was required to be stamped, as was all foreign sail Cloth, which, like other linens, was subject to a heavy duty, and this duty rendered it considerably dearer to the American consumer, than if it had been imported directly from Holland or Russia. In 1746, it was enacted, that no sails should be made or repaired in Great Britain, or the plantations, with foreign sail Cloth, unstamped under penalty of £50, and every vessel built in either country, was required under a like penalty, to have her first suit of sails made new and complete of British manufactured sail Cloth.

The several measures thus adopted for engrossing the Colonial markets, by a monopoly of the export and import trade, by prohibitions of manufactures, by bounties on raw materials and upon the exportation of English manufactures, gave a vast impulse to the productive industry of the mother country. The result demonstrated the value of the plantation trade, and of the policy pursued, and led to renewed recommendations of the same system, and increased manifestations of jealousy and vigilance in regard to Colonial attempts at manufacture.

In 1728, Sir William Keith, previously governor of Pennsylvania, had presented to the king a scheme of government for the Colonies, which was referred to the Lords Commissioners of Trade. After recommending

the same exclusive policy which had been earlier proposed and followed, as to the commerce and industry of the Colonies, he points out the advantages already derived from them. He represents that the Colonies then took off and consumed above one-sixth part of the woolen manufactures of Great Britain, and more than double that value of the linens and calicoes of the Kingdom, and the returns for the same exported to foreign countries. The luxury of the Colonies, which daily increased, consumed great quantities of English silks, haberdashery, furniture, and trinkets of all sorts, and a considerable value of East India goods. A great revenue resulted from the produce of the Colonies, especially tobacco, which enabled England nearly to balance her unprofitable trade with France; and their shipping and seamen and West India trade enabled her to balance her trade with Spain, Portugal, and Holland. With a little encouragement, the Colonies could supply England in full with timber, naval stores, hemp, flax, copper ore, pig and bar iron, etc. The profits of the trade returned in bullion to England, where the superfluous cash and riches acquired in America necessarily centred. As their present employments sufficed, without interfering with the manufactures of England, he recommends that all the products of the Colonies for which the trade and manufactures of Britain have a constant demand, be *enumerated* among the articles which by law must be transported to her markets before going to any other, and especially all commodities found in the Colonies and rarely elsewhere, for which there was a demand in Europe; that all the linen and woolen manufactures of the Colonies be brought from Britain and Ireland only. He further recommends that a revenue for the defense of the Colonies be raised by a tax, which they would never voluntarily raise themselves; for which end he suggested that the duties on *stamps* and *paper* in England might be extended by Act of Parliament to all the American plantations.

This selfish policy, though consonant to the less enlightened views of those times, was probably honestly regarded as quite compatible with the best interests of the two countries. It was too closely followed, in several particulars, by the ministry at a later period. The great future of the American Provinces was early perceived, and the sources of their increasing prosperity were narrowly watched, that no adverse influence might alienate their growing advantages to the parent state. The divergence of their trade from its prescribed channels was the more complained of by the merchants as it became more lucrative and extended; and the manufacturers of the kingdom were alike jealous of foreign competition and of the incipient efforts to dispense with their goods by domestic manufactures. These complaints induced the House of Commons, in 1731, to institute, through the Board of Trade, an inquiry "with

respect to laws made, *manufactures* set up, or trade carried on, detrimental to the *trade, navigation,* or manufactures of Great Britain." The report made by the Board, in Feb., 1731–2, in pursuance of this order, furnishes the fullest particulars accessible respecting the manufacture of Cloth in the Colonies at that time, and their opinion as to the proper mode of legislating upon the subject.

"In New England, New York, Connecticut, Rhode Island, Pennsylvania, and in the County of Somerset, in Maryland, they have fallen into the manufacture of woolen cloth and linen cloth for the use of their own families only; for the product of these Colonies being chiefly cattle and grain, the estates of the inhabitants depended wholly on farming, which could not be managed without a certain quantity of sheep; and their wool would be entirely lost were not their servants employed during the winter in manufacturing it for the use of their families.

"Flax and hemp being likewise easily raised, the inhabitants manufactured them into a coarse sort of cloth, bags, traces, and halters for their horses, which they found did more service than those they had from any part of Europe.

"However, the high price of labor in America rendered it impracticable for people there to manufacture their linen cloth at less than twenty per cent. dearer than that which is exported from home for sale. It were to be wished that some expedient might be fallen upon to direct their thoughts from undertakings of this nature; so much the rather because these manufactures, in process of time, may be carried on in greater degree, unless an early stop be put to their progress by employing them in naval stores. Wherefore, we take leave to renew our repeated proposals, that reasonable encouragement be given to the same. Moreover, we find that certain trades carried on and manufactures set up there are detrimental to the trade, navigation, and manufacture of Great Britain. For the state of these plantations varying almost every year, more or less so in their trade and manufactures, as well as in other particulars, we thought it necessary for His Majesty's service, and for the discharge of our trust, from time to time to send general queries to the several governors in America, that we might be the more exactly informed of the condition of the plantations; among which were several that related to their trade and manufactures, to which we received the following returns, viz.:

"The Governor of New Hampshire, in his answer, said that there were no settled manufactures in that Province, and that their trade principally consisted in lumber and fish.

"The Governor of Massachusetts Bay informed us that in some parts of this Province the inhabitants worked up their wool and flax into an ordinary coarse cloth for their own use, but did not export any. That the greatest part of the woolen and linen clothing worn in this Province was imported from Great Britain, and sometimes from Ireland; but considering the excessive price of labor in New England, the merchant could afford what was imported cheaper than what was made in the country. There were also a few

hat makers in the maritime towns, and that the greater part of the leather used in that country was manufactured among themselves, etc.

"They had no manufactures in the Province of New York that deserve mentioning; their trade consisted chiefly in furs, whalebone, oil, pitch, tar, and provisions. No manufactures in New Jersey that deserve mentioning; their trade being chiefly in provisions shipped from New York and Pennsylvania. The chief trade of Pennsylvania lay in their exportation of provisions and lumber; no manufactures being established, and their clothing and utensils for their houses being all imported from Great Britain. By further advices from New Hampshire, the woolen manufacture appears to have decreased; the common lands, on which the sheep used to feed, being now appropriated, and the people almost wholly clothed with woolen from Great Britain. The manufacture of flax into linens, some coarse and some fine, daily increased by the great resort of people from Ireland thither, who are skilled in that business. By late accounts from Massachusetts Bay, in New England, the Assembly have voted a bounty of thirty shillings for every piece of duck or canvass made in the Province. Some other manufactures are carried on there, as brown holland for womens' wear, which lessens tho importation of calicoes, and some other sorts of East India goods. They also make some small quantities of cloth, made of linen and cotton, for ordinary shirting. By a paper mill set up three years ago, they make to the value of £200 sterling yearly. There are also several forges for making bar iron, and some furnaces for cast iron or hollow ware, and one slitting mill and a manufacture for nails. The Governor writes, concerning the woolen manufacture, that the country people, who used to make most of their clothing out of their own wool, do not now make a third part of what they wear, but are mostly clothed with British manufacture. The Surveyor-General of His Majesty's woods writes that they have in New England six furnaces and nineteen forges for making iron; and that in this Province many ships are built for the French and Spaniards, in return for rum, molasses, wines, and silks, which they truck there by connivance. Great quantities of hats are made in New England, of which the company of hatters in London have complained to us that great quantities of these hats are exported to Spain, Portugal, and our West India Islands. They also make all sorts of iron for shipping. There are several still-houses and sugar bakeries established in New England.

"By the last advices from New York there are no manufactures there that can affect Great Britain. There is yearly imported into New York a very large quantity of the woolen manufactures of this Kingdom, for their clothing, which they would be rendered incapable to pay for and would be reduced to the necessity of making for themselves, if they were prohibited from receiving from the foreign sugar colonies the money, rum, molasses, cocoa, indigo, cotton, wool, &c., which they at present take in return for provisions, horses, and lumber, the produce of that province and of New Jersey, of which he affirms the British Colonies do not take above one half. But the company of hatters of London have since informed us that hats are manufactured in great quantities in this Province.

"By the letters from the Deputy-Governor of Pennsylvania, he does not know of any trade in that Province that can be considered injurious to this Kingdom. They do not export any woolen or linen manufactures; all that

they make, which are of a coarse sort, being for their own use. We are further informed that in this Province they built many brigantines and small sloops, which they sell to the West Indies.

"The Governor of Rhode Island informs us, in answer to our queries, that there are iron mines there, but not a fourth part enough to serve their own use; but he takes no notice of any manufactures there. No returns from the Governor of Connecticut. But we find by some accounts that the produce of this Colony is timber, boards, all sorts of English grain, hemp, flax, sheep, black cattle, swine, horses, goats, and tobacco. That they export horses and lumber to the West Indies, and receive in return sugar, salt, molasses, and rum. We likewise find that their manufactures are very inconsiderable; the people being generally employed in tillage, some few in tanning, shoemaking, and other handicrafts; others in building, and in joiners' tailors' and smiths' work, without which they could not subsist. No report is made from Carolina, the Bahama or the Bermuda Isles.

"From the foregoing state, it is observable that there are more trades carried on and manufactures set up in the Provinces on the continent of America to the northward of Virginia, prejudicial to the trade and manufactures of Great Britain, particularly in New England, than in any other of the British Colonies; which is not to be wondered at, for their soil, climate, and produce being pretty nearly the same with ours, they have no staple commodities of their own growth to exchange for our manufactures, which puts them under greater necessity, as well as under greater temptations, for providing themselves at home; to which may be added, in the charter governments, the little dependence they have upon the mother country, and consequently the small restraints they are under in any matters detrimental to her interests. And therefore we humbly beg leave to repeat and submit to the wisdom of this honorable House the substance of what we formerly proposed in our report on the silk, linen, and woolen manufactures hereinbefore recited, namely—whether it might not be expedient to give these Colonies proper encouragement for turning their industry to such manufactures and products as might be of service to Great Britain, and more particularly to the production of naval stores."[1]

The information conveyed in this report probably falls considerably short of a correct statement of the extent to which domestic manufactures were carried on in the Colonies. The use likely to be made of facts elicited under those circumstances, was well known to the people in the Colonies, and was not calculated to favor a full disclosure of the truth, and the concealment was complained of in England. Indeed, Col. Jeremiah Dunbar, Surveyor-General of His Majesty's woods, in communicating the facts above stated respecting the exportation of hats, informed the Board of Trade that "it was with the greatest difficulty they (the officers of Government) were able to procure true information of the trade and manufactures of New

The manufacture of Hats in the Colonies.

(1) Macpherson's Annals of Commerce, vol. iii.

England; that the Assembly of the Massachusetts Bay had the boldness to summon him for having given evidence at the Bar of the House of Commons with respect to the trade and manufactures of the Province." Much of the information furnished by Gov. Belcher respecting the manufactures of iron, leather, and hats in Massachusetts, had been substantially given to the Board in 1719, since which, as ascertained by Col. Dunbar, it had increased to the extent of exportation. Other branches probably exceeded the official statements.

The company of Feltmakers, in London, petitioned Parliament, in Feb., 1731, to prohibit the exportation of hats from the American Colonies, representing that foreign markets were almost altogether supplied from thence, and not a few sent to Great Britain. The petition was referred to a special committee, who reported that, in New York and New England, beaver hats were manufactured to the number, it was estimated, of ten thousand yearly. In Boston there were sixteen hatters, one of whom was stated to have commonly finished forty hats a week. The exports were to the Southern plantations, the West Indies, and Ireland. In consequence of this evidence, and that furnished by the Board of Trade in the same session, an Act was passed (5 George II. c. 22) that "no hats or felts, dyed or undyed, finished or unfinished, shall be put on board any vessel in any place within any of the British plantations; nor be laden upon any horse or other carriage to the intent to be exported from thence to *any other plantation*, or to any other place whatever, upon forfeiture thereof, and the offender shall likewise pay £500 for every such offence. Every person knowing thereof, and willingly aiding therein, shall forfeit £40. Every officer of customs signing any entry, outward, or warrant for the shipping or exporting of said articles, shall for every offence forfeit £500."[1] By the same statute, no person was allowed to make hats unless he had served an apprenticeship of seven years (as in England), nor could he have more than two apprentices at one time; and no negro was permitted to work at the business of making hats. This severe and stringent law continued in force in the Colonies until the Revolution. It aimed at the prostration of one of the oldest and, on account of the abundance and cheapness of beaver and other furs, one of the most profitable branches of industry. The manufacture of fur and wool hats had been encouraged by bounties in Virginia as early as 1662, and ten years after a company of hatters in Massachusetts asked for peculiar privileges, which were promised them "when they should make as good hats and sell them as cheap as those imported were." In 1704, the Feltmakers of Pennsylvania also petitioned the General Court to prohibit the exportation of beaver and

(1) Pope's Laws of the Customs and Excise.

other furs proper and needful to be worked up, and leave was granted to bring in a bill to that effect.

Means were found, however, to evade the statute, and hats continued to be exported to other Provinces, and not unfrequently to foreign countries. Felts, which were the ordinary wear of the people, were made in large quantities, and much of the business being carried on in interior towns, where wool was cheap, the manufacture was less exposed to official scrutiny than in the seaports. This Act was followed, in 1750, by one for the encouragement of the pig iron manufacture, and to prohibit the erection of slitting and rolling mills.

Notwithstanding several efforts made to encourage an attention to domestic manufactures in Virginia, scarcely any progress had yet been made toward the supply of their own clothing. The soil was well adapted for hemp and flax; repeated experiments had shown the ease with which silk could be produced. But the profits of the tobacco culture extinguished nearly all other industry, and all their clothing, as linen, woolen, silk, hats, and even leather, were received from England. Sheep increased, and yielded good fleeces, but were only shorn, we are told, for the purpose of cooling them. Hides were plentiful, but were suffered to lie and rot; and he was a rare economist who made a pair of leather breeches from the excellent deer skins which abounded. We find mention, however, in 1721, of a coarse stuff for servants' wear which, in neighboring Provinces, was known by the name of Virginia Cloth. An article of the same name is mentioned after the War as having been brought to great perfection in that State. It is described as having been made of cotton, and woven with great taste by the women in the country parts, whence it was brought to town, and was much sought after for the use of slaves, being considered superior to anything of the kind imported.[1]

Virginia Cloth.

The arts of the clothier were as little attended to in Carolina as in Virginia. Until its surrender to the Crown, in 1729, industry was not much encouraged. The removal of rice, the staple of the Province, from the list of enumerated commodities, and other marks of imperial favor, gave an impulse to cultivation and the useful arts after that time. Georgia does not come into view as an independent government until 1732, and scarcely made any progress in the mechanic arts before the Revolution.

During the thirty years that elapsed between the enactment of the law prohibiting the exportation of hats, which followed the Report of the Board of Trade, in 1732, and the Peace of Paris, in 1763, we do not find

(1) Carey's Amer. Museum, vi. 91.

that any material advances were made toward the introduction of the manufacture of Cloth. Great Britain and her Colonies were principally occupied in wars with the French and Indians, during which the Colonial policy of the former was in a measure forgotten. With the exception of the restraints imposed on the manufacture of iron, the trade and industry of the plantations remained free, and their commerce grew with the rapid increase of population and of the products of agriculture and the fisheries. The Provincial population extended and somewhat improved its household manufactures, which, in the aggregate amounted to a considerable value. But the importation of English manufactures continued to augment with the growing wealth and luxury of the people to the full extent of their ability to purchase. Large quantities of woolens, consisting of broad and narrow Cloths, between six and twelve shillings a yard, duffles and frizes, from 3*s*. 6*d*. to 6*s*., druggets, serges, camblets, Kendal cottons, plains, half-thicks, flannels, Scotch plaids, and woolen hosiery were imported together with linens of English, Scotch, Irish and Dutch manufacture, and a considerable amount of India goods and of silks. The cheaper and coarser kinds, particularly of woolens, were for the supply of the Indian trade and for negro wear, and, with the better qualities, which also included such articles as gold and silver and fine Flanders lace, and the finest Dutch linens, French cambrics and chintzes, etc., for the use of the planters's own families, swelled the importations to a large sum. Cotton being then in limited use, linens were a large item in the accounts. The importation of these was probably much increased, and their domestic production curtailed in the same proportion by a statute made in 1745, increasing the bounty upon the exportation of British and Irish linens, and by the formation, in the following year, of the British Linen Company, the principal object of which was to supply merchants trading to Africa and America with the description of linens previously obtained from foreign nations. The exportation of the latter as British goods was stringently prohibited by the Act referred to. A large saving to the nation was anticipated from this measure. The total exports from Great Britain to the Continental Colonies, between the years 1720 and 1738, amounted to £4,712,994; and in the next ten years, from 1738 to 1748, to £7,481,637; and in 1763, the imports of British manufactures alone amounted to about three millions.[1]

Some efforts continued to be made to work up the wool, which the natural increase of sheep supplied of a quality sufficiently good for the kind of cloths attempted, but not in sufficient quantity for home consumption. Fulling-mills were multiplied in all parts of the country, and

(1) Minot's Hist. Mass. vol. i.

the manufacture of coarse linen proceeded, particularly among the Scotch-Irish, and some of the Germans, the former in New England, Pennsylvania, and Virginia constantly producing a surplus for neighboring Provinces. Flax and wool-growing, and the manufacture of these staples into Cloth, were encouraged by an Act of the Assembly of Rhode Island, in 1751.

Although, in the main, the Colonists were eminently simple and frugal in their habits, the progress in luxury was sufficient to alarm the more prudent, who saw the difficulty with which their accounts in England could be balanced, by a drain of all their specie and the profits of their circuitous and lucrative trade. As early as 1724, the General Court of Massachusetts prohibited the use of scarfs at funerals, as "a burdensome custom." About the year 1748, the scarcity of money; the suppression of the paper currency; the failure of the "Manufacturing Company," or "Land bank scheme," for issuing Bills of credit, called "Manufactory Bills," redeemable in produce or manufactures, for which lands were pledged as security;[1] the complaints of the Sugar Colonies against the most profitable part of their commerce, the contraband trades with the foreign islands; the introduction of a Bill into Parliament containing some provisions deemed hostile to Colonial rights, and the restoration of Cape Breton to the French, produced some irritation of the public mind in New England. As a consequence of this feeling, and for prudential reasons, a society was formed in Boston, the following year, for promoting industry and frugality, and was probably the forerunner of those associations which, a few years later, became the favorite mode throughout the country, of sustaining resistance to the pressure of ministerial authority. To favor this design, the Assembly purchased the factory, or "Spinning House," in Boston, and granted four townships of land for the use of foreign Protestants, and the use of the Provincial frigate for their transportation. At the anniversary of the society, in 1753, great enthusiasm was exhibited. About 300 young female spinners appeared upon the commons, seated at their wheels, arranged in three rows. The weavers also assembled, neatly dressed in cloth of their own manufacture, and one, working at a loom upon a platform, was carried on the shoulders of men, accompanied by music. A large assemblage was addressed on the occasion by the Rev. Dr. Samuel Cooper.

A memorial presented to the Governor and Court, the same year, by Andrew Oliver and other members of the association, states, that their principal object was the employment of the poor in the manufacture of Linen of which the imports, exclusive of English linen, were computed at £30,000

(1) See Hazard's U. S. Register, i. 241.

sterling annually; that flaxseed, which would alone pay for the raising and curing of flax, was yearly exported from Connecticut to the value of £80,000, Connecticut currency,—the breaking, swingling, etc., being done during leisure time, or in the winter, and the spinning by the women. The Court made a grant of £1500, annually, to aid the society, and taxed the districts for the amount. The raising, dressing, and manufacturing of flax and hemp, in which much the larger part of the labor consists in bringing the material into the condition of thread, at that time employed large numbers in Connecticut and some other Colonies. A proposition was that year made in Connecticut to import from Scotland a flax-dressing machine, of which there appears to have been none yet in use in America. Hugh Orr, of Bridgewater, Massachusetts, an ingenious machinist, and a friend to manufactures, not long after constructed a machine of that kind, and became an exporter of flaxseed, in which he was followed by others.

During the same year, a liberal public offer was made by an individual in Delaware—which then formed a territory of Pennsylvania—to promote the industry of the lower counties: To the maker of the finest and best piece of linen, not less than fifteen yards, a premium of £4 was offered; for spinning four pounds of the best and finest sewing-thread, 20*s.*; for the largest produce of hemp off an acre, 40*s.*; for the finest piece of coating, 40*s.*; for the neatest and best hat, 40*s.*; for the most flaxseed off an acre, £4; for the most and best *cotton* off an acre, £4; for making the neatest and best spinning-wheel, 40*s.*; for the best dressed deer skin, 40*s.*; for the neatest piece of smith's work, 40*s.*; for the best and greatest quantity of strong beer, £6; the best and greatest quantity of cherry, blackberry, and grape wine, 40*s.* The premiums to be awarded on first Tuesday in November, 1754, and to be increased in following years, by John Crevet, Surgeon, St. George's Hundred, Newcastle county.

Comptroller Weare, afterward Consul at Madeira, in a letter written about this time to a British nobleman, after remarking on the "enlarged utterance" that might be opened in the Colonies for British woolens, "provided, always, that an effectual stop be put to all clandestine importation, and that the people be drawn off from interfering in these manufactures themselves, not by prohibitory laws, which are too frequently impracticable, but by leading them into other employments less detrimental to the mother country, and more profitable to themselves," proceeds to observe: "Upon actual knowledge, therefore of these northern Colonies, one is surprised to find, that notwithstanding the indifference of their wool, and the extravagant price of labor, the planters throughout all New England, New York, the Jersies, Pennsylvania, and Maryland (for south of that Province no knowledge is here pretended), almost entirely clothe themselves in their own woolens, and that generally, the

people are sliding into the manufactures proper to the mother country, and this not through any spirit of industry or economy, but plainly for want of some returns to make to the shops; that their trade, so valuable to Great Britain, should, contrary to the policy of all other nations, be suffered to run off into clandestine channels; and that Colonies, on which the fate of this country will be found to depend, should, without the least regard to influence of impression early made on the human mind, be suffered to remain in this day under these little, factious Democracies which had their first rise in the republican ideas of licentious times." The clandestine trade referred to in the above extract had long been a subject of complaint, as well with British merchants as with the West India Colonies, but had been to the Colonial merchant the chief means of making returns for his large indebtedness for English goods.

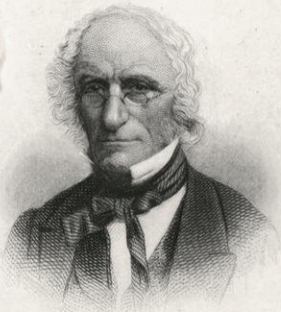
But the conclusion, in 1763, of the wars which had been long waged between Great Britain and France for supremacy on the American Continent, opened a new era in the history of the Colonies. Indulgence was no longer to be allowed to this lucrative traffic. The design, of which the Colonists had already received distinct intimation, of raising a revenue to defray the future expenses of possessions, which the nation had incurred an enormous debt to extend and protect, was carried into execution by the Ministry; and a short period of misrule was terminated in a successful revolt. But before narrating the future course of their industry and legislation in regard to the textile arts, it may not be amiss to inquire what efforts were made by the Colonies to provide materials, which, in a measure, employed the labor of several of the southern Provinces.

CHAPTER XV.

OF CLOTH AND THE MATERIALS FOR CLOTHING CONTINUED, FROM THE PEACE OF 1763, WITH ESPECIAL REFERENCE TO THE CULTURE OF INDIGO, COTTON, AND SILK.

THE cultivation of the Indigo plant and the manufacture of the dye were very early recommended and attempted in the Southern Colonies. As early as 1650, Gulian Van Rensselaer also made experiments with wild Indigo seed near Albany, and Augustus Heerman, near the present city of New York. By the Navigation Act of 1661, it was *enumerated* among the articles which were to be sent to England alone. It was introduced into Louisiana by the French in 1718, and within ten years became an article of export. The manufacture was encouraged by bounties from the French Government. About the year 1740, when rice had become reduced in price, the seed of the East India plant, which had been for many years extensively cultivated in the West Indies, was sent, along with that of cotton, ginger, lucerne, etc., from Antigua by Mr. Lucas, the governor of the island. His daughter, Miss Eliza Lucas, the mother of General Charles Cotesworth Pinckney, was at the age of eighteen in charge of a plantation in South Carolina, where she planted the seed, and, after one or two attempts, was successful. A person named Cromwell was then sent from Montserrat to instruct in the manufacture of the dye. After erecting vats, and producing a quantity of Indigo, he became alarmed lest he should ruin the manufacture of his native country, and made a mystery of the art, but did not manage to conceal the knowledge of it. Indigo in a year or two began to be exported. Soon after Mr. Pinckney, who had married Miss Lucas, received some plants of the indigenous weed, and experiments having shown its fitness for making the pigment, the planters engaged in its culture. In 1741, about 100,000 lbs. of Indigo were exported from Charleston to England, and in 1747, 134,118 lbs., worth 2*s.* 6*d.* sterling a pound. Though not so well cured as the French, its quality was approved, and the merchants in the Carolina trade, who, by the commercial statutes, had a monopoly of the article, petitioned for a small bounty

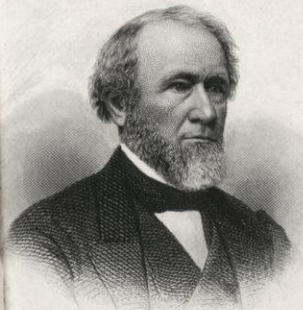
EDWARD HARRIS.
Woonsocket, R.I.



SAMUEL BATCHELDER.
Boston

JAMES Y. SMITH.
Providence, R.I.

REPRESENTATIVE MANUFACTURERS. OF NEW ENGLAND. TEXTILE FABRICS.



WILLARD LOVERING.
Taunton, Mass.

JEFFERSON BORDEN.
Fall River Mass.

LEMUEL POMEROY.
Pittsfield Mass.

Eng.d by G.E. Perine & Co N.Y.

to encourage its manufacture. An inquiry elicited the fact that Indigo was one of the most profitable articles of French colonial commerce, her islands supplying principally the markets of Europe and not less than 600,000 lbs. annually at a cost of 5s. a pound to England alone. The manufacturers and dyers now joined their requests for a premium, and in 1748 a bounty was offered of 6*d.* a pound on all Indigo raised in the British North American Colonies, and imported directly into England.

In 1754, the Assembly procured the Guatemala Indigo seed, and distributed it to the different settlements, but the native plant was found most profitable. Its cultivation now commenced with spirit. Many planters doubled their capital in three or four years, and American Indigo undersold the French in some of the markets of Europe. "It proved," says Dr. Ramsay, "more really beneficial to Carolina than the mines of Mexico or Peru are, or ever have been, either to Old or New Spain." Charleston, in 1753, exported 216,924 lbs., and the two Carolinas, in 1756, produced 500,000 lbs. South Carolina the next year sold to the value of £150,000 sterling, and, for a few years preceding the war, the exports were over one million pounds annually, about one-half of which was re-exported from England. The best Indigo in Carolina was produced on the Island of Edisto.

Georgia, in 1754, exported 4,508 lbs.; in 1757, 18,150 lbs.; and in 1772, 55,380. Twenty-five negroes could manage a plantation of fifty acres and complete the manufacture of the drug, besides providing their own subsistence and that of the planter's family. An acre yielded an average of 50 lbs. The apparatus was not very expensive, consisting chiefly of vats and tubs of cypress wood. Great skill and care were required in the several stages of the process, but, when properly conducted, the manufacture was an extremely profitable one. A premium for improvements in the manufacture was offered by the Society of Arts in London. After the Revolution, the increased attention to the manufacture of Indigo in British India, and to the cultivation of Cotton in the Southern States, caused a rapid decline in the quantity produced. In 1794, the whole Union exported 1,550,880 pounds. But for many years past, Indigo, which was once the most profitable commodity of Carolina and Georgia, has not been taken into account in the census. We annually import over one million pounds. Its cultivation could still be made a remunerative business, especially in Carolina. But Indigo, once the leading article in the exports of Charleston, has now wholly disappeared from the list, and the loud call, said a hundred years ago to exist for the encouragement of Cotton in the State, has been answered by a yearly export of ten or twelve millions of dollars worth of an

THE STATE HISTORICAL SOCIETY OF WISCONSIN
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article then merely named among the exports, and considered not worth estimation.

The Colonists were not unprovided with other native dye-stuffs, and were cheaply supplied with logwood, fustic, cochineal, and other materials from the West Indies. The cochineal insect is also found in South Carolina and Georgia, and its cultivation was an object in the first settlement of the latter Province. Its production was encouraged by the Society of Arts, which in 1762 offered a premium of £40 for the largest quantity imported from the Colonies. Madder and woad were also introduced and encouraged long before the Revolution. The native plants which yield dye-stuffs are very numerous in America, and some of them were used by the natives with great success. In 1630, Mr. Higginson, of Salem, wrote, "also here be divers roots and berries wherewith the Indians dye excellent holiday colours that no raine nor washing can alter." Dr. Ramsay gives a long list of native plants in Carolina yielding dyers' colors, and observes that the art of dyeing ought to make a conspicuous figure among the arts of the Carolinians, on account of the profusion of the materials. He says: "A Captain Felden, near Orangeburg, obtained, during the Revolution, a guinea a pound for a paste made from the leaves of the sweet leaf (*hopea tinctoria*) and those of the yellow Indigo, a species of cassia." He was also informed by Dr. Bancroft, the author of "Researches concerning the Philosophy of Permanent Colors," that his patent for introducing into England certain dye-stuffs yielded him, for several years before its expiration, £5,000 per annum. He found some materials in the woods of America equal to those obtained at a high cost from other countries. He annually imported and sold of black oak bark (*quercus tinctoria*) to the above value.[1]

(1) Among the materials for BLACK *Dyes* he enumerates the juice of the poison oak (*rhus toxicodendron*); the leaves and berries of the gall berry bush; the juice of the berries of the water hoarhound, or gipsy wort (*Lycopus Europæus*); the capsules and bark of the red oak (*quercus rubra*).

BLUE.—Common Indigo (*Indigofera tinctoria*); false Indigo (*amorpha fruticosa*); the inner bark of the common ash tree (*fraxinus excelsis*); bluestone or sulphate of copper was also used.

YELLOW.—Roots of the common nettle (*Urtica dioica*); the bark of the blackberry bearing elder (*rhamnus frangula*); root of the berberry bush (*Berberis vulgaris*); bark of common plum tree (*prunus chicasa*), and apple tree (*pyrus malus*); leaves of the birch tree (*betula*); saw wort (*seratula tinctoria*), and common knapweed (*centaura jacea*); spotted arsesmart (*polygonum persicaria*); yellow willow herb, or loose strife (*lysimachia vulgaris*); leaves of the devil's bit (*scabiosa succisa*); the flowers of St. John's wort (*hypericum perforatum*); the petals of garden marigold (*calendula officinalis*); American dodder, or love vine (*cuscuta Americana*); leaves of horse laurel, sweet or yellow leaf (*hopea tinctoria*); petals of the Jerusalem artichoke, or tuberose sunflower (*helianthus tuberosa*); yellow wort, or parsley-leaved root (*zanthorhiza apiifolia*); yellow root (*hydrastis canadensis*).

RED.—Blossoms of the bastard saffron (*carthamus tinctorius*); roots of common sorrel (*rumex acetosella*); roots of cross wort,

The very early introduction and cultivation of the valuable Cotton plant, including "the Cyprus and Smyrna sort," with a view to domestic use, has been already incidentally mentioned. The fitness of the soil and climate for Cotton, and its occasional production, are frequently noticed by early writers on America. Peter Purry, in his description of Carolina, in 1731, says, "Flax and Cotton thrive admirably, and hemp grows 13 to 14 feet in height; but, as few people know how to order it, there is very little cultivated." Cotton seed, probably from the Levant, was carried into Carolina by Mr. Purry, who settled a colony of Swiss people near Purrysburg, in 1733. The cultivation of the plant in gardens was frequently to be met with as early as 1736 in the southern Provinces, as far north as the thirty-ninth degree. A year or two later, Miss Lucas, who introduced the Indigo culture, also planted Cotton seed, and, in her journal, in 1739 and 1741, speaks of the pains she had taken to bring Cotton and Indigo to perfection. An exportation of seven bags, valued at £3 11*s.* 5*d.* per bag, was made from Charleston, between November, 1747, and November, 1748, but it is not clearly ascertained to have been of native growth. Among the exports of Carolina, in 1753, and of Charleston, in 1757," "some cotton" is mentioned; and a London publication, in 1762, says "what Cotton and Silk both the Carolinas send us is excellent, and calls aloud for the encouragement of its cultivation in a place well adapted to raise both."[1] Cotton was one of the articles intended to be cultivated by the founders of Georgia, and a paper of the seed was received by the trustees from Philip Miller, of Chelsea, England, which was planted in 1734. It appears, also, to have been early cultivated, on the very limited scale first attempted, by the French inhabitants of Louisiana. In 1742, a French planter of enterprise and capital, M. Dubreuil—who, a few years after, erected on his plantation, now covered by the lower portion of the City of New Orleans, the first sugar-mill in Louisiana—invented a Cotton gin, for separating the fibre from the seed. The invention greatly stimulated the culture of Cotton in that Colony, by partially removing the greatest obstacle to the

Cotton gins introduced.

madder (*galium boreale*), and of other species of galium; roots of puccoon, or bastard turmeric (*sanguinaria canadensis*); prickly pear (*cactus opuntia*).

CRIMSON.—Juice of the poke berry, or American night-shade (*phytolacca decandra*); with lime as a mordant, it produces a yellow color.

GREEN.—Leaves of the common reed or cane (*arundo phragmites*).

BROWN, GOLD, and OLIVE shades.—The bark of the common maple (*acer campestris*) and tops of the wild marjoram (*origanum vulgare*) impart a brown; the inner bark of red oak (*quercus rubra*) produces an orange, a reddish brown with alum, and a black with copperas; the bark of black walnut (*juglans nigra*) a dark olive; common hops (*humulus lupulus*), a good brown; common agrimony (*agrimonia eupatoria*), a gold color.

(1) Amer. Gazetteer, vol. iii., London: Art. Charlestown.

business as a profitable industry. The separation of the seed had previously been effected by picking it from the wool by the fingers, at the rate of one pound a day. This operation, as the evening task of the women, children, or other members of the household, long continued to be the practice in the Cotton regions, until an increased production called for mechanical appliances. The bow-string, which had been used immemorially in India for the purpose, was first introduced into Georgia, whence originated the commercial term of "Bowed Georgia Cotton." Mention is made, in 1772, of another contrivance for the same purpose, which appears to have been a form, original or derived from the East, of the roller gin, the best contrivance for cleaning Cotton, until the invention of the saw gin, by Whitney, in 1793, introduced a new era in Cotton husbandry. This article was used by a Mr. Crebs, the alleged inventor, upon his plantation, on the Pascagoula river, in West Florida, now Alabama, where the owner grew Cotton, which he packed in canvas bags suspended between two pine trees, by treading it down until each bag contained three hundred pounds, about the present capacity of a bale. The machine is described, by Bernard Romans, as consisting of four upright posts, about four feet high, strongly framed together at the top, and supporting two polished spindles or rollers grooved longitudinally, and, by means of treadles, made to revolve in opposite directions. The Cotton, thinly spread, entered upon one side, and the lint passed between the rollers, while the seed fell down upon one side in a separate pile. The French improved upon the device, by the use of a large wheel, which turned two of these mills with such velocity as to clean seventy pounds of Cotton in a day.[1] Among the documents in the Archives of the Colonial Department at Paris, there is said to be "a most curious report on Cotton, in 1760, of the great advantages Louisiana might derive from its culture—the difficulty of separating the seed from the wool—its introduction from St. Domingo—a report of M. de Mauripas on that matter, suggesting the importation from the East Indies of machinery to separate the seed, &c." Early in the Revolution, Kinsey Borden, to whom

(1) In Chambers' Cyclopedia of Arts and Sciences, (London, 1728,) it is said: "The seed of the Cotton being mixed in the fruit together with the Cotton itself, they have invented little Machines which, being played by the motion of a wheel, the Cotton falls on one side and the seed on the other; and thus they are separated." The primitive mode in India was to separate the seed by the fingers, and another still used there, was that of *beating*, by which, according to Dr. Buchanan, a man separated 4½ pounds a day, for which he received 6¾ pounds of grain in payment. To these succeeded the bow-string, which has been used there for ages, and the rollers, at first roughly constructed, which are mentioned by Nearchus, an officer in Alexander's Indian expedition. These were made of two rollers of teak wood, fluted longitudinally with several grooves, and revolving nearly in contact. They seem to have been the original of the roller gin long used in this country.

Carolina is indebted for the silky Cottons of her sea islands, constructed a roller-gin, which is believed to have been among the first made or used in that State, and enabled him to clothe his negroes in garments of domestic fabric. It was composed of "pieces of iron gun-barrels, burnished an fixed in wooden rollers, with wooden screws to secure them, and wooden cranks to turn in the manner of the steel corn-mill." It was turned by one person, and fed by another. Mr. Bissell, of Georgia, in 1788, resorted to the "simple plan of a bench, upon which rose a frame supporting two short rollers revolving in opposite directions, and each turned by a boy or girl, and giving, as the result of a day's work, five pounds of clean Cotton." This seems to be nearly the same as the earlier contrivance of Crebs. In December, of the same year, Richard Leake, of Georgia, who that year led the way in Cotton-growing on a large scale, wrote to Thomas Proctor, of Philadelphia, "The principal difficulty that arises to us is the clearing it from the seed, which I am told they do with great dexterity and ease in Philadelphia, with gins and machines made for that purpose. I shall now esteem it a singular favor your procuring me one, and I will thankfully pay whatever the cost of it may be. I am told they make them that will clean from thirty to forty pounds clear cotton per day, and upon a very simple construction." This passage has led to the inference that the foot gin, or some equally efficient instrument was in use at the north, while only a rude hand-mill was employed in Georgia. In the neighborhood of Philadelphia, where those instruments are now extensively manufactured, Cotton was grown at the commencement of the Revolution; in Cape May County, New Jersey; Sussex County, Delaware, and St. Mary's County, in Maryland; and the product being sold in the seed, doubtless gave employment to such machines. About two years after, Joseph Eve, or Eaves, of Providence, Rhode Island, then residing in the Bahamas, introduced what was long considered in Georgia a great improvement on the treadle gin. It was a double gin, with two pair of rollers placed obliquely one above another, and could be worked by horses, oxen, or water-power. It was patented in 1803, previous to which, a number of patents for ginning machinery had been issued: the first being that of Whitney, in March, 1794. The present form of the foot or treadle gin first used in Georgia, is said to have been introduced about two years after Whitney's, by William Brisbane, to whom several were sent from Bahama by his father-in-law. Various modifications of these, as to mechanism and power, followed in rapid succession. These contrivances for preparing the fibre for the spindle, gave increased value to the crop for domestic consumption, and its importance was, at the same time, daily augmented by the train of splendid inventions going forward in England for converting it into Cloth with a facility previously deemed

unattainable. Scarcely an attempt had yet been made, however, to produce Cotton for exportation. In 1770, there were shipped to Liverpool three bales from New York, four from Virginia and Maryland, and three barrels full from North Carolina. Of hemp, flax seed, and Cotton, togetner, the exports from Virginia, before the War amounted to near £2,000 in value. The convention held in Williamsburg, Virginia, August, 1774, in view of the altered relations of the country with Great Britain, resolved that attention should be turned "from the cultivation of tobacco to the cultivation of such articles as may form a basis for domestic manufactures, which we will endeavour to encourage throughout this Colony to the utmost of our abilities." Cotton is not mentioned in the resolutions, which had, among many others, the influential signatures of Washington, Jefferson, Lee, and Peyton Randolph; but, on the 27th March, of the following year, the Assembly of the Province adopted, unanimously, a plan for the encouragement of arts and manufactures, including resolutions of non-importation, and, "that all persons having proper land ought to cultivate and raise a quantity of flax, hemp, and *Cotton*, sufficient not only for the use of his own family, but to spare to others on moderate terms." The planting of Cotton had been also recommended, in the previous January, by the first Provincial Congress held in South Carolina. But very little attention appears to have been paid to the recommendation of either body in regard to Cotton.

In 1784, an American ship which imported eight bags of Cotton into Liverpool was seized on the ground that so much Cotton could not be the produce of the United States. The first regular exportation of Cotton from Charleston commenced in 1785, when one bag arrived at Liverpool, January 20th, per Diana, to John and Isaac Teasdale & Co. In the same year, twelve additional bags from Philadelphia and one from New York were received at that port. During the next five years, the receipts of American Cotton were respectively 6, 109, 389, 842, and 81 bags, estimated at 150 lbs. each, or 1441 bags, weighing 216,150 lbs., in six years, from 1785 to 1790 inclusive. The increase was progressive but not uniform, and probably corresponded to the nature of the demand.[1] The *green seed*, or short

Cotton begins to be exported.

(1) Cotton, consisting of the wild produce of the country, and lampwick made by the natives, was first exported to Europe from Brazil, about the year 1760, by the Company of Maranham, who encouraged its growth from that time so successfully that sugar was abandoned for Cotton, as indigo was in our plantation States. A petition was presented against the first shipment, lest there should not be a sufficiency for the country. As an evidence of the limited demand for Cotton in Europe, it is mentioned that a Portuguese merchant, in 1762, purchased at the company's sale 300 bags, at 300 reis per pound, in set-off of a debt. He sent it to Rouen, then the only Cotton market, but was a loser in consequence of the peace of 1763. At the next sale there were no bid-

staple Cotton, was the kind principally cultivated before the Revolution. The *black seed*, or Sea Island Cotton, now the great article of export, was introduced into Georgia from the Bahamas about the year 1786, and in 1788 the first attempt was made in South Carolina by Mrs. Kinsey Burden, of St. Paul's parish, whose husband, already mentioned as having introduced the roller gin in that State, had nearly ten years before clothed his slaves in that and the short staple Cotton. The first successful crop is said, by Mr. Seabrook, to have been grown by William Elliot on Hilton Head, near Beaufort, in 1790, with five bushels and a half of seed, purchased in Charleston at 14*s.* a bushel. The price then varied from 10*d.* to two or three shillings the pound. The intelligent and well-directed experiments of the two last-named planters so improved the quality of the Sea Island Cotton, by attention to the seed, that some years later, the silky, long fibre of their raising sold for 90 cts. to $1.25 per pound, and one lot at $2, the highest ever obtained. The culture of Cotton was so far successful in 1786 that, at the Annapolis Convention in that year, Mr. Madison said "there was no reason to doubt that the United States would one day become a great Cotton-producing country." Several of the patriotic assemblies called together at the beginning of the war recommended the manufacture of Cotton. Through the influence of a society formed at Philadelphia, principally with a view to its manufacture, and the zealous advocacy of Tench Coxe, an active member, who has been styled the father of the Cotton culture in America, planters generally engaged in the business. To encourage an article which promised soon to become a source of revenue, Congress was induced, in 1789, to impose a duty of three pence a pound on foreign Cottons, which were then obtained from the West Indies and Brazil. The culture was, however, still so limited, that in the treaty negotiated by Mr. Jay in 1792, it was stipulated by the 12th article "that no Cotton should be imported from America." This article, inserted either in ignorance that Cotton was cultivated at all, or that it possessed any commercial value, and designed to secure to England the transportation of Cotton from the West Indies, the Senate of the United States refused to ratify.

The saw gin of Whitney.

The saw gin by Eli Whitney, invented in the following year, and patented the next, gave an immense impulse to the cultivation of Cotton, and "conferred on the plantation States a benefit that can scarcely be estimated in money." The history of this in-

ders for a larger quantity; the directors therefore took it among themselves at 160 reis, and were losers even at that price.—*Southey's Hist. of Brazil.*

England first received Cotton from Brazil in 1782, and from the East Indies in 1788. The Dutch Colony of Surinam, in South America, sent Cotton to Holland as early as 1735.

vention, which in economical value ranks with those of Arkwright and Fulton, and of its ingenious but ill-requited author, is too well known to require repetition here. It enabled the planter to clean for market by the labor of one man, a thousand pounds of Cotton, in place of five or six by the hand, or twenty-five by the roller gin. It was invented and brought into use under an intense excitement of the public mind in Georgia, where the patent of the inventor was immediately invaded. A series of wasteful lawsuits, for a too vigilant and persevering defense of his patent, dissipated all the emoluments derived from it, including $50,000 received from South Carolina, which threw open the use of it to her planters, and smaller amounts accruing from taxes granted him in North Carolina and Tennessee, the only other States that offered any compensation. The culture of Cotton now became general, and some very large estates were soon accumulated in South Carolina. That State exported, in 1795, Cotton to the value of $1,109,653, and in 1801 about eight millions of pounds weight. The growth of the whole country, in 1795, was eight millions of pounds, and the exports six millions; and in 1801 the product had risen to about forty-eight millions, and the exports to over twenty millions of pounds. Indigo entirely yielded to the new staple as an article of commerce in 1798.

While the several Provinces were thus endeavoring to supply themselves and other countries with cotton and indigo, the cultivation of Silk, which, in the last century, employed vast numbers of people in England, was hopefully attempted and encouraged by the imperial and local governments, by public and private associations, and by individual enterprise. A few of the very early essays in this branch, and efforts to force it prematurely upon the Colonists, have been mentioned.

Production of Silk in Georgia.

The "Company of the West," in 1718, introduced the cultivation of Silk, with that of indigo, into Louisiana. Some little progress was made in the business by the French, at New Bordeaux, in Georgia, who, during the Revolution, supplied the upper country with much of the sewing Silk used.

Silk, cotton, indigo, wool, wine, and cochineal, but especially Silk, were the articles to which attention was principally directed by the benevolent founders of Georgia. Appropriations were made, both by the British Parliament and by private persons, with a liberality seldom equaled, to convey thither distressed and deserving artisans and husbandmen from all parts of Europe. Under their patronage the most extensive and successful attempts made in Silk growing in colonial times were conducted in Georgia. Lands were granted to settlers upon condition that they planted ten Italian or white mulberry trees to every acre of

land, and additional grants for extra quantities. As expressive of their leading design and the spirit of the undertaking, a public seal was adopted, having upon one side the appropriate motto, "Non sibi sed aliis"—"Not for ourselves but for others," with a representation of silkworms engaged in their labors. Trees, seed, and silkworm eggs were liberally provided by the trustees. One or two professed silk-reelers from Piedmont, and others from Italy, were sent over, to instruct in the management of the worms and the winding of silk, who, after reeling some fine cocoons for the trustees' garden, became dissatisfied, destroyed the machinery, trees, and eggs, and fled to Carolina. An Italian with his family was next engaged, at a salary of £520 for six years, to take charge of a filature. The first product of the silkworms, consisting of eight pounds of raw Silk, was taken to England in 1734 by Mr. Oglethorpe, and another lot the following year. It was organzined by Sir Thomas Lombe, one of the proprietors of the famous silk-throwing mills erected at Derby in 1719, who so admired its quality, that he exhibited it to Queen Caroline, by whose order it was woven into a dress pattern and afterward presented to her majesty, who at the next levee appeared in a full court dress of Georgia Silk. Renewed attention was given to the business on the return of General Oglethorpe. The manuscript book of the trustees contains a charge, in 1738, "for making a rich brocade, and dyeing the Silk from Georgia, £26." A parcel taken to London the next year was pronounced, by an eminent Silk weaver and a Silk merchant, equal to any from Italy, and worth twenty shillings a pound. The Saltzburgers, who had settled at Ebenezer, on the Savannah, cooperated zealously with the trustees, and erected and employed two reels with success. In 1749, bounties were offered by the trustees to every woman who should, within the year, become a proficient in reeling, and by their permission sheds for that purpose were erected and supplied with machines. The bounty was claimed by fourteen young women, who were the next year engaged at the filature. Over one thousand pounds of cocoons were raised, and so well reeled by them as to command in London a higher price than Silk from any other country. In 1749, Parliament passed an Act for encouraging the Silk manufacture in Georgia and Carolina, by admitting Silk from those Provinces free of duty. The trustees of Georgia, in 1750, sent two commissioners to promote the Silk culture, who, the following year, erected in Savannah a public filature or Silk house, to instruct in the management of private filatures, and it went into operation in May. Six thousand three hundred pounds of cocoons were received at the filature that year, of which two thousand were sent by the Germans at Ebenezer, and the remainder from Whitfield's orphan house. Mr. Robinson, one of the commissioners, who had

been sent to France to acquire "the mysteries of silk-winding," having proved his skill, and been made an assistant in the government, returned to England in 1752, after failing to obtain permanent encouragement of the business for at least fourteen years. He was succeeded by Joseph Ottolinghe, an accomplished Piedmontese reeler. The exports of raw Silk from Georgia, in 1750, and the three following years, amounted in value to $8,880. During the next eighteen years, according to the statement of the Comptroller of Customs at Savannah, 9,829 pounds, or an average of 546 pounds yearly, were exported. It is, however, stated by some authorities that, in 1759, no less than ten thousand pounds of raw Silk were exported, which sold two or three shillings higher than other Silk.[1] At the filature there were delivered, in 1757, and the three succeeding years, the following quantities of cocoons, viz.: 1,050 lbs., 7,040 lbs., 10,000 lbs., and 15,000, which shows an increase in the business perhaps too encouraging while the Colony was yet in its infancy, the means of subsistence uncreated, and more profitable industry was open to the Colonists. The filature was consumed by fire on the 4th July, 1758, but was the next year rebuilt on a larger scale. Nearly 100,000 pounds of cocoons were received at the filature during the next eight years, much of which came from Ebenezer.

In 1762, the Society established at London for the encouragement of Arts, Manufactures, and Commerce, offered premiums of three pence for every pound weight of cocoons raised in Georgia and South Carolina "of a hard, weighty and good substance wherein one worm only has spun;" two pence a pound for inferior qualities produced by a single worm, and one penny a pound for cocoons spun by two worms; the premiums to be awarded and paid by Mr. Ottolinghe, the superintendent of the Silk culture in Georgia, on presentation at the filature in Savannah. These various measures secured considerable attention to the Silk business. But just as it seemed about being established on a permanent footing, an Act of Parliament, in 1766, reduced the price which Government had been paying for cocoons from three shillings to 1*s.* 6*d.* a pound. The larger part of the price before paid had been in reality a bounty, and its reduction caused a decline in the production of Silk from 20,000 lbs. cocoons, in 1766, to 290 in 1770. In April, 1769, a parliamentary bounty was offered of £25 on every £100 worth of raw Silk imported from the Colonies for seven years; £20 for the next seven years, and £15 per cent. for a third term of seven years. "If this encouragement," M. Raynal observes, "produces such improvement as may be expected from it, the next step undoubtedly will be the cultivation of *cotton* and olive

(2) McCall's Hist. Georgia, i. 251. *Rush's Letters* on Silk, published by Act of Congress, 1828.

trees, which seem particularly adapted to the climate and soil of the British Colonies." The Silk culture was again partially revived, particularly by the Saltzburgers, who continued to send yearly to England several hundred pounds of raw Silk, until the Revolution caused the business to be nearly abandoned. The last Silk offered for sale in Georgia was in 1790.

Perhaps none of the Colonies, and least of all Georgia, notwithstanding the entire fitness of the climate, were as yet prepared for a profitable attention to the Silk culture. The tending of silkworms and the winding of Silk were not calculated to nourish the qualities required to subdue the forests and cultivate the swamps of a new country. That another industry was needed to launch the Province on a prosperous career, is evident from the fact that in 1752, when the government was transferred to regal authority, the greater part of Georgia was an unproductive wilderness, and its exports were less than £10,000 sterling annually. After the discovery, a few years later, of the value of the rich swamps on the rivers, of the fertile and more healthy lands of the interior, and of the new staples suited to them, progress was rapid, and the exports rose from £27,020 sterling, in 1763, to £121,677, in 1773.

The Colonists were of course unprepared for anything more than the production of the unwrought material, and it is probable that nothing more would have been allowed. Silk throwing involves the use of expensive machinery, and was long the valuable monopoly of the Lombes. Every stage of the manufacture was protected by enormous duties, prohibitions, and monopolies in England. No interference would have been allowed in the Colonies. An eminent commercial writer, Joshua Gee, one of the earliest and strongest counsellors of the restrictive policy in regard to the plantations, had distinctly suggested that, as the Colonies "have never thrown or wove any Silk as yet, that we have heard of, therefore if a law was made prohibiting the use of any throwing-mill, of doubling or throstling Silk with any machine whatever, they would then send it to us raw." The exportation of machinery used in the Silk manufacture was prohibited in 1774.

The cultivation of Silk was also, before the Revolution, a fashionable occupation in Carolina. It had been long produced in South Carolina, and some early essays in that way have been mentioned. Silk growing was a principal object with the Swiss, who, in 1733, settled at Purrysburg, under John Peter Purry, of Neufchatel. It was kept up by them for some time. The French in that Province also raised Silk, which they wrought up with their wool. It was cultivated by many ladies, who sent it to England to be manufactured. The exports, however, were small, and amounted, in the years 1742–'48–'49,

Silk in Carolina.

1750–'53, and 1755, to only 251 lbs. of raw Silk in the aggregate. The quality, however, was said to be superior. In the last-named year, Mrs. Pinckney, the mother of the revolutionary generals of that name, who had introduced the indigo and cotton plants into South Carolina, took to England a quantity of excellent Silk, raised and spun by her near Charleston, sufficient to make three complete dresses.[1] At Silk Hope plantation, in St. Thomas Parish, where Sir N. Johnson had cultivated Silk near seventy years before, 630 lbs. of cocoons were raised in 1765. The legislature of the Province, in the following year, voted £1000 to establish a Silk filature at Charleston, under the direction of Mr. Gilbert. This was probably on account of the liberal premiums offered by the Society of Arts for cocoons raised in South Carolina and Georgia, which had to be sent to Savannah. The business could make little progress without reeling establishments. The bounties also included an offer of 2*s.* 6*d.* for every pound weight of merchantable raw Silk raised in Connecticut, Pennsylvania, and North Carolina, to be paid to the Society's correspondents in those Colonies. Several hundred pounds were paid in premiums by the Society, in Carolina and the other Provinces, previous to the withdrawal, in 1772, of the bounties which had been renewed from year to year.

Silk in Connecticut.

The premiums, when first offered for Connecticut, were payable on the condition that a public filature should be erected in that Colony. Silk had been early produced in Connecticut, and was the subject of legislation as early as 1732. In 1747, Mr. Law, the Governor, wore the first coat and stockings make of New England Silk, and in 1750 his daughter wore the first Silk dress of domestic material. The establishment of the Silk culture as a permanent industry in Connecticut, where it has existed to the present day, is chiefly due to the exertions of President Styles, of Yale College, and Dr. Nathaniel Aspinwall, of Mansfield. The former commenced his experiments in 1758, by planting three mulberry trees, which, as the initial of the business, he named A, B, C. His experiments, extending over a period of nearly forty years, in which he liberally distributed seeds, trees, and judicious advice, are recorded in a manuscript Journal now in the library of the college. About the year 1760, Mr. Aspinwall commenced the breeding of silkworms in Mansfield, by the introduction of the white mulberry tree from Long Island, where he had a nursery. He planted a large mulberry orchard at Mansfield, and another at New Haven, and

(1) Ramsay's Hist. South Carolina, i. 221. "One of them was presented to the Princess Dowager of Wales, and another to Lord Chesterfield. They were allowed to be equal to any Silk imported. The third dress, now (1809) in Charleston, in the possession of her daughter, Mrs. Horry, is remarkable for its beauty, firmness, and strength."

at the same time endeavored unsuccessfully to engage other towns in the business. His efforts were effectual in rendering it a permanent and valuable industry in Mansfield. Mr. William Hanks, of that town, according to the New London Gazette of 1768, raised the previous year sufficient Silk for three dress patterns. He and a number of other gentlemen in Windham County, had large vineyards and nurseries of mulberry trees, which had been cultivated "to bring on a Silk manufactory." It is stated that one Silk house had already been erected in Lebanon. The card of Mr. Hanks offered for sale 3,000 mulberry trees, which would "be sold cheap for the speedy promotion of the culture of Silk." The Rev. Jared Eliot, of Killingsworth, one of the correspondents of the Society of Arts in London, states, in his Essays on Silk-growing and Field Husbandry in New England (1760), that a principal cultivator of Silk, of credibility, informed him he could make a yard of Silk as cheap as he could a yard of linen cloth, of eight run to the pound; and that it was then considered "more profitable than any other ordinary business." The family of Dr. Styles, among many others, were engaged in Silk growing, and had fabrics woven in England from domestic Silk of their own raising. After the Revolution, which suspended the business, and extinguished it in most places, Silk raising was resumed with some spirit in Connecticut, and through the zeal of Messrs. Styles and Aspinwall, an Act of the Assembly was obtained in 1783, and another the following year, granting a bounty of ten shillings for every hundred white mulberry trees planted during ten years, and three pence an ounce for raw Silk. In 1788, Thomas Barrens and thirty-one others were incorporated as a company to manufacture Silk cloth in the State. President Styles that year appeared at the commencement at Yale in a gown woven from Connecticut Silk, which was then worn by many ladies in the State. In the following season, the town of Mansfield made about 200 lbs. of raw Silk, worth $5 a pound. A woman and two or three children could make ten or twelve pounds in about five or six weeks. The Silk was usually made into stockings, handkerchiefs, ribbons, buttons, and sewing Silk, worth $1 an ounce. The profit was said to be large. About fifty families at New Haven were engaged in the business in 1790, and about thirty families at Norfolk raised and spun 1200 run of Silk the same year. Connecticut, and particularly Mansfield, has never abandoned the business from the first, and that town is said to have passed through periods of commercial depression with less embarrassment than others by virtue of its Silk business.

The Silk Journal of Dr. Styles mentions that Silk was raised at Newport, R. I., as early as 1758.

Ames' Almanac, for 1769, states that a gentleman "whom posterity

will bless," placed in the hands of the Selectmen of Boston $100, to be distributed in sums of 40, 30, 20, and 10 dollars to the persons who, in 1771, should have raised severally the largest lots of mulberry trees in Massachusetts. The General Council of the Province in 1770, in answer to the petition of William Mollineau, of Boston, for aid to carry out a plan for employing the poor in spinning, and for dyeing and manufacturing raw Silk, granted him, for the term of seven years, rent free, a lease of the provincial manufactory for the manufacture of Silk. The petitioner states that the raising and manufacturing of raw Silk was an object on which he had expended between eleven and twelve hundred pounds, chiefly in fixed apparatus in the Province factory house. He engaged to purchase, at a reasonable price, all the raw Silk raised in the Province, and to cause it to be manufactured, or as much of it as he could find hands to manufacture. Fine samples of sewing Silk were also made in parts of Massachusetts, among others by Mr. Jones, of Western, in Worcester County, in 1790. The town of Ipswich, which had for some time carried on the manufacture of Silk and thread lace, produced the same year forty thousand yards of lace.

Some early essays in this department were made in New York, New Jersey, and Pennsylvania. A dispatch of Governor Patrick Gordon, of Pennsylvania, to the Lords of Trade, in 1734, mentions that it was the whole study of the merchants how to make returns for the large importations of British manufactures, and recommends the encouragement of naval stores, hemp, flax, and Silk, of which last, he says, there was a distant prospect of some advances toward a Silk manufacture, and some among them had shown how practicable a design of that kind was, by making some small quantities equal to French or Italian.[1] A London paper of Feb. 7, 1765, states that within four days one hundred journeymen Silk throwsters had engaged themselves for New York and Philadelphia, upon extraordinary encouragements, intending at both places to establish the manufacture of Silk. The New Jersey Assembly, the same year, acting upon the recommendation of Governor William Franklin, granted bounties on hemp and flax, and for the planting of mulberry trees. The great efforts then making in England to rival the French in the Silk manufacture, and the liberal appropriations of Parliament and the Society of Arts for its production in the Colonies, created strong hopes of its becoming a permanent and profitable industry. The subject had been frequently broached before the members of the American Philosophical Society, whose objects were kindred to those of the London Society; and Moses Bartram, in March, 1768, read a paper before the

(1) Hazard's Register of Pennsylvania, i. 444.

Society on the management of the native silkworm, with which he had experimented.[1] In the following year, the Society, upon the recommendation of Dr. Franklin, set on foot a subscription, by which a filature of raw Silk was established in Philadelphia under the management of a skillful and intelligent Frenchman. Franklin was one of the persons in Pennsylvania charged with the dispensation of the premiums of the Society of Arts in that Province, and being in London when the parliamentary bounty was discussed and passed, he addressed a letter to the Philosophical Society recommending its attention to the Silk culture and the erection of a filature. The restrictions which the ministry was then laying upon Colonial trade and industry, and the large importations of Silk annually made, probably not less than the bounties, pointed to the Silk culture as a desirable resource in case of emergency. Franklin also sent a copy of the work of Sauvage on the rearing of silkworms, which furnished valuable aid. A committee drew up a plan and an address to the General Court, asking public encouragement and power to grant premiums to the amount of £500 yearly. Subscriptions in sums from two to fifteen pounds, and headed by Gov. John Penn for £20, were raised the first year to the amount of nearly £900 for the purchase of cocoons and the building of the reeling establishment. Silkworm eggs and mulberry trees were imported, and a digest of instructions compiled, published, and distributed. The filature was opened in June, 1750, on Seventh street, between Arch and Market. Native mulberry trees were used until the white could be procured, and were found to agree well with the worms, and to yield samples of Silk equal to the best foreign. All the Silk produced to the Society is believed to have been raised from the food of native trees. In 1771, there were brought to be reeled and purchased by the managers 2,300 lbs. of cocoons, between the 25th June and 13th August. They were from Pennsylvania, New Jersey, and Delaware, in all of which Silk-growing was followed with spirit. Many individuals in those States were quite successful in producing Silk. Susannah Wright, an intelligent Quakeress of much note in the borough of Columbia, in Lancaster County, in 1770 received a premium for a piece of mantua, sixty yards in length, made from cocoons of her own raising, and from which a court dress for the Queen of Great Britain was made. Mr. Watson has preserved in his manuscript Annals, deposited with the Philadelphia Library Company, samples of the fabric.[2] Mrs. Wright also made much sewing Silk. Grace Fisher, a minister among the Friends, made a considerable quantity of Silk stuffs, some of which was presented to the celebrated Mrs. Catharine Macaulay by Governor

(1) Transactions, vol. i. p. 224.

(2) Watson's Annals of Pennsylvania and Philadelphia, vol. ii. 436.

Dickinson. The mother of Hon. Francis Hopkinson also raised much Silk; and many other ladies, before the war, wore dresses of domestic Silk, some of which are still preserved in their families.

In addition to the directions for the breeding and management of silkworms, extracted from the treatises of the Abbe Boissier de Sauvages and of Pullein, published in 1770 by the managers of the filature, Dr. John Morgan obtained from Italy, through Hare & Skinner, Silk merchants of London, and communicated to the Philosophical Society, a paper detailing the most improved method of preparing raw Silk in that country. A knowledge of the different branches was greatly promoted by the essay which was published in the second volume of the Society's Transactions. The London merchants suggested greater care in assorting the Silk, a neglect of which was complained of in all Silk from America, and caused the Georgia Silk, otherwise good, to sell 1*s.* 6*d.* or 2*s.* a pound less than it would have done had greater care been used.

The Revolution terminated the Silk enterprise in Pennsylvania and the neighboring States. It was partially revived after the peace by several individuals. Among others, Dr. Aspinwall, of Connecticut—whose interest in the Silk culture never faltered—planted a nursery of Italian mulberries on Poplar Lane, in Philadelphia, and another at Princeton, New Jersey. In relation to the former, Mr. Tench Coxe observes: "We have a large nursery of white Italian mulberry trees established here this summer. Within ourselves little can be expected, but the idea of the nursery has been encouraged upon the principle that it prepares things for an emigration from a Silk country. This, perhaps, is refining, but the expense is small; the trees are wanted to replace those destroyed by the British army, and the measure falls in with our plan *to foster and encourage but not to force manufactures.*" The filature, we believe, was never reopened, and as there was no sale for cocoons without one, the cultivation was again dropped.

In 1796, a manufactory of bolting cloth, from Georgia Silk, was established at Wilmington, Delaware.

The success of these early attempts at Silk growing, as well as those of later date, leave no doubt of the practicability of producing silk of excellent quality at a moderate cost. When the amount of our importations of this elegant and indispensable article, exceeding those of any other commodity, is taken into account, it may well be questioned whether the business of Silk raising has not fallen into undeserved neglect. With our increased mechanical and productive forces, an immense saving might be effected and liberal profits realized by a return to this ancient

industry, which is certain to become once more an object of very general attention in this country.

Taxation of the Colonies proposed.

The extraordinary naval and military exertions of the American Colonies, during the war of 1755, and the display of furniture, plate, and other appointments, somewhat ostentatiously made in the eyes of British officers, by the opulent classes of the towns throughout the campaign, had impressed the English people with a high opinion of their wealth and resources. Their ability to share the heavy burdens of the public service could not be doubted. Gratitude for the subjugation of a common enemy, of which their own part of the expense was to be reimbursed, it was believed, ought to secure ready acquiescence in a tax for their own future protection and government. A native of New Hampshire, holding a seat in the House of Commons, at the same time, declared the ability of the Colonies to pay a tax of half a million pounds annually. A measure regarded by the English Government as so reasonable and equitable, was, however, looked upon in quite another light by the American people. They saw not their own but the national aggrandizement in the recent victories partly achieved by their arms, and failed to see in the proposed scheme of taxation the essential element of validity—the representation of the taxed. No sooner, therefore, did Parliament commence the enforcement of the Navigation Acts, and the imposition of duties by the Sugar Act of April, 1764, whereby certain imposts were for the first time laid, with a view to revenue, upon sugar, indigo, coffee, wines, silks, and other East India and Chinese goods, calicoes, etc., and give intimation of a duty about to be laid upon stamps, than loud complaints were uttered, and measures were adopted to lessen the dependence upon British manufactures, by a rigid practice of the virtues of industry and economy. The execution of the laws of trade was carried out in a manner altogether vexatious by the armed vessels stationed along the coast; and the revenue officers were soon forced to call for writs of assistance to enable them to encounter the opposition which they met. The valuable trade with the Spanish Colonies and French islands, which had supplied the English Provinces with coin and bullion for their own use and for remittance to Great Britain, was nearly ruined. The great scarcity of specie which resulted was aggravated by the duties being collected in hard silver, while at the same time the use of a paper currency was prohibited by the Act of 1751, before alluded to. Some compensation was, indeed allowed in the form so often suggested, by allowing bounties on hemp and unwrought flax, and by encouragement of the whale fishery. But the distress occasioned forced upon the people of the Colonies a retrenchment in luxuries, no less salutary and needful

as a matter of prudence, than it was efficient as a means of resistance. The tacit agreement which had induced many from the first to abandon the use of all superfluities, and especially of British manufactures, became immediately, upon the passage of the Stamp Act, in March, 1765, the form of organized retaliation on the part of numerous associations in different sections of the country. The merchants entered into the most solemn engagements not to import any goods from Great Britain, let the consequences be what they might; to countermand orders already given, if not executed before the first of January, 1766; and even to refuse to sell British goods sent them on commission, until the offensive Acts were repealed. Committees of correspondence were formed in different Provinces to bring about a concert of action in the matter. The retailers also adopted the resolutions, and the people generally agreed to abstain from the use of mourning at funerals, such as black cloth, scarfs, gloves, etc., not of domestic manufacture, and to promote the manufacture of woolens by abstaining from the use of mutton, and even not to deal with any butcher who should kill or expose any to sale. The promotion of manufactures among themselves was also to be encouraged in all possible ways. The promptness with which this spirit and action were aroused may be inferred from a letter from Virginia, to a correspondent in Bristol, dated Sept., 1764, previous to the passage of the Stamp Act: "The Acts of Parliament have made such impressions on the minds of the northward people, and the men-of-war so strictly enforce them, that there is an entire stagnation of trade. Nothing do they talk of but their own manufactures. The downfall of England and the rise of America is sung by the common ballad-singers about the streets, as if in a little time we should supply ourselves with most of the necessaries we used before to take from England." Another person, writing from Boston, Oct. 8th, of the same year, observes:

Non-importation Assoc'ns.

"The disposition seems to continue in many of the inhabitants of this and the neighboring governments to clothe themselves with their own manufactures. At Hempstead, on Long Island, in the Province of New York, a company of gentlemen have set up a new woolen manufactory, and have given notice to gentlemen, shopkeepers and others of any of the Provinces, that by sending proper patterns of any color, they may be supplied with broadcloths equal in fineness, color, and goodness, and cheaper than any imported. The proprietors give good encouragement to any persons who are any way versed in the woolen manufacture, such as wool combers, weavers, clothiers, shearers, dyers, spinners, carders, or understanding any branch of the broadcloth, blanket, or stroud manufactory. At Jamaica, on the said Island, one Tunis Popham is erecting a fulling mill, which will be compleat in about a month, and carry on all the branches of a fuller and dyer of cloth. There are many articles of dress manufactured in this Government, which if worn would be a

great saving thereto, particularly knit stockings, leather habits for working, shoes, etc., more especially shoes for women, which are made at Lynn, and exceed in strength and beauty any that are usually imported from London. The practice of putting on mourning at funerals, is already almost abolished in this town; the new method of only wearing a crape tied around the arm is introduced in several of the neighboring towns, and it is to be wished it might prevail throughout the government: the saving to this town only, it is judged, would be twenty thousand pounds per annum.'"

Effects of the Associations.

The resolutions to arrest the importation of British goods commenced in New York, where hostility to the Stamp Act was particularly rife, and were adopted in Massachusetts and Rhode Island, whose trade suffered greatly by the Sugar and Molasses Act. They were embraced with more hesitancy in Pennsylvania. Among the beneficial measures directly ascribable to this cause, was the formation in New York of a "Society for the Promotion of Arts, Agriculture, and Economy," which every real friend of his country was invited to join. The reasons for this Association were set forth to be the declining state of trade, the vast luxury introduced during the late war, the immense importations, and the want of sufficient staples for returns; the extreme scarcity of cash; the great inconvenience resulting from the prohibition of paper currency, and the restrictions with which the commerce of the country had been recently encumbered. The principal object of the Society, which was organized in Nov., 1764, was stated to be the encouragement to the utmost of the manufacture of Linen, which it hoped to establish on the most solid foundation, and thereby increase the value of land, give employment to the poor, and save the public large sums of money and heavy debts for English goods. At a meeting on Dec. 4th, there were appointed a Committee of Arts, a Committee of Agriculture, a Committee for Schemes of Economy, and one for Correspondence, embracing many of the most influential names in the Province. On the 20th of the same month the Society met and appointed a list of premiums for linen thread and cloth and their materials. The Governor of the Province, in his speech in September of the same year, strongly recommended to the Assembly the encouragement of hemp, which the farmers did not know how to cultivate or prepare for the manufacturer, and a law granting a bounty on the article had expired without producing the de-

(1) London Chronicle for 1764, pp. 413, 518. The great promoter, if not the originator, of the custom of leaving off mourning and gifts at funerals, and of voluntary associations against foreign luxuries in Boston, is said to have been the Hon. James Bowdoin, afterward Governor of the Province, and always a friend to manufactures. The first funeral so conducted was that of Ellis Callender.

sired effect. The Society offered premiums for the raw material and the manufacture, viz.: For the five largest quantities of Linen yarn spun under the direction of one person in the Province in 1765, regard being had to the quality, from £30 to £10, respectively; for linen Cloth, in like manner, five premiums, from £25 to £5; for wove stockings (three thread) £16 and £12, and smaller amounts for the best bend and sole leather, women's shoes, dressed deer skins for breeches, beaver-skin gloves, pantiles, roofing slate, etc. At a subsequent meeting, premiums were offered of £30 to £10 for the greatest quantities of flax raised by one farmer, and £15 to £5 for the greatest quantity on one acre. For hemp, an honorary medal only was offered, because that article was already liberally encouraged by a bounty from Parliament of £8 sterling per ton, and of £20 currency from the Provincial legislature, and of £100 for every twenty tons, by the Society of Arts in London. Ten pounds were, however, given for the largest amount of hemp seed grown on an acre, and a premium also for the largest amount of bog meadow cleared and prepared for hemp, flax, and grass, and medals and premiums for other agricultural products.

The disuse of mourning and of hot wine at funerals was adopted at the instance of the Committee on "Schemes of Economy." In the following year, numerous samples were produced and premiums awarded, and the markets opened for the sale of home-made goods showed that "neither the natives nor the manufacturers whom the natives had for some time past been inviting from Great Britain by very large encouragements, had been idle. Linens, woolens, the coarser but more useful articles of iron-ware, malt spirits, paper hangings, etc., were produced to the society and greatly approved, and when brought to market were as greedily bought up. At the same time, lest the new woolen manufacture should come short of materials, most of the inhabitants came to resolutions not to eat any lamb, and to extend the influence of these resolutions to those who did not join them in it, not to deal with any butcher that should kill or expose any lamb to sale. In a word, the spirit of industry and frugality took the place of idleness and profuseness. The most substantial and even fashionable people were foremost in setting the example to their countrymen of contenting themselves with homespun or old clothes, rather than make use of anything British, which they before used to be so madly fond of. And such were the efforts of all ranks and so prudent their measures, that they now began to be convinced of what they had till then thought impossible—that the Colonies would soon be able to supply themselves with every necessary of life. Such foreign articles as they were compelled to have, they took from Ireland.

They even talked of prohibiting the export of Tobacco from Virginia."[1]

The society in New York, which continued for a number of years to give generous encouragement to domestic industry, in March, 1766, again announced, through its secretary, Benjamin Kissam, a series of premiums for better qualities and larger lots of linen thread and cloth, and for machinery, etc., including £15 for the greatest quantity, "not less than 500 yards of best quality, 36 inch linen check, each color of highest perfection, white and blue;" £10 for the first three stocking-looms of iron set up in that year, and £5 for next three; £15 for the first stocking-loom made in the Province in that year; a medal for the first flax-mill erected in the Province in 1766, to go by water, and £30 for the first bleaching-field, costing £150, or one in proportion to that sum. A treatise on Hemp-husbandry, by Edmund Quincy, was offered for sale by appointment of the Society, at the price of 2s.

The resolutions of non-importation and retrenchment in the use of foreign merchandise, and the indications of a determination on the part of the Colonists to manufacture for themselves, caused much alarm in Great Britain. It was stated there, early in the year 1765, that no less than fourteen new manufactures had been lately established in North America, by which it was computed Great Britain was annually injured in a sum little short of half a million sterling. It was heard, with much concern, that a muslin manufacture was carried on at New York with great success, under the direction of one Douglas, from Glasgow, Scotland. They wrote from Pennsylvania that a new manufactory of cotton is going to be established there by several gentlemen of property at that place.[2] The state of the exports from Great Britain to the Colonies was immediately affected in a serious degree. They had amounted annually to nearly three millions sterling in British manufactures, exclusive of foreign goods received by way of Great Britain. Ships in the Colonial trade now came with only half lading, and many were withdrawn. Thousands of weavers and workmen in the manufacturing and commercial towns were thrown out of employment, and many emigrated to America. The manufacturers who, in a time of great scarcity of breadstuffs, were unable to employ their hands, whose materials and made-up goods were a dead stock upon

(1) Annual Register, vol. viii. pp. 55, 56.

(2) In Watson's Annals (vol. ii. p. 259), the following is cited from the Complete Magazine, published in England, August, 1764: "Some beautiful samples of the *cotton manufacture*, now carried on at Philadelphia, have been lately imported and greatly admired." That an attempt to the extent of producing samples of cotton Cloth should be made in Philadelphia, where the imported article and the raw material had been long used, and skillful spinners and weavers abounded, is not very improbable. The *new* manufactory of cotton above alluded to was not long after attempted, and may have been thus early talked of.

their hands, sent up petitions for relief. The merchants in the Colonial trade, whose remittances from America were stopped, and their outstanding debts imperiled, added their prayers for a repeal of the Stamp Act. Memorials were at the same time sent from the Colonial Assemblies, and zealous efforts made by their agents in London for the same end. The numerous petitions received, of which no less than thirty-seven (fourteen of them from North America) were laid before the Board of Trade in one day—the distress occasioned in England, and the determined hostility manifested by the Colonies in their resolutions and more violent Acts, but especially a change in the ministry and the total failure of the measure as a financial scheme, procured its repeal in March, 1766.

Repeal of the Stamp Act.

Universal joy was excited in England and America by the repeal, and trade again resumed its wonted channels. A declaration of the right to tax the Colonies accompanied the abrogation of the statute. Mr. Pitt also, in advocating the repeal of the Act "absolutely, totally, and immediately, and that the reasons for the repeal be assigned because it was founded in erroneous principles," at the same time recommended that "the sovereign authority of this country over the Colonies be asserted in as strong terms as can be devised, and be made to extend to every part of legislation whatever, that we may bind their trade, *confine their manufactures*, and exercise every power whatsoever, except that of taking their money out of their pockets without their consent." Notwithstanding these assertions, pregnant with future trouble, the Colonists in their gratitude voted a statue to Mr. Pitt, and "resolutions were made to prepare new dresses made of British manufactures for celebrating the fourth of June, the birthday of their most gracious sovereign, and to give their homespun clothes to the poor."

In August of the same year, the Lords of Trade addressed a circular to each of the Governors on the continent of America, requiring them forthwith to prepare and transmit to them, to be laid before the House of Commons at the next Session, a particular and exact account of the several manufactures which had been set up and carried on within the Colony since the year 1734, and of the public encouragement which had been given thereto. A like account was to be yearly transmitted of new manufactures set up and of the public encouragement given to them.

Circular of Board of Trade.

The communication was laid before the Council of New York in November by Sir Henry Moore, the Governor, whom the Council informed that no new manufacture had been set up or received public encouragement, nor did they know of any manufacture of wool or woolen Cloth but what was principally confined to private families for their own consump-

tion. The report of Gov. Moore, in January, 1767, to the Board of Trade, refers to "a small manufactory of linen in this city, under the conduct of one Wells, and supported chiefly by the subscriptions of a set of men who call themselves the Society of Arts and Agriculture." He states that it employed only fourteen looms. It was established to give support to poor families, who were comfortably sustained by it in spinning flax. The weavers from Yorkshire, who came to New York in the expectation of being employed in the broadcloth manufacture, he says, were disappointed, and it did not appear that there was any established manufacture of that article. "But there is a general manufactory of woolen carried on here, and consists of two sorts; the first a coarse Cloth entirely woolen, three-quarters of a yard wide, and another a stuff which they call linsey-woolsey. The warp of this is of linen, and the woof woolen. A very small quantity of it is sent to market. Last year, when the riots and disorders here were at the height, on the occasion of the Stamp Act, these manufactures were greatly boasted of and the quantity then made greatly magnified by those who were desirous of distinguishing themselves as American patriots, and would wear nothing else. They were sometimes sold for three times their value." These Cloths were made in almost every house throughout the country, and in sufficient quantity for family use, the children being employed in spinning and carding as soon as they were old enough. Nearly every family was furnished with a loom, and itinerant weavers traveled through the country to do the weaving. There was a considerable manufacture of hats in New York, which would probably be of short continuance on account of the high price of labor.

The manufacture of hats was at this time briskly carried on in Carolina, and a profitable export trade in hats existed with the Spanish Islands. The letter of Governor Penn, of the same date, states that he could not find that the least possible encouragement had ever been given to the establishment of any manufactures in Pennsylvania, nor were there any then carried on in the Province except two. One of these was set up in the city about three years previous, by private subscription, for the manufacture of sail-cloth, ticking, and linens; but the proprietor had already sunk money, the high cost of labor not allowing the articles to be made as cheap as those of the same quality from England were sold by retail. Its discontinuance had therefore been decided upon. The other was a glass manufactory in Lancaster.

The rejoicings of the Colonists at the repeal of the Stamp Act were of short duration. The Sugar Act, in a modified form, still remained, and to some was scarcely less grievous than the former. Several measures favorable to Colonial trade were enacted in Parliament the same year, but

the next witnessed a renewal of the fiscal schemes of the previous ministry by the imposition of a duty on paper, glass, painters' colors, and tea, providing for the quartering of soldiers in the Colonies, and for a more effectual enforcement of the revenue system, by the establishment of a Custom-House. Although the people had so readily receded from the determined stand taken against the Stamp Act, and a sum of £15,000 was voted to be raised by a tax on foreign sail-cloth and lawns, to be paid in premiums on hemp and flax imported from the Colonies, this and other favorable legislation did not prevent a renewal of the opposition to the new plan of taxation. Boston, in town-meeting, Oct. 28, commenced the former system of retaliation and redress, by declaring that the "excessive use of foreign superfluities is the chief cause of the present distressed state of this town, as it is thereby drained of its money; which misfortune is likely to be increased by means of the late additional burdens and impositions on the trade of the Province, which threaten the country with poverty and ruin." Resolutions were made to abstain from the use, after 1st December, of such foreign articles as "loaf sugar, cordage, anchors, coaches, chaises and carriages of all sorts, horse furniture, men's and women's hats, men's and women's apparel ready made, household furniture, gloves, men's and women's shoes, sole leather, sheathing and deck nails, gold, silver, and thread lace of all sorts, gold and silver buttons, wrought plate of all sorts, diamonds, stone and paste ware, snuff, mustard, clocks, and watches, silversmiths' and jewelers' ware, broadcloths that cost above 10*s.* per yard, muffs, furs, and tippets, and all sorts of millinery ware, starch, women's and children's stays, fire engines, china ware, silk and cotton velvets, gauze, pewterers' hollow ware, linseed oil, glue, lawns, cambrics, silks of all kinds for garments, malt liquors, and cheese."

Non-importation agreements renewed.

At the same time, it was resolved, "by all prudent ways and means to encourage the manufactures of British America, and more especially those of this Province." Retrenchment in the use of new or superfluous clothing and mourning apparel was pledged. The spinning-wheel was in demand in every household, and garments of domestic fabric, spun by their own hands, were emulously worn as proofs of patriotism by the daughters of the most wealthy families in the land. "Spinning matches," in which young ladies assembled at the house of a neighbor with their wheels, and vied with each other in the ancient and queenly art of spinning, were a common occurrence, and extraordinary achievements are recorded of the fair spinners. The graces of a kindly act often crowned a day of honorable industry, by the bestowal of the products of their united labor upon the family of the pastor or friend whose house they had enlivened, and who was only permitted to offer

Spinning matches.

them a cup of balm tea or of coffee in place of their wonted but now proscribed beverage. In Rhode Island, and especially at Newport, there was scarcely flax enough to supply the spinners.[1]

In February, 1768, the subject came up in the General Court, and the establishment of manufactures was generally approved of, only one member, Timothy Ruggles, opposing them. His reasons were assigned in writing, but a motion to have them recorded on the Journals was negatived. The Assembly had previously prepared a petition to the King, and now addressed a circular letter to the Assemblies of sister Provinces, stating what had been done, and asking co-operation in their plan to obtain redress of grievances. The resolutions were generally approved of, and petitions were sent from other Colonies. At New Haven similar resolutions were adopted in the same month. An attempt was made again to set at work the Linen manufactory in Boston, which had been discontinued. A town meeting in Boston, in March, appointed a committee to frame a vote of thanks to the author (then unknown) of the "Letters of a Pennsylvania Farmer," by John Dickinson, which so ably vindicated the rights of American subjects. A large committee on manufactures was at the same time appointed to procure subscriptions to aid a manufactory of Duck, lately established in the town by John Bennett, Esq. They reported in May that only one-half the required sum (£300) had been subscribed, and were directed to renew their efforts. At this time, the non-importation agreements, which, for want of concerted action, had not been acted upon, were renewed in Massachusetts, and the Assembly,

(1) The inventions of a mechanical age have rendered nearly obsolete in Europe and America this primitive employment of woman, which was a time-honored custom in the rural economy of all ancient and modern nations. The temporary impulse given to it by the claims of patriotism about this time, was nearly the last of its existence as a general or national custom. The term spinster has an honorable derivation. Spinning and weaving have been domestic arts from the most ancient times, and chiefly belonged to the women. It was the province of royal ladies to direct the labors of the spindle and the loom, and even to handle the distaff, when Solomon drew his portraiture of "a virtuous woman," or the wife of Hector plied her loom surrounded by her maids. Even the goddess Minerva is represented to have contended at the loom with Arachne, whose dexterity with the spindle also was such that,

Oft to admire the niceness of her skill,
The nymphs forsook their fountain shade or hill.

Our Anglo-Saxon ancestors held labor in high honor, and their Scripture illustrations represent the angel of mercy as compensating our first parents for the physical part of the curse by presenting Adam with a spade and Eve with a spindle. Ladies of the highest rank did not disdain its use. The daughters of Edward the Elder were regularly instructed in spinning and weaving. The will of Alfred the Great calls the females of his house "the spindle side." Their legends represent the spinning-wheel as a divine gift. When a young girl was presented to James the First as a prodigy of learning, who could speak and write Latin, Greek, and Hebrew, he replied, "These are rare attainments, but pray, tell me, can she spin?"

refusing to rescind its resolutions, was dissolved. Many efforts were made by merchants and others to excite an interest in the subject of manufactures. In August, previous to which time the Royal Commissioners of Customs had arrived, and the seizure of the sloop Liberty had taken place for violating the revenue laws, the Boston merchants again entered into agreements not to import any British goods from January 1, 1769, to January 1, 1770, except salt, coals, fish hooks and lines, hemp, duck, bar lead and shot, wool-cards and card-wire. The Virginia Assembly now followed with resolutions, conceived in similar terms and spirit; and Connecticut, New York, Maryland, North Carolina, and others, successively joined the compact. New Hampshire, Rhode Island, and Georgia were forced to accede to the measure by threats of non-intercourse. The resolutions were rigorously observed in the Northern Colonies, where the reluctance of individuals was overcome by fears of popular resentment. A committee in Boston waited upon a refractory merchant, and informed him that 1,000 men were waiting for his answer. "The newspapers soon published that he had voluntarily ceased importing." Goods were even reshipped from Boston. Committees of superintendence were employed, who were vigilant in preventing any violation of the agreements. In the Southern Colonies they were less strictly observed, and in Carolina and Georgia an actual increase of imports took place. The decrease in the exports from Great Britain to the Colonies in two years, is exhibited in the following statement from British Custom-House returns:

Exported from Great Britain to	1768.	1769.
New England	£430,807	£223,696
New York	490,674	75,931
Pennsylvania	441,830	204,976
	£1,363,311	£504,603
Maryland and Virginia	669,422	614,944
North and South Carolina	300,925	327,084
Georgia	56,562	58,341
	£1,026,909	£1,000,369

The importations, which were thus reduced in the Northern Colonies considerably more than one-half, were but little decreased in the Southern Colonies, on account of the nature of their pursuits, and their more limited ability to supply themselves from their own industry. The effect of the non-importation system was a renewal in Great Britain of the distresses of 1765, and a general demand for the repeal of the imposts complained of. This was obtained in March, 1770, with the exception of

the duty on tea, retained as an evidence of the supremacy of Parliament. The concession did not, however, on this occasion, cause the people to abandon their successful policy, because the right to tax them was still asserted, and the system was therefore continued in the hope of forcing an entire surrender of the prerogative and of the remaining duty on tea. This determination was strengthened in Massachusetts by the conflicts which took place in 1770 between the British soldiers and the citizens of Boston, to whom their presence was hateful, and which happened on the very day of the repeal. The propositions to abandon the self-imposed restraints were suppressed in some of the smaller Colonies. But New York, which had suffered most by her loss of trade, at length receded from the agreement by importing all goods which were free of duty. Rhode Island followed, and others in succession, until even Massachusetts was at length forced to yield.

Renewal of Manufacturing efforts.

Although the non-importation covenants, it was hoped, would only be of temporary continuance, and had yet been of too recent adoption to produce any marked influence upon the infant manufactures of the country, an increased attention to several branches of domestic industry was among the salutary results of the system. The habit of dependence upon their own resources, which was in a few years to become a compulsory measure, was not less serviceable to all classes. To the good effects of these resolutions was ascribed the encouraging fact that at the Commencement exercises held in Cambridge, in the year 1770, the graduating class appeared in black cloth entirely of New England manufacture. In March, of the same year, a memorial was presented to the General Court by William Molineaux and others, who, in consideration of the increasing number and expense of the poor, had caused a large number of spinning-wheels to be made, and engaged rooms for employing young females, from eight years old and upward, in earning their own support. In aid of these spinning-schools, where children were instructed for two years free of cost, they had asked and received a loan of £500, without interest. The petitioners state that at least 300 women and children had already been thoroughly instructed in the art of spinning, to whom a large amount had been paid in wages. They had then on hand about forty thousand "scanes of fine yarn, fit to make any kind of women's wear." The first year's success had induced the manager to commence the manufacture of the yarn into Cloth, for which purpose he had erected, at much expense, "a complete apparatus, viz., working (winding?) and twisting-mills for working and twisting the yarn fit for the looms, which, with two boys only, will keep more than fifty looms constantly at work, and looms for weaving, and furnaces, hot and cold presses for finishing the goods, and has fixed up a

complete dye-house with large copers, etc., on the premises, more complete than any in this country, and has procured from England a large assortment of dye-stuff for carrying on the dyeing business, and also proper English manufacturers to perform the whole in the most perfect and ample manner; and, with Provincial encouragement, he hopes this summer to turn out large quantities of goods, equal in beauty and colour (and much more lasting) to any imported into these Colonies." He informs the House that he had also expended eleven or twelve hundred pounds in fitting up machinery in the Province factory-house for the manufacture of raw silk, and therefore invoked the Assembly's aid to that object, which it was now for the first time in a condition to encourage. The use of the building was granted him, free of rent, for seven years. Elisha and John Brown were at the same time allowed "to improve, for the said term, rooms for the linen or cotton and linen manufacture, to keep three looms constantly employed for the space of one year, and, after that, four looms for the same purpose for the remainder of the term of seven years, he paying (as in the former case) five peppercorns annually."

The example of Mr. Molineaux produced great activity in spinning throughout the community. This establishment, which approached more nearly than any previous one of the kind to the character of a manufactory, appears to have been in part engaged on worsted, and to have possessed some description of self-acting machinery, which would enable two boys to keep fifty looms employed upon the yarn of the spinners.

It is the earliest mention we have seen of any improved mechanism in the Cloth manufacture. The Society of Arts offered premiums in 1760 for machines in the wool, cotton, flax, and silk manufactures, and several winding, doubling and twisting machines, and improved spinning wheels had been received, some of which may possibly have found their way to America.

Hopes appear not long after to have been entertained, that the new machinery used in the Cotton manufacture, was about to be transferred to America, and as will presently be mentioned, the Jenny patented by Hargreaves this year, was in reality obtained within four or five years.[1]

(1) Hargreaves was, in 1768, compelled to fly from Lancashire by a combination of the handwheel spinners, who entered his house and destroyed the machine. Wyatt had in like manner been forced to leave Lancashire; and Kay, the inventor of the fly-shuttle, fled to France. Mr. Earnshaw, the inventor of a cotton-reel and spinner, generously destroyed the instrument rather than deprive the poor of bread. Nearly every step in the progress of those inventions was violently opposed by the workmen, and the energy of Arkwright alone carried him to ultimate triumph. In 1789, when spinning machinery was introduced in France, the spinners of Normandy destroyed the mills, and suppressed their use for a time.

An extract from a letter, dated at Baltimore, January 11, 1772, appeared in the Pennsylvania Gazette on the 30th, in which the writer says:— "We learn that a person, who has for many years past been a master in several large manufactories for linen, cotton, and calico printing, likewise cutting and stamping of the copper-plates for the same, intends, some time this month, to leave England for America, with six journeymen, and all the machinery for carrying on the said business, previous to which, and unknown to the English manufacturers he has shipped sundry machines, some of which will spin ten, and others from twenty to one hundred threads at one time, with the assistance of one hand to each machine. Those machines are not allowed at home, and so inveterate are the common people against them, that they burn and destroy not only these but the houses also, where they are found. The Americans being able to purchase cotton to more advantage than the Europeans, a manufactory of this kind will doubtless be properly encouraged by the well-wishers to America."

Among other indications of a pervading interest in the subject of manufactures, which at this time led to the establishment of a public filature for reeling silk, and attempts in several other branches of domestic manufacture in Philadelphia, the same Journal, on the second of January, gave notice that there was on exhibition at the "London Coffee House," a piece of broadcloth, of the manufacture of the Province. As it was "one of the finest and best perhaps ever made on the Continent, and the manufacturer had been at considerable expense at procuring an engine, looms, etc., he hopes the generous public will encourage this infant attempt." Though probably not the first piece of broadcloth made in the country, inasmuch as there were many immigrants acquainted with its manufacture, some of whom came with a special view to that business, and doubtless brought their looms with them, it is the first specific mention we have met of such a fabric. Wool was less abundant in Pennsylvania and the Southern Provinces, at this time than in New York and New England. Flax, hemp, and cotton, were the principal materials. There were, however, many fulling-mills in Pennsylvania, and more or less probably in all the Colonies. A fulling-mill was erected in Lancaster at considerable expence, by Stephen Atkinson, in 1730, when it contained two hundred inhabitants.

Although his dam on the Conestoga had been demolished by the inhabitants on the upper part of the creek, for obstructing the fish and rafting business, it had been rebuilt, and Lancaster was now becoming an active manufacturing town. Fulling-mills were also in operation as early as this at Columbia, Ephrata, and in Chester and Bucks Counties, and other parts of the Province. The assessors, in 1760, reported twelve

fulling-mills in Philadelphia County. But the Germans, Scotch, and Irish chiefly employed linen materials. Dr. Franklin stated at the bar of the House of Commons, in 1766, that the annual imports from Great Britain to Pennsylvania were probably £500,000, and the exports not over £40,000. Flax-seed was a considerable item in the shipments, and amounted in that year to 12,094 hogsheads, worth £3 10*s.* per hogshead. In 1771, it was 110,412 bushels, in 1772, 85,794, and in 1773, 68,681 bushels. New York exported, in 1766, of that article, 11,037 hogsheads, and in 1774 and 1775, respectively, 129,150 and 111,845 bushels. Connecticut and several other Colonies yearly sold a large quantity of flax-seed. All the fibre grown with the seed, in addition to much of the hemp raised and imported, was converted into Cloth by the extended system of household manufactures which then prevailed. The agreements which had been twice made to discard foreign luxuries, and to become as self-dependent as possible for manufactured products, had rendered the custom of spinning and weaving in families almost universal. The number of artisans from Great Britain and the Continent, forced hither by want of employment or invited by Americans, led to many projects for introducing small manufacturing establishments. The formation and encouragement of these received the powerful advocacy of Dr. Franklin's pen, and of others, who pointed out the increased value given to lands and agricultural produce, and the greater plenty of money produced by a manufactory.

By the Act of 1719 (5 Geo. I. c. 27), the transporting and seducing of artificers to settle abroad, was made punishable by fine and imprisonment; and by that of 1750 (23 Geo. II. c. 13), the exportation of tools and utensils used in the Silk and Woolen manufactures was prohibited. But neither of these Acts applied to the Colonies. The evidence, however, of a design in the Colonies to establish manufactories, to the great detriment of those of Great Britain, led, in 1774, to another aggressive step in the Colonial policy of the ministry. By the 14 Geo. III. c. 71, it was enacted that if any person exports any such tools or utensils as are commonly used in the cotton or linen manufactures, or other goods wherein cotton or linen are used (excepting wool-cards to North America), or any parts of such tools or utensils, he shall not only forfeit the same, but also £200. The collecting or having in possession such implements, or those used in the woolen or silk manufacture, with a view to exportation, made them liable to seizure, and the possessor to arrest.[1] But this statute, which was highly injurious to the industrial prospects of the country, was regarded with less abhorrence

Exportation of Machinery prohibited.

(1) Pope's Laws of the Customs.

than other measures adopted the same year for the enforcement of the Revenue Laws.

Scarcely had the news arrived that the port of Boston had been closed, on account of the resistance to the duty of 3*d.* a pound on tea in the previous year, than Boston, in town-meeting, on 13th May, 1774, with Samuel Adams as moderator, once more resolved to stop all importations, and called on the other towns and Provinces to join in a measure which it declared would be the salvation of North America. In June the Committee of Safety sent an address and the form of "a solemn league and covenant" to suspend all commercial intercourse with Great Britain and her Islands after the first of October, accompanied by non-importation agreements, to every town in the Province. The General Court called on other towns to assist Boston in her extremity, and recommended a general congress of delegates from each Province, to meet at Philadelphia on 1st September, to consider the state of the country. Delegates from the several counties of Virginia met at Williamsburg, on 1st August, and adopted resolutions, which were signed by Peyton Randolph the moderator, Lee, Washington, Jefferson, Patrick Henry, and other prominent men of the Province. Several of these were deputed to attend the General Congress at Philadelphia in September, when the Virginia resolutions were substantially indorsed as the sentiment of the country.

Non-importation resolutions again adopted.

The General Congress, which met accordingly on the 5th September, by resolution, on the 22d, requested the merchants in the several Colonies not to send any orders to Great Britain for goods, and to direct the execution of those already sent to be delayed or suspended. On the 27th, it unanimously resolved that importations ought to cease, and on the 30th, that, after 10th September, 1775, all exportations to Great Britain should cease likewise, if redress was not granted in the mean time. These resolutions were all formally reaffirmed on the 20th October in fourteen articles, which pledged the Congress and its constituents, "under the sacred ties of virtue, honor, and love of country," not to import, after the 1st December, any goods whatever from Great Britain or Ireland, or British goods from any place; not to import or purchase any slave imported after that time, after which they would wholly discontinue the Slave Trade; not to import or purchase East India tea; to suspend the non-exportation agreement until September 10th, 1775; to request merchants, as soon as possible, to order their factors in Great Britain not to ship any goods to them on any pretense whatever; to use their utmost endeavors to improve the breed and increase the number of sheep, by killing them as seldom as possible, and not exporting them, but selling on moderate terms to their neighbors who

Congress adopts non-importation and non-exportation resolutions.

might need them; to encourage frugality, economy, and industry, and promote the agriculture and manufactures of this country, especially that of wool; to discontinue and discourage every species of extravagance and dissipation, shows, plays, etc.; to use on funeral occasions only a ribbon or piece of crape on the arm for gentlemen, and a black ribbon and necklace for ladies, and to discourage the giving of gloves, scarfs, etc., at funerals; it recommended vendors of goods not to take advantage of the scarcity occasioned by the association to ask more than they had been accustomed to do; that goods imported after the 1st December ought to be either reshipped, or stored at the owner's risk until the non-importation agreements ceased, or be sold, and the owner re-imbursed the first cost and charges, the profits to be devoted to the relief of the Boston sufferers; committees should be chosen in each county, city, and town to carry out the resolutions and report violations, and the Committee of Correspondence should frequently inspect the Custom-House, and inform each other of the state thereof; that all manufactures of the country should be sold at a reasonable rate, and that no trade, commercial dealings, or intercourse should be had with any Colony or Province that did not accede to or should afterward violate the agreements, but they should be held unworthy the rights of freemen, and as inimical to the liberty of their country.

The resolutions of the delegates met with the unanimous approval of the people, and committees of vigilance were formed in the several towns and districts, who published the names of those who disregarded the recommendations of Congress as enemies to public liberty, and dealings with them were suspended. By all who approved of the measure, the hum of industry was awakened in all the dwellings and workshops throughout the land. Thus, as a distinguished writer has observed, "the first measures of the patriots (of the Revolution) aimed to establish their independence on the basis of the productive industry and laborious arts of the country. They began with a non-importation agreement nearly two years before the Declaration of Independence. That agreement was signed by every member of that body, and, with the exception of the address to the people of America and Great Britain, was the only positive act of the first Congress."[1]

Resolutions, framed in the spirit of this memorable Assembly, were adopted in twelve of the thirteen Continental Provinces, and all its suggestions were carried out with strict fidelity to its directions. Nine of the Colonies were by Parliament interdicted from all trade but that from which they had voluntarily excluded themselves. The measures by which

(1) Hon. E. Everett. Address on American Manufactures before the American Institute of New York, Oct. 14, 1831.

an infatuated ministry continued to urge its omnipotence upon its subjects at length rendered forbearance no longer a virtue. On the 19th of April, 1775, the disputes which had hitherto been temperately conducted on the part of the Colonists, by petitions, remonstrances, resolutions of non-intercourse, frugality, and industry, and other peaceful means, were referred to the terrible arbitrament of the sword.

Encouragement of Manufactures becomes general.

The readiness with which the people in every section of the country entered into resolutions to discard the use of foreign goods, indicates a confidence in their ability to supplement the loss by their own industry, which had indeed long been nearly or quite equal to a supply of all the necessary clothing. The increased attention and encouragement given to domestic production was, however, an essential part of the system, especially in those Provinces where little progress had been made in the arts of the clothier. An increase of the materials for clothing, as wool, flax, hemp, cotton, silk, and leather, were primary objects with some, and a supply of the implements of manufacture was not overlooked. The first act of the Assembly of Pennsylvania, in session at the same time with the National Congress, was to recommend the people to abstain from eating, and the butchers from the killing of sheep, and the Association of Butchers signed an agreement to that effect in December. In the following year, it was ascertained that in consequence the number of sheep killed was 20,000 less than in 1774. The other propositions of Congress were recommended, and the manufacture of wool-cards or combs, of which none had yet been made in the Province, was urged among other things by a convention in January. Bedford County, the next month, offered a premium of £5 for the first fulling-mill erected in the county, £3 for the finest and and best piece of linen, forty and twenty shillings for the second and third best, and twenty shillings to the weaver of the finest piece before October. Among the frugal measures recommended in Philadelphia, the most opulent commercial city in America in 1774, was the fashion of wearing "leather doublets."

The Congress of Deputies, which met at Annapolis in December of that year, resolved to encourage the breeding of sheep, and to promote the woolen manufacture; to increase the manufacture of linen and cotton; that no flax-seed grown that year ought to be purchased for exportation; and that no merchant ought to sell his goods wholesale for more than 112½ per cent., at retail for more than 130, or on credit above 150 per cent. advance on prime cost.

The Provincial Congress of Massachusetts, the same month, gave its authoritative sanction to the measures of Congress, and recommended the people to improve their breed of sheep, and the greatest possible

increase of the same; the use of their own woolen manufactures, and a very careful sorting of their wool, so that it might be manufactured as much as possible into the best goods; the raising of hemp and flax, and the manufacture of flax-seed into oil; the manufacture of nails, steel, tin plate, fire-arms, salt-petre, gunpowder, glass, salt, etc.; the use of the paper and buttons then made in the country; the encouragement of horn-smiths, and the establishment of one or more manufactures of wool-combers' combs, as an article necessary in the woolen manufactures; the use of domestic hosiery, so as to enlarge the manufacture thereof; the raising and curing of madder, as an article of great importance in the dyeing business; the formation of a society or societies for the purpose of introducing and establishing such arts and manufactures as may be useful to the people, and are not yet introduced, and the more effectually establishing such as they had already among them; and the use of their own manufactures and those of their sister Colonies in preference to all others.

The first Provincial Congress of South Carolina, in January, 1775, recommended, among other measures, the raising of cotton; and that of North Carolina, in September, for the encouragement of manufactures, offered the following premiums, viz.: £50 for fifty pairs of cotton cards of wire made and drawn in the Province, equal to British cards costing 2*s.* sterling a pair; £50 to the maker of the first one hundred pairs of wool cards equal to English cards of 15*d.* sterling a pair. The same reward was offered for the finest piece of linen of twenty-five yards, one yard wide, equal to British linen of 3*s.* first cost, and £25 for the next best piece worth 2*s.* 6*d.* sterling; £100 for six pieces of woolen Cloth, well dressed, each piece 25 yards, ¾ wide, and equal to British Cloth of 4*s.* 6*d.* per yard, sterling, first cost. Large premiums of from £50 to £750, Provincial currency, were also offered for the manufacture of given quantities and qualities of pins, needles, paper, hollow ware, gunpowder, saltpetre, salt, and for the erection of works for their manufacture, and of rolling-mills, iron furnaces, etc.

Bounties, which were a favorite mode of stimulating industry at that time, were also offered in March by the Committee of Essex County, Virginia, which had ordered the re-exportation of four pieces of British Osnaburg and three of Irish linen, imported from Antigua. It declared its determination to encourage domestic manufactures, and offered £50 to any person who would produce five hundred pairs of men's and women's stockings manufactured in the country, one-third to be worth 1*s.*, one-third worth 2*s.*, a one-third worth 3*s.* sterling a pair, the county to have the refusal of them at 75 per cent. on these prices. A committee of the Convention of the Province, appointed to prepare a plan for the encourage-

ment of Arts and Manufactures, reported, on 27th March, a series of resolutions similar to those adopted at Cambridge, Mass., in December previous, and which were unanimously agreed to. They state that, "Whereas, it hath been judged necessary to associate against importations, and as the freedom, happiness, and prosperity of a state greatly depend on providing within itself a supply of articles necessary for subsistence, clothing, and defense," etc., and proceeded to urge that, after the first of May next, no persons should use in their families, unless in case of necessity, and in no case to sell to butchers, or kill for market, any sheep under four years old; that the setting up of woolen, cotton, and linen manufactures ought to be encouraged in as many different branches as possible, especially coating, flannel, blankets, rugs or coverlets, hosiery, and coarse cloths, broad and narrow; that all persons having proper lands ought to cultivate and raise a quantity of flax, hemp, and cotton sufficient, not only for his or her own family, but also to spare to others on moderate terms; that, whereas wool-combs, cotton and wool cards, hemp and flax heckles, have been for some time made to advantage in some of the neighboring Colonies, and are necessary for carrying on linen and woolen manufactures, the establishing such manufactures be recommended; that the erecting fulling-mills, and mills for breaking, swingling, and softening hemp and flax, also the making of grindstones, be recommended. The manufacture of salt, saltpetre, sulphur, and gunpowder, of nails, iron, wire, steel, paper, and malt liquors, and the use of the manufactures of that and other Colonies in preference to all others, and also the formation of societies and offering of premiums for the encouragement of the several branches in different parts of the Colony, were each recommended. The Committee of Chesterfield County, in April, resolved also to promote and further the establishment of manufactories for the making of linen, cotton, and woolen Cloth, and to give encouragement to such persons as excelled in the preparation of materials for that purpose, to which end it was recommended to open subscriptions in the County to raise a fund, etc. The Provincial Congress of Georgia also formed an association at Savannah to encourage economy and industry, and to promote Agriculture and the Arts and Manufactures of America, especially the manufacture of wool.

First Spinning Jenny.

Among the efforts tending to a positive advance in the arts which these measures of the general and local Conventions, and the single or associated attempts of private persons, were designed to promote, we have to mention the introduction, about this time, of the first Spinning Jenny probably seen in America. This was exhibited at Philadelphia early in the year 1775. A cut and description

of this "new invented machine for spinning of wool or cotton," may be seen in the first volume (p. 158) of the Pennsylvania Magazine or American Monthly Museum, for that year, accompanied by the following note of Mr. Aitkin, the publisher: "The machine for spinning twenty-four threads of cotton or wool at one time (by one person) having attracted the notice of the public, and we being desirous to contribute everything in our power towards the improvement of America, engaged Mr. Christopher Tully, the maker of the machine, to furnish us with an engraved plate and description thereof. . . . We have seen the machine perform, and are convinced of its usefulness. The Society for the improvement of Arts, Manufactures, and Commerce in England, repeatedly offered a premium of £100 sterling for a machine on this plan, but never had any presented to them which would answer the purpose. Notwithstanding which, a very large one has been erected at Nottingham, in England, which performs to great advantage, but no person as a speculatist is admitted to see it."

Arkwright's Spinning Frame.

Arkwright erected his first Spinning-frame, moved by horse power, at Nottingham, in 1769, and his second one, to go by water, in connection with Messrs. Need & Strutt, at Cromford, in 1771. He took out new patents for all his improvements in spinning, carding, etc., in 1775. Richard Hargreaves had made a few of his Jennies for sale previous to 1768, when he was also forced by persecution to remove from Lancashire to Nottingham, where he made and operated in secret a machine of eight spindles, turned by hand, which spun yarn for the hosiers. In 1770, he patented a machine to spin, draw, and twist sixteen or more threads at one time, which he soon after increased to twenty or thirty. Jennies of twenty spindles, which could be worked by hand, were the only ones it was then deemed safe to tolerate, and four years after, a desperate attempt was made by the populace to put them down. All Jennies of more spindles, carding engines, water-frames, and other machines, employing horse or water power, were destroyed for miles around Blackburn, by which the manufacturers were driven to Manchester and other places. So little understood was the tendency of such machinery to benefit the working-classes, that even the middle and higher ranks shared the dread of the laboring-people, through apprehensions of its effect upon the poor rates. The machine of Tully, which was on the plan of Hargreave's, was probably made in England, where the manufacturers had already constructed a number in violation of the patent of the inventor. It was probably a portion of the machinery, which the letter mentioned on a previous page had announced, three years before, as about to be shipped to America. Whether the importation of this machine had any relation, either as a cause or a consequence, of the es-

tablishment in Philadelphia in that year of a woolen, cotton, and linen manufactory, in which it was employed, we are unable to say. The prospect of its receiving the patronage of the legislature, is referred to in the speech of the president, at the opening of that enterprise in March.

This undertaking, which was one of the fruits of the American system inaugurated by the general and local conventions of the United Colonies, was commenced by subscription in the beginning of the year 1775. It was, we believe, the first joint stock company formed for such a purpose, and the first to attempt the manufacture of cotton goods in this country. A plan of an "American Manufactory of Woolens, Linens, and Cottons" was formed previous to the 22d February, 1775, when the books were opened for subscriptions. The following is an outline of the plan: The company was to be called "The United Company of Philadelphia for promoting American Manufactures." It was to continue three whole years from the date of the first general meeting. Shares were £10 each, and entitled the subscriber to a vote on all occasions, and also to election to any office, and such only. They were to begin with the manufacture of Woolens, Cottons, and Linens, and carry on the same to the greatest extent and advantage their stock would admit of during three years. One moiety or full half of the subscription to be paid in within a week after the first general meeting, and the other half within two months, the same to continue with all the profits as company stock for three full years. A general meeting was to be called by tickets within a week after 200 subscribers were obtained, to choose by ballot twelve managers, a secretary, treasurer, etc. One-third of the managers were to be changed annually, by drawing lots for going out. The managers were to conduct the manufactory agreeably to the rules of the Company, and were to attend daily two by two at the Company's store. The treasurer was to give security for a faithful discharge of duty. A state of the Company's accounts was to be made out every six months, and kept at the store for the inspection of members. The managers had power to call a general meeting as often as necessary, for which, after the first one, three weeks' notice in the newspapers should be sufficient. No rule or regulation was binding on the Company unless a majority of the members was present.

American Manufactory of Woolens, Linens, and Cottons.

The first general meeting of the subscribers was held at Carpenters' Hall, on 16th March, when Dr. Rush, having been elected president, opened the business of the day in a very sensible and appropriate speech, in which he ably pointed out the necessity, the possibility, and the advantages of establishing such manufactures. The *necessity* was obvious from the action of Congress, excluding British goods, of which Cloths were always a considerable part, and the non-importation agreements—a

two or three years observance of which would purchase the liberties of the country at a cheap rate. The *possibility* was apparent from the success which had attended several attempts of the kind; the extent of the family manufactures, which were equal in several counties to the entire wants of the people; from the excellence of the linen made; the quality of the wool, which equaled that of several European countries, and could, in five years, be increased to be sufficient for all the inhabitants; the cheapness of cotton,[1] the manufacture of which seemed to be of the utmost consequence, both on account of the great use made of cotton stuffs by the people, and the bond of union its trade would create between the Southern and Middle States. The *advantages* were to be found in the annual saving to the Province, which, supposing 50,000 out of the 400,000 inhabitants to consume £5 worth of British Cloths, would amount to £250,000; in the employment, which, according to their plan, would be given to the poor; in the establishment of a new basis of wealth, next in value, in every State, to agriculture; in the introduction of foreign manufacturers, particularly English; in the exclusion of vice and luxury, of which foreign goods were the vehicle; and in the formation of an additional barrier to tyranny. The *objections* that manufactures withdrew labor from agriculture, and could not be conducted to furnish goods as cheap as they could be imported; that they were injurious to health and population, and that they deprived the country of its only effectual weapon—a resort to non-importation agreements, which had twice saved the liberties of the country—were each reviewed and answered. The fact was adverted to, in relation to labor, that it had been the misfortune of most of the manufactures set up that they only employed workmen six or nine months in the year, thereby raising the price of wages, and to the fact also that they possessed a machine for saving labor, which was likely to receive encouragement from the legislature. The address concludes with this generous and patriotic sentiment: "I am not one of those vindictive patriots who exult in the prospect of the decay of the manufactures of Britain. I can forgive her late attempts to enslave us, in the memory of our once mutual freedom and happiness; and should her Liberty, her

(1) Philadelphia was supplied with native cotton throughout the Revolution at two shillings sterling a pound, in sufficient quantity for home consumption. New England was best provided with wool, but there was a general deficiency of that material; and Mr. Otis, during the war, said there was not enough to make each of the inhabitants a pair of stockings. Dr. Franklin, while in London, ridiculed the extravagant reports of the wealth and luxury of the Colonists, and their ability to manufacture, which favored schemes of taxation and prohibitory laws. A pasquinade in a London paper, in 1776, which has been ascribed to him, says: "The very *Tails* of the American sheep are so laden with wool, that each has a cart or wagon on four little wheels to support and keep it from trailing on the ground."

Arts, her Fleets and Armies, and her Empire, ever be interred in Britain, I hope they will all arise in British garments only in America."

Upon the conclusion of the address, the Company proceeded to the election of the following officers for the first year: Treasurer, Joseph Stiles; Secretary, James Cannon; Managers, Christopher Marshall, Jacob Winey, Isaac Gray, Samuel Wetherill Jr., Christopher Ludwick, Frederick Kuhl, Robert Strettel Jones, Richard Wells, Thomas Tilbury, James Popham, and Isaac Howell.

Christopher Marshall, one of the managers, and a member of the Council of Safety, makes frequent mention, in his Remembrancer, of visits to this manufactory. He states that on the 21st, the managers leased the house of William Smith, in Market street, for three years, at £40 per annum, for a manufactory. In August an advertisement was issued to the spinners of the city and county, informing them that their services were wanted to promote the American Manufactory at the corner of Market and Ninth streets, where cotton, wool, flax, etc., were delivered out, and exhorting them each to avail herself of the opportunity in a time of public distress to help to sustain her family, and cast her mite into the treasury of the public good. Under the date of Sept. 19, Mr. Marshall makes this record: "At two, I went to [the] Manufactory by invitation, to consult some of the managers respecting the employment of three (it's said) *complete spinners on the machine, and cotton weavers*," etc., etc. This, we presume, refers to the Jenny before mentioned.

In addition to this machine, the manufactory, in October, employed in spinning and other work four hundred women, who would otherwise have been destitute. On the 8th November, Mr. Tench Coxe became a member of the Company, and labored to promote that and all other efforts to create manufactures. An address was annually delivered before the Society. Mr. Richard Wells, of Philadelphia, officiated at the commencement of the second year. From the oration of Robert Strettel Jones, of Burlington, delivered in the College on the third anniversary, March 17, 1777, we learn that the goods manufactured by the Society consisted of linens to the value of £1,443 1*s.* 7*d.*, and cotton and woolen goods worth £474 12*s.* With raw materials and other assets, the stock amounted to £5,081 9*s.* 10*d.*, exclusive of implements, new looms, and other machines to the value of £254 14*s.*, which last would be a fair offset for rent, bad debts, and losses by spinners. The value of a share, which originally cost £10, was therefore at the end of the second year, notwithstanding some mismanagement through inexperience, £17 6*s.* 6*d.* But how long the business was continued by the original Company does not appear. Samuel Wetherill, one of the first managers, who, as a mem-

ber or encourager of a military company of Friends, which sometimes exercised in the factory yard, was disowned by his Society, appears to have continued both the woolen and cotton branches. Two years after, he contracted with Congress to make woolen Cloth for the army. The business, under more favorable circumstances, and with State patronage, was resumed in 1787 by Mr. Coxe and several of the original Company, in the same building, which three years later was burned by an incendiary.

Every description of machinery and implements was at this time extremely scarce and high-priced, as well on account of the prohibition laid on their exportation from England, as by the interruption of trade between her and the Colonies. Hence several of the Provinces, in their resolutions, had recommended and encouraged by bounties the manufacture of cotton and wool cards, iron wire, and different kinds of textile apparatus. In 1775, Nathaniel Niles, of Norwich, Connecticut, set up at that place a manufactory of iron wire for the making of such cards, which he continued throughout the Revolution. The Assembly, in view of its importance to the cotton and woolen manufactures, as set forth in Mr. Niles' memorial, granted him a loan of £300 for four years. About the same time, Jeremiah Wilkinson, of Cumberland, Rhode Island, was engaged in making hand cards. On account of the high price of tacks used in the business, occasioned by the war and the labor of making them by the old process of hammering, he adopted the plan of cutting them from a sheet of iron with a pair of shears, and afterward heading them in a vice. This process he afterward applied to cold or cut nails, and is said to have been the first to employ that mode of making tacks and nails. In 1777, Oliver Evans, of Philadelphia, then a young man of one or two and twenty, having also been engaged in making card teeth by hand, as then practiced, invented a very efficient machine for manufacturing them, it is said, at the rate of fifteen hundred per minute. Proposals made by him to establish under State patronage a factory for drawing wire and making it into card teeth by the machine in less time than it took to coil the wire into hanks, not having been accepted, he sold the secret to individuals. A plan for pricking the leather, and for cutting, bending, and setting the teeth, soon after devised by him, he is also said to have abandoned, because of his failure to secure a due share of the benefits of the previous invention. The manufacture of such cards was commenced in Boston before the Revolution. In 1788, Giles Richards & Co. began the manufacture with newly-invented machinery, possibly that of Evans, by which, in 1793, the factories of G. Richards, Amos Whittemore, and Mark Richards, turned out 12,000 dozen cards annually. In addition to these, there were several smaller establishments in Boston and other parts of the State. A machine

Manufacture of Cotton and Wool cards.

for bending and cutting card teeth was also invented about the year 1784 by Mr. Chittenden, of New Haven, capable of making 86,000 in an hour. Hand cards were also made throughout the war by Daniel Anthony, of Providence, R. I. Amos Whittemore, in 1796, took out patents for an improved loom, for cutting nails, etc., and the following year for his improvement in making wool-cards.

The Revolution unfavorable to Industry.

As the United Colonies were now about entering upon the sanguinary struggle for Independence, in which all the energies of the people were absorbed in sustaining the conflict, it would be in vain to look for much progress in the useful arts. The infant manufactures of the country did not escape the baleful influences which a state of warfare always exerts upon industry. Many young and feeble enterprises were entirely ruined. But the mechanical genius of the country did not slumber, and the exigency of the occasion created some new branches and stimulated others, while it developed unusual examples of ingenuity and enterprise in the arts, as it did remarkable talents in the field and in council.

In the non-intercourse agreements and the necessities of the war, were laid the foundation of that superstructure of mechanical industry which speedily rose to fair proportions after the peace. The flourishing commerce of the Colonies was, however, totally ruined. This Mr. Burke characterized as out of all proportion beyond the numbers of the people, and that with the mother land, within less than £500,000 of being equal to what England carried on at the beginning of the century with the whole world. He cites the case of Pennsylvania, which, in 1704, called for only £11,459 in value of British commodities, but in 1772 it took nearly fifty times as much, or £507,909 worth, nearly equal to the exports to all the Colonies together at the first period. The Colony trade of Great Britain had increased from one-sixteenth to nearly one-third of the whole. The importations were particularly heavy in 1770 and the three following years, and amounted, as Mr. Glover stated to the House of Commons in 1775, to ten and a half millions sterling in the three years, or three and a half millions at the annual medium. He estimated the Linen sent from Great Britain and Ireland to amount to £700,000 per annum. The importations in the foregoing years exceeded the wants of the Colonies, and through the embarrassments thereby created, the debts of the American merchants, who bought largely on credit, were not as promptly paid, when due, as they had been in previous years. The indebtedness of New England was stated at near one million sterling. The Colonies were, in consequence, charged in some quarters with a desire to evade payment—a charge which was refuted by the testimony of merchants in the Colonial trade at the bar of the House, and by the subsequent good faith

of American merchants. Of six millions due in December, 1774, four millions were paid in the next twelve months, even when a separation seemed inevitable, although the restraints upon their trade and fisheries were certainly not calculated to facilitate payment. That the sudden interruption of this large amount of importation should cause serious inconvenience, so soon as the accumulated stock was exhausted, might reasonably be expected. With all our present vast productive power, it is fair to presume that a total exclusion of foreign merchandise would still be deeply felt. It is true that all the measures of Congress and the Conventions did not prevent a considerable amount of British goods from being landed and sold.

There is no means of arriving at any estimate of the aggregate value of the Colonial manufactures in all or any single branch at the commencement of the Revolution. The household industry of the New England Provinces, and of some parts of the middle Colonies, was nearly or quite equal to the ordinary wants of the inhabitants for clothing.[1] The prompt consent and faithful adherence to the non-intercourse agreements indicate a general confidence in their inherent ability to supply the deficiency created by the suspension of trade. Their habitual and compulsory frugality alone carried them through the trying occasion.

The scarcity of Clothing.

But the scarcity and dearness of Clothing and camp furniture, particularly of woolens suitable for the use of the army, was early experienced, and continued throughout the war to embarrass the commissariat department, to impair the health and *morale* of the soldiery, and at times even endangered its subordination. Congress was in consequence forced to make frequent appeals to the people to increase their supplies of wool and other materials, and to promote the manufacture of Cloth for the supply of their destitute countrymen who were fighting the battles of freedom. In Nov. 1775, it resolved that clothing

(1) A writer of this date, in recommending an increased use of the spinning-wheel, estimated that out of two millions of inhabitants in the thirteen Colonies, there were at least 450,000 females who could be employed in spinning. If only one-third of them were so employed, there would be 150,000, each of whom could spin thread for six yards of linen per week, during the five months in each year in which it was customary to use the little wheel. This would give 23,400,000 yards of Cloth annually, or twelve yards to each of the two millions of the population—a quantity quite sufficient for that portion of their clothing. He supposed this number to be 30,000 more than were then so employed. As all the flax produced was already spun, he proposed to employ hemp, of which foreign lawns, dawlas, Oznaburgs, etc., were made, and which was then used to advantage in some parts of this country. His own county (in New Jersey) produced the previous year above 100 tons, and could produce 500 tons of hemp, of which each pound would make nearly one yard of linen (sail-cloth excepted). The Province (to which the culture was not confined) could readily produce sufficient hemp to make 4,500,000 yards of Cloth—enough to supply the 30,000 extra spinners.

be provided for the army by the continent, to be paid for by stopping $1\frac{2}{3}$ dollars per month out of the soldiers' pay; that as much as possible of the Cloth be dyed brown, the distinction of the regiments to be made in the facings; and that a man who brought into the camp a good new blanket, should be allowed two dollars therefor, and be at liberty to take it away after the campaign. In the following March, the several Assemblies, conventions, and committees of safety, correspondence, and inspection were recommended to use their utmost endeavors to promote the culture of hemp, flax, and cotton, and the growth of wool in the United States; to take the earliest means for erecting and establishing in each Colony a Society for the improvement of Agriculture, Arts, Manufactures, and Commerce, and to maintain a correspondence between such societies, that the rich and numerous natural advantages of the country for supporting its inhabitants might not be neglected. They were further recommended to consider of ways and means of introducing the manufactures of duck, sail-cloth, and steel where they were not already understood, and of encouraging, increasing, and improving them where they were. Each Colony was called upon, in June, to furnish a suit of clothes —of which the waistcoat and breeches might be of deer leather, if to be had on reasonable terms—a blanket, felt hat, two shirts, two pair hose, and two pair shoes for each soldier in the army, to be paid for by Congress. In July the commissary was granted a quantity of gunpowder with which to purchase deer-skins for breeches; and the secret committee was directed to fall upon ways and means of procuring a further supply of deer-skins for the like purpose from Georgia and South Carolina. At the same time, John Griffith, "an experienced artificer in making and dressing fullers' shears," was, on petition of the inhabitants of Chester County, Pennsylvania, released from service and ordered to return home to follow his trade. Toward the end of the year, General Washington was desired to order agents to be sent into each State to buy up linens and other clothing and tent-cloth. But notwithstanding orders had been issued in the beginning of the year to import considerable quantities of woolens and other Cloth from Europe, and Philadelphia was twice called upon to furnish blankets, which were not to be purchased in the stores, and even to sell its awnings for tents, of which there was scarcely one in the army, the sufferings of the troops during the winter were extreme. A large proportion of the clothing of the soldiers was linen, which was a poor defense against the rigors of a winter campaign. The deficiency of woolen materials in the manufactures of the country was apparent in the contributions for the army. The Commissioners in France were directed, in the beginning of the next year, to make purchases of suitable clothing and blankets, and each State was assessed for a supply of blan-

kets. In September, the Executive Council of Pennsylvania was advised to take possession of any linens, blankets, or other woolens found in the stores and warehouses, and give certificates of their value.

A letter from Samuel Wetherill, Jr., to the Board of War, in May, informs them that, in consequence of the unexpected rise in the price of wool and labor, he would be unable to comply with a contract made for a supply of Cloth at a time when he supposed prices were at the highest. He had a factory, including dye-house, fulling-mill, etc., in South Alley, between Market and Arch and Fifth and Sixth streets, where he carried on the manufacture of woolens, and soon after, if not at that time, of cottons and chemical products. Wool being then 7*s.* 6*d.* a pound, with a prospect of its becoming 10*s.*, he could not furnish for less than 27*s.* 6*d.* such Cloth as he had engaged to supply at 20*s.* the yard. He rendered an account the next month for Cloth furnished, including some samples of superfine red and coating; but the extreme scarcity of wool, he says, almost discouraged him from proceeding with the woolen branch of his business. Those who had engaged to sell him wool at 7*s.* 6*d.*, thought it too cheap, and his spinners and weavers in each branch had doubled their wages. He could continue to make it, however, at an adequate price.

Samuel Wetherill's Factory in Philadelphia.

These prices, which were doubtless provincial currency, and the fact that all the operations of carding, spinning, shearing, etc., were manual operations, and that forty to fifty cents was the usual price for fulling and dressing a yard of Cloth, enable us to comprehend that, with an empty exchequer, and doubtful credit, Congress found no little inconvenience in providing supplies of clothing and other necessaries. All its efforts were inadequate to a comfortable provision, and in November of that year, the Director-General of Hospitals was authorized to make up the measure of comfort which the want of blankets and clothing required for the sick, by the erection of stoves if found necessary. The several States were earnestly called upon to make additional provision for the approaching winter. Notwithstanding the strong recommendations of Congress at the outset, that no advantage should be taken of the scarcity likely to arise, men were found heartless enough to charge the deputy Clothier-General ten to eighteen hundred per cent. for clothing for the Continental army,[1] and even to refuse to deliver it at that price until the cash was paid. Congress was forced to recommend the legislature of the State in which it occurred to seize the goods, which would be paid for at a reasonable price. Cases of extortion having become too general, the several States were also advised to enact laws, empowering the seiz-

(1) Journal of Congress, vol. iii. p. 602.

ure, for the use of the army, of all woolen cloths, blankets, linens, shoes, stockings, hats, and other necessary clothing in the possession of any persons, not foreigners, for sale, to be paid for at a stated price by drafts on the Clothier-General. They were also recommended to employ a sufficient number of manufacturers and tradesmen to supply the clothing required by their respective battalions, exempting them from military duty, and to appoint persons to collect cotton, wool, flax, leather, etc., for that purpose, at stipulated prices. The practice of those in the several States, who, regardless of the claims of humanity or love of country, in a time of scarcity, made large gains "by oppressive sharping and extortion," to the injury of private families and the public service, was denounced in caustic terms, and the severe expedient was recommended to all the States of enacting stringent laws for its punishment and affixing the brand of infamy upon the perpetrators.

Privations of the army at Valley Forge.

The privations of the American army, while encamped at Valley Forge in the winter of 1778, badly sheltered and worse fed, were the most trying of any experienced throughout the war, and were greatly aggravated by the deficiency of clothing among officers, as well men. During the following year, a decline in the military ardor with which the war had commenced was apparent. The deficiency in clothing and other necessaries still continued, and Continental currency becoming rapidly depreciated, many returned to their former pursuits. So great were the losses suffered by the depreciation of the currency, that the manufacturers for the army refused, in 1780, either to go on with their work or deliver what was done without immediate payment. Symptoms of revolt began to appear in portions of the line, and an efficient co-operation of the Americans with their new allies, the French, both of whom were eager to encounter the enemy, was alone prevented, it is said, by the mean apparel of the Continental troops, who, shabby and many of them shirtless, shrunk from appearing by the side of their elegantly-uniformed French allies.[1] But subsequently a subsidy of six millions of

(1) The term *sans culottes* is said by Mr. P. S. Duponceau, who, as the secretary of Baron Steuben, participated in the privations of the camp, to have originated on this occasion. The superior officers were sometimes accustomed to share their rations with the less fortunate soldiers and subalterns. The Baron's aids, on one occasion, invited a number of young officers to dine at their quarters, torn clothes being an indispensable requisite of admission. "Such a set of ragged, and at the same time merry fellows," says Mr. Duponceau, "were never before brought together. The Baron loved to speak of that dinner and of his *sans culottes*, as he called us. Thus this denomination was first invented in America, and applied to the brave officers and soldiers of the Revolutionary army at a time when it could not have been foreseen that the name which honored the followers of Washington would afterward be assumed by the satellites of a Marat and a Robespierre."—*Dr. Dunglison's Discourse in Commemoration of Peter S. Duponceau, LL.D.*

livres having been granted by the King of France, and ten millions more borrowed in the Netherlands, on French security, suitable clothing, principally English Cloth, was purchased in Holland and sent to America, and the old Continental currency, "like an aged man, expiring by the decays of nature, without a sigh or groan, fell asleep in the hands of its last possessor." By the aid of so much coin, and a bank established by the contributions of Philadelphians, and the financial wisdom of Robert Morris, matters were managed with more acceptance to the end of the war, in 1783. On the ratification of peace, the soldiers, with the same facility that they had taken them, laid aside their arms for the implements of the mechanic and the husbandman.

Women of the Revolution.

The readiness with which men who had distinguished themselves in the ranks of war returned to their former occupations, was a matter of astonishment to foreigners. But if they are honored as the instruments of our political freedom, no small measure of credit is also due to their countrywomen for their share of the toils and self-denials by which they were sustained and clothed throughout the protracted contest. Among the expedients adopted to provide clothing for the soldiery, the exertions of the women of the Revolution, on whom much of the labor fell, are entitled to honorable mention, though made in a less conspicuous sphere of duty. We may at least be permitted to refer to two examples, which illustrate the spirit which animated them, and their ready response to the claims of humanity and patriotism. "I will tell you what I have done," writes a lady of Philadelphia to a British officer, just after the battle of Lexington. "My only brother I have sent to the camp with my prayers and blessings. I hope he will not disgrace me; I am confident he will behave with honor, and emulate the great examples he has before him; and had I twenty sons and brothers, they should go. I have retrenched every superfluous expense in my table and family; tea I have not drank since last Christmas, nor bought a new cap or gown since your defeat at Lexington; and, what I never did before, have learnt to knit, and am now making stockings of American wool for my servants; and this way do I throw in my mite to the public good. I know this, that, as free, I can die but once, but as a slave I shall not be worthy of life. I have the pleasure to assure you that these are the sentiments of all my sister Americans. They have sacrificed assemblies, parties of pleasure, tea-drinking, and finery to that great spirit of patriotism that actuates all ranks and degrees of people throughout this extensive continent. If these are the sentiments of females, what must glow in the hearts of their husbands, brothers, and sons? They are, as with one heart, determined to die or be free."[1]

(1) Nile's Principles and Acts of the Revolution, p. 305.

Another instance is related as follows:

"During the war of the Revolution, General Lafayette, being at Baltimore, was invited to a ball; he went, as requested, but instead of joining in the amusements, as might be expected of a young Frenchman, he addressed the ladies: 'You are very handsome; you dance very prettily; your ball is very fine—but my soldiers have no *shirts*.' The appeal was irresistible; the ball ceased, the ladies ran home and went to work, and in a few days a large number of shirts were prepared by the fairest hands in Baltimore for the gallant defenders of their country."[1]

Effects of the Peace.

The immediate effects of the peace were alike unfavorable to the trade and manufactures of the country. Exhausted in resources, with a debt of forty millions of dollars, and no public revenue system, the country was unable to meet its obligations. The public securities fell in value, the creditors of the National Government were ruined in capital, and the arrears of the soldiers were unpaid. Those who were not themselves paid could not pay others, and private confidence fell in the wreck of the public faith. As aliens, the merchants of the United States were excluded from their former trade with the West Indies, the fishermen were denied access to several ports they had been free to visit as Colonists, and the bounty on whale oil was withdrawn. In the absence of any power to regulate commerce, a flood of European manufactures was poured in to supply the exhausted warehouses of the country. The people of all classes were but too ready to escape from the restraints to which they had so long subjected themselves. The trade of the States, which had once been so valuable to Britain, was coveted by all adventurous traders, and merchandise was imported far beyond the wants of the country, or the ability of merchants to pay. Large debts were accumulated in Great Britain, to whose manufactures Americans were partial; and by the treaty, these and the old uncanceled obligations were to be paid in gold and silver, of which the States were speedily drained. All possibility of success in manufactures was for a time excluded by the superabundance of foreign goods, some of which sold twenty-five per cent. cheaper than in London. But the evils produced by the absence of an efficient head to the Government, and of concert in any plan for the regulation of trade and commerce, at length led to the organization of an effective central authority, under whose action all branches of the national industry speedily recovered.

During the Revolution much of the limited capital and skill of the country had been employed in those branches of manufacture which were immediately subservient to the war. But the household industry of the country

(1) White's Memoir of Slater, 169

had been preserved and extended. The new prospects which now opened before the country, pointed out the duty and policy of cherishing these, and of introducing new ones. The several States adopted such measures as they had been accustomed to in their Colonial capacity for the encouragement of trade and manufactures. Discriminating and other duties were laid by several, but without any uniformity, and were all annulled and the power lodged in the General Congress by the new Constitution.

Efforts to procure Machinery.

The increased attention which had been given to wool-growing during the war, and to cotton in the South, created a desire in many quarters to procure the improved machinery by which the manufactures of England were being so rapidly extended, and which France was also laboring to obtain. In 1780, an association was formed in Worcester, Mass., for spinning and weaving cotton, and a subscription raised to procure a Jenny for that purpose. On the 30th April, it was announced in the Spy that "on Tuesday last, the first piece of corduroy made in the manufactory in this town was taken from the loom." The manufacture was probably continued, since Samuel Brazier, of that town, in 1790 advertised for sale "jeans, corduroys, federal rib, and cottons."[1]

The year following this attempt, Parliament raised a further barrier to the attainment of textile machinery from that country by re-enacting and extending the statute of 1774 against its exportation. It was enacted (21 Geo. III. c. 37) that any person who packed or put on board, or caused to be brought to any place in order to be put on board any vessel, with a view to exportation, "any machine, engine, tool, press, paper, utensil, or implement, or any part thereof, which now is or hereafter may be used in the woolen, cotton, linen, or silk manufacture of this Kingdom, or goods wherein wool, cotton, linen, or silk are used, or any model or plan thereof," etc., should forfeit every such machine and the goods packed therewith and £200, and suffer imprisonment for twelve months. The like penalties attached to having in custody or power, or collecting, making, applying for, or causing to be made, any such machinery, and the forfeitures were to go to the use of the informer after the expenses of prosecution were paid. The exportation, and the attempt to put on board for that purpose, "any blocks, plates, engines, tools, or utensils used in, or which are proper for the preparing or finishing of the calico, cotton, muslin, or linen printing manufactures, or any part thereof," were the next year (1782) prohibited under penalty of £500 The same act interdicted the transportation of tools used in the iron and

(1) Lincoln's Hist. of Worcester County, p. 321.

steel manufactures. Wool or stock cards, not exceeding 4*s.* per pair, and spinners' cards, not exceeding 1*s.* 6*d.* per pair, used in the woolen manufactures, were by a later Act (26 Geo. III. c. 76) allowed to be exported.[1]

Progress of Textile Machinery in Europe.

These statutes, which were vigilantly enforced, along with those against enticing artificers to emigrate, proved serious obstacles to the introduction of machinery both in America and the Continent of Europe. In 1784, a German was fined £500 for seducing operatives to Germany; but a native of Amiens succeeded, the same year, in importing into France the first machine for spinning cotton. But, two years after, another person incurred the legal penalty for having a quantity of machinery, with a view to export it to Germany. Some attempts to obtain machinery for this country miscarried about the same time. A set of complete brass models of Arkwright's machinery was made and packed in England by the agent of Mr. Tench Coxe, of Philadelphia, in 1786, but was seized on the eve of its shipment, and the object defeated.[2] Abel Buell, an ingenious mechanic of Killingsworth, Connecticut, who had been engaged in engraving, type-founding, and the manufacture of copper coin for the State, visited England about the same time, ostensibly to purchase copper, but in reality, it is said, to obtain a knowledge of the various kinds of machinery used in the Cloth-manufacture. The mechanical resources of the English manufactures had at this date been further enriched by the invention, in 1774, of the power-loom, by Cartwright; of the mule jenny, in 1775, by Crompton, which soon superseded the machine of Hargreaves; by several improvements of Arkwright and others in carding, drawing and roving, and above all by the adaptation, in 1783, of the steam-engine of Watt to the spinning and carding of cotton at Manchester. Cylinder printing was invented by Bell in 1785, and the use of acid in bleaching was introduced at Glasgow by Watt in 1786, and at Manchester in 1788. These and some minor improvements had increased the consumption of cotton in England to 11,280,238 lbs. in 1784, valued, in its manufactured state, at £3,950,000. In 1787, the cotton and wool used on hand and water-machines amounted to 22,600,000 lbs., worth, in the raw state, £2,230,000, and when manufactured, £7,500,000, yielding the immense profit of £5,270,000 sterling. The total value of the woolen branch was estimated in 1783 at £16,800,000, equal in value to all the exports of Great Britain.

Notwithstanding the difficulty of procuring machinery of any kind, the complicated evils, financial and moral, growing out of the profuse and

(1) Pope's Laws of the Customs and Excise.

(2) White's Memoir of Slater, p. 71.

wanton use of English and East India goods, which were introduced in unlimited quantities and sold for cash or credit below English prices, and the facilities for obtaining a cheap supply of cotton, made the necessity for creating domestic manufactures to be deeply felt. In Philadelphia, New York, and some parts of New England, much interest was manifested by prominent citizens in the attainment of the object by the aid of labor-saving appliances. A Jenny had been several years in use in Philadelphia, and Mr. Wetherill had conducted throughout the war a private manufacture of cotton and woolen goods. In April, 1782, he advertised for sale at his manufactory in South Alley, "*Philadelphia Manufactures*, suitable for all seasons, viz., Jeans, Fustians, Everlastings, Coatings, &c.," which he is believed to have been the first to manufacture in this country.[1]

First Cotton Machinery made.

In 1786, the Hon. Hugh Orr, of Massachusetts, a pioneer in many useful enterprises, employed two brothers, Robert and Alexander Barr, from Scotland, who had some knowledge of cotton machines, to construct for him at his works, at East Bridgewater, three carding, roping, and spinning machines. A committee of both houses of the legislature was appointed to examine them, and report what encouragement ought to be given them. Their report, on November 16, recommended a grant of £200 to enable the brothers to complete them, and a gratuity to the makers of the machines after their completion and delivery to a committee of the house. This was concurred in, and in the following May, six tickets in the State land lottery, in which there were no blanks, were granted to the Barrs, "as a reward for their ingenuity in forming those machines, and for their public spirit in making them known to this commonwealth." They were deposited, by direction of the General Court, and subject to its order, with Mr. Orr, who was requested to exhibit them, and explain their principles to any who might wish to be informed of their great use and advantage in carrying on the woolen and cotton manufactures. Mr. Orr was allowed to use them as a compensation for his trouble. The cost of the machines was £187, and they are believed to have been the first Jenny and stock card made in the United States.

While these were constructing, Thomas Somers presented a petition to the General Court, stating that in consequence of a circular letter from the committee of the tradesmen and manufacturers of Boston, an association of the tradesmen and manufacturers of Baltimore was formed, in the fall of 1785, to apply to the legislature in behalf of American Manufactures. Having been brought up to the cotton manufacture, he had visited Eng-

(1) White's Memoir of Slater, p. 49.

land at his own risk and expense to prepare machines for carding and spinning cotton. But he was only enabled, after much difficulty, to bring away descriptions and models of such engines, with which he returned to Baltimore. Finding little could be done there, he set out for Boston, and having lost much of his property by the way, he asked assistance to begin the manufactory. The Assembly, on the 2d March, in consideration of his having such models and descriptions, and a knowledge of adapting the thread for and of weaving dimities, plain, striped, and checked muslins, calicoes, jeans, jeannettes, and other cotton manufactures, ordered £20 to be deposited in the hands of Mr. Orr to encourage him in a trial. This model of an early and imperfect form of the Arkwright machine, appears to have been exhibited with the others, and was known as the "State's Model." It was visited by several manufacturers, among others by Moses Brown, of Providence. Daniel Anthony, of that place, who had made an engagement with Andrew Dexter and Lewis Peck to make jeans and other "homespun cloth" of linen warp and cotton filling, to be spun by hand, soon after its completion visited it with John Reynolds, a woolen manufacturer of East Greenwich, and made a draught of the machine. This appears to have been laid aside for a time, but a machine was afterward built from it, and put in operation at Providence. Mr. Orr did not escape the reproach of wishing to supersede honest manual labor by the introduction of such machines.

First New England Cotton Factory at Beverly.

In the meantime a company had been formed at Beverly, Mass., in 1787, of which John Cabot and Joshua Fisher were the principal managers, to manufacture cotton. One or more Spinning Jennies, either imported or made from the State's models, were obtained, and a carding-machine was imported at a cost of eleven hundred pounds. The legislature made a grant of £500 to assist the design. The factory was visited by General Washington, in his tour through the Eastern States in 1789. It was mentioned by Brissot De Warville, in October of the previous year, as "a flourishing manufacture of cotton." It created considerable interest throughout the country, as the first attempt in New England to manufacture cotton by machinery, for it does not appear that Mr. Orr either designed or attempted to employ his machines for the creation of a manufacturing business, although permitted to use them. It was reported in distant places that the Beverly factory was carried on with the Arkwright machines, but such does not appear to have been the case in the first instance. In a memorial to the General Court, in June, 1790, the managers state that they had encountered more expense and difficulty than they had anticipated, especially in the purchase and construction of machines. They had then expended nearly four thousand pounds. Many losses and great obstacles

had been encountered, to which other attempts would not be liable, as in the case of the carding machine, which could then be obtained for £200. They had commenced the business from a regard to the public advantage, and had sustained heavy losses without any present hope of emolument. But their efforts, under all the disadvantages, had proved that the manufacture was practicable, and would, when established, prove sufficiently lucrative to support and extend itself, and afford a supply not only for domestic consumption but a staple for exportation. Much loss of material was occasioned in the instruction of workmen, whose wages had to be raised to prevent their desertion when half instructed, "in consequence of the competition of rival manufactories." The greater perfection and beauty in foreign goods were attributed to the superior skill, which workmen in long established manufactories exhibited, "but principally (they say) from the use of machines which your petitioners have as yet found too expensive for them to procure." This, we suppose, refers to the Arkwright machines.[1] The managers ask that the General Court will

(1) The expense of machines, labor, etc., for manufacturing cotton, about this time, was thus estimated in Philadelphia: "One machine for carding cotton will cost about £50; one man will work the machine, and card about 20 lbs. of cotton per day. One spinning machine, commonly called a jenny, with 40 spindles (which is a proper number), will cost about £13. One man or woman will work the machine, and will spin from 4 to 6 lbs. of good yarn per day, of a suitable degree of fineness for good jeans, fustians, etc. . . . A woman will *rope* (on a common wheel) about 4 lbs. per day, for which she receives five pence per pound. One pound of cotton yarn will fill six yards of very good jeans—it usually fills more, but then the goods are proportionally lighter. Two lbs. of good flax from the swingle will make 1 lb. of heckled flax—this flax being spun to two dozen and six cuts to the pound, which is a proper-sized yarn for common jeans. 18 dozen will make chain for 50 yards; 8 lbs. of cotton yarn will fill these 50 yards. The cotton yarn spun on the machines in Philadelphia costs, on an average, about 13½ pence per pound, besides the carding and roping. The man who turns the machine is employed by the day. His wages, when the days are long, are about three shillings and nine pence per day. The weaver in Philadelphia has seven pence per yard for weaving common jeans, besides having his chain wound for him, and the winding his quills. He will weave about 7 yards per day. Women attend on the weavers to wind their chains and quills for about seven shillings and sixpence per week, and find themselves. One woman can attend three looms. The dyers ask four pence per yard for dyeing jeans, but they may be well afforded at half that price. The following is the estimate of the expense on 50 yards of jeans:

18 doz. flax yarn will make the chain for 50 yds. of jeans, at 18*d.* per dozen	£1	7*s.*	0*d.*
8½ lbs. of cotton yarn will fill the same, at 5*s.* per pound	2	1	8
Weaving 50 yds., at 8*d.* a yard	1	13	4
Dyeing 50 yds., at 3*d.* per yard		12	6
	£5	14	6
The above estimate is calculated for 50 yds. of very good jeans, such as will sell for 3*s.* per yard, which is	7	10	0
Profit	£1	15	6

"N.B. The price is supposed to be a retail one. The calculation of expenses is rather high than otherwise."—*American Museum*, vol. v. p. 225.

in lieu of a grant of land previously made, afford some real and ready assistance, without which they must abandon the enterprise.[1]

They afterward discontinued the business as a corporate body, and it was carried on by individuals, who erected a mill at the head of Bass River for spinning cotton by water power. This also proved unprofitable, and the machinery was removed along with a portion of the building. The brick factory was burned in 1808. A steam factory company, with large capital, was incorporated at that place in 1841.

Water Spinning attempted at Providence.

Although this establishment appears to have been the first for the manufacture of cotton by machinery that went into operation in New England, if that at Worcester, before mentioned, may not claim the precedence, there were, at the date of the petition, as therein intimated, several rival establishments. The earliest of these was that attempted at Providence. After obtaining a draught of Mr. Orr's machine, Mr. Anthony had a Spinning Jenny of twenty-eight spindles built also in 1787, on the model of the Beverly machine. The wood-work was made by his son Robert, and the brass-work by Daniel Jackson, a coppersmith of Providence. It was set up first in a private house, and afterward in the chamber of the market-house, where it was operated. A carding machine was also constructed for him by Joshua Lindly, of Providence, from patterns of that at Beverly. The rolls, 18 inches long, were taken from it and roped on a hand-wheel, as in wool-carding. A spinning frame was next built from the draught of the State's model at Bridgewater. It had eight heads of four spindles each, or 32 spindles in all, and was operated by a crank turned by hand. The first head was made by John Baily, a clockmaker of Providence, and the rest of the machine by Lindly & Jackson. In 1788, Joseph Alexander and James McKerries, weavers from Scotland, who understood the use of the fly-shuttle, came to Providence to weave corduroy. McKerries went to East Greenwich, but, under the direction of Alexander, a loom was built and put in operation in the market-house, with the first fly-shuttle ever used in Providence, and probably in America.[2] As there was no person who knew how to cut the corduroy to raise the pile which formed the ribs, and gave the finish, that kind of Cloth was abandoned after the first piece, and Alexander removed to Philadelphia. Thus unsuccessful, the owners sold the spinning frame, which was too heavy for hand-power, to Moses Brown, of Providence. It was removed to Paw-

(1) White's Memoir of Slater, p. 54.

(2) The spring or fly shuttle was invented about the year 1738 by John Kay, of Bury. However late its introduction here may seem to have been, we find it stated in an essay read about this time, before the Literary and Philosophical Society of Manchester, that not a single weaver in the Norwich trade then understood the use of the fly shuttle.

tucket, and attached to a water-wheel, for which it was also found to be ill-adapted from its imperfections. Mr. Brown also purchased the carding machine and Jenny, an additional spinning frame, made from the State model and unsuccessfully tried at East Greenwich, and a stocking-loom from John Fullem, an Irish stocking-weaver, who had attempted the business also at East Greenwich. The spinning frames, which were employed for a short time on warp, which they made imperfectly both as to quality and quantity, were laid aside until some one could be found who understood their use. These two Arkwright machines, one of 32, the other of 24 spindles, not in use, a carding machine, an 84 and a 60 spinning jenny, and a doubling and twisting jenny, constituted the principal machinery of Almy & Brown, at Pawtucket, when Samuel Slater arrived. The account of Andrew Dexter, of Providence, with the firm, shows a charge, in May, 1789, for a complete spinning jenny, £24 4*s.* 10*d.*, and in 1790 for a jenny, carding and spinning frame, completed at the joint and equal expense of Lewis Peck and Andrew Dexter, £139 15*s.* A machine for calendering cotton goods was also charged in March, 1790. It was put up in Moses Brown's barn, and worked by a horse. One of the jennies purchased by Mr. Brown belonged to David Buffum, for whom it had been operated about two years at Newport by Joseph Anthony, another son of Daniel Anthony.

Just as this attempt to introduce water spinning machines had proved unsuccessful, a letter opportunely reached Moses Brown from Samuel Slater, at New York. This ingenious and enterprising manufacturer, to whom this country owes so much, was born near Belper, in Derbyshire, England, June 9, 1768. At the age of fourteen he went to live as a clerk with Jedediah Strutt, the inventor of the Derby ribbed stocking machine, and the partner of Sir Richard Arkwright in the cotton spinning business at Milford, near Belper. Having continued with them as clerk and several years general overseer both of the machinery and manufacturing departments, till August, 1789, he was induced to turn his thoughts to America, in consequence of the great interest taken by the several governments in the establishment of manufactures. A notice in the the newspapers of a grant of £100 by the legislature of Pennsylvania, in Oct., 1788, to John Hague, for introducing a machine for carding cotton, and of the establishment of a society, with legislative encouragement, for the manufacture of cotton, determined him to try his fortunes in this country. He sailed from London, Sept. 13, 1789, and reached New York about the 18th November. In consequence of the restrictions upon the emigration of artisans and the exportation of models and machinery, he did not, on leaving Derby, inform his family of his destination, and took with him neither patterns, drawings, nor memoranda that could

Arrival of Sam'l Slater.

betray his occupation or lead to his detention. In New York he was engaged by the New York Manufacturing Company. Hearing that Moses Brown, of Providence, was in need of a manager, he wrote him on the 2d December, stating that he had been three weeks in the New York manufactory, which had but one card, two machines, and two spinning jennies, which he thought were not worth using. His wish and intention were to erect a *perpetual card and spinning* establishment; and he could make machinery for spinning, either for stocking or twist, equal to any in England.

Mr. Brown accordingly invited him to come, stating that an experiment had been made and failed with the first frame used in America, and offering him all the profits, as well as the credit and advantages of perfecting the first water-mill in America, provided he was able to accomplish it. On seeing the machines of Almy & Brown, he declined having any thing to do with them. A contract was made with Almy & Brown to construct the Arkwright series of machines, in which Slater was to have one-half interest; and on the 18th January, 1790, Mr. Brown took him to Pawtucket, where he completed the machinery chiefly with his own hands. On the 20th December, he started three cards, drawing, and roving frames, and two frames of 72 spindles, which were worked by an old fulling-mill wheel in a clothier's building, where they were used for twenty months, at which time several thousand pounds of yarn had accumulated on their hands, notwithstanding all attempts to sell and weave it. Early in 1793, Almy, Brown & Slater built a small factory (the old mill), where the machinery was set in motion, and increased as occasion served. Thus, after unexpected difficulties, delays, and expense, arising out of the want of patterns, suitable materials, and workmen, was completed and put in operation the first successful water-mill for cotton in the United States.[1]

First successful Water-spinning.

The accounts of Almy & Brown's, successors (the former a son-in-law, the latter a relative of Moses Brown, who supplied the capital), show their first spinning to have been commenced about the 11th June, 1789, between which time and the close of the year they made of corduroys, royal ribs, and denims, etc., cottonets, jeans, and fustians, 189 pieces, containing 4,556 yards, which sold from 1*s.* 8*d.* to 4*s.* a yard. From the 1st January to the 15th October, 1791, when they had the new machinery, they made of the same goods and of fancy cords, thicksets, etc., 326 pieces of 7823 yards.

During this time, several other essays were made in cotton spinning.

(1) For fuller particulars of the history, difficulties, and subsequent success of Slater and the cotton business in New England, the reader is referred to White's Memoir of Slater: Philadelphia, 1836.

Jennies of Hargreaves' pattern were obtained, and warp for mixed goods of linen and cotton was spun from rolls prepared by hand-cards in the cellars of dwelling-houses, and was woven principally by Scotch and Irish weavers. When goods wholly of cotton were attempted, the warp was obtained from Almy & Brown, as the jenny was not adapted for hard twist, and from this time fell into disuse. No sheetings, shirtings, checks, or ginghams were made before 1790.

At East Greenwich, where the cotton business had also been attempted, Herman Vandausen, a German, also about 1790 commenced the calico printing business. He cut his own blocks (samples of which and of his prints are in the cabinet of the Historical Society at Providence), and printed India cottons and the coarse cottons woven in families for the people generally. Although encouraged by John Brown, an India trader, it was found cheaper to import than to print cottons, and the business was given up. Indeed, the great abundance and cheapness of English and India cottons and yarn proved a serious obstacle to the success of the infant manufactures of the country, for which a remedy was soon provided by the General Government.

The Byfield Factory in Massachusetts, which it has been asserted was the first *regular* factory in the United States, was not established until 1793, and for several years after, was confined to the manufacture of woolen Cloth.

We have now to notice, among the efforts made almost simultaneously in different places to manufacture cotton, an Association, before alluded to, which was quite as early formed, we believe, as any of the foregoing, and one which, by the collective and individual influence of its members, in connection with the State patronage accorded it, was more influential than any other in giving an impulse to the cultivation and manufacture of cotton in the United States. We have before stated that the first spinning jenny introduced into this country, and probably the first attempt to make cottons, was in Philadelphia, by the Society formed in 1775 for manufacturing purposes. Between that time and the year 1787, when the "Pennsylvania Society for the encouragement of Manufactures and the useful Arts" was instituted, an effort to obtain the Arkwright machinery had been defeated. Mr. Wetherill had in the meantime manufactured the ordinary cotton stuffs afterward made at the infant New England factories, and, as a member of both societies, seems to have formed a sort of connecting link between the two. This society was open to every citizen of the United States who should fulfill the engagements of a member of the same. It was governed by a president, four vice-presidents, two secretaries, a treasurer, twelve managers, and a committee for manufactures, all, except the com-

Philadelphia Cotton Factory.

mittee, chosen annually by ballot. Each member paid an admission fee of ten shillings, and the same sum annually toward a general fund to defray expenses and for premiums. Subscriptions of £10 or upward, to constitute a manufacturing fund, were received from individuals or companies, for the purpose of establishing factories, the subscribers to be entitled to the profits of the same. The subscribers were to be owners of the ground, buildings and improvements belonging to the society, etc., and the shares were made transferable. The manufacturing operations were controlled by the manufacturing committee, chosen annually by the subscribers to that fund.

By appointment of a previous meeting, Mr. Tench Coxe, an ardent and influential encourager of all efforts for the promotion of manufactures, delivered an address before the Society in the University of Pennsylvania, on the 9th August, 1787, which was published at their request. It appears from his remarks, that after giving relief to the industrious poor, which was one object of the Society, the employment of machinery as much as possible in their operations was contemplated by its friends. This purpose was urged in reply to the objection which, among many others, appears to have been made against the establishment of manufactories, and were severally combated by the speaker, that they were injurious to the health of the work-people. A proper regard for the interests of Agriculture, as the most important, was recommended in any measures that might be adopted for the advancement of manufactures. In this connection the cultivation of cotton in the Southern States was recommended as an article from which the best informed manufacturers expected the greatest profits, and upon which some established factories depended. It thrived as well there, he said, as in any part of the world, and those States raised it formerly when the price was not half what it had been for several years past. It was then worth double the money in America which it sold for before the Revolution, European nations having prohibited its exportation from their colonies to foreign countries. The great progress made in agriculture and manufactures, particularly in Pennsylvania, since the year 1762, and still more since the late war, was adverted to, and a lengthy list of articles then made in the State was given. These included hosiery, hats and gloves, wearing apparel, coarse linens and woolens, some cotton goods, wool and cotton cards, etc. The advantages of America in having the raw materials and market at home, in exemption from duties, in the ability to sell for cash by the piece instead of large invoices on long credits, as imported goods were then sold, in the superior strength of American linens, in the benefits of a better atmosphere for bleaching linen and

Address of Tench Coxe.

cotton,[1] were severally urged as so many inducements to undertake manufactures. He recommended the exemption from duties of raw materials, dye stuffs, and certain implements; premiums for useful inventions and processes; the invitation of foreign artists to settle by grants of land, and that every emigrant ship should be visited to ascertain what persons were on board capable of constructing useful machines or of conducting manufactures. The wasteful use of foreign manufactures was illustrated by the fact that the importation into Philadelphia alone of the finer kinds of coat, vest, and sleeve buttons, buckles, and other trinkets, was supposed to amount in a single year to ten thousand pounds, and cost the wearers sixty thousand dollars. In urging the benefits to the agricultural interests of manufactures in their midst, he ventured the assertion that the value of American productions annually consumed by the manufacturers of the State, exclusive of the makers of flour, lumber, and bar iron, was double the aggregate amount of all its exports in the most plentiful year.

Premiums of the Society.

The Board of Managers, in November, offered a gold medal of the value of $20 for the most useful engine or machine, to be moved by water, fire, or otherwise, by which the ordinary labor of hands in manufacturing cotton, wool, flax, or hemp, should be better saved than by any then in use in the State; and also for raising and cleaning the greatest quantity of hemp, flax, or cotton; for the best specimens or patterns of printed linens or cotton goods stained within this State; for letter press, in bound volumes, from Pennsylvania types and paper;[2] for earthenware, flint glass ware, and bottles; for the greatest quantity of wool, and of bleached wax fit for candles. Thirty-dollar premiums or medals were offered for the greatest quantity of hemp or swingled flax,

(1) A company of English merchants, with a large capital, was about being formed, it is said, before the Revolution, to import the *brown* linens of Europe to be bleached in this country, where the superior sunshine and plenty of land was an inducement. Linens had long been sent to Holland to be bleached, and the time (six to eight months) required for the process and the extent of ground occupied, in the middle of the last century, greatly abstracted from the profits of the manufacture. The discovery by Scheele, in 1774, of the properties of chlorine, was scarcely less valuable to the cotton and linen manufactures than the mechanical inventions of the same age. Berthollet, in 1785, introduced the use of oxymuriatic or hydrochloric acid in bleaching, which James Watt, in the following year, carried over from Paris to Glasgow. It appears not to have been employed at Manchester until the year after the date in the text. Dr. Henry, of that city, suggested the use of chloride of lime in the form of bleaching powders, to get rid of the noxious vapor. The time of bleaching was reduced by these means from months almost to as many hours; but the acid was supposed, not without reason, probably, in the infancy of the art, to injure the fabric. Thomas Cooper, afterward a prominent man in this country, was one of the earliest calico bleachers by this method in Manchester.

(2) The premium in this branch was given to the publishers of a German book in Lancaster.

and the greatest number of smiths' anvils; and fifty dollars for the greatest quantity of potash and pearlashes, and for the greatest quantity and variety of painters' colors made from fossils and earths of the United States. Of the propriety and value of premiums and honorary rewards, when judiciously conferred, in stimulating invention and competition in the arts, there can be little doubt. The offer of this Society and the subsequent award of a large sum by the legislature for a machine for making rolls for spinning, which was probably a fruit of that offer, are said to have finally determined Samuel Slater to come to America. The premium for calico and linen printing probably led to the first establishment of the former business in the United States by John Hewson, a Revolutionary soldier, who also, in March, 1789, received a loan of £200 from the State, by an Act of the legislature, to enable him "to enlarge and carry on the business of calico printing and bleaching within this State."[1] How far the discrimination of the Society in offering its highest premiums for chemical products may have contributed to the commencement, about this time, of the first white-lead manufacture in the United States, by Mr. Wetherill, and to the subsequent eminence of Philadelphia in the chemical branches, it is impossible to say.

Report of the Committee.

The Manufacturing Committee, of which S. Wetherill, Jr., was chairman, in the autumn of 1788, soon after the close of the first year from its organization, made a report to the Board of Managers of their operations to the 23d of August. It furnishes some interesting statements. The contributions received amounted in hard specie to £1327 10*s.* 6*d.*, and the expenditures for machines, utensils, and fitting up the manufactory, to £453 10*s.* 2*d.*, leaving a circulating capital of £874. To employ the poor, they had purchased flax and employed between two and three hundred women in spinning linen yarn during the winter and spring, and engaged workmen to make a carding machine and four jennies of 40, 44, 60, and 80 spindles, respectively, for spinning cotton. Owing to the difficulty of finding artists and making machines without models or with imperfect ones, and obstructions caused by foreign agents, etc., they did not get the first loom at work until 12th April, 1788. The number had since been increased to twenty-six,

(1) John Hewson, it is said, was invited to this country from England by Benjamin Franklin, and having espoused the cause of the Revolution, he was taken prisoner by the British at the battle of Monmouth. Having made his escape, fifty guineas reward were offered for his re-capture, dead or alive. His print works were near Richmond, where Dyottville now is, and were continued by his son, of the same name, who inherited his father's probity and benevolence, and only recently died at the age of 93. General Washington was accustomed to point, with patriotic pride, to domestic fabrics upon the person of Mrs. Washington from the establishment of the elder Hewson. He was elected in Oct., 1788, to print for the Society. Robert Taylor was his competitor.

with which had been manufactured, up to 23d of August, the following goods : Jeans, 2959½ yds, corduroys, 197½, federal rib, 67, beaver fustian, 57, plain cottons, 1567½, linen, 925, tow linen, 1337½—total, 7,111 yds. In addition to these, they had in the looms 200 yards of jeans, corduroys, cottons and linen. They had sold up to that time of jeans, cotton and linen yarn, fine and tow linen to the value of £458 5*s*. 11*d*. The net profit upon their operations was about £72, or at the rate of 30 per cent per annum. Between the 23d of August and the 1st of November, they manufactured of jeans, corduroys, flowered cotton, cottons, flax linens, tow linens, and birdeye, 4016 yards, of which over one-half, or 2095 yds., were cottons, and they had 240 yards in the looms. The entire product from the beginning amounted to 11,367 yards. From the want of proper bleach yards and persons who understood the bleaching business, only 190 yards of cotton had been printed.

The Committee of the Board of Managers, consisting of Messrs. George Clymer and Tench Coxe, considered this exhibit of their operations as highly encouraging, especially as the price of flax had fallen from ninepence and tenpence the pound to sevenpence, and would probably be lower on account of increased attention to its cultivation ; and cotton had also declined in price from 2*s*. 7¾*d*. a pound to 2*s*. or 2*s*. 2*d*. The price of cotton would be kept down should its cultivation succeed in the Southern States. If a good profit had been realized by the manufacture on a limited scale of materials purchased at the former high rates, one-half of which—the linen yarn—could not be spun by machinery, it was certain that more extensive machines, moved by horses or water, must greatly increase the profit. Carding machines for which they paid £100, could now be purchased for £60 ; and a jenny, for which they paid £28, for £15, and smaller implements were reduced in price in proportion. Two separate and independent estimates by different persons made the cost of a given quality of olive-colored jean, with linen chain, 2*s*. 5*d*. and 2*s*. 4½*d*. respectively, for jean equal to the British, which sold for 3*s*. 3*d*. ; flax being rated at 7*d*., cotton at 2*s*. 3*d*. per pound, weaving at 7*d*., and dyeing and calendering at 4*d*. a yard. The American goods were above half an inch wider and much heavier than the imported. The Committee state, in conclusion, that being impressed with the clearest conviction of the importance of the cotton branch, they "beg leave to recommend in the strongest terms the prosecution of the manufacture by fresh subscriptions, until a knowledge and due sense of its value shall induce some proper persons, either citizens or foreigners, to undertake the business."

On the 29th March, previous to the opening of this manufactory, the legislature of Pennsylvania passed an "Act to encourage and protect the

Manufactures of the State." This Act, which was limited to two years, prohibited, under certain penalties, the exportation of manufacturing machines, the scarcity of which was the great obstacle to such undertakings. This Act is stated by the editor of the American Museum, M. Carey, to have owed its existence to the fact that in the year 1787, two carding and spinning machines in the possession of a citizen of Philadelphia, and calculated to save the labor of one hundred and twenty persons, were purchased by the agency of a British artisan, packed up in cases as common merchandise, and shipped to Liverpool. A quantity of cotton seed is also stated to have been soon after purchased in Virginia and burned, in order to prevent, if possible, the extension of the cotton manufactures in America, and their injurious effects upon the importation of Manchester goods. In October, 1788, a reward of £100 was given John Hague, of Alexandria, Va., for a carding machine completed for the Society in March of the ensuing year, when the legislature passed "An Act to assist the Cotton Manufactures of this State." This Act was designed to assist "The Manufacturing Committee of the Pennsylvania Society for the encouragement of Manufactures and the useful Arts, and under whom a manufactory of cotton articles has accordingly been established with great prospect of success in the city of Philadelphia, but the sums subscribed to which are inadequate to the prosecution of the plan upon that extensive and liberal scale which it is the interest of this State to promote." It authorized the Treasurer of the State to subscribe in the name and for the use of the State for one hundred shares, of £10 each, in the manufacturing fund of the said Society; which was done accordingly, and an order drawn upon the Treasurer, Dr. Rittenhouse, in favor of Christopher Marshall, Jr., Treasurer of the Society, for the sum of one thousand pounds, April 9, 1789.[1] The manufactory was burned down on the night of the 24th March, 1790,[2] and evidence having been obtained that it was fired by design, a reward was offered by the State for the detection of the culprit.

Legislative encouragement.

The earnest recommendation of Mr. Coxe and the efforts of the Society to introduce the manufacture of cotton are believed to have had much influence with the members of the Convention assembled in Philadelphia, at the time of its organization, to frame a Constitution under which a more efficient government could be adopted to

Influence of the Society.

(1) Laws of Pennsylvania. Colonial Records, xvi. 61.

(2) "March 24. 1790.—About 11 o'clock at night, the *Calico* Manufactory at the S. W. corner of Market and Ninth streets, Philadelphia, adjoining Peter Markoe's house, then called the upper end of Market street, now No. 322, was entirely destroyed by fire, together with a quantity of good machinery."—*Shallus' Chron. Tables.*

The site of this factory thus appears to have been the same as that of the Manufacturing Society of 1775, and was rented of William Bingham at £40 per annum.

remedy the numerous evils arising under the old Confederation. The Southern delegates, on returning home, generally recommended the cultivation of cotton, and with such success as to secure increased attention to that crop. The same influence and the necessity of a revenue induced the first Congress, of which Mr. Clymer was a member, to protect the growth of the raw material and its manufacture by a duty of 3*d.* a pound on foreign cotton, and of five per cent., which was soon after increased to twelve and a half, on foreign manufactured cottons. There is little doubt that the first Secretary of the Treasury derived important hints, in the formation of his fiscal scheme, and much material for his able report on Manufactures, from the statesmanlike views and accurate knowledge of his assistant, Mr. Coxe. In his recommendation of the cotton culture for the creation of a redundant staple, and of manufactures as one of the firmest supports of a prosperous agriculture and commerce, the latter was unremitting and enthusiastic. His writings on the subject constitute a principal source of information respecting the state of industry during a number of years succeeding the peace. His review of the work of Lord Sheffield is an able refutation of the errors of that writer, who opposed the liberal commercial treaty with the late Colonies, introduced in Parliament by Mr. Pitt in 1783, on the ground that they had forfeited the privileges of British subjects; that no treaty with them could be binding on all the States, and that they must necessarily remain dependent chiefly upon Great Britain for most kinds of manufactures, in which they could never rival the former, and that they had few surplus productions which the remaining Colonies of the Crown could not furnish with equal facility.

Plan of a manufacturing town suggested.

We learn from the writings of Mr. Coxe, that Pennsylvania, within a year or two after if not before the destruction of the small manufactory above referred to, was in possession of a full set of the Arkwright machinery for spinning cotton, as well as the complete works of the water-mill for spinning hemp and worsted yarn.[1] He strongly advocated the introduction of manufactures on a large scale commensurate with the increased abilities and wants of the country. He drew up and published the details of a plan for a manufacturing town in

(1) William Pollard, of Philadelphia, patented, December 20, 1791, a machine for spinning cotton, which is stated by Mr. White to have been the first water-frame erected there. The want of success on the part of the inventor, retarded the cotton manufacture in Philadelphia. Cotton machinery of all kinds was then made at Philadelphia, and at Hartford, Conn., and Providence, R. I. At Philadelphia, John Butler, "Cotton machine Maker and Plane Maker," carried on at 111 N. Third st., and a Mr. Garlick, from Great Britain, also made them. Felix Crawford made flying shuttles at that time at 364 S. Second st.

the interior of the State, which should be to Philadelphia what Manchester, Leeds, Birmingham, and Sheffield were to their respective seaports. A capital of five hundred thousand dollars, raised either by the subscriptions of an associated company, by lottery tickets, or by an appropriation of State funds to that amount, was to be invested in the purchase of two thousand acres of land, whereon the factories for all branches of manufacture, dwellings, and other appurtenances of a complete manufacturing village were to be erected, to become the great support of the rural population around. Navigable communication with the city and the interior, an ample water-power and access to wood and coal, etc., were the conditions which should determine its selection. The suggestion was afterward acted upon by a "Society for the establishment of useful Manufactures," which, under the patronage of the Secretary of the Treasury, and with a large capital in shares of $400 each, was chartered in November, 1791, by the legislature of New Jersey, with extensive privileges to carry on all kinds of Manufactures at the Falls of the Passaic. Although not immediately successful, the enterprise was the foundation of the present active town of Patterson, which not many years after became the seat of numerous cotton factories, that having been the first in the State.

We are furnished from the same source some interesting particulars of the state of other branches of manufactures at this time in Pennsylvania and the neighboring States, and particularly of the family manufactures.

In nearly all the States there had been a great increase in the quantity and quality of the household productions, and in many of them small manufacturing establishments for woolen, linen, and cotton, as well as other descriptions of goods, were springing up. The average exports of British manufactures to the United States for several years preceding 1789, notwithstanding a great increase of population in the States, were nearly half a million dollars less than the average of several years preceding the war. But the trade which had opened with India and China supplied large quantities of muslins, calicoes, and other cottons, nankeens, and silks from those countries. The profits of this commerce, in which it was not unusual for the merchant to sell such goods by invoices marked one hundred per cent. above the price at Calcutta, caused a vigorous prosecution of the trade. British manufactures, at the same time, in order to drive India goods from the market, supplied their cottons in unlimited quantities and upon the easiest credit. These causes combined, raised one of the greatest obstacles to the successful establishment of the cotton manufacture in these States. As the American trade was now an open one, the importations of duck and

Increase and extent of Household Manufactures.

other linens from Russia and Holland also greatly increased. No less than twenty-two ships arrived in American ports in the year 1790 from St. Petersburg, laden with cordage, tickings, drillings, diaper, broad, narrow, and printed linens, crash sheeting, rovers' duck, hemp, flax, and iron. Notwithstanding these large importations, there had been a very great and general increase in the number of manufactures and in the amount of their products.

The city and suburbs of Philadelphia, in a total population of 43,000, contained, exclusive of carpenters, masons, and other handicrafts, 2,200 persons who might properly be denominated *manufacturers*, or over one-fourth of the 8,600 adult males it was supposed to contain. Several inland towns of the State, and some in other States, exceeded that proportion of manufacturers. The extent of the household industry and its future increase were overlooked by Lord Sheffield. "The progress and present state of this invaluable branch of the natural industry," Mr. Coxe observes, "exceeds every idea, it is believed, that has been formed of it either in this country or in Europe. In all the States inhabited almost entirely by white people, domestic manufactures are known to be very considerable, yielding a considerable surplus for the use of the other parts of the Union."

Household Manufactures in Southern Colonies.

But even in States where the blacks were numerous, and near the sea-coasts, where imported goods were easily obtained, this branch of Manufactures was greater than was supposed. An illustration is furnished in the case of one neighborhood in Virginia, on a navigable river, where the whites were to the blacks as one to two. In twenty families, rich and poor taken indiscriminately, it was ascertained that, among a total of 301 persons of both colors, there were made of fine table linen, sheeting, shirting, etc., 1907 yards; of negro clothing, blanketing, etc., 1007 yards; 152 pairs of coarse and 108 of fine stockings. The finer qualities of Cloth were worth 60 cents per yard, and the coarser 42 cents; and the total value of their industry was $1670. The highest value made in one family was $267, and the lowest $21.50. There was but one family in the twenty that did not manufacture.

Another example of twenty families, taken in the same indiscriminate way, furnished the following products of family industry. Linen, 1095 yards; woolen, 344 yards; cotton, 1681 yards; stockings, 174 pairs; shoes made on the estates, 237 pairs; total value, $1791. These were considered fair averages of the family manufactures generally. In the maritime counties of Accomac and Northampton, Virginia, in a district containing 2729 families, it was ascertained that 315,000 yards of flaxen Cloth were made in a year, 45,000 yards of woolen, 30,000 yards of

cotton, and 45,000 of linen and woolen Cloth, besides a quantity of coarse stockings. All the shoes and three-fourths of the Clothing were made in the country from materials grown on the farms, including the cotton used. Four other counties showed an average of nearly 200 yards of cotton, woolen, and linen made in each family, and five-sixths of all the apparel worn was produced in the same way. So great had been the increase of this industry in Virginia, that a few years later it was believed that, throughout the State, three-fourths of all the Clothing was manufactured by the people, who, before the war, had imported seven-eighths of it.

In South Carolina, the family manufactures in interior parts of the State furnished a sufficient supply of substantial middling and coarse cotton, woolen, and linen goods. It was the same in Georgia. In North Carolina they were nearly as attentive to domestic manufactures as in Virginia, and some good cotton stuffs were made.

Mr. Jefferson, in a letter addressed to M. De Warville, August 15, 1786, observes, "The four southernmost States make a great deal of cotton. Their poor are almost entirely clothed in it in winter and summer. In winter they wear shirts of it, and outer clothing of cotton and wool mixed. In summer their shirts are linen, but the outer clothing cotton. The dress of the women is almost entirely of cotton, manufactured by themselves, except the richer class, and even many of these wear a good deal of homespun cotton. It is as well manufactured as the calicoes of Europe." In his Notes on Virginia, written in the previous year, he opposed the establishment of manufactures, believing that the people would be more happy, virtuous, and prosperous as an agricultural people than they could be with the vices and evils of manufacturing towns in their midst. His views afterward underwent a change, and he became an advocate of domestic manufactures. He even became himself a manufacturer in the household way, and employed two spinning jennies, a carding machine, and loom with flying-shuttle, by which he made more than two thousand yards of Cloth which his family and servants required yearly. Previous to this, however, we find him, in 1788, writing to Mr. Digges, that "in general it is impossible for manufactures to succeed in America from the high price of labor," and that it was "not the policy of the government of that country to give any aid to works of any kind."

In Connecticut, according to Mr. Coxe, the household manufactures were such as to furnish a surplus sold out of the State. New England linens had affected the price and the importations of that article from New York to Georgia. The household manufactures (exclusive of those made in regular factories) included woolen and linen cloth, sail cloth, bed-ticks, some cotton goods, hosiery, nails

Household Manufactures in New England.

and spikes, some silk buttons, handkerchiefs, ribands and stuffs, sewing-silk, threads, fringes, and pot and pearl ashes.

In Massachusetts the importation of foreign manufactures was less by one-half than it was twenty years before, although population had greatly increased, and considerable quantities of home-made articles were shipped out of the State. The dress, furniture, and outward cargoes gave evidence of the increase of domestic production. In a regular factory there were made as much as ten thousand pairs of cotton and wool cards, chiefly employed in the domestic manufactures throughout the Union; 100 tons of nails in another, and 150,000 pairs of stuff and silk shoes in the single town of Lynn, of which 10,355 pairs were shipped by one family to Philadelphia in a year. Thread and silk lace and edgings to the amount of 41,979 yards were made in families, and not in regular factories, in the town of Ipswich, which contained 4,562 inhabitants. Pattern cards of 36 specimens of these new manufactures were exhibited. Yet Ipswich was a seaport, and lace a compact article easily imported. Other towns in Massachusetts and Connecticut made the same articles to a less extent. The financial troubles growing out of the disordered public and private credit, and the heavy importations of foreign goods, which an inefficient Federal government could not relieve, produced an insurrectionary spirit in Massachusetts in 1786, and renewed the former combinations against the use of imported goods and for the promotion of the domestic manufactures. Spinning matches and other modes of cherishing the native efforts of the people for a time prevailed, and were encouraged by Governor Bowdoin and the friends of home industry.

In Rhode Island and New Hampshire the same progress had been made. The number of regular factories in the former was great in proportion to the population. The linen manufactures were a leading branch, and cotton-mills were in operation. In Providence and vicinity, 30,000 yards of woolen Cloth were made in 1790, and in the following year 25,265 yards of linen, 5,858 of cotton, 3,165 of woolen, 512 of carpeting, and 4,093 pair of stockings, 859 of gloves, and 260 yards of fringe were made, all of which were household fabrics.

The number of fulling-mills in New Hampshire indicated the extent of the household manufactures of woolen, of which they had no established manufactory of any extent.

New Jersey had in 1784 forty-one fulling-mills for household woolens, but they had no woolen factories.

Fulling-mills were very numerous throughout Pennsylvania. There were ten in the vicinity of Reading. The number of oil-mills indicated a great production of flax, and as no regular linen factories existed, a

vast household manufacture of linen was to be inferred. The sale of spinning-wheel irons from *one* shop in Philadelphia, in 1790, amounted to 1,500 sets, nearly all for domestic use in families—an increase of twenty-nine per cent. over the previous year. In Lancaster, the largest inland town in the United States in 1786, were about 700 families, of whom 234 were manufacturers, in which were included 14 hatters, 36 shoemakers, 25 tailors, 25 weavers of woolen, linen and cotton Cloth, 3 stocking weavers, and 4 dyers. Within ten miles of the town were 4 oil-mills, 5 hemp-mills, and 1 fulling-mill, which indicated a predominance of the linen branch in their manufactures. The increase must have been great in the four subsequent years. Lancaster, York, and Berks Counties were among the most active in manufactures of any in the State, and probably in the Union. Delaware, Bucks, Chester, and Montgomery had also very numerous manufactures and much household industry. Pittsburg, Bedford, and Huntingdon, in the Western part of the State, had respectively 130, 40, and 85 families, and the number of manufacturers in each was severally 40, 15, and 23. Washington, near the Ohio, and still more remote, had grown up since the war, and numbered 32 manufacturers of 25 different kinds. Twenty-seven per cent. was the lowest and thirty-seven per cent. the highest proportion of manufacturers to the whole population in those villages, which exceeded that of any of the older towns, and indicated the value of manufactures to the agricultural population.

Frederick and Elizabeth, towns in Maryland, and Stanton and Winchester, Virginia, and some other southern towns, were believed to exhibit equal advance in domestic industry. The last-named employed 8 or 10 hatters, whose manufacture was in much repute, and sold for one dollar each, and eleven dollars per dozen. They were made of wool, which was often ordered from Philadelphia, and brought one-third of a dollar per pound. There were several oil-mills, which paid 2*s.* to 2*s.* 6*d.* a bushel for flax-seed. There were eight or nine weavers and two spinning-wheel makers.

Such, taking a part for the whole, was the vast scene of domestic household manufactures which, at the commencement of our national existence, was presented throughout the whole country. With few exceptions, the spirit of a self-dependent industry animated more or less every household, from that of the wealthy planter of the oldest towns to the bark or log cabin of the frontier settler on the Scioto or the Alabama.

In the absence of anything like correct or general statistics of the industry of the States, no reliable estimate can be formed of the aggregate of their family manufactures. The writer from whom we have drawn

the foregoing particulars, ventured, however, to make a computation of the value of hosiery and Cloths of wool, flax, hemp, and cotton produced annually in 1790, on the basis of the partial returns from Virginia. The population of that State, exclusive of Kentucky, was 70,825 families. Taking the lowest of the returns, which gave the rate of $\$83\frac{1}{3}$ to each family, and rejecting one-third and odd numbers for a moderate calculation, he obtained the sum of $3,900,000 as the value of household manufactures alone, exclusive of the work of regular tanners, shoemakers, blacksmiths, weavers, and other tradesmen in Virginia. Computed at the same rate, the population of the United States, taken at 3,900,000 persons, would yield a value of above twenty millions of dollars annually of such manufactures.[1] It is at least certain that this species of industry, combined with the product of regular factories for the production of various species of Cloth, leather, etc., went very far toward a full supply of the necessary clothing of a large proportion of the population. And when the great economy to which the entire population outside of the large towns had been long inured, and the less artificial wants of all compared with those of the present generation are taken into account, it may be questioned if the people of that day were not as really independent of other countries for such necessaries as their descendants at present.

The great attention which, since the Peace, had been given to the increase and improvement of the wool of the country, had called into existence many small manufactories of woolen Cloth. Our previous pages will show that wool had all along been an object of encouragement in the several Colonies. Rapid progress was made, after the war, in agriculture; and Agricultural Societies, which, within a few years, were formed in most of the States, contributed much to that end, as associations for the promotion of Arts, Science, and Manufactures did in the mechanical branches. The Philadelphia Society for Promoting Agriculture, formed in March, 1785, is believed to have been the earliest of these useful organizations. But the first incorporated in this country was the "Society for the Promotion of Agriculture," in South Carolina, which was chartered the same year. This society turned its attention to the introduction of new staples and the improvement of old ones. In addition to premiums or medals for the best mode of destroying the caterpillar which infested the cotton plant; for a practicable method of discharging stains from cotton and rendering it perfectly white; for the production of rice, olives, vines, oils of olives, castor sesamum, cotton, and sunflower seeds, for senna, cassia, rhubarb, hops, mad-

(1) View of the United States, 262.

der, figs, etc., it offered a medal to the person who should first establish and keep within the State a flock of sheep of the true *merino* breed. This appears to have been the earliest effort to procure that valuable animal for America; and it is creditable to the people of Carolina, that their effort to obtain the breed was as early as the first introduction of Spanish sheep into Silesia, which afterward became so celebrated for its wool. The German province procured the stock in that year, and France during the next, but it was not introduced into these States until the year 1802-9, when Mr. Jervis and Colonel Humphreys, and Chancellor Livingston, of New York, sent to America the merino wooled sheep.

Indeed, Carolina, in which the useful arts had not before met with the encouragement they deserved, seemed about this time to have awakened to a sense of their importance. The legislature, in the previous year, enacted a law for the encouragement of the Arts and Sciences, which, as recommended by Congress, secured to authors the copyright of books, and to inventors of useful machines the benefits of their discoveries. A correspondent of the American Museum, writing from Charleston, in July, 1790, states that a gentleman, well acquainted with the cotton manufacture, had already completed and in operation on the High Hills of the Santee, near Statesburg, ginning, carding, and other machines, driven by water, and also spinning machines with 84 spindles each, with every necessary article for manufacturing cotton. If this information be correct, the attempt to manufacture by machinery the cotton which they were then beginning to cultivate extensively was nearly as early as those of the Northern States. A fulling and dressing-mill for fine and coarse woolens was also at work on Fishing Creek, near the Catawba River, which was kept fully employed by the spinners and weavers, and the operations of dyeing, fulling, and pressing were well performed by artists from Great Britain. A fulling-mill had been still earlier erected in Pendleton district, on Cane Creek, which afterward suspended operations for want of workmen acquainted with the business. Cotton gins were worked by water in that district about this time. The ordinary wool of the country had, however, been somewhat improved by attention, and attempts were made to manufacture it in a better manner and on a larger scale than before.

As early as 1736, John Davis, a clothier of Connecticut, proposed to "instruct the people in the process of woolen manufacture;" and in 1787, Samuel Loomis, of Colchester, announced that he was "prepared to introduce a new epoch in the manufacture of wool, cotton, flax, hemp, and silk upon a new constructed plan." Much of the wool in early times was combed and spun for worsted, and a con-

Stocking weaving in Connecticut.

siderable part of it used in the stocking manufacture. In 1777, James Wallace, a stocking weaver from abroad, petitioned the Assembly of Connecticut for a loan of £100, to erect stocking-looms and a machine to spin the materials. He professed a thorough knowledge of the manufacture of silk, cotton, and worsted stockings, which he could make as cheap as any imported; but his petition was not allowed. In the following year, Benjamin Hanks, of Windham, afterward the inventor of an ingenious self-winding clock, also sought from the Assembly a premium for making stockings in looms. In 1789, Thomas Hubbard and Christopher Leffingwell, of Norwich, who had erected eight stocking-looms, asked for themselves and their apprentices an exemption from poll taxes, which was granted by the lower but refused by the upper House.

About the same time a woolen manufactory was established at Hartford under the patronage of Col. Jeremiah Wadsworth, and with encouragement from the legislature. We are informed by De Warville, that between September, 1788, and September, 1789, about five thousand yards of Cloth were made there, some of which sold at five dollars a yard. General Washington, while on his eastern tour in the latter year, visited it in company with Col. Wadsworth, Mr. Ellsworth, and Col. Jesse Root, on the 26th October, at which time it "seemed to be going on with spirit." "Their broadcloths," he records in his diary of that date, "are not of the first quality as yet, but they are good, as are their coatings, cassimeres, serges, and everlastings; of the first, that is, broadcloth, I ordered a suit to be sent to me at New York, and of the latter a whole piece to make breeches for my servants. All the parts of this business are performed at the manufactory, except the spinning—this is done by the country people, who are paid by the cut."[1] He is said to have read his speech to Congress, in the ensuing January, in a full suit of broadcloth made at the Hartford factory, and presented by the owners. Cloths of gray-mixed or pepper-and-salt colors were well made at this factory; and many prominent gentlemen, including Mr. Wadsworth, an active patron of domestic industry, Mr. Jay, the minister to France, and Baron Steuben, set the example of wearing them. The latter is said to have invented a button, expressly to be worn with them, which was made from the conch shell, like the wampumpeage, or Indian coin. Robert Pierpont, a Cloth-dresser of Hartford, in the seven months following September, 1789, finished at one press 8,134 yards of Cloth, of which 5,282 yards were fulled Cloth.

Woolen factory at Hartford.

The President remarks in his diary, that he did not hear much of the

(1) Everett's Mount Vernon Papers, No. 10, p. 94.

linen manufacture while at New Haven, and that it seemed to be less important than he had been led to believe. He, however, "saw samples of lustring (exceedingly good) which had been manufactured from the cocoons raised in the town, and silk thread very fine." All, except the weaving, was the work of private families.

A cotton manufactory on a large scale was not long after started at New Haven, but was less successful than some others of the kind. A duck factory was also commenced at Hartford; and another, chiefly supplied with hemp from Connecticut, was, about the year 1788, set on foot at Springfield, Mass. During the next seven years, it yielded a handsome profit to its owners. At the end of that time it employed twenty men. Duck was made in many of the farmers' houses also, in Connecticut and other parts of New England.

In 1788 or '89, a large manufactory of sail duck was established on Frog Lane, in Boston, where a building one hundred and eighty feet long and two stories high was erected for the purpose. The company was incorporated by the General Court, and encouraged by a bounty upon its manufacture. The regulations adopted by the employees secured admirable order and great perfection of workmanship. The weavers and spinners were each formed into a society for mutual aid of the members, with a system of laws for its governance. Quarrels, profanity, or other misconduct were immediately adjudged on the spot by a jury of the weavers, and a fine, deducted from the wages of the offender, went into a common fund for the relief of sick members. Careless workmanship was punished in the same manner, and the goods, if unsaleable, were to be made good. The spinners admitted none into their company except by vote. Their measures to promote industry and self-government were very successful. The duck made at the establishment was said to be the best ever seen in America, and sold lower than imported sail-cloth. The ship *Massachusetts*, of eight hundred tons, about the year 1790, had her sails and cordage wholly of Boston manufacture. The factory, in 1792, produced about two thousand yards of duck weekly, and employed four hundred hands. Its annual production for a number of years after was between two and three thousand bolts, of forty yards each, worth thirteen dollars per bolt. President Washington, who on all occasions manifested an interest in the struggles of the infant manufactures of the country, and visited such factories as came in his way, thus speaks of the duck manufactory at Boston and of the card factory before mentioned, under the date October 28, 1789: "They have 28 looms at work, and 14 girls spinning with both hands (the flax being fastened to the waist). Children (girls) turn the wheels for them, and with this assistance each spinner can turn out 14 pounds of Thread per day, when they stick to it;

but as they are paid by the piece, or work they do, there is no other restraint upon them but to come at 8 o'clock in the morning and return at 6 in the evening. They are daughters of decayed families, and are girls of character—none others are admitted. The number of hands now employed in the different parts of the work is , but the Managers expect to increase them to . This is a work of public utility and private advantage. From hence I went to the card manufactory, where I was informed about 900 hands of one kind, and for one purpose or another, all kinds of cards are made; and there are machines for executing every part of the work in a new and expeditious manner, especially in cutting and bending teeth, which is done at one stroke. They have made 63,000 pair of cards in a year, and can undersell the imported cards—nay, cards of this manufactory have been smuggled into England."[1]

A sail-cloth manufactory was also commenced at Haverhill, Mass., in 1789, which several years after was in a promising condition, but did not finally succeed. Factories of the same kind were likewise established at Salem and Nantucket, and at Exeter, N. H., and Newport, R. I. Those at Salem and Newport became flourishing concerns. The large shipping interests of those towns, and the still unsettled state of the foreign commercial relations of the country, had a tendency to foster manufactures of that kind.

Near the same time that the Hartford woolen factory was commenced, another was set up at Stockbridge, Mass., which produced between five and six thousand yards of fulled Cloth yearly. Another was in operation in Watertown in 1790. Middlesex County, in 1796, possessed twenty-four fulling-mills. In some of the interior towns a large amount of woolen Cloth was produced, and employed many fulling-mills and small establishments in dressing and dyeing it. In the old agricultural county of Worcester the fulling-mills and clothiers' works had increased in 1792 to between thirty and forty in number, chiefly employed upon the home-spun fabrics of the farmers. Cloth of fine scarlet and deep-blue, which were then favorite colors, was made and dressed in a creditable manner. At Pittsfield, in Berkshire County, since noted for its cotton and woolen manufactures, a fulling-mill of the kind then in use, "an old-fashioned, double-action crank mill, driven by a three foot open bucket water-wheel," requiring a strong head of water, was erected in 1770 by Valentine Rathbun, who charged 40 to 50 cts. a yard for fulling and finishing Cloth. Six years after, another, on an improved plan, was built in the town, near the present site of the Pittsfield Woolen Company's Mills, by

(1) Mount Vernon Papers, No. 12, 112.

Deacon Barber. Jacob Ensign and others followed, and fulling-mills soon became numerous. The first *fine* broadcloth made in the United States, it is believed, was produced at Pittsfield in 1804, from the fleeces of imported merino sheep. It was made by Arthur Scholfield, who came to the country in 1789 with Samuel Slater. With several other English operatives, chiefly from Oldham and Saddleworth, he had previously established at the Falls of Parker River, in the parish of Byefield, Newbury, the first incorporated woolen factory in the State, and probably the largest then in the country. Having proved unprofitable in their hands, the shares were one by one transferred to William Bartlett, and by him to John Lee, one of the original company, who in 1806 converted it into a cotton factory. Mr. Scholfield, like Slater, was compelled to construct his machinery at Pittsfield without patterns or drawings, and was even forced to return to England to refresh his memory before he could complete a wool-carding machine, which was put in operation in 1801, and carded wool at 12½ cents a pound. In 1808 he manufactured a piece of black broadcloth of 13 yards, which was presented to President Madison, and a suit from it was worn by him at his inauguration.

The manufacture of wool and fur hats has been several times incidentally mentioned in the foregoing pages. The former branch was a very early and a very considerable department of the woolen manufacture. Nearly every State in the Union was engaged in the business, and in some of them there was scarcely a town that did not make more or less. Within the period comprised in this review, the hat manufacture had increased in Pennsylvania; there were manufactured, as ascertained by a report to the Manufacturing Society of Philadelphia, over one hundred and sixty thousand wool and upward of fifty-four thousand fur hats annually. The four counties beyond the Alleghanies made of the former kind 10,140 and of fur hats 2,200 in a year, having 33 hatters. There were 68 hatters in the city and county of Philadelphia, who made 31,627 fur and 7,000 wool hats yearly. In Berks County there were 38 hatters; in York, 26; in Lancaster and Cumberland, 16 each; in Delaware and West Chester, 14 each; and 6 to 12 in each of the others, making a total in the State of 315 hatters. No county was without several. Wool was to some extent imported from the Eastern States. The greater plenty of wool in New England had rendered hatteries numerous there also. The county of New London, Connecticut, in 1791, contained 17 hatters, who made yearly 10,000 fur and wool hats. American hat-makers were then able to obtain contracts for supplying the army with hats, by underbidding the importers in sealed proposals.

The business was also conducted to a large extent in several other

States, and notwithstanding the more limited supply of wool in Virginia and the interior parts of Carolina.

A gratifying increase in the manufactures of the country, both of the regular and household kind, since the peace, was evident to every attentive observer at the time when the ratification of the Constitution of 1787, by the last of the thirteen States, conferred upon the country a government invested with power to regulate its trade with foreign nations, in such a way as should give the necessary protection to all branches of its industry. The State impost laws, which had opposed a feeble barrier to the flood of foreign merchandise that flowed in after the war, and in some cases, excluded the products of sister States, were all repealed, and the General Congress alone possessed the power of levying duties in future. The injurious competition of foreign goods had been a chief hindrance to the infant manufactures, and many had speedily sunk under the combined effects of low prices, scarcity, and high cost of skilled labor and of machinery. The enormous importations indeed added to the State and federal debts of the country, with no system of finance to reduce either or to prevent their increase, seemed to be hastening a general bankruptcy of the nation, when the enlargement of the powers of Congress was proposed by some of the wisest of the people. Until that measure was consummated, the bonds which held the States together, after the removal of a common danger, seemed to be a rope of sand, which the first waves of returning prosperity were about to dissolve, by arraying each member of the Confederacy against the others in the protection of its individual interests.

By no class of the community was the formation of the new Government, and its general adoption by the States, more zealously urged than by the friends of American Manufactures. With no class, where all were sufferers, was its ratification a subject of greater rejoicing than with the manufacturers and mechanics of every kind.[1] They saw, in the restoration of public and private confidence by the maintenance of the national faith, and in the wholesome check to an impoverishing and corrupting use of foreign manufactures by a general revenue system, the first dawn of hope for their young and feeble manufactures, which

(1) The federal processions and demonstrations in some of the States to celebrate the adoption of the new Constitution, and the toasts and sentiments adopted, testify to the unwonted exhilaration of the public mind on the occasion. The demonstration at York, in Pennsylvania, of which an interesting account will be found in Carey's Museum, shows the numerical strength of the manufacturers and mechanics in the procession; while the objurgatory character of some of the ingenious toasts exhibits the bitterness engendered by the opposition which the new Constitution met in several States.

under every adverse circumstance, gave encouraging prospects for the future.

The inability of the manufacturers of the country to contend at once with the machinery of Europe, and particularly of England, which they were yet unable to obtain, and with the low prices and extended credits which the state of foreign trade then arrayed against them, rendered the encouragement and protection of their interests, equally with those of commerce, an object with the first Congress. Hence, as Mr. Pitkin observes, "in laying duties on imports, in July, 1789, Congress had reference, as the preamble of the Act imposing them declares, to 'the encouragement and protection of manufactures.' This was also openly avowed on the floor of the House of Representatives, in the debates on the first tariff established by the General Government."

"The first Secretary of the Treasury (Hamilton), whose powerful mind seemed intuitively fully to comprehend every subject to which it bent its force, was the great advocate of American Manufactures.

"In his celebrated report on this subject, presented to the House of Representatives in January, 1791, every argument was used, and, we may truly add, exhausted, in favor of the policy and expediency of protecting and encouraging this branch of domestic economy."

In the lucid report of Mr. Hamilton we shall hereafter furnish official evidence of the state of manufactures at the commencement of our national existence.

We shall only add in this place, that the assistant Secretary, Mr. Coxe, about this period, asserted that the manufactures of the United States were certainly greater than double the value of their exports in native commodities, and much greater than the gross value of all their imports, including the value of the goods exported again.

(1) View of the United States, p. 430.

CHAPTER XVI.

TANNING AND THE MANUFACTURES OF LEATHER.

THE manufacture of tanned Leather, and of tawed and dressed skins of different kinds, and their conversion to the numerous purposes of elegance and necessity, have attained in this country almost the front rank as a branch of national industry. The making of Leather and of its manufactured products probably employs a larger number of separate establishments, of various sizes, furnishes occupation to a greater number of hands, and yields an annual result of higher value than any one raw material, wood alone perhaps excepted. It is a strong support to the agriculture of the country, and to the commercial interests, internal and foreign, of its principal centres of trade. Its relations to these great objects, and to the domestic comfort and the mechanical arrangements of the whole people, render not less applicable to ourselves than to any other nation the suggestive observations of an English author upon the subject of Leather:

"If we look abroad on the instruments of husbandry, on the implements used in most mechanic trades, on the structure of a multitude of engines and machines; or if we contemplate at home the necessary parts of our clothing, breeches, shoes, boots, gloves, or the furniture of our houses, the books on our shelves, the harness of our horses, and even the substance of our carriages, what do we see but instances of human industry exerted upon Leather? What an aptitude has this single material, in a variety of circumstances, for the relief of our necessities, and supplying conveniences in every state and stage of life! Without it, or even without it in the plenty we have it, to what difficulties should we be exposed!"[1]

This great industry, according to the Census of 1850, employed in the United States, in its several allied and dependent branches, wherein Leather and skins are the chief material, over 146,000 hands, and yielded an aggregate product of nearly one hundred and thirty millions of dollars.

(1) Dr. Campbell's Political Survey of Great Britain.

HENRY POOR.
BOSTON.

FAYETTE SHAW
BOSTON.

REPRESENTATIVE LEATHER MANUFACTURERS OF NEW ENGLAND.

1866.

ABIJAH THOMPSON.
WOBURN MASS.

JOHN CUMMINGS.
WOBURN MASS.

GEO. K. PEVEAR
BOSTON.

P. JEWELL.
HARTFORD, CONN.

Eng.d by G.E. Perine Co. N.York.

Its present magnitude has been of comparatively recent growth, and is due in part to the increase of wealth and luxury, to the extension of our mechanical industry and our foreign commerce, but more than all, to the mechanical inventions and the scientific principles applied during the present century to the manufacture of the crude material. The tanning and dressing of Leather and skins, during the ante-revolutionary period, was quite a primitive and empirical art. It received little aid from chemistry or machinery, by which the processes have been abbreviated, economized and cheapened, and the product, in its variety and perfection of finish, adapted to all the purposes of taste and utility that a high civilization has created.

Antiquity of the Art.

The art, however, is one of very high antiquity. The pictorial tableaux inscribed on the tombs of ancient Egypt clearly represent the tanner, the currier, and the shoemaker engaged in the various stages of their arts, with the materials and implements of their trades disposed about them. It is somewhat remarkable that the leather slice of the shoemaker, in nearly its present form, with the blade painted yellow, to show that it was made of brass, as well as the awl, are plainly delineated among the tools that symbolize the trades practiced over thirty centuries ago. So numerous were the leather-makers, that a particular locality in ancient Thebes was assigned them with the dyers and fullers of cloth. These they appear to have equaled in chemical skill, as shown by the various colors given to the skins arranged on shelves in their workshops. The remnants of Leather found in Theban tombs reveal the use of the acacia and other trees in the tanning process. The Jews, after the Exodus, probably practiced the knowledge learned of the subjects of the Pharaohs, in preparing the rams' skins, dyed red, for the service of the tabernacle. Whether the art of dyeing Leather in the manner so long practiced on the eastern and southern shores of the Mediterranean, which Europe obtained with difficulty only toward the close of the last century, has thus descended to us from the Leather manufacturers of Egypt, we leave to those more learned in such matters to determine.

Leather-dressing among the Indians.

It is, however, an interesting fact in the history of the art, that bronze leather-slices, similar to the Egyptian, have been found in large numbers in the sepulchres of ancient Mexico, indicating a knowledge of Leather-working by a people possibly coeval with those among whom the arts were cradled in the Eastern Continent Among their successors at the period of the conquest, and the more barbarous tribes of other parts of the continent, the knowledge of Leather-dressing was confined to the preparation, in various styles suitable for clothing, of the skins of wild beasts and birds—for they had no domestic

animals. Considerable skill was evinced in the dressing of buffalo, deer, elk, and other skins for that purpose. As robes for external wear, they were prepared with the wool, hair, or feathers on, and for under garments the smaller skins were made into a kind of chamois Leather by removing the hair and dressing them with the brains of the animal, which rendered them very soft and pliable. A squaw could thus prepare eight or ten skins in a day. Morton, an early historian of New England, mentions that the northern Indians converted their skins "into very good leather, making the same plume and soft," and that the moose skins "they commonly dress bare and make them wondrous white, and stripe them with size round about the borders in form like lace set on by a Tayler, and some they stripe with size in workes of severall fashions very curious, according to the severall fantasies of the workmen, wherein they strive to excel one another." The moccasins and leggings were usually made from the moose skins. In the coloring and pictorial embellishment of these skins, the southern Indians in early times appear to have excelled any of a later period. "The skins," says an early Spanish historian, "are well corried, and they give them what colour they list, so perfect that, if it be red, it seemeth a very fine clothe in graine, and the black is most fine, and of the same colours." But the American Indians, like all savage and nomadic races, possessed no domestic animals, except, perhaps, a few llamas and vicunas, owned by the more civilized Peruvians. The possession of domestic cattle has been held to mark the boundaries between savage and civilized life, as the extent of the Leather manufacture has been regarded as a fair measure of the degree of civilization among cultivated nations.[1] Nothing, therefore, entitled to the name of a Leather manufacture, existed among the natives of this continent. Although they preserved and hardened the coarser skins by smoking them, they appear to have been ignorant of the properties of certain astringent barks and vegetable substances to condense the membranes

(1) The Empire of Japan forms, in some measure, an exception to the general encouragement of manufactures of Leather among nations at all advanced in civilization. Shoes of leather are not worn by that people, but Leather is manufactured for some other purposes. The tanners, workers, and dealers in Leather are, by a singular national prejudice, confined to their own villages exclusively, and are not even permitted to enter the cities, except as executioners. They do not even form a *caste*, or class, of which there are eight several grades; and they are not estimated in the census, nor their villages taken into account in the estimation of distances. A vessel once used by a Leather-dresser or dealer is thrown away. The prejudice in which this social ban originated, is believed to be connected with the Asiatic doctrine of the metempsychosis and the transmission of souls through the bodies of animals, as the Japanese do not eat the meat of horned cattle.

and correct their septic tendency, upon which the whole process of tanning depends.

As no domestic animals were found in America by the European settlers, some time must necessarily elapse before their natural increase, where many exterminating causes existed, would furnish a regular supply of skins for the tanner.

Columbus is said to have brought the first domestic cattle to America, on his second voyage in 1493. They were taken to Newfoundland and Nova Scotia by the Portuguese, in 1553, and increased rapidly. Black cattle, horses, swine, and sheep, were introduced into Florida about the year 1565, and neat cattle into Canada by the French, in 1608. In the following year, we find the first permanent English colony in Virginia in possession of between five and six hundred hogs, as many fowls, some goats, sheep, and horses. These were all killed or carried off by the natives, or were eaten even to the skins of the horses by the impoverished colonists. In 1610, or earlier, kine were brought by Sir Ralph Lane from the West Indies to Virginia, where the killing of any domestic cattle was that year forbidden on pain of death. The most timely and unexpected accession of cattle was the next year made by Sir Thomas Gates, who arrived with three hundred emigrants, one or two hundred cows, some swine, and ample provisions for the infant settlement. To this stock were added a few obtained two years after by Argall, in a successful raid upon the French settlements of Acadia. In 1620, the cattle had increased to about 500, "much bigger of body than the breed from which they came; the horses also more beautiful and fuller of courage."[1] In a list of tradesmen to be sent to the Colony the same year, are enumerated Tanners, Leather-dressers, and Shoemakers. These and other tradespeople are represented to have made comfortable livings by their arts in 1649, when the cattle, including bulls, cows, and calves, numbered 20,000; which was ten thousand less than they were in 1639. Although the industry of the people had been unwisely directed to the cultivation of silk, vines, and olives, rather than to the raising of corn and cattle, they had also, in 1649, 200 horses, 3,000 sheep, 5,000 goats, and many swine. Cattle were thus early exported to New England, and many were killed to supply the shipping, which in Christmas of the previous year amounted to ten sail from London, two from Bristol, twelve from Holland, and seven from New England. This lively trade supplied the population, which then amounted to about twenty thousand, with shoes and the necessary supplies of Leather. But the earliest mention we find of an attempt to manufacture,

First cattle in America.

Tanners sent to Virginia.

(1) A Declaration of the State of Virginia, p. 5.

though doubtless there were earlier ones, is in a publication of this date. The enterprise of an old settler, Captain Matthews, a member of the legislature, is strongly commended in several branches of industry. He employed a large household in raising and manufacturing hemp and flax into linen. He had also erected a tan-house and manufactured Leather, and kept eight shoemakers constantly engaged in their trade. He had forty negroes trained to mechanical pursuits. This prosperous planter, we are told, had abundance of wheat and barley; "kills stores of Beeves and sells them to victuall the ships when they come thither; hath abundance of kine, a brave Dairy, swine, great store, and Poltery: he married the Daughter of Sir Tho. Hinton, and, in a word, keeps a good house, lives bravely, and a true lover of Virginia; he is worthy of much honor."[1] In 1656 Virginia is represented to have been exceedingly replenished with neat cattle and other domestic animals, except sheep; and the sale of beef, pork, and bacon, to the shipping and for the West Indies, was a source of much profit. But the manufacture of Leather appears not to have kept pace with the supply of hides and skins.

The first indication of a general interest in the subject of domestic manufacture was given in several statutes of the legislature, in 1662, for the encouragement of different branches of industry. Among other things, it was enacted that tan-houses should be erected in every county, at the county charge, and a provision of tanners, curriers, and shoemakers for making the hides of the country into Leather and shoes. An allowance was to be made to every inhabitant of the country for every dry hide, at the rate of two pounds of tobacco per pound; and shoes were to be sold at thirty and thirty-five pounds of tobacco for the six largest sizes, etc. The exportation of hides out of the country was forbidden under penalty of one thousand pounds of tobacco for every hide so exported. Mares and sheep were not to be exported on pain of forfeiting treble their value. The low price of tobacco was the chief incentive to the efforts made at this time to create a more varied industry. The same cause, greatly aggravated by the increase of slave labor, which, as Lord Culpepper stated, made them "too many for that and too few for anything else," and the enforcement of the Trade Acts, produced in 1682 another Act in Virginia for the advancement of manufactures. In addition to the encouragement of the cloth-manufacture, it was ordered (anno 1682, ch. 4) that no person shall "export out of Virginia any Iron, wool, wool fells, skins, or hides, or Leather, tanned or untanned, or any deer, oxe, steer, bull, cow, or calf, or lay the same aboard any ship or vessel, unless it appear by oath of the

Tan-houses to be erected.

(1) A Perfect Description of Virginia, p. 15.

owner that it is to be carried directly to some Tann-house or smith's in the country, to be there wrought up." The price was that year fixed for dressed buckskins—which were abundant, and entered largely into the clothing of the inhabitants—at 2*s.* 4¾*d.* each; undressed, 1*s.* 2*d.*; and of doeskins dressed, each, 1*s.* 9*d.*; undressed, 1*s.*; wheat being 4*s.* per bushel, and tobacco 10*s.* per hundred-weight—at which prices all these articles were to be received for debts. Tradesmen of all kinds, who would settle in the Colony, were made free from arrest for debts previously contracted.

These legislative efforts to preserve cattle and hides, and to promote the manufacture of Leather, appear to have been rendered necessary by the bad economy of the people, with whom live stock seem to have been little valued. If we may accept the statements of Mr. John Clayton to the Royal Society, in 1688, cattle were much neglected. They were provided with neither hay nor shelter, but were allowed to wander at large—except for cowpenning their tobacco patches, the only system of manuring practiced. Some planters lost twenty and thirty in a spring by starvation and various accidents. There were many wild cattle in unfrequented parts. The cows were not even milked in winter, a prejudice prevailing that it would kill them. The price of a cow and calf, he says, was 50*s.*, "sight unseen, be she big or little, they are never very curious to examine that point."

The legislature of Maryland also endeavored, in 1681 and the following year, to create an interest in home manufactures, but with no great success. Laws were enacted to promote tillage and the raising of provisions for exportation, and for restraining the exportation of Leather and hides by the imposition of a duty, intended for the encouragement of tanners and shoemakers.

Leather-making encouraged in Maryland.

Beverley, who wrote a few years after this, represents the hats and Leather of the Virginians, as well as their shoes and clothing generally, to be derived from England, notwithstanding a plenty of furs, and skins, and wool. A few hides, he says, were "with much ado tanned and made into servants' shoes, but at so careless a rate that the planters don't care to try them if they can get others; and sometimes, perhaps, a better manager than ordinary will vouchsafe to make a pair of breeches of a deerskin."

In New England, during this time, the manufacture of Leather had become an established branch of domestic industry. Stock husbandry, upon which the Leather business, notwithstanding large importations of foreign hides, is greatly dependent, was an early and profitable resource of the New England people. The first neat cattle were introduced into the Plymouth Colony by Edward Winslow, in the spring of 1624, and consisted of three heifers and a bull, to which

The art in New England.

were added 12 cows sent to Cape Ann in 1626, and 30 more in 1629. With the emigration to Massachusetts under the first charter, in 1629, were sent 140 head of neat cattle and some horses and goats. Among the estimates of the company were 20 cows and bulls, at £4 each. As in Virginia, many of these were probably sacrificed to supply the wants of a starving population, or fell by the arrow and the hatchet of the Indian, who hovered on the skirts of the distressed settlements. Of three hundred kine and a number of other cattle, shipped in the following year with the large emigration that accompanied Governor Winthrop, more than half died on the passage and during the ensuing winter, while a dire mortality invaded nearly every family of the emigrants. Milch cows, in consequence, rose in value to twenty-five and thirty pounds. The continued accessions of people from England made it the interest of the owners of stock to increase them to the utmost. Notwithstanding the frequent scarcity of food, the depredations of wolves, and the savage forays of the natives, the increase of cattle was very rapid. By the rise in price of corn and cattle, Mr. Bradford says, "many were much enriched and comodities grue plentifull; and yet in other regards this benefite turned to their hurte, and this accession of strength to their weaknes. For now their stocks increased, and ye increase vendible, ther was no longer any holding them togeather, but now they must of necessitie goe to their great lots; they could not otherwise keep their katle, and having oxen growne, they must have land for plowing and tillage. And no man thought he could live, except he had catle and a great deale of ground to keep them, all striving to increase their stocks."[1] This early disposition to migrate, led, in the autumn of 1635, a company of sixty pilgrims, with their women, children, and cattle, through the untracked forests of Massachusetts to the banks of the Connecticut, where they suffered again the privations of the earlier pioneers of New England, losing many of their cattle, but preserving a remnant to stock the future homesteads of the Colony. The following June witnessed a larger pilgrimage from the Bay settlements, wending its slow way, with droves to the number of 160 head of cattle, across the mountains, swamps, and fords of the same wilderness track. The emigrants, subsisting upon the milk of their kine, and these upon the browse of the forest, thus planted, under

(1) History of Plymouth, 302. There were in 1637, according to Graham, but 37 plows in all Massachusetts. As John Blackleach, of Salem, had not, in 1638–9, "sufficient land to maintain a plough" on his farm of 300 acres, "the towne, for the furthering of his endeavors in plowing and for his encouragement therein," allow him more land.—*Felt's Salem.*

The isolation occasioned by this greed of land was regarded as an evil in Virginia and New England, and, while it multiplied settlements, contributed to their insecurity.

an organized government, the arts of civilized life and a new embryo commonwealth, upon the hunting-grounds of the savage. During the Pequot and other Indian wars which followed, live stock was a precarious property, but nevertheless continued to increase, and furnished articles for exportation.

New Hampshire, about the year 1632, obtained its first cattle, of a large-sized breed, from Denmark, through Captain John Mason and his associates. In 1645, one hundred oxen were driven from Capt. Mason's plantation, near Portsmouth, to Boston, and sold at £20 a head. Maine was chiefly stocked from the same large, dun-colored breed, which were valued in the lumbering business for their size.

The continued arrival of new settlers in New England kept up the demand for cattle, and maintained their prices at £20 to £30 a head. Their numbers were consequently multiplied, but being too valuable for slaughter, the herds probably furnished little material for the tanner. But the sudden reduction of the price to £5 a piece, by the subsequent stoppage of emigration from Europe, found neat cattle and other stock well diffused over the country; and the Colonists became consumers and exporters of beef and other meats, perhaps beyond any others in proportion to their numbers. As a people's industry is so often shaped by the physical conditions which surround them, and the presence of a raw material is a strong incentive to manufactures, it is no extravagant conjecture, that the abundance of the integuments furnished by their stock-raising led several of the old towns of New England into the shoe and leather manufacture, for which they have been long noted. Mr. Higginson, of Salem, in 1630, mentions the extraordinary increase of cattle and "store of sumacke trees, good for dying and tanning of Leather."

First New England Tannery.

Among those who excelled in stock husbandry were the first settlers of Lynn, who were principally farmers, and had large numbers of horned cattle, sheep, and goats. For many years before their lands were divided or fenced, their neat cattle were kept in a common herd under an overseer or hayward, and the island of Nahant was the common sheepwalk, where the flocks were attended by a public shepherd.[1] Whether the bovine and ovine wealth of the farmers of Lynn promised a better supply of material does not appear. But at the village of Swampscott, in that town, was erected the first *Tannery* in New England. The first white settlers of Lynn were Edmund and Francis Ingalls, from Lincolnshire, England. The former, in 1629, settled as a farmer in the eastern part of the town, where the site of his residence is still pointed out on Fayette street. His brother Francis

(1) Lewis' Hist. Lynn.

built a tannery on Humphrey's Brook, where it is crossed by a stone bridge, but the precise date is not stated. The vats were filled up in 1825.[1] The first shoemaker known in Lynn was Philip Kertland, from Sherrington, in Buckinghamshire, who settled there in 1635.[2] John Harbert, a shoemaker from Nottingham, settled at Salem the same year.[3]

Among the outfits provided for the Colony in 1629, shoes "*from ten to thirteen*," for men, principally of neats' Leather, are charged at 2*s.* to 2*s.* 7*d.* per pair, with a large proportion of Leather and buff clothing, such as "sutes, dublett and hose, of leather lyned with oiled leather," gloves of calves' leather and of tanned sheepskins, leather girdles, "dubletts and breeches of oyled lether," "breeches of leather drawers to serve to weare with boeth their other sutes." In the Company's letter to the Governor in April, 1629, they say, "Wee have made our servants' apparell of cloth and lether, which lether is not of oyle skinns, for we find them over deere."[4] For many years the dress of servants, and, to some extent, of all the active classes, consisted in part of leather dressed as "buff leather," or tanned; and many deer-skins, obtained by the musket of the planter, or in trade with the natives, furnished materials for this serviceable apparel.

Shoemakers among the first settlers.

The letter of the Company also commends to the care of the Governor, Thomas Beard, a shoemaker, who was to be maintained at the public charge for £10 a year, and to be under the Governor's direction as to his place of employment. A supply of hides for his use accompanied him in the Mayflower, for which he was to pay freight at £4 a ton. It was directed that fifty acres of land should be allotted him as one that transported himself at his own charge.[5] This person appears to have been the first of "the gentle craft of leather" in Massachusetts, but we are not informed where he settled.

Among the early inhabitants of Boston were George Hun, a tanner, who was made a freeman in 1637, but died in 1640; Jeremy Houchin or Hutchins, also a tanner, took the freeman's oath in 1640; and William Copp, a shoemaker, the owner of Copp's (previously Snow) Hill, at the North-End, who took the oath in 1641.[6]

Early law respecting Leather in Mass.

In October, 1640, it was declared by the General Court that "Whereas we are informed of the neglect of many in not saving such hides and skins as either by casualty or slaughter come to hand," all such hides should be preserved to be tanned, or the owner should forfeit the skin and £12. This order implies the existence of tan-

(1) Barber's Hist. Coll. of Mass.
(2) Lewis' Lynn.
(3) Felt's Salem.
(4) Felt's Annals of Salem, i. 5, 49.
(5) Ibid. i. 102.
(6) Dearborn's Boston Notions, p. 46.

neries to which they could be sent. It is probable that tanneries were established in Boston, Charlestown, Watertown, and other of the first settled towns, very soon after their occupation. The cattle in the Province numbered at this date twelve thousand. In Watertown two searchers and sealers of Leather were appointed by order of the court in 1638.[1] Leather searchers, in conformity with an Act of the General Court, were appointed in Salem in 1642. This Act, passed June 14th of that year, was the first general law of the Assembly to regulate the manufacture of Leather in Massachusetts, and shows that it was already becoming an established industry.

It ordered that "no Butcher, Currier, or shooe-maker shall exercise the trade of a tanner, on the forfeiture of 6*s.* 8*d.* for every skin he shall tann, while they use any of the trades aforesaid, nor shall any tanner use the trades of Butcher, currier, or shooe-maker under the like penalty." A clause prohibiting any but tanners from buying or even bespeaking any raw hides of ox, bull, steer, or cow, in the hair, was soon after repealed. No Leather over-limed, or insufficiently tanned, or not thoroughly dried after tanning might be exposed for sale. Tanners putting Leather into hot or warm "moors," or setting their "fatts" in places improper, where the Leather would heat and burn, were to forfeit £20 for each offense. Curriers were not to dress any Leather imperfectly tanned or dried, nor use "any deceitful or subtil mixture, thing, way, or means to corrupt or hurt the leather, nor curry any sole leather with any thing but with good hard tallow, nor with less than the leather would receive; nor dress or curry any upper leather but with good and sufficient stuff, not salt, and should thoroughly liquor it until it would receive no more; they were not to burn or scald any leather in the currying, on forfeiture of every hide marred by unworkmanlike handling, to be judged by the oath of sufficient witnesses. Every town requiring it was to have one or more sealers or markers of leather, who were to receive as fees 1*d.* per hide for all parcels under a certain number, and 5*d.* and 6*d.* for every dicker above, to be paid by the tanner at the time of sealing."[2]

On the 4th Nov., 1646, a law was made to prohibit the exportation of raw hides, skins, felts, or unwrought leather on pain of forfeiting the goods or the value thereof, and a like penalty to the master of any vessel that should take them on board. The exportation of raw hides or skins imported from other parts, and of the skins of wild beasts, as beavers, moose, bears, and otters, was permitted.

Among the most ancient of those companies or fraternities of different

(1) Bond's Hist. of Watertown.

(2) Records, vol. ii. p. 17. Abridgement of Plantation Laws, London, 1704, p. 65.

trades, which arose in Europe upon the decay of the feudal system, with certain civic privileges and powers, to regulate the profits, membership, and other affairs of the corporation, were the cordwainers' company, incorporated in 1410, the coopers' company, in 1501, and the curriers' company, in 1605, all in London. These privileged corporations, in which originated the system of apprenticeships, perhaps served some useful purposes in their day. But by limiting the exercise of the trades to members of the guild, and by the injurious monopolies established by their charters and by-laws, the freedom of industry was crippled to a hurtful extent. With the numerous public and private commercial monopolies, which became a serious evil under the Stuarts, most of these civic bodies were swept away by an Act of Parliament in 1624, and patents limited to fourteen years for new manufactures or inventions, and a few other objects, alone retained. The legislators of Massachusetts early insured the benefits of an untrammeled industry by decreeing, in 1641, that "there shall be no monopolies granted or allowed among us but of such new inventions as are profitable to the country, and that for a short time."

In 1648, the coopers and shoemakers of Boston and the vicinity had so far increased in number, that each craft sought and obtained certain corporate privileges from the legislature. The General Court in Boston, on 18th October, granted to "Richard Webb, James Everell, Robert Turner, Edmund Jackson, and the rest of the shewmakers," an Act of incorporation with power to regulate the trade for three years.[1] Although no political or exclusive privileges beyond the regulation of their own trade affairs appear to have been conferred, Johnson, a cotemporary, considered it of much service to the craft. He observes: "All other trades have here fallen into their ranks and places to their great advantage; especially coopers and shoemakers, who had either of them a corporation granted, inriching themselves by their trades very much." "As for tanners and shoemakers," he adds, "it being naturalized in these occupations to have a higher reach in managing their manifactures than other men in New England, and having not changed their nature in this, between them both they have kept men to their stander hitherto, almost doubling the price of their commodities according to the rate they were sold for in England, and yet the plenty of Leather is beyond what they had there, counting the number of the people, but the transportation of boots and shoes into forraign parts hath vented all, however." Cardmakers, glovers, fell-mongers, and furriers are also mentioned in a lengthy

Shoemakers incorporated.

Account of the Trade in 1651.

(1) Records, ii. 249.

list of those who had "orderly turned to their trades" in 1651. The shoemakers and tanners appear not to have been the only ones who possessed the secret of advancing their own interests by arts often regarded as of later origin. "As for tailers," says this writer, "they have not come behind the former, their advantage being in the nurture of new fashions all one with England," and some "have a mystery beyond others, as have the vintners."[1]

That Leather should, within little more than twenty years from the first settlement, have become relatively more plentiful than in England, and that boots and shoes should in the same time become an article of export, appears almost incredible. We find, indeed, the scarcity of Leather expressly assigned, in a sumptuary law in 1651, as the reason for prohibiting, along with gold, silver, silks, laces, and other extravagances of dress, the wearing of great boots by those whom the Selectmen should consider unable to afford it. Shoes appear, however, to have been thus early exported by the merchants of Boston, who already obtained a few, chiefly of calfskin, from Lynn, where the business had begun to take root.

Stuff shoes, for women's use, afterward extensively manufactured at Lynn, were at this early date only worn by the most wealthy, and upon wedding occasions by the less opulent, who thenceforth preserved them as too delicate for ordinary use. Even calf shoes had before the Revolution but a limited use, and morocco leather was not made in this country until after that date. Of the laboring classes, neats' leather shoes formed the principal wear during the Colonial period.

It was probably found inexpedient, where there was a general scarcity of mechanics, to attempt to restrict the workers in Leather too closely to one branch, as contemplated in the Act of 1642. A memorial from Nathaniel Bishop and Hope Allin, curriers, to the General Court in 1666, praying that tanners and shoemakers might not be allowed to carry on currying, was therefore not granted.[2] In 1677, Hugh Mason, one of the first searchers and sealers of Leather at Watertown, appealed to the Assembly on the subject of a law prohibiting the exportation of tanned Leather.

In 1699, the town of Newbury, on certain conditions, granted Ebenezer Knowlton nine rods of land "for the setting up of a tanning trade" at that place.[3] Tanners and shoemakers were probably to be found in most towns in the Colony at that date. George Branhall carried on tanning at Falmouth, in Maine, between 1680 and 1690.

In Connecticut, during this time, the inhabitants had continued to be

(1) Wonder-working Providence.
(2) Records, vol vi. 303.
(3) Coffin's Hist. of Newbury.

almost exclusively agricultural. Mechanics of all kinds were few, and Manufactures had scarcely been attempted. Live stock formed a valuable portion of their farm produce. Pork, beef, fat cattle, and horses were sold in considerable quantities to Boston, New York, and the West Indies. In May, 1651, it was affirmed in Court that 100 beeves were killed in the town of Fairfield the previous year. *Tanning*, as one of the simplest of the arts, and a support of the stock husbandry of the Colony, was commenced, as in Massachusetts, almost with the first settlement. As early as February, 1640, among the earliest enactments, it was ordered that skins should be preserved under penalty for the use of the tanner, and that hemp and flax should be sown for the manufacture of linen and cordage. "That the country may be better enabled to kill yearly some Beeves for supply of leather," it was ordained, September, 1642, that no calves should be killed in the Colony without the permission of two persons appointed by the Court in each town for that purpose. In 1654, a committee was appointed to draw up rules respecting the sealing of leather, and officers for that service in each town were appointed by the Court, October, 1656. At the same time, the Court, "taking into serious consideration the several deceits and abuses, which in other places have been and are commonly practiced by the Tanners, curriers, butchers, and workers of Leather," enacted a law, similar to the Massachusetts law of 1642, prescribing the mode of tanning, dressing, and inspecting Leather. Butchers were enjoined not to gash or cut ox or cow hides, and no tanner was to offer for sale Leather imperfectly tanned or dried. No person "using or occupying the mistery of tanning, to set any of the fatts in tann hills or other places where the woozes or leather put into tann in the same shall or may take any unkinde heates, nor shall any put leather into any hott or warm oozes whatever, on pain of £20 for every offence." Curriers were not to "burn or scald" the hides or leather. Each town was to nominate two respectable men for sealers of leather, whose fees were 2*d.* a hide, or 12*d.* the dicker (of ten hides), payable by the tanner. An addition was made to the law in the following May, requiring the Leather to be sealed in the town where it was tanned before it was offered for sale, and prohibiting the transportation of hides out of the Colony on pain of forfeiture. The price for sealing Leather was in March, 1661–2, increased to 18*d.* a dicker, 12*d.* a half dicker, and 4*d.* by the single hide.[1]

Tanning, etc., in Connecticut.

Early laws respecting Leather.

In the New Haven Colony, then a separate jurisdiction, there was also in 1656 a law on this subject, made in consideration of "the damage or

(1) Colonial Records of Connecticut, vol. i. pp. 61, 75, 259, 285, 298, 377.

injury which many sustaine by the ill coming of Leather, and by the shooe-makers ill making it up into shooes and boots." In each town where a tanner or shoemaker was employed, there were to be one or more sealers of Leather, who were to be under oath not to seal any leather but such as they should judge "sufficiently tanned and fit to be wrought out and sold in shooes and boots." Of this they were to distinguish by separate marks, two qualities, that which was well tanned and fit for upper leather and outer soles, and another which was less perfectly tanned, or was defective either in the liming, beaming, or by frost, or in drying, but was suitable for inner soles but not for other uses. Leather insufficiently tanned was not to be sealed at all, and shoemakers using it, or employing the second quality for outer soles or uppers of boots or shoes, or using any other deceit in making up their ware, were to make restitution to the injured parties. No imported hides were to be used until sealed.

Laws of New Haven.

In the following year, the Court at New Haven received complaints from Stamford of the excessive prices of boots and shoes at that place, as for instance, "six shillings for a pair of shoes of the tenns, and thirty shillings for a pair of bootes as good as which may be bought here for twenty shillings, which the Court thought was great oppression," and therefore ordered these shoemakers to make satisfaction for what they had done amiss, and to reform in future, or answer at the next Court of Magistrates.

Complaints were also made of wrong done in the sizes of shoes; and the Court having been informed that William Newman, of Stamford, "hath an instrument in his hand which he brought out of England, which is thought to be right to determine this question between the buyer and seller, did ordain that the said instrument should be procured and sent to New Haven," and if approved by the next Court of Magistrates, after taking suitable advice, a standard was to be made from it, from which the several plantations in the Colony were to be supplied, with a rule to which all sizes were to conform. This appears to have been the first introduction, at least in Connecticut, of that useful little implement the size-stick, or some equally infallible measure of the pedal developments of our forefathers. These several ordinances respecting tanning and its accessory branches, exhibit them to us in their primitive rudeness. The very limited "assortments" of a cordwainer's shop in that day gave the latter somewhat more Procrustean power than he now possesses. But that he sometimes failed also in making the complete "fit" which is the artistic boast of his modern representative, should be no matter of wonder, since the intrduction of shoes wholly of leather, in their present form, was a recent event. It is

The Size-stick first used.

popularly assigned to the year 1633, in which the first trading house was built at Windsor, in the neighboring jurisdiction.[1] Technical improvement in his own, as well as in the other branches of the Leather business, was also long impeded by the ultra-crepidean practice of the shoemaker in combining with his proper calling that of the tanner and currier, which the General Court of Massachusetts had vainly endeavored to prevent. A principal source of improvement in these arts in recent times has been the more complete separation of the several branches, securing greater skill in each.

It was proposed in the Council at New Haven, in 1662, to prohibit the exportation of hides and leather; but a rumor that Connecticut had repealed its order on the subject, caused its postponement. But in May of the next year the complaints of a scarcity of shoes, on account of the transportation of hides and leather, caused the Court to prohibit the sending out of the Colony either of hides or tanned leather, except in exchange for their value in raw hides.[2]

The Assembly of the united Colonies of Connecticut, at Hartford, Oct. 18th, 1677, regulated the prices to be charged by tanners and shoemakers, by ordering that no tanner should receive more for tanning than two pence a pound for green, and four pence for dry hides. The selling price was fixed at three pence a pound for green, and sixpence for dry hides, which was to be legibly set upon them that their value might be known when tanned. Shoemakers were not permitted to charge for shoes above five and a half pence a size "for all playne and wooden-heeled shoes of all sizes above men's sevens. Three-soled shoes well made and wrought, not above seven and a half pence a size for well-wrought French falls." Every shoe was to be marked with its proper size, and for that purpose every shoemaker was to have by him a true and just size or measure, and to make them accordingly. To make "shoes or ware with a false size or measure to abuse or wrong the buyer," or to sell above the price decreed, involved the forfeiture of the shoes or wares.[3]

(1) Shoes, in much their present form, were doubtless earlier worn. There appears to have been no material change in their style after the settlement of Massachusetts, when shoes were ordered (1629) of large size, at two to two shillings and sixpence a pair, for the use of the emigrants. Shoestrings, as now worn, took the place of the shoe-rose under the Stuarts, and buckles, resembling the horse bean, came into use about 1688. Boots of large size, and for beaux, of flimsy Spanish leather, were then much worn in England, but were not approved of in Massachusetts, and were not very generally used here before the Revolution.

(2) New Haven Colonial Records, by Charles J. Hoadley, A.M., 1858, vol. ii. pp. 215, 301, 472, 489.

(3) Colonial Records of Connecticut, vol. ii. p. 325.

The adult male population of Connecticut was at this time 2,363, and the whole about 12,000. Its yearly exports were short of £9,000. Its towns and the neighboring settlements of New England, had been greatly impoverished and burdened with debts by the war with King Philip, which still raged, and the cattle and other resources of the people were much diminished. In 1680, however, beef sold for $2\frac{1}{2}d.$ and butter for $6d.$ a pound; and the tegumentary products of their herds probably employed a good number of small tanneries.

The principal exports of Rhode Island at the same period were provisions and horses, grazing being a general occupation throughout the Eastern Colonies. The conversion of hides into coarse Leather, which in early Colonial times was often rudely effected by the farmer for his own domestic use, was doubtless commenced long before this in the Narragansett settlements. The arts of the tanner, currier, and cordwainer were placed under legal control in February, 1706–7, by a Colonial law "for preventing of deceits and abuses by tanners, curriers, and shoemakers."[1]

In New York, which now holds so conspicuous a place in the Leather trade and manufacture of the world, among the useful arts early introduced by the Dutch ancestors of the Province, was that of the tanner.

The Art in New York in early times.

Domestic cattle were imported into New Netherlands, under the patronage of the "West India Company," in the spring of 1625, by the Hon. Pieter Evertsen Hulst. He shipped thither, with extreme care, 103 head, consisting of horses, cows, hogs, and sheep, for breeding; each animal having its own stall covered with three feet of sand, and a separate attendant. For many years, however, the price of horned cattle made them too valuable for frequent slaughter. A cow in 1627 was worth £30, and a pair of oxen £40. In 1650, when the company supplied each tenant not only with land, tenements, and tools, but with 4 cows, as many horses and other animals, to be restored in six years, a cow and calf were worth £40. The city of New York, in 1678, killed 400 beeves; in 1694, nearly 4,000.

The first tannery in the Province of which we have found any mention, was owned by one of four brothers named Evertsen, who settled as early as 1638, some at Pavonia and some on Manhattan. The locality of the tannery is not mentioned.

At Rensselaerwyck, in the neighborhood of the present great manufactories of sole leather, it appears by the account books of the Patroon about this time that imported sole leather cost 45 cents, and upper leather and shoemakers' yarn 60 cents per pound. Shoes were from two to four florins

(1) R. I. Colonial Records, vol. iv. p. 7.

(80 cts. to $1.60) a pair. There were probably tanners and shoemakers in the patroonrey among the first settlers, as well as at Manhattan.

Among the residents and property owners of the Dutch capital at the time of its capitulation to the English in 1664, were Adrian Van Laar, a tanner and shoemaker, and Arent Isaacksen, of the latter trade, both living on "Hoogh Straat," now Stone street, between Broad and William, and Jochem Beekman, a shoemaker, on S. E. corner Broad and Beaver.

Coenraet Ten Eyck, a tanner, shoe dealer, and manufacturer, and a principal member of the trade, resided on the Heere Graft, now Broad street, between Beaver and Pearl. His tan pits occupied several marshy lots on the west side of Broad street above Beaver. As early as 1653 he was a prosperous and influential citizen, and the profits of his business enabled him to build and occupy in respectable style a fine house in the former locality. After his decease in 1680, the tanning and other branches of his business were carried on by his sons, Dirck, Tobias, and Coenraet. Pieter Winster, a shoemaker, occupied premises adjoining the house of Ten Eyck, and several others of the trade established themselves on the west side of Broad, north of Beaver street, where a small brook and the swampy ground afforded accommodation for their tanneries, which then formed a customary appendage to their business.

Ten Eyck's Tannery.

On this tract, previously known as the "sheep pasture," where Mr. Ten Eyck owned a large parcel of ground, Abel Hardenbrook, a shoemaker and tanner, built tan pits about the year 1661, his premises occupying the corner of Broad and the "Prince Graft," now Exchange Place, fronting on the latter. A bark-mill, for grinding the bark, was owned in common by him and others in the business. He soon after removed to High, now Stone street, where some of the finest dwellings in the city then stood, and properties valued at several thousand dollars each were owned by him, Jacob Abrahams, Coenraed Ten Eyck Jr., and John Harpending, all tanners, and by a number of wealthy brewers and merchants. The tan pits on Broad street were filled up, with the ditch which ran through it, in 1676, when they were excluded as a nuisance from the city limits, to accommodate the improvements in the rising metropolis.[1]

In August of the same year, Gov. Andros and his Council appointed two tanners for the city, and prohibited all others from exercising the trade. The currier for the city was Peter Pangborne. This petty monopoly was followed two years after by the more important one estab-

(1) Valentine's Hist. of the city of New York.

lished by the Bolting Act, which was of much value to the city. It was also ordained in 1676, "that no butcher be permitted to be currier, or shoemaker, or tanner; nor shall any tanner be either currier, shoemaker, or butcher; it being consonant to the laws of England and practice in the neighbour Colonys of the Massachusetts and Connecticott."[1]

At that time there resided on the north side of High street, between Broad and William, a worthy citizen, John Harpending, who, by assiduous industry in his trade of tanner and shoemaker, had acquired a respectable fortune, and whose moral and religious character procured him the highest esteem. With several others of his trade, he soon after purchased a large tract of land on the east side of Broadway, extending nearly to Gold street, and from Maiden Lane north to Ann street. To this district, afterward long known as the "Shoemakers' Land," the leather fraternity, expelled from their former quarters, removed their tanneries. They established them outside the city walls, along the fenny line of Maiden Lane, on the north side, eastward from William street. The original proprietors of this estate, now the centre of commercial wealth, were Coenraet Ten Eyck, Jacob Abrahams, John Harpending, and Carsten Luerse; and in 1696 they were, in addition to the last two, Charles Lodwick, Abraham Santfort (Jacob Abrahams), and Heiltje Cloppers. The value of lots here, in the beginning of the last century, was about £30 currency of that day. The site of the "North Dutch Church" was the gift of Mr. Harpending, who obtained a large share in the division; and the present John street is said to have derived its name from that early proprietor of the district. From this region the tanners were once more driven, in the march of improvement, to the borders of the Fresh-water Pond beyond the common, and to Beekman's Swamp, where many of them remained to the beginning of the present century, and one or two much later.

The Swamp.

This locality, still known as the "Swamp," where the commercial interests of the trade yet centre and wield an influence second to few in the city, was in the infancy of the city called the "Greppel Bosch," or "Tangled Briars," from the shrubs which occupied the low grounds in that place. Several acres of the swamp were purchased in 1734 by Jacobus Roosevelt, for the sum of £200, from the corporation, though it was at the same time claimed by the heirs of Jacob Leisler. Having been divided by the purchaser into lots, they were principally taken by the tanners, who occupied much of the entire space included between Cliff and Gold and Ferry and Frankford streets, and the north side of Frankford, between Cliff and Duke. In this noted

(1) Dunlop's Hist. of New York; Appendix, p. 126.

region the activity of the trade, before the Revolution, accumulated vast mounds of tan, where the boys of the neighborhood waged mimic battles behind redoubts of that material, spiked with horns from the tan-yards. Other tanners pursued their occupation outside the city palisades, on the southern borders of the "Collect," or Fresh-water Pond, near the junction of the present Centre and Pearl streets.[1]

Early tanneries in New Jersey.

The art of the Tanner was introduced in New Jersey from Long Island, or Connecticut, by the first white settlers at Elizabethtown, in 1660. John Ogden was one of the early proprietors, and tanning was carried on in the town by several of that name from the first. To Colonel William Edwards, a grandson of the eminent Jonathan Edwards, and a descendant by his mother from the Ogdens, the Leather-manufacture in this country is indebted for some of the most valuable mechanical aids it has ever received. Mr. Edwards was born in Elizabethtown in 1770, and learned the business of his uncles, Colonels Mathias Ogden and Oliver Spencer, revolutionary officers, who carried it on in that town. At Northampton, Mass., where Mr. Edwards afterward conducted the business with enterprise, he is believed to have employed the first bark-mill by water. He subsequently invented and patented the copper-heater, long used by tanners, the hide-mill, or fulling-stocks, and the beating or rolling-mill. The saving of manual labor effected by these inventions gave an immense impulse to the manufacture. He afterward erected in the State of New York extensive tanneries, which are still in operation.

East Jersey was probably supplied with cattle from New York by the Dutch. As early as 1668, beef sold for 2½*d.* a pound and 50*s.* a barrel; and in 1675 green hides brought 3*d.* and dry hides 6*d.* a pound.

Settlement of Newark.

About this time, the proprietors of East Jersey invited mechanics to settle in Newark, setting apart to the first of every trade who would reside there a lot of land as a gift. The town received its first shoemaker, Samuel Whitehead, from Elizabethtown about the year 1676. He was "formally admitted a member of the community on condition of his supplying it with shoes." The first tannery in the town was established in 1698.[2] In 1678, the transportation out of the Province, or the sale to any non-resident, of any hides or tanned leather was prohibited by law.[3] This law, though perhaps designed as a remedy for the high cost of foreign manufactures of all kinds, and the duties which the commissioners of the Duke of York were arbitrarily levying on imported goods, was one of questionable utility as a means of increasing the supply.

(1) For most of the above particulars we are indebted to Valentine's History of the City of New York.

(2) Barber's and Howe's Hist. Coll. of New Jersey.

(3) Whitehead's East Jersey, 298.

The circumstances of the Province were favorable for grazing, and beef had then fallen to 2*d.* a pound and 40*s.* a barrel. An enlarged rather than a restricted market for beef and hides would have been found a better expedient in that as in other Colonies where similar laws existed. The prohibition was the next year extended to Indian dressed skins. Elizabethtown and Newark, the latter particularly, continued from that time to make considerable quantities of Leather for domestic use and for exportation. Newark, which in recent times claims to have made the first japanned leather in this country, was some years before the close of the last century the seat of an active shoe and leather manufacture for those times, and has since expanded those and kindred branches, such as saddlery, harness, etc., to a leading rank among its manufactures.

Stock-raising and the production of beef for the markets of New York and Philadelphia was a profitable part of the early husbandry of West Jersey, and furnished good supplies of hides for numerous tanneries. Burlington, the seat of government within three years after it was laid out, was known to kill eight or nine fat oxen on a market-day. Two or three years later many farmers owned twenty to thirty cows, eight or ten oxen, and horses, which they exported, more than they knew. The profits of the first settlers arose, as one of the proprietaries states, "from their improvement of the land and the increase of their bestial."

Trenton, at a later period, had quite a number of tanneries. Salem and other towns had the usual supply of English tradesmen and mechanics, and were doubtless provided with tanners and shoemakers, but of the first essays in their branches we have no account. Shoes and all other English goods were plentifully supplied from the first settlement, and were usually sold at twenty-eight per cent. profit, but to laborers in part pay for wages, sometimes at an advance of 100 per cent. The scarcity of money and the great plenty of hides, bark, and other facilities for tanning, secured an attention to that branch in New Jersey which placed the Province among the foremost in the Leather-manufacture in Colonial times. New York for a long period derived a considerable amount of Leather from the tanneries of New Jersey.

William Penn, one of the proprietaries of West Jersey, or the Free Society of Traders, appears to have established a tannery in his new territory of Pennsylvania on the first settlement. In a letter to the Society, dated August, 1683, he speaks of their tannery as being well supplied with bark. The Swedes, who in 1627 were supplied by the "Swedish West India Company" with neat cattle from their native country, made their own leather and shoes, and the Dutch, who succeeded them, probably had tanneries also. Among the former, however, such arts as they possessed were in an extremely rude

Early Tanneries in Pennsylvania, 1683.

state, and their dress and customs were in many respects nearly assimilated to those of the Aborigines, with whom they drove a large trade in furs and peltry. They were principally farmers, and the shoes of the country people were made like the moccasin of the Indian, with the sole of the same material as the upper. They wore vests and breeches of the Indian-dressed skins. Even the women wore jerkins and petticoats of the same material; and their beds, except the sheets, were chiefly composed of the spoils of the chase. The women, however, spun and wove flax, hemp, and wool.

Many of the European settlers found the buck and deer skins, prepared as wash or buff leather in the manner already mentioned, either by themselves or the natives, a valuable resource in the peculiar circumstances as to climate and mode of life, in which they found themselves. These and the skins of wolves, bears, elks, buffaloes, and other large animals, dressed with the hair, and sometimes embroidered and painted in various styles, constituted a grotesque but serviceable portion of the outward habiliments in early times. Leather stockings or overalls are charged in the private accounts of William Penn at £1 2*s.*, and a painted skin at twelve shillings. The transportation of dressed and undressed deer skins out of the Province, during one year, was prohibited by an Act of the Assembly in 1695.

The price of beef, which is charged in the proprietary's accounts at 4½*d.* per pound, being about double its cost in New England and New Jersey, would seem to indicate a scarcity of cattle. Yet these appear to have been abundant soon after the settlement. A somewhat rose-colored account of the Province in 1697, by an Englishman some time a resident there, states that twenty fat bullocks, besides many sheep, calves, and hogs, were weekly killed in Philadelphia, even in the hottest season. Many planters owned 40 to 60 head of cattle. One is mentioned who had "three hundred Neat Beasts, besides great numbers of Hogs, Horses, and Sheep," and others nearly as many. A fat cow could be bought for £3, and salted beef and pork were regularly exported. Tanners could purchase raw hides for three halfpence per pound, and sold their leather for twelve pence per pound. The cheapness of land, and the profits of produce and cattle raised for the Barbadoes market, rendered labor scarce in the mechanic arts, and accounted for the difference between raw materials and manufactured products. Curriers received 3*s.* 4*d.* a hide for dressing Leather, and paid 20*d.* a gallon for oil. Journeymen shoemakers were paid two shillings a pair both for men's and women's shoes. Last-makers received ten shillings a dozen for their lasts, and heel-makers two shillings a dozen for heels, which were doubtless of wood. These were used by servants many years after. Among the tradesmen of the pros-

pering town were tanners, skinners, glovers, patten-makers, saddlers, collar-makers, bookbinders, and carriage-makers. In 1699 there were but two tanyards in the town, those of William Hudson and of Mr. Lambert. They were both on Dock Creek, in what was called "the swamp." The Creek, in 1739, was occupied by six tanneries, and the citizens petitioned for their removal from the city as nuisances. There were several tanneries on Third street, near the Girard Bank, long after the Creek was filled in 1784. A law was made in 1700 to prevent the sale or manufacture of ill-tanned Leather, but was repealed in 1705. The exportation of Leather was also prohibited, and shoes were to be sold at 6*s.* 6*d.* a pair for men's, and 5*s.* a pair for women's. Leather might be exported where it did not exceed 8*d.* a pound.

In 1704, the shoemakers, saddlers, and others engaged in the working of Leather petitioned for a law to prohibit its exportation; and several inhabitants of the county at the same time asked for a law against the transportation of deer skins dressed in the hair. Both prohibitions were embodied in one bill. In 1721 the legislature, in view of the importance of this branch, passed "An Act for the well Tanning and currying of Leather and regulating of cordwainers and other artificers using and occupying Leather within this Province."

The interior towns were at this time chiefly supplied with shoes and Leather from Philadelphia. Tanneries existed, however, in most of the older settlements. Lancaster early became a place of some activity in the manufacture of Leather, saddlery, etc., which the transportation and travel between Philadelphia and the remoter towns encouraged. Gov. Pownal, who visited it in 1754, speaks of it as a "growing town and making money, and a manufactory here of saddles and packsaddles. It is a stage town, 500 houses and 2,000 inhabitants." Michael Bertgas and Henry Zanck, in 1771, had tan-yards on Queen street, with bark houses, mills, and other appurtenances of the business attached.

In York County there was neither shoemaker nor tanner for some time after its settlement. Shoes were obtained from the capital, and were mended by itinerant cobblers, who went from house to house. The first established shoemaker was Samuel Landys, who set up a shop on Kreutz Creek.

The tannery did not usually, in that day, tarry long behind the first occupants of a new town. It was a necessary appendage to every village, as communication between places was imperfect, and Leather perhaps relatively a greater dependence than in our time. Transportation and travel in new settlements were exclusively by means of pack-horses. As roads became improved, the heavy and cumbersome four-horse wain became the medium of transport. The gear and equipments of these

conveyances required frequent renewal on account of the roughness of the best constructed roads. For various other purposes in Agriculture and the mechanic Arts, Leather was much depended upon. The cost of freight from the seaports to the interior, and of hides thence to the older maritime towns, was saved by the early establishment of a tannery by some member of each new community, or was extemporized, in a rude style, by the larger farmers for their own convenience. The practical knowledge of the business was often as great in the one case as in the other. Tanneries, however, in Pennsylvania, New Jersey, and several parts of New England, soon became very numerous. The cheapness of hides, and of bark, furnished in the process of clearing land, the abundance of suitable streams for carrying it on, and the demand for Leather created by a rapidly augmenting population, rendered the business profitable. The operations were conducted in a routine way, with little regard to the chemical principles involved, and the usual amount of technical skill was soon acquired. Tanneries on a small scale, with no labor-saving appliances, were multiplied with the spread of population and soon became very numerous. Although the Leather, from want of capital, was seldom kept as long in the vats as in England, it was sufficient to meet the requirements of the farmer, the teamster, and the mechanic. The shoemaker, saddle, and harness-maker were scarcely less needed than the tanner, and their shops were soon found in all the larger towns and villages, where coarse shoes for the laborer, and saddlery for the neighborhood, could be procured. In this way, throughout New England and the middle Colonies, Leather, probably equal to that of any European country except England, was made, even before the separation, to an extent more nearly approaching a sufficiency than any other article.

Pennsylvania, with a mixed population of thrifty farmers and European mechanics and tradesmen, took an early lead in the manufacture of Leather, and supplied New York and the Southern Provinces with a portion of their shoes and Leather. Tanned Leather was among the exports of Philadelphia in 1731. A manuscript account book of an early date, deposited in the library of the Historical Society, furnishes some particulars of prices. This belonged to William Parsons, a shoemaker of Philadelphia, and a member of Franklin's junto, who afterward studied mathematics with a view to astrology, but employed it in more useful callings. The price of men's shoes, as then charged in 1723, was 7*s.* to 7*s.* 6*d.* a pair, and of women's 5*s.* to 6*s.* a pair. Sole leather appears to have cost him 9*d.* the pound, calf skins from 3*s.* 6*d.* to 5*s.* a piece, and sheep skins 1*s.* 8*d.* each.

A branch of the Leather business, which the great improvement in the textile arts in the present century has rendered far less extensive than it

formerly was, was the manufacture of buff leather and other kinds of dressed or half dressed skins for clothing. This formed a distinct business in the principal cities and large towns; and buckskin for jackets, vests, breeches, etc, formed a part of the tailor's stock. In the early numbers of Bradford's Mercury, the first Pennsylvania newspaper, for 1719, Matthew Cowley, a skinner of Philadelphia, announces his removal from Chestnut street "to dwell in Walnut street near the Bridg (now Dock street) where all persons may have their Buck and Doe skins drest after the best manner and at reasonable rates. He also dresses White Leather, and can furnish you with bindings, etc." The advertisements in that and other early papers of numerous absconding servants, describe the dress of men as consisting almost uniformly in part of jackets, breeches, or waistcoats of Leather, and sometimes of cloth with Leather linings. These appear to have been wrought up with considerable art, and sometimes had a worm worked along the button-hole, or other embellishment. The buttons were various, as leather, glass, brass, tin, and pewter. Shoes almost wholly of neats' leather are frequently described as "round-toed," and in many cases had wooden heels. Steel buckles are occasionally mentioned as worn by that class. Buckles of polished steel and more costly materials were then in common use among the wealthier classes, and continued to be worn until after the Revolution.

Buff Leather.

In addition to the skinners and leather dressers in the towns, large quantities of the prepared skins of wild animals were furnished by the natives. Logan, the celebrated Mingo chief, maintained his family for several years near Reedsville, in Mifflin County, Pennsylvania, by this aboriginal art. He hunted the wild deer upon the mountains, and sold the skins, dressed by his own hands, to the white people. These skins, in their raw and prepared state, were an important article of commerce, and their prices were as regularly quoted as other merchandise. Buck and doe skins, dressed in oil by white men, brought a higher price than the Indian-dressed. The current price of the two kinds in Boston, January, 1719, was 8*s.* 6*d.* per pound for the former, and 5*s.* for the latter. Those dressed in the hair sold for 1*s.* 8*d.* a pound. Thus the immemorial practice of a leading art among savage tribes yields to the most empirical exercise of civilized skill. A gentleman of public spirit in Newcastle County, in order to stimulate the mechanical industry of the lower counties, offered in 1753 liberal premiums for several products of domestic labor, including a bounty of 40*s.* for the best dressed deer skins. Deer skins with other peltry were exported from all the Colonies from the earliest period. The Southern Provinces especially shipped large quantities, and supplied many to the more northern ones as they became more

scarce. A cotemporary of the Swedes, describing, some thirty years before the grant to William Penn, the first English settlements in a portion of Maryland called New Albion, quaintly commends these materials as a substitute for English cloth. "A good glover with some onely of our own Elk skins maketh the best Buffe coats, our own Stag and Deer skins make best gentile and soldier-clothes fittest for our woods; a Doe-skin breeches with the fur inside, in our short winter, is better than two broadclothes and warmer, so we need no English clothes."[1] The exportation of hides and Leather, as already mentioned, was forbidden in Maryland in 1681. A severe check was given to the prosperity of the Colony a few years later by a pestilence among the cattle, which, in the years 1694 and 1695, carried off over twenty-five thousand neats cattle, and sixty-two thousand hogs.

First Tannery in Baltimore.

Captain Lux, of Baltimore, who in 1733, four years after it was laid out, commanded a vessel in the London trade, purchased, about ten years after, lots on the west side of Light street, where he transacted business in several mercantile and manufacturing branches. He was the proprietor of the first rope-walk in the town, and had a tannery, probably the first also in Baltimore, situated west of Greene street. Several other tan-yards were established on the west side of the Falls, above and below Gay street, between that time and 1771, about which time John Coruthwait erected one on Wilkes street west of Hartford Run.[2]

Tanneries in South Carolina.

Scarcely any effort was made in South Carolina for many years to manufacture Leather or shoes. This arose from no want of materials, for cattle of all kinds were plentiful. These were first introduced in 1670 from England, by William Sayles; and others were imported before the war by General Wade Hampton and Colonel William Singleton. A bad husbandry, however, prevailed, and, as in Virginia, cattle were seldom housed or fed. Tar, turpentine, tobacco, indigo, and rice employed their chief care, and the planters argued they had too much to think about to shelter their stock. We are informed in Mr. Purry's account of the Province in 1731, that cattle were numerous, but that there was not a hovel in all the country for their shelter, in consequence of which ten thousand horned cattle died the previous winter of hunger and cold. The planters did not even know how to mow or provide fodder. Butter was usually 7*s.* 6*d.* a pound (Carolina currency), and in the last winter was 12*s.* One planter had two hundred calves marked in the spring, which like others were turned into the woods to forage for themselves. Beef was exported to the West Indies, and the hides were either exported in a raw state, or cast away

(1) Plantagenet's New Albion, p. 31. (2) Griffith's Annals of Baltimore.

as worthless. There were few if any tanners or shoemakers, and ox hides were sold for 20*s.* each, and shoes imported and sold at 10*s.* a pair. "Neither are they destitute of the means to tan them," observes this writer, "for they make very good lime with oyster shells, and the bark of oak trees is so plentiful that it costs but the trouble of gathering. They want therefore only a sufficient number of good tanners and shoemakers. I might say the same of Leather-dressers, since they send every year to England above 200,000 deer skins undrest. Yet Carolina produces Oker naturally, and good Fish oyle may be had from New York or New England very cheap, so that they might be drest and made up into Breeches in the country; for which these skins are very proper, being warm in winter and cool in summer."

In 1747, the exports from Charleston included 10,356 pounds weight of tanned Leather, worth 5*s.* a pound (about 8½*d.* sterling), and 141 calf skins, worth 5*s.* 8*d.* of the same currency, and 720 hogsheads of deer skins, at £50 sterling each.[1] In 1754 the exports included 4,196 tanned hides and 1,200 in the hair, with 882 hogsheads of wild deer skins.

North Carolina in 1753 also exported one thousand hundred-weight of tanned Leather, and about 30,000 deer skins.

Georgia in 1755 shipped 49,995 lbs. of deer skins, and 3,250 lbs. of tanned Leather; and in 1760, 65,765 lbs. of the former, and 34,725 of the latter, which amounts were increased in 1772 to 213,475 lbs. of deer skins, and 52,126 of tanned Leather. The export of Leather in 1772, which was just double that of Philadelphia in the previous year, indicates the limited home consumption in Georgia, the population of which was probably not over one-tenth that of Pennsylvania.

Immense numbers of cattle of a small breed, which there were few attempts to improve, were raised before the Revolution in the back settlements of the three Southern Provinces. These were produced at a very small cost, being suffered to run wild in the woods on account of the mildness of the winters. Many farmers owned from 500 to 1,500 head each. But little beef was exported. The cattle were sold in the lean state at from one to two guineas each, and driven to Pennsylvania, where they were fattened for market. The price of calf skins at Charleston, as above quoted, namely 5*s.* 8*d.* currency—which was one-seventh the value of sterling—is an evidence of the small size and value of such skins. It was about the price of one pound of tanned Leather.

An ample supply of hides and wild skins, with unlimited quantities of several kinds of the best oak bark, sumach, and other materials for tanning, failed, however, to attract much attention to the Leather-manufacture until after the Peace. In the high country of the interior, where imported goods were

(1) Hist. Coll. of S. Carolina, ii. 234.

less easily obtained, slave labor less abundant, and the ordinary staple productions less profitable, some Leather and shoes were made, chiefly as a household industry. But in the lower and more populous parts of the Carolinas and Georgia the price of a pair of shoes continued, until near the close of the century, to be almost that of an untanned ox or cow hide. This remarkable disparity in price between the material and the finished product was urged by a Society formed in South Carolina in 1794 to aid emigrants, by directing their attention to profitable fields for the employment of capital in Manufactures, of which Leather was one. Several extensive tanneries existed at that time at Fayetteville, in North Carolina, then the largest mercantile town in the interior, and considered an eligible site for other manufactures, of which there were several. Some Leather and shoes were made by the Saltzburgers, at Ebenezer, in Georgia.

The cheapness of land and of servile labor, the profits of agriculture and those branches of crude manufacture which were encouraged by bounties from Parliament, confined attention in the Southern Provinces, throughout their provincial history, chiefly to such products, and rendered mechanical labor extremely scarce and dear. Shoes, and nearly all their necessaries which were the result of skilled labor, were imported from Great Britain, or from the Eastern and Middle Colonies. Leather was very imperfectly manufactured, and much of it was exported with the stores of wild deer skins and other peltry obtained in barter with the Indians. The exports of Charleston in 1784 included 1,968 sides of Leather, and in 1785, 2,517 sides. In the same years the green and dressed hides shipped were 298 and 2,297 respectively. These small amounts show an increased domestic consumption of Leather as well as of the raw material.

The value of such articles of export was indeed diminished in 1764 by an Act of Parliament (4 Geo. III. 3 c. 15), which placed hides and skins on the list of enumerated commodities which, by the laws of trade, were required to be shipped exclusively to Great Britain. The tendency of this measure was to diminish the value of cattle in the Colonies, and to make it an object to manufacture hides and skins into Leather, instead of exporting them in the green state to so distant a market.

This, however, was but one of the modes by which the imperial government, about that time, sought to reimburse the heavy outlays of the war just concluded, by more completely engrossing the profits of the colonial trade, and by new and extraordinary imposts upon its transatlantic subjects. The course adopted throughout the country to defeat the operation of the statutes imposing duties on stamps, and other taxes and restrictions not required for the regulation of commerce, engrafted

upon the colonial mind ideas of which it had before scarcely a remote conception. The possibility and the practicability of becoming independent of foreign sources, in regard to those manufactures of which the country produced the crude materials, began to be doubtfully entertained in a few resentful breasts. These opinions were inculcated in a few patriotic assemblies of merchants and tradesmen, watchful of the future interests of the country, and soon ripened into a popular belief. The good effects of the first experiments in frugality and industry confirmed the general impression, and the subsequent course of the ministry brought the strongest convictions of duty in the matter. By far the larger part of the regular importations from Great Britain consisted of clothing, shoes, and textile materials of every kind for that and various domestic purposes. A necessary consequence of the retrenchment in these articles, enjoined by the general agreements to suspend importations and encourage economy while the obnoxious statutes were enforced, was an increased dependence upon Leather and skins as clothing, to which the people were already habituated. An increased attention to the preservation and breed of cattle and sheep, and of the hides and skins of such as were slaughtered; a more general use of garments of those materials; an increase of tanneries and improvement in the modes of dressing and working of Leather and buckskins, were among the measures recommended in the assemblies and local associations in the several Colonies. In many instances they were further encouraged by premiums and bounties.

The manufacture of Leather and shoes had already become an important branch of New England industry. As early as 1731, the Lords of Trade, as the result of inquiries instituted through the colonial governors, reported to Parliament that the greater part of the Leather used in Massachusetts was manufactured in the Province. In Connecticut the manufactures were "very inconsiderable; the people there being generally employed in tillage, some few in tanning, shoemaking, and other handicrafts."

Shoes in Lynn.

A very considerable improvement was made, some twenty years later, in the shoe manufacture in Massachusetts, which had given an impulse to the business in the Province, and particularly in Essex County, which then, as now, probably made as much Leather and shoes as all the rest of the State. Lynn had carried on the manufacture of women's shoes as a principal industry for about a hundred years, before any essential improvement was made. The art of the shoemaker was indeed very imperfectly understood. Workmen were generally unskilled, as those who possessed the knowledge and capital to insure success preferred an investment in land or trade. To improve

themselves in the mechanism of shoes, the manufacturers would sometimes procure well-made shoes from England, and take them apart to see how they were made. The business was consequently but limited. At the end of a century, during which a surplus for exportation had been produced at Lynn, only three manufacturers employed journeymen. The business was chiefly conducted in families by the manufacturer, assisted by his sons and apprentices. New England was the principal market, and a few were sent to New York and Philadelphia, and occasionally, perhaps, to other ports. In 1750, a Welch shoemaker, named John Adam Dagyr, settled in Lynn, and, by his superior skill in making ladies' shoes, soon became known throughout the surrounding country as the celebrated shoemaker of Essex. Many persons in Lynn and the neighboring towns acquired from him a better knowledge of the art, and obtained the reward of superiority in the increase of their business. A Boston correspondent of the London Chronicle, in 1764, wrote that shoes for women were made at Lynn exceeding in strength and beauty any that were usually imported from London.

From that time, and especially after the war, the business increased rapidly, and attracted to it a larger amount of capital. With other manufactures, that of shoes received a severe check through the large importations made just before the war, and again soon after the Peace. Considerable quantities of shoes for the use of the army were drawn by Congress from Massachusetts during the Revolution. The business was revived and greatly extended before the close of the last century. It was estimated in 1788 that Lynn exported yearly of women's shoes one hundred thousand pairs. A computation made in 1795 made the number of master-workmen in Lynn to be two hundred, and the journeymen and apprentices six hundred. About 300,000 pairs were then exported by the manufacturers chiefly to southern markets. They were sent from Boston, New York, and Philadelphia, to England, and some direct from Lynn to Europe. A single manufacturer was said to have shipped from his own workshop, within seven months, twenty thousand pairs of shoes, valued at £4,974, exclusive of many sold in the neighborhood. These amounts, though small compared with its present business, were promising indications of that enterprise, individual and collective, which has since raised the annual production of the workshops of Lynn to an aggregate of six million pairs of shoes, and more than half that number of boots, valued together at upward of four millions of dollars, as stated in the official returns of the State in 1855, about the close of the second century of the industrial history of the town.

Marblehead, which now makes over one million dollars' worth of shoes yearly, was led into the business long after the Revolution by the decay

of its former business of fishing. Danvers, Haverhill, and other places in Essex were early engaged in the manufacture of women's shoes; and there was, in 1788, a considerable manufacture of men's shoes at Reading near Lynn. Boston, Quincy, and many other towns in the vicinity, engaged in the shoe manufacture after the Revolution. Middlesex County, before the end of the last century, had seventy tanneries.

The fisheries of New England furnished abundance of oil at a cheap rate for the Leather-manufacture. From the coasts of Labrador and Newfoundland were also obtained, before the Revolution, considerable quantities of seal skins. On account of the high duty upon them in England, many, which would otherwise have gone there, were sent to New England, where they were tanned and made into shoes, boots, etc., and returned to supply the fishermen on the northeast coast. Others were dressed in the hair, and were variously employed in making trunks, caps, coats, etc. The manufacture of Leather in Massachusetts in early times was chiefly confined to the old maritime counties, Essex, Middlesex, and Suffolk.

The first tanned Leather sent from Hampshire to Boston market was from Northampton, in 1794, and was the manufacture of Col. William Edwards, before mentioned. He commenced business in that town four years before, while under twenty years of age, and at the same time began a series of improvements in the mechanical branch of the art which were afterward adopted and extended by others, to the signal profit and extension of the manufacture. He was one of the first in his occupation to infuse a greater spirit of enterprise into the business. The construction of his works on an improved plan from those in use throughout the country, and at Elizabethtown, N. J., where he had served an apprenticeship of four years for his board and the privilege of tanning with his master's stock *four sheepskins a year*, and afterward labored as a journeyman at thirty dollars per annum and board, first engaged his attention. The rude appointments of a tannery, as generally built before his time, embraced a greater or less number of oblong boxes or hogsheads sunk in the earth near a small stream, and without cover or outlet below, to serve as vats and leeches. A few similar boxes above ground for lime vats and pools, an open shed for a beam house, and a circular trough fifteen feet in diameter, in which the bark was crushed by alternate wooden and stone wheels, turned by two old or blind horses, at the rate of half a cord a day, completed in most cases the arrangements of the tanyard. Mr. Edwards, as an improvement on this, "began by laying down a trunk of plank made tight underneath his vats to carry off the spent liquor; then a junk to receive it, next leeches above ground in tiers, one above another, raising the liquor by a suction pump worked by

Improvements in Tanning.

two or four men; then substantial buildings over his beam house, and handles, using the lofts for a currier's shop.

He early erected a bark-mill on a stream five miles from his tannery, and so much nearer the region where his bark was ground by water-power, using at first mill-stones, afterward the several iron-mills as they were invented by others; but it is believed to have been the first departure from the old horse-mill already described."[1]

This humble commencement, with a stock of fifty hides, and an improved mechanism and arrangement of the tannery, was afterward pushed, through the intelligent observation of an active mind, to higher results. His operations were extended to neighboring towns, and all his enterprise finally to the Catskill mountains. His subsequent improvements may be more fully noticed hereafter as among the earliest and most important of the mechanical benefits conferred upon the Leather-manufacture.

An early history of the important county of Worcester, Mass., published in 1793,[2] though in other respects somewhat full, has few references to tanneries, or other branches of Leather-manufacture. The author makes mention of over thirty fulling-mills and clothiers' works, which were scarcely more important to the people than tanning and leather-dressing establishments. Two tanneries are mentioned in the township of Charlton, those of Captain Israel Waters and Mr. Asa Corben, the former being carried on in great perfection. Captain Waters had an excellent bark-mill, constructed on a new plan, and propelled by water. It must therefore have been nearly as early as that of Colonel Edwards at Northampton. Water-power was used for that purpose, but to a limited extent, before the present century. There was a bark-mill near the same time at Medford, which was propelled by wind. We should not be warranted in inferring from the silence of the topographer, that there were not many tanneries in that large agricultural county at that date, and shoemakers in nearly all the towns. The county now manufactures more boots than any other, except Essex, and large quantities of shoes, and is the second in the number of its tanneries. Yet, at the above date, thick boots were an indulgence quite unknown to the majority of the inhabitants of the western counties, for we are told that a young stranger, who made his appearance in them, ran the risk of being unpleasantly reminded that "boots" were an innovation.

Tanneries in Worcester.

Among the many expedients devised about the year 1764 to relieve the distress occasioned by the restrictions on colonial trade, was the formation of societies to promote industry and frugality. One of these was

(1) Report of Proceedings at Annual Dinner of Hide and Leather Trade of New York, 1859.

(2) Whitney's History of Worcester County.

established in New York in that year "for the promotion of Arts, Agriculture, and Economy." The Leather branch received its share of encouragement from the society, which in December offered premiums of £20 for tanning the best twenty sides of Bend Leather in the year 1766, and £10 for the best sole Leather, not less than fifty hides; for the best pair of women's shoes, made of stuff, and with soles of leather tanned in the Province, £10; and like sums for the best dressed hundred deer skins, and for the best made pair of beaver skin gloves.

Society encouragement.

The necessity of some form of encouragement appears from the letter of Sir Henry Moore to Lord Hillsborough, dated Fort George, 7th May, 1768, with which he transmitted an official answer to the queries of the Board of Trade respecting manufactures. "No mention is made in the former letter (of January, 1767) of the great quantities of Leather being tanned in this country, as this branch of business has been carried on for many years; the Leather is greatly inferior in quality to that made in Europe, and they are not yet arrived to the perfection of making sole leather." How inapplicable to the present state of the business in New York are the concluding remarks of the governor!

Governor Tryon's report on the same subject, in 1774, represents eleven-twelfths of the dress of the people to be British manufactures, except hats and shoes manufactured in the Province. Peltries, the produce of the Colony, and raw hides from the West Indies or Honduras Bay, were among its exports, which amounted to about £130,000 annually, exclusive of ships built for sale to the value of £30,000 more. Its imports he estimated at £500,000 sterling.

The importation of hides and skins into New York, which is now the great emporium for these commodities, amounted, according to the tables of Lord Sheffield, taken from official sources, in 1774 to only 30,000, and in 1775 to 13,927, valued at 4*s*. 6*d*. each. The exports of these articles are not enumerated.

The first hides from South America sent to Europe were shipped from Brazil to Castile in 1580. But it is not probable that any were brought from that part of the continent, or from the east, until after the Revolution, when American merchants began to extend their commercial adventures into distant seas. As the war interrupted the importation of hides as well as of shoes and other manufactures of Leather, a scarcity soon began to be experienced. Although the manufacture of Leather was at that time one of the most important, the greatest care in the preservation of hides and skins failed to meet the necessities of the people in some parts, and the troops were, in many instances, nearly unfit for duty from inability to obtain shoes. The con-

State of the business during the Revolution.

sumption of Leather and dressed skins, however, was much increased by the substitution of that material for cloth in the apparel of the people and the soldiery, and by the large quantity required for military equipments, saddlery, and other horse furniture.

As early as Oct. 15, 1776, three days after the landing of the British forces under Lord Howe in Westchester, hides were ordered by the New York Convention to be carefully preserved and sent to some safe place north of the Highlands. On the following day, Robert R. Livingston stated in the Convention that large numbers of the hides of cattle supplied by the Eastern States for the army at Ticonderoga, and of others purchased in the State, were sent by the contractors into Connecticut, and many were wasted for want of care. The supplies of Leather were in consequence already nearly exhausted. As much would be required for troops about to be raised in the State, and the people were already distressed by the scarcity of that article, he moved that Congress be asked to authorize the appointment of a commissary to take charge of hides. On the 23d of the following month, Congress by resolution empowered the Commissioners in each Department to employ proper persons to take charge of the hides and tallow in each district, "that the former may be tanned into Leather, or at least so far cured as to prevent them being spoiled," etc. It is stated in a letter from the Commissioners to the northern army to the Commissary-General, that hides at that time were worth at Albany three dollars, but two thousand had without authority been sold to Mr. Ogden, of Elizabethtown, for a medium price between seven and ten shillings, and to others for 13*s.* 4*d.*, 15*s.*, and 22*s.* each. Not the least embarrassing of the many discouragements which attended that campaign and the retreat of the army through New Jersey, was the destitution of shoes and suitable clothing for the temporary levies embodied for the defense of the country, without arms or ammunition, or any system of finance to provide the sinews of war. It was stated to Congress, December 4th, that one-third of the soldiers at Ticonderoga were obliged to do duty without shoes to their feet. Only 900 pairs were sent thither for 12,000 to 13,000 men, in consequence of which many were down with pleurisy, and there were no barracks or hospitals to receive them. The deficiency did not probably arise so much from the actual scarcity either of Leather or shoes, as from inexperience in the Commissariat department, the depreciation of the Continental currency—which it was treasonable to refuse—and the inability of Congress to purchase, by money or credit, suitable supplies. Congress was more than once called upon to denounce in severe terms the conduct of men in different parts of the country who monopolized certain necessaries, or sold them at enormous profits to the agents of Government or

their suffering neighbors. In November 26th a resolution of this kind censured certain persons in Philadelphia who engrossed shoes, stockings, and other necessaries required by the army, and recommended the Assembly to find a remedy therefor. On the following day, ten thousand pairs of shoes and an equal number of stockings were ordered from New England; and the Council of Safety in Philadelphia, in order to supply the companies with arms and clothing, empowered the field officers of each battalion to purchase, and if they could not purchase, to *impress* arms, cartouch boxes, blankets, shoes, stockings, and other necessaries. The several legislatures were also recommended, on 20th December, to enact laws to empower the seizure within their jurisdiction of woolen cloths, shoes, and other necessary supplies for the army.

Among the extraordinary powers conferred on General Washington by a resolution of Congress, December 11, for raising and equipping an army, was the authority to take whatever he might want for its use, if the inhabitants would not sell it, at a reasonable price, and to arrest and confine persons who refused to take the continental currency, or were otherwise disaffected to the American cause. During the operations in New Jersey in the ensuing months, there was much suffering in both armies. The Americans suffered most. "Many of them were without shoes, though marching over frozen ground, which so gashed their naked feet that each step was marked with blood. There was scarcely a tent in the whole army." There was a like scarcity of other clothing. There was probably a greater plenty of Leather and materials than of manufactured work, on account of the limited supply of labor. Women's shoes sold in the summer of 1776 for 13*s.* 6*d.* a pair; and James Claypoole, of Chestertown, Maryland, wrote the Council of Safety, in December, that his inability to obtain hands had prevented his full performance of a contract to supply shoes. In the autumn of the following year, Col. Roberdeau wrote to President Wharton, of Pennsylvania, from Yorktown that he was informed by Mr. Henry, of Lancaster, there were greater quantities of Leather at that place than was ever known before. Much Leather was also stored at Yorktown. The tanners were willing to part with it for green hides, which the Board of War would supply. In the mean time, Mr. Wharton was advised to take possession of the Leather at those places, on account of the necessities of the public service. Tanners who were associators had the preference in the distribution of hides.

Special efforts were also made by Congress to procure supplies of deer skins for the clothing of the military. Gunpowder was placed at the disposal of the commissioners for that purpose. The chief supply of such skins was drawn from Georgia. That material was conspicuous in

the dress of several divisions of the American soldiery. Col. Smallwood's regiment, officered by young men of the best families of Maryland, was principally clothed with it, and the Convention of the State provided liberally of the same material for all its troops. Many a brave and patriotic heart beat beneath a vest of Buckskin, by which name the American soldier was called. Leather doublets were recommended to the people of Philadelphia in the beginning of the troubles with Great Britain in 1774. In that and all the principal towns there were many engaged in the manufacture of the various descriptions of chamois or wash leather, and in making it up into gloves, shirts, vests, breeches, belts, cartouch boxes, etc.

Buckskin.

Parchment was also made in Philadelphia in 1772 by Robert Wood, Fifth street below Walnut, and probably by others. It was considered by the conveyancers equal to any imported.

In March of that year the Assembly of Pennsylvania passed an "Act to prevent Frauds and Abuses in the Manufacture of Leather."

The exports of Leather from the port of Philadelphia for the year ending January 5th, 1772, amounted to 25,970 pounds, and in the two following years to 40,725 and 31,696 pounds respectively.

In 1780 the legislature passed an Act granting to Henry Guest, of New Brunswick, N. J., the exclusive right, for the term of five years, of manufacturing curriers' oil and blubber in a way previously unpracticed and unknown, from materials discovered by him in the United States. A sample and sealed description of the materials were lodged with the Clerk of the Assembly.

The manufacture of the several descriptions of Fancy Leathers from goat and sheep skins, in imitation of the Turkey and Morocco Leathers, was attempted in Philadelphia soon after the introduction of the art in England. This branch has long been a prominent one in the Leather business of Philadelphia, which manufactures Morocco to a far greater amount than any other place in the Union, employing at present over thirty large factories, about sixteen hundred hands, and half a million of capital, with annual sales to the value of about two millions of dollars. The quality is very superior.

Fancy Leathers.

It appears from the first volume of the *Transactions of the Society of Arts* in London, for the year 1783, that, under the influence of rewards offered by the Society, a large manufactory of Red Leather, in imitation of Turkey or Lisbon, had been established in England, and the process first laid before the Society had been greatly improved by a foreigner from whom they had purchased the secret. Skins were then prepared and dyed red and yellow in a manner so excellent as to be preferred by the consumers to any imported; and they were exported in

considerable quantities to foreign markets. It was but one of the many benefits accruing to the productive interests of Great Britain and her Colonies from the generous encouragement, by pecuniary and honorary rewards, extended by the Society to all branches of industry, and which, about the same time, had brought the manufacture of Losh or Buff Leather to equal perfection with the imported, and had also introduced the art of dyeing Turkey red on cotton equal to any from the Levant, an art previously unknown in the kingdom.

The Pennsylvania Society for the Encouragement of Manufactures and useful Arts was established in Philadelphia with similar aims in the year 1787. In the following year Messrs. Tench Coxe and John Kaighn were appointed a committee to inquire into the process of coloring Leather as practiced in Turkey and Morocco. They reported to the Board of Managers that they had made inquiry, and found the business had been attempted by two manufacturers in the city, by one of whom it was still carried on; but they were informed the method of fixing the colors had not yet been obtained. They found also that this branch had been an object of repeated inquiry and experiment in Europe, and that the most valuable matter relating to it ever made public there, was the process which they recommended to the attention of the Board. The excessive difference between the prices of American and Morocco skins, and the great and increasing importance of the Leather branch in the United States, rendered it very desirable that every part of the process, which conveniently could, should be adopted by the manufacturers.

The process for dyeing Leather red and yellow, as practiced in Turkey, with directions for preparing and tanning the skins, as communicated by Mr. Philippi, a native of Armenia, to the Society of Arts, from which he received £100 sterling and the gold medal of the Society, were published in full by order of the Board. Those who are curious to compare the process recommended in the infancy of the art with that pursued at present, may find the instructions, over the signature of the Secretary, C. Wistar, December 24, 1788, in the *Pennsylvania Packet and Daily Advertiser*, No. 3104, for January 13, 1789.

With some differences in the manipulation, we apprehend the process in the several operations of liming, drenching, bating, salting, tanning, and dressing, and the preparation of the dyes, will be found to conform in its essential features to the present practice. Morocco leather of fair quality is said to have been made as early as 1770 by the afterward famous Lord Timothy Dexter and others, at Charlestown, Mass., where it was resumed about 1796 by Elisha Mead.

Sheep skins, now extensively employed in making the inferior or imitation Moroccos, have been rendered much less valuable as tanners'

stock than formerly, by the introduction of the Merino and other fine-wooled breeds, in which the weight and quality of the fleece have been increased at the expense of the size and value of the pelt. They were probably little used at that time by the tanner in Pennsylvania, as there were comparatively few sheep in the State, and their increase was an object with the farmer.

The address of Mr. Coxe before the Pennsylvania Society in 1787, his review of Lord Sheffield, and other writings, in which he labored to direct attention to Manufactures, furnish a few particulars relative to this industry at the period at which we have now arrived.

In calling attention to its importance, he states that the Leather branch in Great Britain was estimated at eleven millions of pounds ster-

State of the Leather-manufacture at the Peace.

ling, or more than a fifth of all their staple manufactures. The American people ate more meat than they, and had the command of many more deer skins. Lord Sheffield stated, about the date of the Peace, that men's shoes were never imported in any great amount except by Virginia and the Carolinas, but that women's shoes were and must continue to be imported in considerable quantities, principally from Great Britain. Although many were made in Massachusetts, particularly at Lynn, and were exported, the stuff, such as callimanco, and the binding and lining, came from Great Britain. No other nation in Europe made Leather as well as the British, and all others were far behind the Americans in that respect. Sole Leather was, however, imported from England to America, because better made; but upper Leathers were as good in America as in England. These remarks of his Lordship, who was not disposed to represent the capabilities of the late Colonies too favorably, are an evidence that good progress had been made in the Leather-manufacture, as well as in those branches which were its chief support.[1]

In reference to the future dependence upon Great Britain for shoes, Mr. Coxe estimated that probably not less than eight millions of pairs of shoes, boots, half-boots, gaiters, slippers, clogs, and galoshoes were annually consumed or exported from the United States in 1791, which was equivalent to two pair of shoes per annum for each of the four millions of the population. At a medium valuation of 75 cents, or 3*s.* 4½*d.* sterling, per pair, they would amount to six millions of dollars. Of that large quantity only 70,450 pairs of shoes, boots, etc., were imported into the United States in the previous year. Tanned Leather weighing 22,698 lbs. was exported within the same time, and 5,700 pairs

(1) Sheffield's Observations on the Commerce of the American States; 2d ed. p. 18.

(2) These consisted of 49,003 pairs of shoes and slippers of Leather, 20,701 pairs of silk and stuff, and 746 pairs of boots.

of boots and shoes. Of unmanufactured hides only 230 were shipped abroad. Leather and shoes to some extent were sent from the Western country.

Principal seats of the Leather-manufacture.

The principal seats of the shoe and Leather-manufacture in the last century and the beginning of this were in Massachusetts, Connecticut, New Jersey, and Pennsylvania, though Maryland and Delaware also made a considerable amount. South Carolina also appears to have made Leather of good quality many years before the Revolution. Sole Leather from that Province even came into competition with that of Pennsylvania in her own markets. Charleston sole Leather and Carolina tanned Leather were advertised by different Leather dealers in Philadelphia in 1759. The hemlock forests of New England furnished the principal tanning material for the former, and in the Middle and Southern States oak bark was chiefly employed. The black oak bark, or Quercitron of commerce, so extensively exported for making yellow dye, was first sent to England before the Revolution from Wilmington, Delaware, where an export trade in the article was established soon after the Peace by one of the discoverers of its valuable dyeing properties.

The abundance and cheapness of several kinds of oak bark in that and neighboring States, and an early impression derived from the superiority of the sole Leather there made that hemlock bark was not well adapted to that manufacture, doubtless contributed to the great development of the business in the vicinity of Philadelphia. Although oak-tanned Leather still has the preference, great improvements have been made in the use of hemlock bark; and the most extensive factories now in the country for making heavy Leather are situated on the borders of the great hemlock forests of New York and New England. The manufacture of Leather has received a great impetus from the transfer of operations to interior situations such as those of the Catskill and other regions abounding in hemlock or oak bark, fuel, and water-power. As early as the middle of the last century Mr. David Ferriss conducted a large and very complete tannery in Wilmington, Delaware; and Zechariah Ferriss, a minister among the Friends, had one at a later period on the north side of the present Second street, above West. Tanneries were early scattered over the interior settlements of Pennsylvania, even to the extreme western borders; and much tanned Leather is still sent thence to Philadelphia to be curried, dressed, and sold. They became extremely numerous in the valleys even in the last century, and still exceed in number those of any other State. Lancaster, Pennsylvania, in 1786, among 234 manufacturers in a population of 700 families, numbered 4 tanners, 36 shoemakers, 17 saddlers, 14 hatters, and 3 skin dressers.

Within ten miles of it were eight tanneries. Beyond the mountains, in Pittsburg, Bedford, Washington, and Huntingdon, some of which had grown up since the war, there were to be found, two or three years after, skin-dressers and breeches-makers, tanners and curriers, shoemakers, saddlers, and saddletree-makers. Pittsburg, which in 1788 was little more than a collection of log-houses, with four or five hundred inhabitants, had two tanners and curriers, five shoemakers, and three saddlers. In 1803, tanned Leather to the value of $10,000 was made there, over $12,000 worth of boots and shoes, nearly $10,000 worth of saddlery and harness work, and $2,300 worth of buckskin breeches and dressed skins. There was a large tannery at Bethlehem, and in nearly all the older towns of the State tanning and leather-working was conducted in its different branches. In the Federal procession in 1789, six hundred shoemakers belonging to Philadelphia and its environs took part, and at York, on a similar occasion, the several branches of the Leather trade were numerously represented.

At this time Leather was exported from Pennsylvania to Virginia, though there were a considerable number of tanneries in that State. Winchester had four or five tanyards, eight or nine shoemakers, and three or four saddletree-makers. These and other branches of the Leather business were all established in many of the older towns of Maryland and Virginia, and even the Western territory, now Kentucky, contained about this time several valuable tanneries.[1]

Importations injure the business.

By the enormous importations of foreign goods to the extent of near thirty millions of dollars in the two years which followed the Peace, against eight or nine millions of exports, many of the shoe manufacturers were nearly ruined, the market having been overstocked with shoes from England and France. To arrest a measure so destructive to the feeble manufacturing interests of the Union, and to stay the efflux of specie, of which it had been already depleted by the war, but especially to provide the means of redeeming the public credit, and thereby restoring private confidence, Congress had vainly asked for the power to regulate the commercial

(1) By the Census of 1810, which returned the number of tanneries in each State and Territory except Massachusetts, North Carolina and East Tennessee, Kentucky was the fifth or sixth in the number of those establishments. New York had 867, Pennsylvania 715, Virginia 442, Connecticut 408, Kentucky 267, New Jersey 248, New Hampshire 236, Ohio 217, Vermont 205, the District of Maine 200, and Maryland 191. Massachusetts returned 299 from seven counties. Five of the most important—Suffolk, Essex, Middlesex, Plymouth, and Nantucket—were not returned. All the remaining States and Territories were below 100. The entire number in the Union was 4,316, and the value of Leather made, $8,388,250. The number of establishments returned in 1850 was 6,263, and the value of their manufacture, $32,861,796.

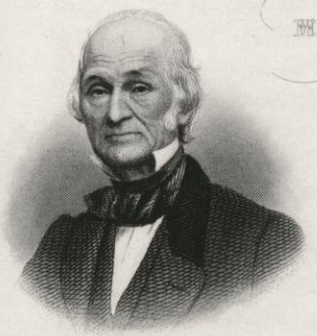
JOSIAH M. JONES.
BOSTON, MASS

HON GERRY W. COCHRANE.
BOSTON, MASS.

REPRESENTATIVE MEN IN THE LEATHER MANUFACTURE

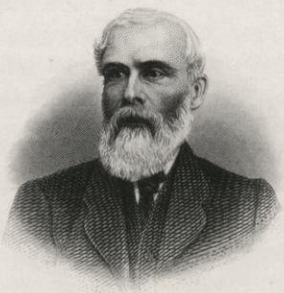
PLATE II

ALFRED LORING.
HINGHAM, MASS.



WILLIAM MUSSER.
PHILADELPHIA.

THOMAS SMULL.
NEW YORK.



EDWIN C. BURT.
NEWYORK.

Engd by H.B.Hall Jr. N.Y.

interests of the States, and to levy duties on imports. The several States had continued to oppose a feeble barrier to the flow of foreign commodities by imposing duties on imports, in some cases from sister States as well as from foreign countries. The Virginia Assembly, in 1788, laid the following duties on Leather and its manufacture: Upon dressed Leather, 6*d*,, and tanned Leather, 4*d*. per pound; saddles, 12*s*. each; ladies' shoes of stuff or Morocco 1*s*., and of silk 2*s*. per pair; men's and women's shoes, 1*s*.; shoe-boots, 6*d*., and boot-legs 1*s*. 6d. a pair. But under the new Constitution, which was at length adopted as the only remedy, this fiscal privilege was surrendered to the General Government; and the first Congress, which met in 1789, having the counsel of Roger Sherman of Connecticut, who represented the shoemakers in that body, and of several influential friends of Manufactures in Philadelphia, so adjusted the tariff in reference to the Shoe and Leather manufactures as to enable those branches within a few years to attain a prosperous footing.

Congress affords protection.

The duties imposed by that Act were for the most part laid at five per cent. ad valorem. Upon sole and upper leathers, leather manufactures and gloves of that material, the rate was placed at seven and a half per cent. Boots paid 50 cents, and shoes 7 cents per pair. Raw hides and skins were admitted free of duty.[1] These rates were increased in 1794 to fifteen per cent., with an increase of ten per cent., when imported, on foreign bottoms. Shoes and slippers of silk paid 25 cents per pair, and other shoes, slippers, clogs, and galoches 15 cents per pair, and other shoes for children ten cents. Saddles ten per cent. ad valorem. Shoe and knee buckles paid fifteen per cent.

The improvements in the manufacture of Leather, some of which have been briefly adverted to, have been very numerous, and principally originated within the present century. They have been both mechanical and chemical, of foreign and of native origin. Their adoption has been attended by a marked influence in the progressive improvement of the quality and quantity of the

Recent improvements in shoes and Leather business.

(1) This Act, which, so far as it related to the Leather interests, was made manifestly protective, to a small extent, by a rate fifty per cent. higher than on other articles, was stated by the Hon. John B. Alley, Representative in Congress from Lynn, Mass., at the Annual Dinner of the Hide and Leather Trade in New York, in Feb., 1859, to have been secured by the management of Mr. Ebenezer Breed, an intelligent young shoemaker of Lynn, who had established himself in Philadelphia during the depression of business in his native town, and of his friend Stephen Collins, a Quaker merchant formerly of the same place. By their influence with members of Congress, and with Dolly Payne, the young Quakeress who afterward became the wife of Mr. Madison, an influential member of the Congress, whose addresses she was receiving, they are conceived to have obtained this legislative boon for the staple manufacture of their native place.

product, in the enlargement of the operations individually and in the aggregate, and in a proportionate increase of profits, while the price of Leather, compared with that of the raw material, has been reduced.

The principal of these are the several mechanical appliances for softening, fulling, rolling, and splitting skins and hides, and for grinding bark, some of which were very early introduced, and others for washing, glazing, and finishing Leather. The application of water-power and especially of steam in many of the operations, and of hot water in others, the extraction and application of tannin in concentrated solutions, and by hydraulic pressure; the instruments for ascertaining the tanning power of different liquors; the greater subdivision of labor in large establishments, attended by more skillful manipulation in the processes of tanning, currying, and finishing Leather, have all greatly influenced the economy of the Leather manufacture. Its profits have been much augmented by the sweating and other operations, whereby the gelatine and muscular fibre of the skin is more completely exposed to the tannic acid, and the weight of Leather increased, and also by the various utilizing inventions which have appropriated all the refuse materials to some useful purpose in the arts.

In the shoe manufacture, the introduction of pegged work, probably more than any other improvement before the invention of the Sewing Machine, gave an impulse to the business. The shoe peg, a small but revolutionary instrument, is said to have been invented by Joseph Walker, of Hopkinton, Massachusetts, about the year 1818, previous to which time sewed work alone was made. At the present time, probably seven-eighths of the shoes made are pegged. The process of manufacture has been thereby greatly expedited, the product cheapened, and the consumption increased. The machinery for making pegs and lasts, for crimping boots, with many other improvements in the utensils of the craft, have carried forward the boot and shoe manufacture concurrently with the advances made in the preparation of the material, until these two great, allied, and reciprocally promotive interests, constitute a leading department in the system of American industry.

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CHAPTER XVII.

IRON, COPPER, AND OTHER METALLIC MANUFACTURES.

THE original inhabitants of this continent are not known to have had any knowledge of the uses or of the working of Iron. The precious metals, as they are denominated, being more fusible, and oftener found in a virgin state, more readily reveal themselves to the observation of mankind. These appear, therefore, to have been earlier known; and among savage nations generally, metallurgic knowledge is confined to a limited use of a few of them. The first metal mentioned on the page of history is Gold. The sacred record informs us that one of the rivers which watered the garden of Eden compassed "the land of Havilah, where there is gold, and the gold of that land is good." In the early ages of the world, Gold and Silver, and especially Copper, pure or alloyed, subserved many of the uses for which Iron is now employed. The wise economy of Nature, in covering her most abundant deposits of mineral treasure with the largest growth of wood and the richest measures of mineral fuel, has been often remarked. And as the growth of vegetation after the deluge may be supposed to have been more rapid than the increase of population, it has been reasonably suggested that, in the most natural process of clearing the land by setting fire to the forests, veins of metallic ore lying near the surface would be fused by the heat, and thus lead to the discovery, and to the means of reducing the native ores.

But Iron ore is quite too refractory to be thus subdued; and the metal, therefore, remained longer undiscovered. Even when brought to the metallic state by the intenser heat of the furnace, Iron, in most of its forms, cannot be wrought with the same ease as the more malleable metals. Ancient histories, paintings, and cabinets of ancient relics therefore abundantly show that Gold, Silver, and Copper, hardened by combination with Tin, constituting Bronze or Brass, formed the principal weapons, tools, and metallic manufactures of the early ages and of the half civilized nations of modern times. Whatever may have been the original significance of the ancient

The use of Gold, Silver, and Copper preceded that of Iron.

poetic idea of a succession of ages of Gold, Silver, Brass, and Iron, it appears to have had a real as well as an allegorical foundation in the world's history. We appear, in the literal sense at least, to have fallen emphatically upon the Iron times, when the arts of life have rendered that metal more valuable than even Gold, and susceptible of becoming, in the hands of the artificer, many hundredfold more precious, weight for weight, than the finest Gold.

At the time of the discovery and first settlement of America, the natives had in a very few instances advanced beyond that primitive stage of civilization in which the use of metals was confined to trinkets of Gold, Silver, and Copper, worn upon the person of the savage. Their most effective tools and weapons were sharpened flint stones and shells, and they possessed no other means of felling a tree, or scooping a canoe from its trunk, than by the application of fire. Some tribes more advanced possessed, in addition to these rude ornaments and implements, the art of casting images and other figures in Gold and Silver, many of which are still found in the *huacas* or graves of the races. Chisels, hatchets, and a few other tools and weapons of Copper alloyed with Tin, so as to cut wood with facility, were also made by the Peruvians and Mexicans, who thus appear to have reached the brazen era of civilization. Lead was also known to some extent. Although knives of Iron, supposed to have been of meteoric origin, are mentioned as having been found at a later period among the Esquimaux and savages of the Northwest Coast, there is some room to doubt; and most of the fossil treasures of the continent, those of Iron especially, lay for the most part unvexed in the womb of earth until after the date of English colonization.

Antiquity of Iron and Steel.

Although the working of other metals thus everywhere preceded that of Iron and Steel, the use of these in the arts was early known. Tubal Cain was an "instructor of every artificer in Brass and Iron;" and tools, weapons of war, furniture, the implements of husbandry, and even chariots of Iron, and "a land whose stones are Iron," are mentioned in Scripture history. Implements not only of Copper so tempered by a process, no longer known, as to be elastic and hard enough to cut granite with ease, but also of Iron, have come down to us from the Egyptians. Of the different nations of antiquity, including the Greeks and Romans, who possessed in considerable perfection the art of working in Iron and Steel, the people of Chalybia, between Judea and the southern shore of the Black Sea, were the most celebrated, and especially excelled in the manufacture of Steel. The Greeks appropriated the name of that country to designate Steel of the best quality; and our own vocabularies still retain a synonym derived from that source. The "northern Iron" mentioned by Jeremiah, and the

"bright Iron" of Ezekiel, in which the Tyrians traded, were probably the product of that country—"the mother of Iron," as Scythia was called by a Greek poet. The early Britons are supposed to have been first supplied with Iron from the same source, and were probably also taught the art of smelting it by the Phœnicians, who so early traded in this Pontic Iron, which they bartered for the Tin of Britain. If chariots armed with scythes and spears, broadswords, Iron rings, and Iron money, indicate a knowledge of the art before the Roman Conquest, an improvement in the method of smelting and working the metal was certainly communicated by the invaders. A *fabrica* or great military forge was erected at Bath, near the well-wooded ferriferous hills of Monmouthshire and Gloucestershire, A. D. 120; and the beds of iron cinders in the forest of Dean, in the vicinity of Sheffield, and other parts of the Island, in which Roman coins were imbedded, gave evidence of their activity in the Iron-manufacture. The earliest of these masses of scoriæ were found on the hill-tops, where the earliest furnaces were erected to obtain stronger currents of air, which was admitted through holes on all sides. The rudeness of these wind furnaces was indicated by the half-exhausted state of the slag. After the invention of the bellows, at first operated by the foot, and, in process of time, by water-power, the furnaces were built in the valleys, and the slag of the ancient bloomeries long furnished a supply of material for the best Iron. The superior economy of even the rude foot-blast was apparent in the more complete extraction of the metal from the cinders found in the valleys, which no longer paid for smelting. The manufacture afterward declined; and although the smith and other artificers in Iron, especially of armor, were held in high honor by the Anglo-Saxons and Welsh, there is little mention of Iron-works under the Heptarchy. The manufacture was not much improved, except by the bellows and improved furnaces in the sixteenth century, and large quantities of Iron were imported from Germany, Spain, Sweden, and other countries. The destruction of the forests by the increase of the Iron-manufacture had nevertheless become so serious that, in the first year of Elizabeth, an attempt was made to limit the evil; and various statutes in her reign prohibited not only the destruction of trees, but the erection of Iron-works within certain limits. Lord Dudley, in 1620, attempted the substitution of pit coal, but abandoned it on the expiration of his patent in fourteen years; and the waste of timber continued to be a cause of complaint until his method was revived a century after. During this time the consumption of Iron had increased with the progress in the Arts, and especially by its substitution for Bronze in the casting of cannon, which was commenced toward the close of Elizabeth's reign, and in later wars employed enor-

Known to Ancient Britons.

mous quantities of the metal. The patent for this invention and for casting cannon ball, with that of Dudley for smelting with coke, and some others, were excepted in the statute 21 Jac. I. c. 3, abolishing monopolies.

State of the manufacture at the time of colonization.

At the date of Anglican colonization in America, therefore, the demand for Iron was greatly on the increase; and the production of British furnaces, already far short of the demand, was declining with the decay of the forests, which threatened ere long to leave the nation entirely dependent upon foreign sources. The inexhaustible extent of American forests, the removal of which was the first step to improvement, did not fail to stimulate the search for useful ores. Although the quest of Gold and precious minerals was not a primary object with many of the adventurers from Northern Europe to this continent, the latent hope of such discoveries sustained the diligence of many in the search for fossil treasures. In these explorations, occasional glimpses of rare metals quickened the zeal of the prospecter, and nature everywhere revealed rich stores of Iron and other common ores and minerals garnered for future use. Some very early attempts were made to turn these discoveries to account; and the search for other deposits was everywhere encouraged, although interested or designing persons often sought to allure to the vain search for the precious ores.

The commencement of the Iron-manufacture in the English Colonies is usually assigned a date about a hundred years posterior to the colonization of Virginia. During the preceding period, however, a number of essays were made in the business of smelting Iron ore and in casting. It was indeed among the earliest forms of industry attempted in Virginia, and several of the other Colonies. The importance of Iron, as the most needful and useful agent in all their undertakings, was well understood, notwithstanding the very limited use of the metal compared with its infinitely varied and extended applications in our day; an importance which justified the observation of their great cotemporary, Locke, that were the use of Iron lost among us, we should in a few ages be unavoidably reduced to the wants and ignorance of the ancient savage Americans.

In 1610, Sir Thomas Gates testified before the Council in London, that in Virginia were divers sorts of minerals, especially of Iron ore, lying upon the surface of the ground, which had been tested in England and found to make as good Iron as any in Europe.[1] Under a new administration of its affairs, the London Company, in 1619, after twelve

(1) A True Declaration of Virginia, p. 22.

years of unprofitable expenditure, sent to Virginia a large body of emigrants, including workmen and materials for some new branches of industry. These embraced no less than one hundred and fifty persons skilled in the manufacture of Iron, with the design of erecting in the Colony three Iron-works. Of these, one hundred and ten were from Warwickshire and Staffordshire, and forty from Sussex, and were selected for their skill and industry.[1] A part of the funds liberally contributed in England about the same time for a college at Henrico for the education of native and colonial youth, was appropriated by the Treasurer, Sir Edwin Sandys, to the erection of Iron-works, in the expectation of deriving a revenue from that source. Works for smelting the ore were soon erected on Falling Creek, a branch of James River, not far from Jamestown, the first settlement in the Colony, and about thirty-two miles from the sea. Great were the hopes of advantage to be derived by the Colony from this undertaking. Three of the master-workmen having died, a reinforcement of twenty experienced hands was sent over in 1621, accompanied by Mr. John Berkeley and his son Maurice, as skillful persons to superintend the operations. A mine of the brown Iron ore of that neighborhood was opened, and found to yield tolerably good Iron. But Indian jealousy and enmity had unfortunately been already aroused. In an hour of fancied security, when all hostile designs were believed to have been laid aside, in May, 1622, an attack was made upon the village where the works were situated, and the whole company with their families, including the superintendent and his men, were cut off to the number of 347 persons. A boy and girl alone escaped the general massacre.[2] The Iron-works and a glass furnace were demolished by the savages, who appear in several instances to have regarded such undertakings with abhorrence. The blow fell heavily on the Colony, and disappointed several other enterprises which had been warmly cherished. Iron-works were not again attempted in Virginia for many years, although the peculiar advantages of the country in the excellence and plenty of its ore and wood, were strongly urged by writers on colonial matters.

Discovery of Iron ore.

First Iron-works, 1619.

The exportation of Iron from the Colony was forbidden by an Act of the Assembly in 1662, on penalty of ten pounds of tobacco for every pound of Iron exported. The low price of tobacco in England, and the desire to lessen importation by encouraging ship-building and other domestic manufactures, at that time were the motives, and the prohibition was renewed in 1682.

(1) A Declaration of the State of the Colonie, etc., 1620, p. 10.

(2) Beverley's Hist. Virginia.

The discovery of Iron ore, and even some preliminary steps toward its manufacture, appear to have been contemplated at the outset by the Court of Assistants in London, who arranged the emigration to Massachusetts Bay in 1630. Its existence there was probably earlier known. At a meeting of the Court held on the 2d of March, 1628–9, after having engaged a number of mechanics and skilled laborers in different branches of industry, the Journal states that "also for Mr. Malbon it was propounded, he having skill in Iron-works, and willing to put in £25 in stock, it should be accounted as £50, and his charges to be bore out and home from New England, and upon his return, and report what may be done about Iron-works, consideration to be had of proceeding therein accordingly, and further recompense if there be cause to entertain him."[1] Three days after, negotiations were opened with Thomas Graves, gentleman, of Gravesend in Kent, to visit New England at the expense of the Company, as "a man experienced in Iron workes, in Salt workes, in measuring and surveying of lands and in fortifications, in lead, copper, and Alum mynes."

Search for Minerals encouraged in New England.

At a subsequent meeting on the 10th, it was agreed he should visit Naumkeag (Salem), "and exercise his scientific qualifications as circumstances might require, as additional to the services he might render, and which were specified on the fifth, he was acquainted with finding lime-stones, planning acqueducts, drawing maps, and architecture." This accomplished engineer engaged to enter the service of the company for six or eight months, in consideration of a free passage out and home, and five pounds a month with board while employed. In case he remained three years, the Company were to transport his family thither, and support them until the next ensuing harvest, pay him £50 per annum, provide him a house and 100 acres of land, with a share in the general allotment of land. Additional compensation to be left to the discretion of the Company.

Iron-works early contemplated.

The discovery of the precious metals appears to have been no part of the duty or the qualification of Graves, which is the more noticeable because at that time the hope of finding Gold and Silver had not wholly forsaken the public mind. It marks the moderation of the adventurers at a time when vague rumors of undiscovered treasures were rife, when Spain was receiving into her lap enormous tributes of Gold from her American dependencies, and in Europe the alembic was freely plied to transmute the baser metals into all-powerful Gold.

Whether Graves, who settled at Charlestown, made any discoveries of mines, does not appear. No steps seem to have been taken toward the

(1) Felt's Annals of Salem, i. 52, 63, 64.

manufacture of Iron until about fifteen years latter. Morton, however, in 1632, enumerates among the minerals of New England, loadstone, Iron stone, lead ore, black lead, red lead, brimstone, *Tin* (of which mines were known to exist), and Copper mines, which would enrich the inhabitants, Silver, and a mine of Gold found "by one Captain Littleworth, who, if he got a patent of it to himself, would surely change his name." Tin has since been discovered in very small quantities in New Hampshire, but could not then have been known.

According to the ancient fiscal privileges of royalty, mines containing Gold or Silver belonged to the king. In the grants to many of the Colonies, one-fifth of the product of such mines was reserved as a royalty, and the London Company reserved another fifth of Gold and Silver mines in Virginia to itself. By the statutes 1 and 5 W. & M., this prerogative was so modified that mines of Copper, Tin, Iron, and Lead could be no longer claimed, but the precious ores of other mines belonged to the crown, on the payment of the price of the base metal of the mine.. A discouragement to the discovery and working of metals was thus withdrawn.[1]

In November, 1637, the General Court of Massachusetts granted to Abraham Shaw one half the benefit of any "coles or yron stone wch shall bee found in any comon ground wch is in the countrye's disposing."[2]

Discovery was early made at Saugus, or Lynn, of the Bog Iron ore, which is deposited in numerous peat bogs and ponds throughout Eastern Massachusetts, and supplied the early furnaces of that Colony; considerable quantities of this were found in different places within a mile or two of Lynn, and the first attempt to manufacture Iron in New England was made in that town. The great scarcity of Iron-ware and tools, and of Iron for ship-building and the erection of mills and dwelling-houses, with a lessened intercourse between Great Britain and the Colonies, led Messrs. Thomas Dexter, Robert Bridges, and other enterprising persons, to form a plan for the introduction of the manufacture in the Colony. With this view, Mr. Bridges, in 1643, took to London some specimens of ore from the ponds of Saugus. In connection with John Winthrop, Jr., who had preceded him thither two years before, a company was formed, called the "Company of Undertakers for the Iron-works." It consisted of the following gentlemen of wealth and enterprise, viz.: Lionel Copley, Esq., of York, England, Nicholas Bond, Thomas Pury, John Becx, W. Beauchamp, Thomas Foley, William Greenhull, Thomas Weld (minister), John Pococke, William Beck, William Hickocke. The sum of one thousand pounds was advanced for

First New England furnaces.

(1) Archbold's & Christian's Blackstone, i. 304, 305.

(2) Records, i. 206.

commencing the work, with which Mr. Winthrop, accompanied by a corps of workmen, returned to New England the same year. Preparations were immediately made for the manufacture of Iron on a large scale, contemplating not only the smelting, but forging and refining of the metal. The General Court was applied to for encouragement and participation in the business. The design was approved of, but the state of the public treasury did not warrant the Assembly in taking stock in the Company. Two or three private persons joined the enterprise, and the General Court granted them, March 7, 1643–4, nearly all their requests, including the exclusive privilege of making Iron for twenty-one years, provided they made, after two years, sufficient Iron for the country's use. They were allowed the use of any six places not already granted, on condition that they set up within ten years a furnace and forge in each place, "and not a bloomery onely." The undertakers and their agents were exempted from all public charges and taxation upon their stock, and themselves and workmen from trainings.[1]

Grants of land and privileges.

A grant had been previously made in town-meeting, 19th of 11th mo., 1643, to Mr. Winthrop and his partners, and to their assigns forever, of about 3,000 acres of the common land at Braintree, "for the encouragement of an Iron-work to be set up about Monotcot river."[2] This grant was not surveyed, however, and was not laid out till January, 1648. It was long a subject of doubt whether the first forge was at Braintree or at Lynn. Lewis, the historian of the latter town, however, asserts positively that the first works were erected at Lynn, on the west bank of the Saugus, upon land purchased of Thomas Hudson, near a chain of small lakes abounding in ore. The village was called Hammersmith, after the native town in England of several of the principal workmen. Large heaps of scoriæ point out the site of one of the most important, though for various reasons not very successful, undertakings of early colonial times. Operations were continued with variable success for over one hundred years. Mr. Winthrop was ever a benefactor of his adopted country, and several of the workmen whom he introduced in connection with these works were not only of eminent service in laying the foundation of New England enterprise and skill, but left a posterity which has been identified with the manufacturing prosperity of different States to the present day.

First works erected at Lynn.

In response to several additional propositions from the undertakers, the Court, on 13th November, 1644, granted them three years for perfecting the work and furnishing the country with all sorts of bar Iron, provided inhabitants might become proprietors by paying within twelve

(1) Records, vol. ii. p. 61 (2) Savage's Winthrop.

months £100 each, and an allowance to the adventurers for £1,000 already disbursed, and that they, "with all expedition, prosecute said works to good perfection, as well the finery and forge as the furnace, which is already set up, that so the country may be furnished with all sorts of barr iron for their use at £20 per ton." A grant of three square miles of land was at the same time made them in each of the six places they might occupy, etc. On the 14th May following, the records state that, "whereas it is now found by sufficient proof that the Iron-worke is very successful (both in the richness of the ore and the goodness of the Iron), and like to be of great benefit to the whole country, especially if the inhabitants here should be interested therein in some good proportion (one-half at the least)" etc. They were invited to take stock in the business. Twelve to fifteen hundred pounds had then been expended, the furnace built, a good stock of mine, coal, and wood provided, and some tons of sow Iron cast, and some preparations had been made for the forge. About £1500 were required to finish the forge, which was to be paid to Mr. Henry Webb, of Boston, subject to the direction of the undertakers, John Winthrop Jr., Major Sedgwick, Mr. Henry Webb, and Mr. Joshua Hewes. Colonists were about this time publicly notified that they could join the enterprise if they wished. The partners above named were probably of the number who united with the Company in America. Mr. Webb came from Salisbury, England, in 1638, and afterward became a wealthy merchant of Boston. He was a large proprietor in the Iron-works, and was distinguished for enterprise and benevolence.[1] In October of the same year, a charter with ample privileges, embodying the previous grants and conditions, was made out and delivered to the undertakers, under the public seal of the Colony. It confirmed to the Company the monopoly for twenty-one years of the sole privilege of making Iron and managing all Iron mines they might discover, and granted them all waste lands not appropriated, the use of all wood, timber, etc., to convert into coals and earth-stones, clay, etc., for the use of the works, forges, mills, or houses built, or for making or moulding any manner of guns, pots, and all other cast Iron ware, and for converting wood into charcoal, etc., etc. They were allowed to export any surplus to any part of the world except to enemies.[2]

Works successful.

Charter confirmed.

(1) Among his numerous benefactions, 'the Webb Estate," with the house thereon, which has been long occupied by the firm of Little, Brown & Co., publishers and booksellers, was given, with £50 in money, to Harvard College about the year 1660, and now yields a handsome revenue to the University, the rental having risen from £12, in 1778, to $1,100 in 1831, and $5,000 at the present time. The ancient building has just given place to a fine granite structure for the use of the firm.

(2) Col. Records, ii. pp. 81, 103, 125.

On the 29th September, two days previous to this grant of privileges, the first purchase of lands, consisting of twenty acres, for a forge at Braintree, was made from George Ruggles by Mr. Thomas Leader, who came from England as general agent of the Company.[1] The precise date of the erection of the forge at Braintree we do not find stated, but it followed soon after the other. Mr. Winthrop, on 29th May, also received permission to make a plantation and lay out a site for Iron-works at Pequod (New London)—to which place he removed in 1646—provided he could find suitable persons to effect it within three years. The works both at Lynn and Braintree belonged to the same Company.

Johnson, a cotemporary, in allusion to the enterprise, speaks only of the latter place, and quaintly refers to some of the difficulties experienced at the outset. "The land affording very good iron stone, divers persons of good rank and quality in England were stirred up by the providential hand of the Lord to venture their estates upon an Iron-worke, which they began at Braintree, and profited the owners little, but rather wasted their stock, which caused some of them to sell away the remainder, the chief reason being the high price of labor, which ordinarily was as much more as in England, and in many things treble; the way of going on with such a work here was not suddainly to be discovered, although the steward had a very able eye, yet experience hath out-stript learning here, and the most quick-sighted in the Theory of things have been forced to pay pretty roundly to Lady Experience for filling their heads with a little of her active after-wit; much hope there is now (1651) that the owners may pick up their crumbs again if they be but made partakers of the gain in putting off England commodities at N. E. price; it will take off one-third of the great price they gave for labour, and the price of their Iron it is supposed another third is taken off; the abundance of wood had for little will surely take off the residue, besides land at easie rates, and common land free for their use."[2] It was the desire of the rulers, he states, to protect the Company from loss at any sacrifice. The Court, however, in reply to a letter from the proprietors in 1646, acknowledge the importance of the manufacture to the country, both for domestic supply and for exportation, but as an axe at 12*d.* was none the cheaper to him who had not 12*d.* to buy it, "so if your Iron," they add, "may not be had heere without ready money, what advantage will that be to us if wee have no money to purchase it." The scarcity of specie is said to have been a principal difficulty in its management, and caused the busi-

Scarcity of specie.

(1) Lewis' Hist. of Lynn, 125.

(2) Wonder-working Providence, p. 11.

ness a few years after to pass into other hands. In August, 1648, Gov. Winthrop wrote from Boston to his son at Pequod in relation to it:

Yield of the Iron-works.

"The Iron-work goeth on with more hope. It yields now about seven tons per week, but it is most out of that brown earth which lies under the bog mine. They tried another mine, and after 24 hours they had a sum of about 500, which, when they brake, they conceived to be a fifth part silver. There is a grave man of good fashion come now over to see how things stand here. He is one who hath been exercised in Iron-works." On 30th September he again wrote, "Mr. Endicott hath found a Copper mine in his own ground. Mr. Leader hath tried it. The furnace runs 8 tons per week, and their bar Iron is as good as Spanish. The adventurers in England sent over Mr. Dawes to oversee Mr. Leader, &c., but he is far short of Mr. Leader. They could not agree, so he is returned to Teneriffe."[1]

The Iron-works at Lynn involved heavy outlays on the part of the Company, the majority of whom were too distant to exercise a proper supervision. They consequently yielded but little profit. They were several times assessed for damages to neighboring property by overflow of the pond, and in 1671 the dam was cut away, after which they were conducted on a smaller scale. In the hands of the old Company they were more than once attached for debt, and suits were frequent against the proprietors. In 1677 they became the property of Samuel Appleton, who sold them about ten years after to James Taylor, who, we believe, was the last proprietor. They were not finally abandoned until the lapse of over a century from their commencement.

Hubbard, writing about the date of their transfer from the original Company, makes no mention of the forge at Braintree, but says, "A work was set up at Lynn upon a very commodious stream, which was very much promoted and strenuously carried on for some time, but at length, whether *faber aut forceps aut ars ignara, fefellit*, instead of drawing out bars of iron for the country's use, there was hammered out nothing but contention and lawsuits, which was but a bad return for the undertakers; however, it gave the occasion to others to acquaint themselves with that skill to the great advantage of the Colonies, who have since that time found out many convenient places where very good Iron, not much inferior to that of Bilboa, may be produced, as at this day is seen in a village near Topsfield, seven or eight miles west from Ipswich." The undertaking was doubtless of more real service to the country as a pioneer enterprise, by introducing experience in the business and a body of skilled workmen in the several departments, than by its direct produc-

(1) Savage's Winthrop, App. p. 355.

tiveness, although to the adventurers it was fraught with the usual results of first projects.

The works at Braintree also continued in operation during this time. In 1691, Iron ore called Rock-mine was obtained from the ledges at Nahant for the forge at Braintree. The town of Lynn, to which belongs the merit of having introduced the manufacture of the important articles of Leather and Iron in New England, was early supplied with its first blacksmith in the person of John Deacon. But in the number of the men imported for the Iron-works were artificers of higher skill.

In 1646, Mr. Leader was permitted by the General Court to purchase some of the country's guns to melt over at the foundery. Among the first workmen engaged at the foundery was Henry Leonard, who assisted in making the first castings in America. He afterward established with his brother a forge at Raynham, and was one of the first of a long race of Iron-masters of that name in different parts of the country.

A Foundery and skillful workmen.

Another, who probably accompanied Winthrop from England, and was connected with the undertaking from the first as a principal workman and machinist, was Joseph Jenks, a native of Hammersmith, near London. He was held in high estimation for his extraordinary ingenuity as an artificer, and many of his descendants to the present day have occupied prominent positions in civil life and in relation to the industrial arts of the country. Of this early mechanician, who was the Tubal Cain of New England, Mr. Lewis remarks: "Joseph Jenks deserves to be held in perpetual remembrance in American history as being the *first* founder who worked in Brass and Iron on the Western Continent. By his hands the first models were made, and the first castings taken of many domestic implements and Iron tools. The first article said to have been cast was a small Iron pot, capable of containing about a quart. Thomas Hudson, of the same family with the celebrated Hendrick Hudson, was the first proprietor of the lands on the Saugus River, where the Iron-Foundery stood. When the Forge was established, he procured the first casting, which was the famous old Iron pot, which he preserved as a curiosity, and handed down in the family ever since."[1]

Joseph Jenks makes the first models, and castings.

On the 6th May, 1646, Mr. Jenks was granted by the legislature a patent for 14 years "for the making of engines for mills, to go by water, for the more speedy despatch of work than formerly, and for the making of scythes and other edged tools with a new invented saw-mill, that things may be afforded cheaper

Scythes first made and improved by Jos. Jenks.

(1) Lewis's History of Lynn.

than formerly, &c., yet so as power is still left to restrain the exportation of such manufactures, and to moderate the prices thereof, if occasion so require."[1]

In the following January, he purchased of the Iron Company's agent the privilege of building a forge at the Iron-works for the manufacture of scythes and other wares.

In May, 1655, he was accorded another patent for an improvement in the manufacture of scythes, "for the more speedy cutting of grass, for seven years." The innovation consisted in giving greater length and thinness to the blade, and in welding a bar of Iron upon the back to strengthen it, as in the modern scythe. This was an essential improvement upon the old form of the English scythe, which was a very clumsy instrument, short and thick like the bush or stub scythe.[2] No radical change has since been made in the form of the implement.

His genius took a somewhat wide range. In October, 1652, when Massachusetts undertook to supply the deficiency of specie by a silver coinage, Mr. Jenks was employed to make the dies, which he executed at the Iron-works. The issue consisted of shillings, sixpences, and threepences, to which was added, in 1662, an emission of twopences. Of the shillings, there were at least sixteen different dies, and several of each of the others, all bearing the same date, and stamped with the name of the Colony and a pine tree in the centre, "as an apt symbol of its progressive vigor."[3]

Dies for the first Coinage.

(1) Records, vol. ii. 149; vol. iii. 275.

(2) Lewis's Hist. of Lynn.

(3) These coins, which were of the fineness of sterling silver, but by weight "two pence in the shilling of less valew than the English coyne," are now extremely rare, and, from the device on the larger ones, are known to the curious as the "pine tree coinage," although no such tree is designated by the law. The Act creating this first colonial mint was much complained of, as an invasion of the royal prerogative, but the emission of money nevertheless continued for over thirty years, and some of the coin circulated in England. The wrath of Charles II. is said to have been adroitly turned aside by Sir Thomas Temple (brother of Sir William), who, having shown the king some of the coins after his return from New England, was asked what tree that was upon them, to which he replied that it was the royal oak which saved his majesty's life. Pleased or amused by the supposed compliment, he called them "*a parcel of honest dogs*," and listened complacently to Temple's defense of his colonial subjects.

The money was coined by John Hull, a gold and silver smith, on whose land the "Mint Howse" stood, and Robert Sanderson, of Boston.

Previous to this, business had been done largely by barter, and taxes were paid and exchanges made chiefly in beaver skins, cattle, corn, or other produce, at fixed rates, and in leaden bullets and Indian wampum; the importations, and recently the stoppage of emigration, having drained off the English coin. In New Netherlands, also, where Director Stuyvesant the same year recommended a coinage in imitation of New England, and also raised the value of specie 20 to 25 per cent. to prevent its exportation, beaver skins and Zeawant, or Indian shell money, were the principal currency. The

Two years after, Mr. Jenks made a contract with the Selectmen of Boston "for an Ingine to carry water in case of fire," which was undoubtedly the first attempt to make or use a fire-engine in America. Very few such machines were built in Europe until after this date They were not used in Paris until near 50 years later, and the addition of an air-chamber was not made until long after.

First fire-engine.

Wire-drawing, a well-established industry of their native country for the manufacture of pins from native Copper and of wool-cards from Yorkshire Iron, for the protection of which the importation of wire, and even its transfer from old to new cards, was prohibited by Charles I., was the next branch for which encouragement was sought by the early artificers of Lynn and its vicinity.

Wire-drawing proposed and encouraged.

In October, 1666, Nathaniel Robbinson, "wyer drawer," petitioned for aid to carry on his trade, which the Court saw no cause to grant. In October of the next year, Joseph Jenks, Sr., also desired "the ffavor of the Court to advance a sume for ye encouragement of wyer drawing, &c." The Court judged it "not meet to advance any money on that design; but being desirous to encourage all persons among us in manuall arts and trade of publicque vtilitje, and being informed that there are in this towne a sett of tooles for wyer drawing, and that there be some in the place that are able and skillful in that imploy, the improovement whereof would be of great vse in sundry respects, this Court doth therefore order the Treasurer of the county to disburse out of the public treasury such a sume of money as will be necessary for the purchase of the said instruments and tooles, not exceeding fifteen pounds; and the Treasurer with Major-Generall Leueret are appointed and impowered to dispose of the said instruments so as may best further the ends proposed, as also to disburse forty shillings for the encouragement of those that shall make cards and pinns of the said wiar."[1]

Joseph Jenks died in 1683. Of his sons, Joseph, the elder, after living some time in Lynn, removed to Pawtucket, R. I., where he erected a forge; and two others, we believe, to Boston, where Samuel Jenks &

manufacture of the latter was a considerable business with the Indians, "curious minters of wampumpeag," and by many of the white people, who counterfeited it. Maryland issued silver and copper coins in 1662, the only other silver coins made before the Revolution. Carolina, in 1694, struck a halfpenny coin, and penny and twopenny pieces in 1723, and another penny in 1733. Coppers were coined from native metal in Connecticut in 1737 and 1739. Virginia issued halfpence in 1773. Several silver and copper coins were minted by the different States and by individuals after the war, and previous to the Act of April 2d, 1792, establishing the national mint under the authority conferred by the Constitution of 1787.

(1) Records, vi. 325, 348, 351.

Son carried on the blacksmith business on Gardner's Wharf previous to 1789; and John Jenks had a store at 39 State street at the same time.

A large number of the towns on the seaboard of New England are diversified by small ponds and lakes scooped out of the drift and tertiary formation, at the bottom of which the waters, having percolated the surrounding hills of sand and gravel, deposit large quantities of the sesquioxyd of Iron. This ferruginous sediment mixed with vegetable mould, and partially solidified by combination with water into amorphous masses of soft and spongy bog iron ore, or crystallized into a more compact hydrate, when removed is again renewed, at intervals of twenty to thirty years, according to the chalybeate impregnation of the springs whence the ponds are supplied. These ponds are particularly abundant in the County of Plymouth, Mass., where furnaces and forges for smelting and working up the metal with charcoal from the neighboring swamps and hills were formerly numerous, until the wood or ore was exhausted, and the cheaper pig Iron from the coal regions of Pennsylvania rendered smelting no longer profitable. Some of these ponds, as those in Middleboro, Attleboro, Carver, Scituate, Halifax, and other towns, supplied one hundred to six hundred tons of ore annually, which yielded twenty-five per cent. or upward of crude Iron. The ore was easily fused, and, mixed with silicious ores, produced a tolerably good metal for castings. Shells from the seashore furnished the flux. As early as 1648, Timothy Hatherly, the principal founder of the town of Scituate, requested leave of the General Court to erect an Iron-mill. His request was granted in 1650, on condition that the privilege accorded him of certain woodlands about Mattakeeset Pond (now Pembroke) should revert to the Colony, unless it was erected within three years. The design was not then carried out, but a furnace was built upon the site in 1702.[1]

Bog ores of Plymouth County.

The adjoining County of Bristol also abounds in these lacustrine deposits of the oxyd of Iron; and the next attempt, after that at Lynn and Braintree, to manufacture Iron in the Colony was made at Raynham in 1652. The previous undertaking probably embraced nothing more than simple blast furnaces for the production of crude Iron, and a variety of coarse castings directly from the fused metal. To these the Leonards, from the Iron district of South Wales, one or both of whom had been engaged in the works at Lynn, appear to have added the operations of the bloomery and the forge hammer.[2]

Iron-works at Raynham, 1652

(1) II. Mass. Hist. Coll., iv. 224.

(2) John Ray, F. R. S., has left on record a description of the process of smelting and forging Iron, as practiced in Sussex, Eng

The following notice of the commencement of the business in the county, where it has ever since flourished, is an interesting passage in the early history as well of the arts as of the perilous times of the colony. It is from the description of Raynham by the Rev. Dr. Fobes, in 1793.

"The first adventurers from England to this country who were skilled in the forge Iron-manufacture, were two brothers, viz., James and Henry Leonard. They came to this town in the year 1652, which was about two years after the first settlers had planted themselves upon this spot; and in the year 1652 these Leonards here built the first forge in America. Henry not long after moved from this place to the Jerseys and settled there. James, who was the great progenitor from whom the whole race of the Leonards here sprang, lived and died in this town. He came from Pontypool, in Monmouthshire, and brought with him his son Thomas, then a small boy, who afterward worked at

The Leonards.

land, in 1674. It was probably nearly the same as that of our first Iron-workers. The hearth of the furnace was made of sandstone, and the sides round, to the height of about a yard or thereabout; the rest of the furnace was lined up to the top with brick. Every six days was called a *founday*, in which about 8 tons of Iron on an average were run. Twenty-four loads of charcoal would make that quantity of Iron. To every load of eleven quarters of coals they put in one load of mine, containing 18 bushels of mixed, roasted, and broken ore. The fire was at its height in about ten weeks, and a hearth of good stone would last forty foundays or weeks, during which it never went out. The hearth was never used the second time.

The forge had two hammers, one called the *finery*, the other the *chafery*. At the former the metal was brought into the state of *blooms* and *anconies*. The bloom was a four square mass, 2 feet long, prepared by beating a *loop*, or mass of metal weighing about ¾ cwt., with Iron sledges upon an Iron plate, and afterward with the forge-hammer worked by water. This was called *shingling the loop*. After two or three more heats at the finery, the mass was brought to an *ancony*, the middle of which was a square bar of the desired size, and the two ends rough, square lumps. At the *chafery* the bar was completed by reducing the ends to a uniform size with the middle portion. Three loads of large wood coal made a ton of Iron at the finery, and one load of small coals at the chafery. A man and boy at the finery would make two tons of Iron per week, and two men at the chafery would make 5 or 6 tons a week.

John Houghton, F. R. S. (Husbandry and Trade Improved), in 1697, says, both the finery and chafery were open hearths covered with heaps of coals, blown by bellows in the same way as the furnaces, but not so large; and the sow and pigs received five heats in the two—two at the finery and three at the chafery. He calls the thick square first made a *half bloom*, and the bar with the two knobs a *bloom*, the greater end being called the *mocket head*, and the less the *ancony end*. At the fourth heat the mocket head was reduced, and at the fifth the ancony end, to the state of a bar. This process, by which they could make two or three tons of Iron in 24 hours, he regarded as a great improvement upon their ancestors, who, with the treadle or foot-blast, could make but one little lump or bloom, of less than a hundred-weight, in a day! He speaks of *slitting* and *rolling* mills as a new invention. He gives the importation of Iron in 1695 as 9,599 tons, chiefly from Sweden, and of Steel, principally from Holland, 1,679 hundred-weight.

the bloomery art with his father in the forge. This forge was situated on the great road; and, having been repaired from generation to generation, it is to this day still in employ. On one side of the dam, at a small distance from each other, stand three large elms and one oak tree. Two of the elms are near three feet in circumference, and are still flourishing. These trees are now almost a hundred and twenty years old, which, with the ancient buildings and other objects around, present to the eye a scene of the most venerable antiquity. In the distance of one mile and a quarter from this forge is a place called the Fowling Pond, on the northerly side of which once stood King Philip's house. It was called Philip's hunting-house, because in the season most favorable to hunting he resided there, but spent the winter chiefly at Mount Hope, probably for the benefit of fish. Philip and these Leonards, it seems, long lived in good neighborhood, and often traded with each other; and such was Philip's friendship, that as soon as the war broke out, which was in 1675, he gave out strict orders to all his Indians never to hurt the Leonards. During the war two houses near the forge were constantly garrisoned. These buildings are yet standing. One of them was built by James Leonard long before Philip's war. This house still remains in its original Gothic form, and is now inhabited, together with the same paternal spot, by Leonards of the sixth generation. In the cellar under this house was deposited for a considerable time the head of King Philip; for it seems that even Philip himself shared the fate of kings: he was decollated, and his head carried about and shown as a curiosity, by one Alderman, the Indian who shot him. There is yet in being an ancient case of drawers which used to stand in this house, upon which the deep scars and mangled impressions of Indian hatchets are now seen; but the deeper impressions made on those affrighted women who fled from the house when the Indians broke in, cannot be known. Under the door-steps of the same building now lie buried the bones of two unfortunate young women, who, in their flight here, were shot down by the Indians, and their blood was seen to run quite across the road; but more fortunate was the flight of Uriah Leonard, who, as he was riding from Taunton to the forge, in this place was discovered and fired upon by the Indians. He instantly plucked off his hat, swung it around, which startled his horse, and in full career he reached the forge dam without a wound; but several bullets were shot through the hat he held in his hand, and through the neck of the horse near the mane, from which the blood on both sides gushed and ran down on both his legs."[1]

(1) I. Mass. Hist. Coll., iii. 170.

Fowling Pond, near which the forge was erected, the author states, was remarkably prolific in material, having furnished an uninterrupted supply of good ore for that and other works for more than eighty years, during which the former was kept going, and the deposit was still unexhausted. The metal, however, would not make Iron of the best quality. He notices the coincidence of beds of Iron ore being usually found in that part of the country in the immediate neighborhood of pine and cedar lands, and offers the suggestion that vegetable growths of that kind may be found to stand to the generation of the ore in the relation of a proximate cause, and that "the time may come when it will be easy and as common to raise a bed of bog ore as a bed of carrots." Although the pine forests held no causative relation to the collection of ore, another and highly economical one did subsist between the two, inasmuch as pine-trees and the whole class of the *coniferæ* were highly valued as fuel in the process of smelting and forging. Respecting the Leonards, he further remarks:

Bog ores.

"The circumstances of a family attachment to the Iron-manufacture is so well known, as to render it a common observation in this part of the country, viz., '*where you can find Iron-works, there you will find a Leonard.*'

"Henry, the brother of James, went from this place to the Jerseys, and was one of the first who set up Iron-works in that State. He was the progenitor of a numerous and respectable posterity in that part of America."

In the adjoining town of Norton, which, with Raynham, originally formed a part of Taunton, extensive Iron-works were erected a few years later by George Leonard, Esq., who was one of the early settlers of the town about 1696. He was attracted thither by the discovery of Iron ore, and of ample water-power for the manufacture in the branches of Taunton River. The business in its various departments has been continued by his descendants to the present time.

Iron-works at Norton.

1654 Vanderdonck, a Dutch writer on New Netherlands, a year or two after the forge at Raynham was built, says the people of New England already "cast their own cannon, plates, pots, and cannon balls from native Iron." Much of this work was probably done at Lynn. The Royal Commissioners, in 1664, reported but one bloomery for Iron in Plymouth Colony, that at Taunton, now Raynham.

The dissatisfaction of the New England people with the commercial restrictions enacted at the Restoration, and particularly with the imposition of customs, duties, and the appointment of colonial revenue officers to carry them into effect, caused a renewal, in 1672, of the Articles of Confederation, and stimulated to greater efforts in domestic industry.

Edward Randolph, in the following year, reported to the commissioners respecting New England: "There be five iron-works, which cast no guns."[1] The duty on Iron imported into the Colonies was, in 1679, ten shillings per ton.

5 Iron-works in 1673.

In 1674, Nathaniel and Thomas Leonard entered into a contract with John Ruck and others of Salem to carry on the Iron-manufacture at the village of Rowley, which possessed all the advantages of wood, water-power, and bog ore. The business did not prove remunerative.[2]

Works at Rowley, 1674.

One of the Iron-works in the Colony was destroyed by the Indians in 1677.

Iron of good quality, as mentioned by Hubbard in a passage already quoted, was made at a village near Topsfield previous to 1680. At Boxford, in the same county, the manufacture was commenced in that year with ore taken from the ponds supplied by the headwaters of Rowley and Parker rivers, but was, not long after, discontinued. A bloomery was, however, in operation in the southern parish of that town toward the close of the last century. Several other towns in Essex were engaged in the same business in former times.

At Topsfield.

As early as 1648, Governor Endicott of Salem also discovered Copper ore upon land granted him between Danvers and Topsfield, and in 1651 petitioned the legislature for 300 acres of woodland for a better supply of fuel, at a place called Blind Hole, near which he intended to set up smelting-works. The grant was made on condition that the works should be set up within seven years.[3] He had already made some preparations and expenditures for that purpose, and sent to Sweden and Germany for workmen acquainted with the business of smelting and refining copper. But the mine proved less productive than was expected.[4]

Copper-works, 1651.

In 1702 the first furnace was erected in the County of Plymouth which has ever since been a principal seat of the Iron business of Massachusetts, and still has a larger number of furnaces for hollow-ware and castings, exclusive of pig Iron, than any in the State, and nearly one-half of the rolling and slitting-mills. Assawampset, Monponset, and Sampson's ponds were in early times the principal reservoirs of bog ore in the county. In these and others it was obtained at a depth of from two to twenty feet of water, either by digging around the margins in dry seasons, by draining off the water, or by dredging in the deep water; and, so long as the supply lasted, produced

Iron-works in Plymouth County.

(1) Holmes' Annals.
(2) Felt's Salem, i. 282.
(3) Records, iii. 256.
(4) Felt, i. 282.

an active business in smelting. Ores of a similar kind were also obtained at a later period from the southern shore of New Jersey, and having been carried back from Plymouth to the pine lands which surrounded the ponds, was mixed with the native ore. Much of the metal, which was generally not good for bar Iron, was run directly into cannon-balls, hollow-ware, and other castings, the furnaces for that purpose differing little from the smelting furnaces. As wood and ore became exhausted, the manufacture of crude Iron was abandoned, and attention was devoted to refining, rolling, and slitting metal from the other places, and to the manufacturing of nails, tacks, scythes, and other utensils.

In the year 1702, Lambert Despard, a founder, associated with some persons of the name of Barker, and built a smelting-furnace in the town of Pembroke, then a part of Duxboro, at the outlet of Mattakeeset pond, upon a tract of land granted in 1648 to Timothy Hatherly, of Scituate, for that purpose. The furnace continued in operation a number of years, but was finally abandoned for want of fuel.

At Pembroke, 1702.

In May, 1710, Joseph Mallinson, in a petition to the General Court, stated that he was interested in the ownership and management of a furnace in Duxboro, which was then ready to work, and understanding that "some great shot of several weights" were wanting for the ordnance of Her Majesty's Castle William, he was desirous of serving his country in that respect, and of entering into treaty on the subject. This furnace was possibly the same with the foregoing.

In Duxboro, 1710.

In March, 1739, Mallinson again memorialized the legislature for a grant of unimproved land, in consideration of the great benefit that had accrued from the manufacture of Hollow-ware, such as pots, kettles, etc., in *sand moulds*, of which he claimed to be "the sole promoter, whereby the Province saved annually at least twenty thousand pounds Importations." The wares referred to were made some years before; and the General Court, in acknowledgment of his claim, allotted him 200 acres of unimproved land.[1]

First casting in sand.

The introduction of the art of casting in sand, in place of clay moulds, has been ascribed to Jeremy Florio, an ingenious Englishman, who practiced the improvement at Kingston in the same county, previous to his decease at Plympton in 1755, at the age of ninety.[2] At one of the small furnaces in Kingston some of the first experiments in this country in smelting with Anthracite coal are said also to have been made early in the present century. A rolling and slitting mill were in operation there in 1795, at which time many of the charcoal smelting furnaces in the county had been abandoned.

(1) Mass. State Papers.

(2) Barber's Hist. Coll. Mass. 510.

About the year 1710 a large purchase of land, in the neighborhood of Abington and Hanover, was made by a person of the name of Mighill, who erected thereon what were afterward known as the "Drink-water Iron-works."[1] At Abington cannon and shot were cast during the war of Independence by Col. Aaron Hobart, who erected there an air furnace. The casting of church bells was also introduced there before the Revolution by the same person. Anchors, cables, and bar Iron have long been forged, and hollow-ware made, at Hanover. The anchors of the favorite national ship "Old Ironsides," built in the last century, were forged at that place. A slitting-mill was in operation there before the war.

Works near Abington.

The condition of the New England Colonies generally at the Peace of Utrecht, in 1713, was such as to challenge the admiration of English writers at their unparalleled progress in so short a time. To all the necessary handicraft trades, they added, as our previous pages will show, several of the more advanced manufactures; and in Massachusetts especially, where the greatest progress had been made, many of the embellishments of a refined life were engrafted upon the industry of the people. The commerce of Massachusetts employed about 500 sail and over 25,000 tons of shipping, and her activity in ship-building was great. This branch was especially flourishing on the North River, in the vicinity of these Iron-works; and its demands, added to those of agriculture, mill-building, and other industries, promoted a steady growth of the metallurgic arts. The manufacture of Iron had been already attempted in several other Colonies, and was about this time permanently revived in Virginia. Although no exportation of Iron had yet taken place that we can learn, the independent bearing of the Colonies in the defense of their charters and natural rights, and the evident extension of a manufacturing spirit, which was fostered by the amplest facilities, particularly for the Iron-manufacture, soon after gave rise to schemes for securing a greater dependence of the plantations upon the parent state, and for restraining the erection of Iron-works in America.

Progress of the Colonies alarming.

In Oct., 1750, James and Abiel Packard, Daniel and David Haward, and Constant Southworth, certified the General Court that they were the present owners "of a certain Bloomery Forge or Iron-works, standing in the North street, Bridgewater, in the County of Plymouth, which was erected about the year 1722." Bridgewater was early and actively engaged in several branches of the Iron business during the last century.

Iron-works at Bridgewater, 1722.

In 1738 an important accession to the mechanical industry of the town

(1) II. Mass. Hist. Coll., iv. 243.

was made by the removal thither of Hugh Orr, a young Scotchman from Renfrewshire, who had spent one year at Easton, in Bristol County. He had been educated as a gunsmith and locksmith, and erected at Bridgewater a shop, and the first trip-hammer known in that part of the county. The services of artisans, however humble, who have acted as pioneers in any branches of the useful arts, we regard as fit subjects of record in connection with the rise of American Industry. The following particulars respecting this ingenious and truly patriotic citizen are by his friend, Dr. James Thacher, of Plymouth.

Hon. Hugh Orr.

" He commenced his experiments in the manufacture of scythes; and it was by his exertions, prompted by an ardent desire of promoting the useful arts in an infant country, that the scythe and axe manufactory were introduced in the States of Rhode Island and Connecticut. And such were the happy resources of his mind and love of enterprise, that there was no branch of iron manufactory that did not at some period become the object of his pursuit; nor was there any obstacle too formidable for his perseverance to surmount. For several years he was the only edge-tool maker in this part of the country, and ship-carpenters, millwrights, etc., in this county and State of Rhode Island, constantly resorted to him for supply. And indeed such was his fame, that applications were frequently made to him from the distance of twenty miles for the purpose of having an axe, an adze, or an auger new tempered by his hands. About the year 1748, he made five hundred stand of arms for the Province of Massachusetts Bay, which were deposited in Castle William; but nearly all were carried off by the British when they evacuated the town of Boston. The perilous state of our country after the commencement of the Revolutionary war afforded new scope for his enterprising genius, and fresh impulse to his sentiments of patriotism. Instances were not numerous of foreigners embracing with cordiality the American cause; he was one of its early advocates, and continued among its firmest supporters, notwithstanding the reiterated enticements of his friends and correspondents in Europe. He was again employed in manufacturing a number of stands of arms, and under his superintendence, in concert with a French gentleman, a foundery for casting cannon was erected. Iron ordnance were, till within a few years of this period, cast with a cylindrical cavity of a diameter somewhat smaller than the intended calibre, which was afterward bored to a proper size; but this method was found by experience to be attended with inconveniences. The guns were extremely liable to be spongy in that part where strength and smoothness are required. To remedy this evil, an improved method had recently been introduced in Europe. The gun was to be cast solid, and the calibre afterward with a boring bar-iron

Edge tools & Fire arms.

and cutter to be perforated and smoothed out to its proper diameter. This method, though difficult and laborious, was adopted by Mr. Orr at the new Foundery at Bridgewater; and by his exertions a great number of pieces of iron and several pieces of brass ordnance, from 3 to 42 pounders, besides a vast quantity of cannon-shot, were produced, which being distributed to different parts of our army, proved at that critical conjuncture of affairs an acquisition of inestimable value.[1] His knowledge of minerals and ores was so extensive, that from every newly-discovered mine in the country he was immediately furnished with specimens of its quality, and a few years previous to his death he was in possession of a valuable mineralogical collection."[2]

Cannon cast solid & bored.

In a previous chapter we have spoken of the connection of Mr. Orr with the introduction of cotton machinery in New England. His biographer further observes that "the present improved method of making scythes by the trip-hammer is the result of the successful experiments of Robert Orr, Esq., son of the subject of this memoir, who also introduced the iron shovel manufactory in this State. He is now (1804) Master-armorer of the public Arsenal at Springfield." The Hon. Hugh Orr died in 1798, at the age of 82.

Scythes.

The muskets made by Mr. Orr in 1748 are believed to have been the first ever made in this country. The plate shovel manufacture established by his son soon obtained considerable repute in neighboring States.[3] The shovels were for some years considered better and cheaper than the English, which character they subsequently lost. But at Easton, under the management of the Messrs. Ames, the reputation has been revived, and the factory has become one of the most celebrated and extensive in the country. Millwrights, nail-makers, and artificers in Iron were very numerous in Bridgewater in the last century. Before

(1) "When a Salem captain was asked by an Englishman during the war, 'Where do you get your cannon?' he replied, 'We cast them;' and when asked again, 'But where do you get your patterns?' he replied, with a significant smile, 'At Saratoga.'" In 1788, Congress ordered the following inscriptions upon a cannon preserved through the war: "The Hancock," "Sacred to Liberty," "This is one of four cannon which constituted the whole train of field artillery possessed by the British Colonies of North America at the commencement of the war, on the 19th April, 1775." *This cannon*, and its fellow, belonging to a number of citizens of Boston, was used in many engagements during the war. The other two, the property of the Government of Massachusetts, were taken by the enemy. By order of the U. S., in Congress assembled, May 19, 1788." The other, named "The Adams," received a similar inscription.

(2) I. Mass. Hist. Coll., ix. 264.

(3) In May, 1765, Jonathan Holmes, on "Pot Baker's Hill," New York, advertised for sale "Keen & Payson's (by some vulgarly called Salem scythes) improved scythes, made in this part of America, of all lengths," etc., which he states had given the greatest satisfaction, and were allowed to be of superior quality and form to any other make.

the invention of the machine for cutting cold tacks and nails, which is claimed for Ezekiel Reed, a native of the town about the year 1786, more wrought nails were made there than at any other place in the State. The machinery was adopted and improved at Abington, where, in 1815, about one hundred and fifty millions of tacks were made. Jesse Reed, the son of the inventor, afterward patented (1807) a machine to make and head tacks by one operation, at the rate of 60,000 per diem. The second slitting-mill erected after the Revolution was in Bridgewater.

Slitting mills.

Two rolling and slitting-mills in the town, in 1795, cut and rolled 445 tons of Iron, of which 100 tons were made into hoop iron and for cutting nails, and it was regarded as a large business. One of these, a mile from the village, built in 1785, and now owned by Messrs. Lazell, Perkins & Co., has at present "14 furnaces, 3 trains of rolls, 44 nail-machines, 9 fires, and 5 hammers (one a 3-ton Nasmyth) in the forge, driven by steam and water, and makes perhaps 2,000 tons of nails, machinery, forging, etc., per annum."[1] Some others in the county are still larger, having over 20 furnaces and 80 or 90 nail machines, producing between four and five thousand tons of nails, hoops, and shapes annually.

Plympton and Carver.

Iron-works were erected in Plympton in 1730 by Joseph Thomas (Holmes?). They were afterward owned by Joseph Scot, a merchant of Boston, and still later by Mr. Beacham of the same place.[1] In that part of the town now included in Carver the first cast-iron tea-kettle was made, between the years 1760 and 1765. That important utensil had been previously made of wrought iron, and was imported from England. A copper tea-kettle was first used at Plymouth, whence Carver was chiefly settled, in 1702.[2]

Scarcity of Iron wares.

Among the primitive colonists of New England many domestic utensils of Iron, with which the humblest dwellings are now supplied, were quite unknown. Others were comparatively rare, and were prized accordingly. The inventories of property, and the wills of many persons of good estate, particularly enumerate such articles as Iron pots, of which one or two appear frequently to have comprised the whole stock. These were often bequeathed to some member of the household as a mark of esteem. The exclusive use of wrought-iron tea-kettles, and the extreme rarity of iron vessels a century ago, are evidences of the limited production of cast-iron ware, even in the parent country, whence the colonists were supplied with such things as were then in common use. The profusion of such wares in every department of culinary service at this time is the result of comparatively recent im-

(1) Lesley's Iron Manufacturer's Guide. (2) II. Mass. Hist. Coll.

provements in this branch of Metallurgy, and is due to the substitution of coke, and still more of anthracite, for charcoal in the reduction of the ores.

About 1751, a large body of bog-ore was discovered by Joseph Holmes, while angling in Jones river pond in Kingston or Plympton, whence large quantities were for several years taken for the use of a forge. The ore yielded about twenty-five per cent. of Iron, which was widely known as "Holmes' Iron," and of material for cannon-shot during the Revolution. The forge site, three-quarters of a mile from the Plympton station of the Old Colony railroad, is now known as Holmes' Anchor Forge, to which use it was afterward converted, and employs 1 charcoal fire, 4 forge fires, and 2 hammers driven by water. It is about the oldest works now in the country, and, with another anchor forge a mile from the Kingston Depot, erected in 1792 as an edge-tool factory, and changed to an anchor forge in 1800, is still owned, we believe, by a descendant of the original proprietor.

About the date of the erection of the first forge in Plympton (1731), the number of Iron-works in New England, according to the returns made to the Board of Trade, was six furnaces for hollow-ware, and nineteen forges or bloomeries for bar-iron. At that time there were no pig-iron furnaces exclusively, nor any refineries of pig-metal. There was one slitting-mill and a manufacture of nails. Refineries were in use within the next sixteen or eighteen years.[1]

Returns of Iron-works, 1731.

Carver has been long celebrated for its production of iron castings. The only grate factory now in New England is in South Carver. Its early enterprise in this branch was sustained by a good quality of bog-ore, supplied by at least a dozen ponds within its limits. From one of these, about 500 tons were dragged yearly. At the beginning of the present century, however, the furnaces were chiefly supplied with ore from New Jersey. The charcoal was made from pine growing in the neighborhood, which was prefered to that from other woods. One and a half cords were estimated to make 80 bushels of charcoal, and six men could make 200 loads in three months. An acre of well-wooded land yielded about 20 loads, which was above the average. The price paid on delivery at the furnaces was 15*s.* for a load of 80 bushels, some works paying as high as 24*s.* for 100 bushels. About 120 bushels were required to smelt one ton of pig-iron. Each furnace employed eight or nine men, besides wood-cutters, coalers, carters, and other common laborers.[2]

(1) Douglass' British Settlements in America, i. 540; ii. 109.

(2) Ibid. i. 540.

The best idea we can gather of the general character of the furnaces in the last century, is from an account by Dr. James Thacher, one of the proprietors[1] of the Federal Furnace in Carver, seven and a half miles from Plymouth, erected in 1794. Though written in 1804, it is not inapplicable to those of an earlier period. At the date of the description, the production of pig-iron from the ore had nearly or quite ceased in the county, but ten blast-furnaces were in operation for castings. Ten forges were also employed in making bar-iron from scraps and old cast-iron to the amount of two hundred tons annually.

The Federal Furnace.

The Federal furnace was 20 feet high above the hearth, and 8 feet wide in the boshes. The blast was produced in the manner of that day by two huge bellows, 22 feet long and 4 in width, producing alternate blasts by a water-wheel 25 feet in diameter. Two or three blasts, of 16 to 18 weeks each, were made in about 6 months, in which time 360 tons of hollow-ware and other castings were produced, estimated at 1,200 lbs. per nominal ton of all sizes. The expenses were estimated as follows, viz.:

2,130 cords of wood, converted into 1,420 loads of charcoal at $2.50	$3,550.00
726 tons of ore, at $6	4,356.00
Two sets of stone for hearth	153.32
Compensation to the founder at $1 per ton	360.00
Ditto to the moulders and other workmen	2,331.00
Total	$10,750.32

In addition to hollow-ware of all kinds, this furnace produced at that time such articles as Seymour's patent rolls for slitting-mills (patented June, 1797), of superior quality, cast in iron cylinders, potash kettles, stoves, fire backs and jambs, plates, gudgeons, anvils, large hammers, cannon-shot of all kinds, and machinery for mills in great variety.

Middleboro.

At Middleboro, in the same county, works were early erected for smelting the sedimentary ore of numerous small ponds in the town. The ore was dragged from the water by an instrument similar to an oyster dredge, at the rate of about two tons per diem for each man, which quantity gradually diminished to half a ton a day. About the year 1747, it was discovered that a much richer deposit of the hydrated peroxyd lay at the bottom of Assawampset Pond, the largest of those reservoirs. A good supply was thenceforth obtained from it, and was used both in furnaces and forges, and considerable quantities were transported to other places. The Charlotte furnace in that town

(1) II. Mass. Hist. Coll. ix. 258–264.

was erected in 1756, and is still in operation in its one hundred and thirteenth year. It is now owned by Mr. Matt Ellis & Co., and employs about 80 hands.

The first rolling and slitting mills in New England were erected in Middleboro. In 1750, when a particular account of all such establishments was called for by the Act for encouraging the importation of Pig and Bar Iron from America, and prohibiting the erection of any slitting or rolling mills, plating forges, or steel furnaces, there were two of the first-mentioned class in Middleboro, one in Hanover, and one in Milton. The Province also had in operation one plating-forge with a tilt-hammer and one steel furnace. The rolling-mills were chiefly employed in making nail-rods, from which spikes and large nails were already made in great abundance, and cheaper than they could be imported, which was not the case, however, with small nails. In addition to one regular factory for wrought nails, the farmers, at leisure seasons, hammered many large nails and spikes as a household industry, which in the aggregate was very considerable.

First Slitting mills.

So arbitrary an exercise of legislative authority as that part of the Act above mentioned which virtually interdicted all manufacture of Iron, save of the rough material, while that product of colonial labor was only admitted duty free into London, where the market was always glutted with foreign Iron, met with strong reprobation on the part of Massachusetts. The Colonies of New England were always, on account of the greater progress there made in all the mechanical and laborious arts, the smallest exporters of either pig or bar iron, and the largest importers of bar iron and steel. The selfishness of the policy which compelled them to send all their crude Iron at great cost to Great Britain, and to receive from a distant source all the nails, steel, and finished products of foreign Iron for the benefit of the shipping and a few interested classes in England, rendered the injustice of the measure still more irksome. The framers of the bill doubtless considered the concessions made a fair equivalent for the restrictions imposed. Massachusetts nevertheless declared the Act to be an infringement of her natural rights, and other Colonies considered it no less unfair. We are not aware that any manufactories of the prohibited class were set up in the State during the remainder of its Colonial history, with the exception, perhaps, of a few tilt-hammers, one of which was erected in Enfield, Hampshire County, about the year 1773.

Prohibition of Slitting mills, etc., 1750.

Wareham, Halifax, Dighton, Weymouth, and other towns in Eastern Massachusetts, were early engaged in some branches of the Iron-manufacture. The Leonards owned a furnace at Wareham at the beginning

of this century. The two counties of Plymouth and Bristol had in operation in 1798 fourteen blast and six air furnaces, twenty forges and seven rolling and slitting mills, in addition to a number of trip-hammers and a great number of nail and smith shops. The furnaces were estimated to produce annually 1,500 to 1,800 tons of Iron-ware, and the forges upward of 1,000 tons of bar-iron one year with another. The rolling and slitting mills produced at least 1,500 tons per annum. Many branches of Iron and Steel manufacture had grown up in the neighborhood. Cut and hammered nails, spades and shovels, card-teeth, saws, scythes, metal buttons, cannon-balls, bells, fire-arms, sheet-iron for tin ware, wire, etc., were made in large quantities.

At Amesbury, in Essex County, a furnace was erected about the year 1790, and a bloomery forge in Boxboro, near the same time. Several kinds of tools and agricultural implements were made in the former place. The machine for cutting and heading nails, invented by Jacob Perkins, of the neighboring town of Newburyport, about 1790, was first used at Amesbury.[1] This machine was patented January 16th, 1795, and was said to be capable of turning out 200,000 nails in a day. At Amesbury, where the machines were in operation previous to 1798, they were worked by water-power, and the nails were considered superior to those from England, while they sold 20 per cent. cheaper.[2] The proprietors, we believe, were Jacob Perkins and Jonathan Ellis, who, being more intent on the machinery than the success of

Perkins' nail machine.

(1) This ingenious artisan was born at Newburyport, in July, 1766. At the age of fifteen he assumed the management of the goldsmith business of his deceased master, and gave early evidence of the mechanical genius which placed him among the first of American inventors. He made gold beads and shoe-buckles in a superior manner, and invented a new method of plating the latter. At twenty-one he made dies for the Massachusetts mint, and at twenty-four invented the nail machine, which involved him in difficulties. He afterward removed to Philadelphia, as furnishing the best field for his talents, and subsequently to London, where he prosecuted his inventions, and conducted the engraving business with Fairman & Heath. Few have done more to raise the fame of American ingenuity abroad. We have not space here to notice his numerous inventions. He took out seventeen patents in the United States and a number in England. Among the principal of these were the nail machine, the stereotype check plate, improvements in steam boilers and engines; in decarbonizing and hardening steel for the indenting cylinders of engravers; a method of boring cannon; for steam artillery and other gunnery; apparatus for ventilating rooms and holds of ships; for a ship's pump; rivets for fire-engine hose; a method of drawing off back-water from water-wheels. He also demonstrated the compressibility of water, and invented the bathometer and pleometer, and made numerous experiments on the theory and practical applications of steam. Many of his inventions were rewarded by the gold and silver medals of the Society of Arts, in London, and were honorably mentioned by scientific and mechanical journals and societies.

(2) Morse's Univ. Geog.

their business, eventually became involved, and discontinued the business.

Central and Western Mass.

Although the numerous deposits of bog-iron ore in the Tertiary formation of the seaboard were the first and principal resource of the early Iron-manufacturers in Massachusetts, they are of far less consequence, notwithstanding the renewal of the mass after certain intervals, than the brown hematite and magnetic ores of the Western counties. The most abundant and valuable of the primary ore beds are found in the Berkshire hills, or Green Mountain range, on the western and northwestern borders of the State, where they are continuous with similar deposits in the adjacent States of New Hampshire, Vermont, Connecticut, and New York. In less quantity, Iron ore occurs also in several places in Worcester and Hampshire Counties.

Worcester County.

Several towns in the former contain the sulphurets of iron, lead, and zinc, arsenical iron ore, and the carbonate or steel ore, though nowhere in any great quantities. The general diffusion of the yellow pyritous scales through the rocks in the western part of Worcester led, in the last century, to several extensive explorations for gold and silver. A vein of galena discovered in the town, in association with a small proportion of silver, led, about the year 1754, to mining operations in which considerable money was expended. Arsenical Iron and the more valuable carbonate also abound, but we do not find any mention of a forge or furnace for smelting the latter.

At Furnace Village, in Hardwick, a furnace was erected on the river Ware previous to 1773, by Joseph Washbourne, of Braintree, who, on petition, received from the General Court a grant of a limestone tract near Ashfield for the use of the furnace. Iron wares were made at Hardwick for some time in considerable quantity. Bloomery forges were erected in the towns of Mendon, Harvard, and Western, and a refining forge in Douglass previous to 1793. Western, which had also a scythe manufactory, furnished some ore for the forge; and a mine in Uxbridge supplied the forge in Douglass, which stood near the line. In the western part of Brookfield was a pond, whence a good amount of bog-ore was annually taken, probably for the forge at Western, as none is mentioned in the town. This town also contains considerable sulphate of iron, from which copperas was extracted. A manufactory of copperas was many years ago set up in Hubbardston, where much of the sulphate also exits. In Sterling, where the carbonate of iron occurs, are also found the sulphurets of zinc and lead, which, near the close of the last century, led to extensive search for precious metals.

The prevalent infatuation of the period on the subject of precious metals, and the fallacious guidance of "mineral rods," led also to the

formation, in 1783, of a company of twenty-five persons, under the direction of Messrs. Ives & Peck, to mine for silver ore in the town of Harvard. The search was continued through the superimposed earth and forty feet into solid rock, but was abandoned in 1789, after expending about $1,100.

Iron-works were erected about the year 1793 in Westminster. A manufactory of cut-nails and a trip-hammer were in operation in that town. In Northboro, on the Assabet river, was also an Iron-works, for which the town furnished a good supply of bog-ore. It also contained a manufactory of edge-tools, of different kinds and excellent quality.

Trip hammers and various manufactures in Northboro.

The county was early engaged in the manufacture of edge-tools, hardware, machinery, and other branches of Iron-manufacture, in several of which it still takes a prominent position. As many as seventeen trip-hammers are mentioned by Whitney in 1793. Of these, seven were in the town of Sutton, which had five scythe, one ax, and one hoe manufactory, and several naileries. These were situated on Mill brook, which also supplied power to paper, oil, fulling, powder, grist, and saw mills in such number as to merit its name, and render the town famous for its manufactories. The town, however, had no iron-mine, forge, or furnace. A gun factory was erected on the same stream in 1776, which, after the war, was converted into a manufactory of scythes, axes, mill irons, etc. Leicester, six miles from Worcester, on the great post-road from Boston to Philadelphia, had also "a famous gunsmith, Thomas Earle, who was supposed to equal any workman in the U. States in that branch of business." It had one trip-hammer, and a manufactory of cotton and wool cards, which employed 15 or 20 men, exclusive of many women and children, and made annually twelve to fifteen thousand pair of cards. There was also a card factory in Rutland, recently established, and one trip-hammer. Grafton had three of the last-named machines in operation, Worcester two, and Brookfield two, the last owned by Mr. Jenks, who, in addition to mills on the Chicopee, carried on the blacksmith business extensively, his hammers being driven by water. Westboro, in this county, gave birth to the ingenious Eli Whitney, whose mechanical talents were employed during the Revolution in the humble occupation of making nails by hand, a business which everywhere received a great impulse from the scarcity created by that event.

Western Mass.

In the limestone and slate of the Connecticut valley, in the old County of Hampshire, several rich beds of magnetic ore, and some micaceous ore, occur, particularly in Bernardston, Hawley (now in Franklin), and Chester, in Hampden County. Some of these contain over 80 per cent. of the sesqui and peroxyds, as that of Bernardston;

but attempts to smelt it toward the end of the last century were not very successful, on account, it is supposed, of an associated oxyd of manganese. Of earlier attempts to make Iron in that part of the country we have no account.

Springfield, on the Chicopee, was the first town settled in Western Massachusetts, but its growth was long retarded by Indian hostility.

Springfield Armory.

Its central and inland, yet accessible, situation recommended it as at once safe and convenient for a recruiting station, a depot for military stores, and a place for the repair and manufacture of the munitions of war during the Revolution. The main street of the town was soon occupied by the shops of artisans employed in the public service, until at length, in 1778 and '79, the Government works were established on a portion of their present site on the hill. Some cannon were cast and forging done here during the war, but small arms were not made until after the peace. When the establishment of a national armory engaged the attention of Congress in 1794, the favorable situation of Springfield, and the commencement already made there, led to its selection as one of the sites of national works, and to much of the subsequent prosperity of the place. The other was established at Harper's Ferry.

In Berkshire County, which contains the most valuable Iron ores of the State, mining and the manufacture of Iron has been carried on for a

Berkshire County.

century or more. The beds of brown hydrate of Iron are numerous and extensive throughout the county, at the edge of the Lower Silurian limestone of the Berkshire valley. In many places this ore is of the fibrous and concretionary kind, which are its purest varieties, but generally is in the forms of compact ore and the red and yellow ochres. The most abundant deposits, which are wrought in open quarries, are in the towns of West Stockbridge, Richmond, Lenox, Lanesboro, Cheshire, Tyringham, Great Barrington, and Pittsfield. These valuable ores contain from 30 to 60 per cent. of metallic iron, and some beds have yielded 100,000 tons without signs of exhaustion. A number of cold blast charcoal furnaces have been long engaged in making superior forge iron of the quality known as the "Salisbury brand," the ore being of the same character as that of the celebrated Salisbury mines in Litchfield County, Connecticut, and with ore beds in Vermont and New York, for which it is frequently interchanged. The production of this kind of Iron is now limited by the scarcity of charcoal, and the warm and hot blast and anthracite are employed in several furnaces which make soft foundery and car-wheel iron. The infusible nature of the gangue, which almost invariably contains manganese, is also more readily overcome by these means.

The charcoal hot blast-furnace of the Lenox Iron-Works Company was built at Lenox in the year 1765, like nearly all the charcoal furnaces of that day, with one tuyère; and having been rebuilt with three tuyères now makes near 2,000 tons of metal annually from ore in the town.

In West Stockbridge, where the ore is rich and abundant, three Iron-works were erected during the last century. Others were built at Pittsfield and in the different towns on the Housatonic, near the hematite beds. But the Iron enterprise of this region has been of more recent growth than that of the maritime counties of the State, and fewer particulars respecting the first operations have come to our knowledge.

In the latter section of the State, also, the principal manufactures from Iron in the last century were carried on. These embraced many classes of useful metallic products, some of which have been mentioned; and the amount of labor and capital employed in them was far greater than in the strictly metallurgic branches. In aid of these, rolling and slitting mills, as we have seen, were very early erected. After the Revolution, when the prohibition of such machinery was no longer operative, they were speedily multiplied. The number of these establishments in three of the Eastern counties of the State in 1795, as furnished to Dr. Morse by the proprietor of one of them, was eleven. Five of these were in Bristol County, viz., three in Taunton, one in Pawtucket, and one in Norton. There were two at Bridgewater, one at Plymouth, and one at Kingston in Plymouth County, and one at Needham, and one at Stoughton in Norfolk County. They cut and rolled in that year 1,732 tons of Iron, of which 610 were rolled for hoops and for cut nails, and the remainder for common nail-rods. The slitting-mill at Stoughton, where a bell-foundery was also erected in 1770, was in the part afterward the town of Canton, and cut and rolled in the next four years about 1,000 tons of Iron, chiefly Russian Iron, which at the time was largely imported.[1] Messrs. Leonard & Kinsley, of Canton, made annually, from the year 1790 to 1797, from 150 to 200 mill-saws. The town also contained at the latter date a forge and scythe shop in which two to three hundred dozen scythes were made annually. Some steel was also made there from crude iron by the German process. Mill saws, considered the best in the State, were also made at Easton at that time. The Steel-manufacture was introduced in the town in 1787 by Eliphalet Leonard. The article was made in considerable amount, and cheaper than imported Steel. In quality, though suitable

Manufacture of Iron in Eastern Mass.

(1) In the year 1790, twenty-two ships arrived in the United States from St. Petersburg with cordage, sail-duck, and other linens, nail-rods and rolled iron for hoops, the balance of their cargoes consisting of bar-iron, hemp, and flax, to be manufactured in the country.

for coarse work, such as plowshares, mill saws, horseshoes, which consumed great quantities, it was much inferior to foreign steel for edge-tools and cutlery.

Slitting-mills for cutting American iron were in operation also at Dighton, and probably other towns in Suffolk and Middlesex counties.

Colonel Paul Revere was the proprietor of a foundery on Lynn street, Boston, where cannon and bells, which since the Peace had been chiefly imported, were made. Very neat brass cannon were cast at this foundery, and many iron articles, such as cabooses, stoves, clothiers' plates, chimney-hearths, anvils, forge-hammers, and whatever was out of the ordinary way, if patterns were left.

Wire cards by machinery.

The manufacture of wool-cards by hand was commenced in Boston before the Revolution. In 1788, Mr. Giles Richards formed a company to carry on the business by newly-invented and improved machinery of American invention, which it is very probable was mainly that invented several years before by Oliver Evans for cutting and bending card-teeth and piercing the leathers. They established a manufactory near Windmill bridge, where the card-boards were cut by wind-power, one man at a machine being able to cut and bend in twelve hours sufficient wire for twenty dozen cards, at a saving of one-half the labor of any previous method. This factory was visited in the following year by President Washington, who was informed that about 900 hands were employed in it, and 63,000 pair of cards (of all kinds) had been made in a year. They undersold the imported, and had even been smuggled into England. The business was also carried on by Mark Richards & Co. near Faneuil Hall market, in 1794, and the manufacture then employed about 1200 persons (chiefly women and children) in sticking the teeth. Four-fifths of the cards made in the State were by these factories, and were largely exported to the Southern States. In 1797, Amos Whittemore, an ingenious gunsmith, who, with his brother William, had been connected with Giles Richards & Co., and the previous year had taken out three patents, including one for cutting nails, received letters-patent for his card-making machinery. Previous to this, the Whittemores had established a third considerable card factory in Boston, in which the old machinery was employed. The three factories at this time manufactured about 12,000 dozen of cotton and wool cards, which consumed nearly 200 casks of wire, averaging $130 per cask, 35,000 tanned sheep and calf-skins, worth 37½ cts. each, and employed nearly 2,000 children and 60 men. There were three smaller factories in Boston, and 2,000 to 3,000 dozen cards were made yearly in other parts of the State. The wire consumed by them was made at Dedham, where a wire-mill was erected at considerable expense for the use of the

card and fish-hook makers of Boston. The wonderful piece of mechanism devised by Amos Whittemore created a complete revolution in the business in England and America, by reducing all the successive operations of holding and piercing the leather, drawing the wire from the reel, cutting and bending the card tooth, inserting and finally shaping the tooth, to a series of rapid, precise, and completely automatic movements. Sheet-cards for cotton and wool, hatters' cards, and clothiers' cards and jacks, were made with great rapidity and cheapness by its aid. It was introduced into England by Mr. Dyer.

This machine and those of Perkins and Jesse Reed, before mentioned, for cutting and heading nails by one operation, a modification of the last by Thomas Odiorne of Malden, Mass., who adapted it for cutting brads, and some other improved nail machines, were regarded in England as possessing uncommon merit. They were adapted either to steam, water, or horse power, and were soon employed abroad, and within a few years enabled this country not only to supply an enormous demand for tacks and nails, but to export vast quantities to foreign countries. The manufacture of nails, an early branch of industry in Massachusetts, and the subject of 120 American patents from 1790 to Sept., 1825, was, on account of its importance, strongly recommended to the people of that Colony by the Provincial Assembly, in December, 1774, when war had become imminent. Steel, tin plates, fire-arms, which had been made in several parts of the Colony previously, gun and other locks, and wool-cards were also commended as deserving of special attention, with several branches of non-metallic manufacture. For several years following the Peace, however, the nail-makers and all other artificers in Iron, in common with the proprietors of furnaces and forges, had to contend with an overflow of foreign manufactures to an impoverishing extent. At this critical period in the financial history of the State and the nation, when, in addition to the unpaid State and Federal debts of the Revolution, the liabilities of all the States were increased by a ruinous balance of trade, Governor Bowdoin, who had ever been a friend of manufactures, was elected to the chief magistracy of the Commonwealth. In his first message to the legislature, in 1785, he advised that the credit of the State should be maintained at all hazards, and adequate power be given to the Federal Congress to retrieve the national credit and finances by a regulation of the commerce with foreign nations. To this end he recommended a convention of the several States for the revision of the Constitution. The State legislature, by his advice, passed an Act, to be of temporary force, laying duties with a view to the encouragement of its manufactures. In a message in February of the following year, he called upon

Nails by machinery.

them to do something for the further protection of Iron, stating that Mr. John Noyes, who had recently returned from Europe, informed him he had while there obtained a perfect acquaintance with several branches of the Iron-manufacture, and of the machines used in manufacturing iron and steel, including the "construction and use of the new invented steam-engine, very necessary in those operations, and which may be advantageously employed in many others." Mr. Noyes, who was the bearer of a letter from Hon. Mr. Adams, the American Minister at London, recommending his projects for introducing some new manufactures, was willing, in connection with his partner Col. Revere, and under suitable encouragement from the legislature, to erect works for carrying on these branches to considerable extent. Circumstanced as they then were, Mr. Bowdoin deemed it highly necessary to encourage every useful and practicable manufacture, especially that of Iron, which in those respects might vie with any. As it must, with the proposed improvements, prove highly beneficial to the Commonwealth, he strongly recommended this branch to their favorable consideration.[1]

Under Governor Hancock, encouragement by the legislature was extended. In the system of duties, however, enacted by Congress under the new Constitution, which Bowdoin early and strongly urged as the best remedy for the industrial interests of the country, the protection given to the iron, steel, and especially the nail manufactures, though small in amount, was a concession to the industry of Massachusetts and one or two other States. The impost of one cent per pound on spikes, nails, tacks, and brads, proposed in April, 1789, was opposed by several Southern members as a burden upon ship-building and the improvement of estates, and as bearing unequally upon the States north and south, inasmuch as the former made enough for domestic consumption, and therefore would not feel it. On the other hand, it was stated that great quantities were made for exportation in Massachusetts and Pennsylvania, and probably other States, and enough might soon be made to supply all North America. Mr. Ames, of Massachusetts, said: "This manufacture, with very little encouragement, has grown up remarkably. It has become common for the country people in Massachusetts to erect small forges in their chimney-corners, and in winter and on evenings when little other work can be done, great quantities of nails are made even by children. These people take the rod-iron of the merchant and return him the nails; and, in consequence of this easy mode of barter, the manufacture is prodigiously great. These advantages are not exclusively in the hands of the people of Massachusetts. The business

(1) Winthrop's Address on the Life and Services of James Bowdoin.

might be prosecuted in a similar manner in every State exerting equal industry." In this state of the business, Mr. Tucker, of South Carolina, thought it evidently stood in need of no prohibition, and Mr. Fitzsimmons believed the American manufacturers would have little to fear if those articles were left without a special duty. Neither spikes nor nails for ship-building were imported, but, being large and heavy, were made in the country according to the builder's order. They then had slitting-mills and all the materials for nail-making independent of foreign countries. The extra duty on nails and spikes was agreed to, but tacks and brads were left subject to the ordinary rate of five per cent. The manufacture of nails in the State was supposed to have doubled in the next ten years, chiefly through the aid of machinery.

Inventions.

In the construction and adoption of those labor-saving methods and instruments by which Iron and other materials are wrought up with facility into the varied forms which now employ so much of the industry of the State, rapid progress was made after the Revolution. Massachusetts has contributed its full share to the reputation for ingenuity, dexterity, and versatility in the mechanical arts which is characteristic of the American artisan. Many of its early contributions to the several branches of manufacture treated of in former chapters, evinced the fertility of the inventive resources of its people. In all the departments of textile and other machinery, the production of its workshops generally kept pace with the demand, and many improvements were engrafted upon mechanism of foreign origin. Boston had quite a body of skillful mechanics, who, in 1785, were united in an association of tradesmen and manufacturers for the good of the whole. From this body emanated, in August, 1788, a circular to "their brethren in the several States in the Union."

Among the additional examples of the practical skill of this class, involving the use of metals, may be mentioned the following:

Fire-engines.

At a fire which occurred in 1765, a fire-engine of home construction was used, "and found to perform extremely well." It was made by David Wheeler, a blacksmith in Newbury street, who announced his intention to manufacture fire-engines as good as any imported. Wheeler at the same time proposed to "make and fix iron rods with points upon houses, and any other eminences for prevention from the effects of lightning." This was probably the first practical application in his native town of the grand theoretical and practical discoveries of Franklin, which, at its first announcement some years before, had encountered the ridicule of so learned a body as the Royal Society of England, although its author received afterward the highest marks

of its esteem. Dr. William King, of Boston, is said to have introduced many years after the use of rods with many points along them.

Some improvements in the forcing-pump, and its adaptations to the hydraulic mechanism of the fire-engine, were made and patented some years after by Benjamin Dearborne, of Boston, the inventor of the Patent Balance, and numerous improvements in other articles. An account of these may be found in his letters to Governor Bowdoin, and other papers in the Memoirs of the American Academy of Arts and Sciences, of which he was an esteemed member.

Curious clock.

At a town-meeting convened at Boston in March, 1768, on the subject of Manufactures, Mr. Gawen Browne, a native of the town, exhibited "the frame and principal movements of a new and curious Town Clock which he had manufactured." The two great wheels, it was said, "took near 90 lbs. weight of cast brass. It was calculated for 8 days, and to shew the hours and minutes; to have 3 dials and a mechanical lever to preserve the motion during the winding up; the pendulum wheel and plates to perform the dead beat; its 'mathematical pendulum' was so contrived that it could be altered the 3,500th part of an inch while the clock was going." In the second volume of the Memoirs above mentioned is also a description of the

Orrery of Pope.

orrery or planetarium constructed by Joseph Pope, an ingenious clockmaker of Boston, made without previous acquaintance with such a machine, and pronounced by Dr. Dwight to be, except in size and durability, "probably inferior to none in the world." It was purchased by the State for Harvard University. The inventor was also the author of an ingenious theory of gravitation, and the inventor of a threshing-machine, patented in 1802, and also an improved windmill.

Theodolite.

As early as 1735, Rowland Houghton, a merchant of Boston, was the inventor of an instrument for surveying land, which he called "The New Theodolite." He obtained exclusive privileges for seven years for making and selling it, by an Act of the General Court, which declared that "land could be surveyed with greater ease and despatch than by any surveying instrument heretofore projected or made within this Province."

Rhode Island.—The first forges in Rhode Island and Providence plantations were built in the towns bordering on Bristol County, Mass., and run on the bog ore of the neighborhood, which in early times fed so many furnaces in that and Plymouth County. Pig iron and a variety of castings were the principal product, the ore being ill adapted for making good malleable iron or steel.

The first house in Pawtucket was erected by Joseph Jenks, of Lynn, who had probably with his father been engaged in the first iron-manufactures at that place, and whose son of the same name was afterward the Governor of Rhode Island from 1727 to 1732. He also erected a forge at Pawtucket, which was destroyed by the Indians during the Wampanoag War in 1675, in which about 600 New England people were killed in battle or murdered, as many buildings—chiefly dwellings—burned, and twelve or thirteen towns entirely destroyed. Several Iron-works and other infant enterprises were also overthrown in the sanguinary contest, much shipping was destroyed, and the Colonists accumulated an enormous debt, while their resources were greatly reduced thereby. After the death in the following year of King Philip, the implacable chieftain of the Narragansett tribes, whose capital was at Mount Hope, now Bristol, and the dispersion of his followers, the improvements of the county were subject to less frequent interruption from Indian hostility. With the flourishing ship-building which grew up around the Plymouth and Narragansett Bays, the demand for Iron increased, and furnaces and forges were multiplied. But the bog-ore which supplied the furnaces produced a cold short iron, not sufficiently tough for nails, spikes, or tools of good quality.

Magnetic ore of Cumberland.

In the town of Cumberland, however, in the extreme northeastern angle of the State, and nearly on the line between it and Massachusetts, exists a mass of the magnetic oxyd, one of the largest in New England. This deposit was early discovered, and though better adapted for the manufacture of malleable iron and steel, appears not to have been successfully wrought. The abundance of the ore, and of wood, water-power, and limestone, which was early quarried in the immediate neighborhood, afforded every facility for a profitable working of the mine.

Scituate.

In 1735, Samuel Waldo purchased an ore bed in the town of Scituate, and erected there a furnace and foundery on the Patuxet river, which afterward became widely known as the Hope Furnace. Cannon for the Navy, large bells, and other castings were made there, and munitions of war were supplied for the revolutionary contest. These were the most important works in the State in the last century. The ore was obtained about four and a half miles distant, by turning a brook from its channel, and a few years after the War a steam-engine was constructed at the furnace under the direction of Joseph Brown, Esq., of Providence, for the purpose of draining the pits. Among the Iron articles made in Scituate at an early day were iron tobacco-pipes, said to have been made by one Jabez Hopkins, and swords of excellent quality by his son Ezekiel Hopkins.

Respecting the mine at Cumberland, Dr. Douglass remarks: "In Attleboro, now Cumberland, annexed lately to the jurisdiction of Rhode Island, were erected at a considerable charge three furnaces; the country was well wooded for coal, but the ore proved not good or profitable, and is neglected; they were of some small use in the late war [with France] in casting small cannon, bombs, and bullets. Here is a magnetic iron ore which yields a red short iron not good."[1]

Professor Hitchcock was informed by the owner of the hill, General Leach, an extensive manufacturer of Iron in that and other towns, that the Cumberland ore did not yield above 20 or 30 per cent. of metallic iron, although magnetic ore is usually one of the richest. He was not aware that it had been analyzed, but conjectured that it would be found strongly impregnated with manganese, of which we believe subsequent analysis has shown it to contain 2 per cent., in addition to 4 per cent. of magnesia. These proportions of either would probably have rendered it refractory, and have impaired the quality of the iron. The method of counteracting the resistance of such substances in the gangue was not formerly known or well understood, and may have been a source of failure with other ores smelted by the inexpensive Catalan method, as in the case of the sparry carbonate at New Milford, Connecticut, an ore usually associated with one or both of these substances.

Coal discovered.

The first discovery of fossil coal in Rhode Island was made in 1768, and in February of that year application was made to the Assembly for the exclusive right of digging and vending it in the town of Providence, where mining was about to be commenced.[2] The anthracite of Cumberland and other parts of the State, now valuable to its manufactures, did not come into use for a long period after, although it began about the same year to be used in a few smiths' forges in Pennsylvania. The sulphuret, gray oxyd, and carbonates of copper are also found in several excavations formerly made in Cumberland, Rhode Island.

Iron-manufactures.

Manufactures of Iron, including bar and sheet iron steel, nail-rods and nails, farming implements, stoves, pots, and other castings and household utensils, iron-work for ship-builders, anchors, and bells, formed the largest branch of productive industry in the State toward the close of the eighteenth century. A slitting-mill was built on one of the branches of Providence river. Another slitting and rolling mill, three anchor forges, two nail-cutting machines, and several other mills and factories carried on by water were soon after erected at Pawtucket

(1) Summary of Br. Settlements, ii. 109. (2) Staple's Annals of Providence.

Falls. A screw-cutting machine, hollow-ware furnace, and several forges were also in operation.

Muskets were manufactured for several of the militia companies of the Colony as early as 1775, by Stephen Jenks, of North Providence.

Fire-arms.

Small arms were at the same time pretty extensively made by several other persons in the Colony. About the same date, Jeremiah Wilkinson, of Cumberland, who was engaged in making hand cards, commenced the manufacture for his own use of cold or cut tacks. They were first cut by a pair of shears (still preserved) from an old chest lock, and afterward headed in a smith's vice. Sheet-iron was afterward used and the process extended to small nails, which he appears to have been one of the first to attempt. They were cut from old Spanish hoops, and headed in a clamp or vice by hand. Pins and needles were made by the same person during the Revolution, from wire drawn by himself. The high cost and scarcity of those articles and of tacks were the incentives to these efforts. The nail-manufacture in the State was improved by Eleazer Smith; and Samuel Slocum, of Rhode Island, who some twenty-five years ago patented in England a machine for making pins with solid heads, with which a factory was commenced in this country. The Wilkinsons, as machinists, were of much service in the construction of the first Arkwright machines, with which Samuel Slater, who was connected with the family by marriage, commenced in 1790 the cotton-manufacture in the State. David Wilkinson, a few years later, patented a machine for cutting screws. The importance of Providence as a manufacturing centre will be noted subsequently.

Cut nails, etc.

Connecticut.—It has been already mentioned that the younger Winthrop, who was the prime mover in the organization of the Stock Company which commenced the first Iron-works at Lynn and Braintree in 1643, also received the next year a grant for a settlement and Iron-works within the present limits of Connecticut, where he had been previously commissioned by Lord Say-and-Seal and Lord Brook to build a fort. He was also allotted about the same time, by Massachusetts, "the hill at Tantousq, about 60 miles westward where the *blacke leade* is," and "liberty to purchase some land there of the Indians."[1] Although he appears to have retained for several years an interest in the works at Lynn, as may be inferred from the letters of his father, his attention was early fixed upon a settlement in Connecticut, where he had hopes of finding mines and minerals, which could be wrought with profit to individuals and the Colony. As early as June, 1645, he was found at Pequot,[2] and the next year, having laid his hearth-stone hard

(1) Mass. Records, iii. 82.

(2) Palfrey's N. E., ii. 234.

by the lodge of Uncas, the friendly sachem of the Mohegans, took up his residence in the Colony, of which he was made a magistrate in 1651, and the Governor in 1657. His attainments in Physical science, his ingenuity and enterprise, were of much service to the infant State in other departments, and have been elsewhere referred to. In 1651, the Assembly of Connecticut, on motion of Mr. Winthrop, passed an Act to encourage the discovery of mines and minerals within its jurisdiction. The Act declares that, "Whereas, in this rocky country among these mountainous and rocky hills there are probabilities of mines of metal, the discovery of which may be of great advantages to the country in raising a staple comodity; and whereas, John Winthrop, Esq., doth intend to be at charges and adventure for the search and discovery of such mines and minerals, for the encouragement there of, and of any that shall adventure with the said John Winthrop, Esquire, in the said business, it is therefore ordered," etc. It granted to him, his heirs, associates, partners, and assigns forever, the lands, wood timber, and water within two or three miles of any mines of lead, copper, tin, antimony, vitriol, black lead, allum, stone salt or salt springs he might discover, if he should set up any works for digging, washing, melting, or other operations required by such metals or mineral, provided it was not in a place already occupied. We are not informed what success rewarded his research, nor that any manufacture of Iron was undertaken at Pequot.[1] The General Court again, in 1663, encouraged the development of the mineral resources of the Colony, by ordering that any person who would lay himself out for the discovery of any mines and minerals, etc., and purchase them for the country, "shall be honorably rewarded out of what he doth discover."[2] The Act was renewed in 1672.

Discovery of minerals encouraged.

The earliest legislative encouragement given to the manufacture of Iron in Connecticut appears to have been by the Assembly of New Haven, seven years before the date of the charter of the United Colonies of Connecticut, obtained by Mr. Winthrop in England, and ten years before their amicable union. On the 30th

Act to encourage Iron-works.

(1) Trumbull's Hist. Conn., i. 235. Mr. Winthrop's son, Governor John Winthrop, who possessed the same inquisitive mind as his father, afterward discovered, it is said, about three miles from New London, at a place called by the Indians *Nant-neague*, an ore resembling the chromate of Iron, which he sent to Sir Hans Sloane, by whom it was deposited in the British Museum. It was analyzed in 1801 by Mr. Hatchett, who found united with the oxyd of iron a metallic acid of peculiar properties, the base of which he supposed to be a new metal, which he named *Columbium*, as having come from America. The metal is now regarded as identical with *tantalum*. The mineral *columbite* or *tantalite*, which furnishes it, is extremely rare. It has been since found near Middletown, but not in the vicinity of New London.

(2) Colonial Records of Connecticut, ii. 193.

May, 1655, it was ordered, "that if an iron worke goe on within any part of this jurisdiction, the persons and estates constantly and onely imployed in that worke shall be free from paying rates."[1] In October of the same year, there is an order respecting the manufacture of *steel*, which was the first attempt to produce that article in these Colonies. A letter was read from John Tucker of Southold (on Long Island) wherein he informs the General Court of his "abilitie and intendment to make steele there or in some other plantation in this jurisdiction, if he may have some things granted he therein propounds." The Court acquiesced in a grant of privileges within its jurisdiction, but that of taking clay or wood from private grounds it left to Southold or the town in which he might set up the manufacture, being unwilling "to meddle with any man's proprietie." In the following May, as a further encouragement to proceed in the expenditure of a large part of his property in the business, Tucker obtained from the Assembly a declaration "that if he doe laye out his estate in such a manner about this publique worke, and that God shall cross him therein so that he be impoverished thereby, they are willing that that small remaining part shall be free from rates for ten years."[2]

First steel made.

At the same time, it was ordered that none of the property invested in the works should be attached for the individual debts of the undertakers, so as to hinder the work or damage the other proprietors; but if necessary, a lien upon the debtor's stock might be taken, until the demand was paid from the profits of the same.[3]

The works appear about this time to have gone into operation at New Haven. A proposition made in May, 1662, "in ye behalfe of Capt. Clarke, that wine and liquors drawn at the jron workes might be custome free," was allowed to the extent of one butt of wine and one barrel of liquors, and no more.[4] Four years after, Messrs. Wm. Jones, Jasper Crane, and James Bishop were authorized, by the Court at Hartford, to grant a license to the clerk of the Iron-works, or other suitable person, to draw wine and liquors at the works, in accordance with their instructions. No inference is to be made as to

Iron-works at New Haven.

(1) New Haven Colony Records by Hoadley, ii. 149.

(2) New Haven Colony Records by Hoadley, ii. 153, 175. The first patent granted in England for manufacture of steel was to Richard Lord Dacre, Thomas Letsome, and Nicholas Page, on 8th April, 1626, for "apparatus for making steel," according to the invention of Letsome. At the date in our text but little steel was made in England, and that very imperfectly and all of foreign Iron. Forty years after, English writers speak of steeling articles by "boiling them in sow metal," and steel was made by a similar process, and by plunging into water. Steel was, however, made by cementation by John Heydon, at Bromley, in 1697.

(3) New Haven Colonial Records, ii. 173.

(4) Ibid. ii. 454.

the number of persons or amount of interests affected by these laws, which were made for the accommodation of such works in several of the Colonies in early times, sometimes to prohibit altogether the sale of liquors to the workmen.

In May, 1669, upon petition of Wm. Andrews, "on behalfe of Capt. Thomas Clarke, master of the iron workes of New Haven for encouragement of the said worke in supplying the country with good iron and well wrought according to art," the General Court renewed the exemption granted by New Haven to the persons and estates employed therein for another seven years.[1]

We do not find any further reference in the Records to those enterprises in the Iron and Steel manufacture.

Slitting-mill proposed.

In 1716, an Act was passed granting to Ebenezer Fitch & Co. the exclusive right to erect a slitting-mill at Stony Brook, situated, we believe, between New London and Norwalk, to slit and draw out iron rods for nail-makers. All other persons in Connecticut were forbidden to erect slitting-mills for 15 years on penalty of ten pounds per month.[2] We have no knowledge of any earlier proposition to erect such a work in any of the Colonies. The intentions of the patentees may have been thwarted by the disposition evinced in Parliament, in 1719, to prohibit slitting-mills in America. A memorial, without date, filed in the Colonial archives, entitled "Reasons against a General Prohibition of the Iron Manufacture in His Majesty's Plantations, intended by a clause in the bill now pending, entitled 'A bill for encouraging the importation of naval stores from America,'" must be referred to this date. "It seems a further hardship," says the memorial, "that the subjects abroad should be permitted to forge their ore into bars but not to run or cast it into pots and other implements, because the same fire and even the same heat will suffice for both." A clause, afterward added by the upper house, prohibited the conversion of sows and pigs, or cast iron, into bar or rod iron, but the bill did not become a law.

A furnace was erected in the same county in 1741 by Samuel Southworth, of the adjoining town of Lyme.

Copper mines.

About the beginning of the last century the prevalent zeal for the discovery of precious ores, which it is probable had prompted the researches of Winthrop, was rewarded by the discovery in Connecticut of two deposits of copper ore, which it was confidently hoped would yield constituents of a richer metal. One of these was found at Wallingford, and a more abundant mine at Simsbury, now

(1) Trumbull's Col. Rec., ii. 37, 108. (2) Scientific American, vol. xi. 246.

Granby. The mines were opened, and an Act of the legislature, exempting the miners from military duty and giving them power to manage their operations, was obtained from the proprietors, who represented the business as one of great public advantage.[1] As early as 1707, a Company, composed of a greater part of the landholders of Simsbury, was formed to work the mine at that place, paying the town ten shillings for each ton of copper produced, the proceeds of which went to the support of "an able schoolmaster in Simsbury" and to Yale College. A contract was made with three brothers, clergymen, John, Dudley, and Timothy Woodbridge, belonging respectively to Springfield, Simsbury, and Hartford, to smelt the ores. Their scholastic attainments as divines were supposed to confer the requisite scientific and metallurgic knowledge, but they failed to give satisfaction. An Act, obtained in 1709, conferred several privileges, and authorized the settlement, in a summary way, of disputes, which were frequent and under it the business was managed upward of sixty years. In 1714, Jonathan Belcher (afterward governor), of Boston, William Partridge, of Newbury, and Timothy Woodbridge, Jr., became the principal operators until 1721, when Andrew Freeman and Charles Cornelia, of New York, were associated in the business. The Boston company was then expending £70 per month, and the law, having expired, was renewed at their request by the Assembly, which extended all the legal encouragement in its power, and authorized the division of the mines among the several lessees. In 1735, Governor Belcher stated that he had expended about £15,000 or about $75,000 in the business. He erected a smelting-furnace in Boston.

Simsbury mine.

During the excitement about this time on the subject of mining, Joseph Whiting, of New Haven, petitioned the General Court (Oct., 1733) for a loan of £1,000 for ten years, to aid him in further search for mines and minerals, in which he claimed to have made greater discoveries than any other man. But neither prospecting nor mining proved of much profit to individuals or the State.

The mine at Simsbury continued to be worked with various success until the year 1773. Shafts were sunk, one to the depth of 80 and another 35 feet, and vast caverns were excavated in the hill. But the imperfect state of mining knowledge and machinery, the insufficiency of drains or *levels* to carry off the water, and the cost of pumping, which had to be carried on day and night by the aid of the neighboring farmers, absorbed much of the profits. The copper mines of England, which now yield over 20,000 tons of copper annually,[2] at that time

(1) See Trumbull's Hist. Conn., vol. ii. chap. ii. (2) Annals of British Legislation, ii.

produced only 600 or 700 tons, and much was imported from the continent. The discovery, previous to 1722, of a deposit of rich cupreous ore in New York induced Parliament in that year, by the statute 8 Geo. I. c. 18, to place copper ore from the plantations on the list of enumerated articles, with a view to obtaining a future supply from its own dominions. The quality of the Simsbury ore was tolerably good, yielding 3 to 5 per cent., and some masses 50 per cent., of metal, and, the price being high abroad, there was a prospect of a profitable business. Several cargoes were sent to Europe from Hartford. But the limitation of the market, and the cost of exporting it in ore, as required by a law prohibiting the smelting of it in the Colonies; the expense of mining, as then conducted, and the loss of two ship-loads at sea, one of which was captured by the French during the wars, proved discouraging to the operators. Works for smelting and refining the ore were, notwithstanding prohibitions and discouragements, erected in Simsbury, at a village named Hanover by the German workmen, where the operations were quietly conducted. By the original proprietors, and different companies of lessees, including one British company, the work was thus conducted for about seventy years, when there appeared to be a failure of the ore.

The vast subterranean vaults in Copper Hill, now included in East Granby, were in 1773 converted into a prison for felons, who were employed in the mines. The mine, as Dr. Trumbull observes, was thus rendered "of much greater value to the State than all the copper dug out of it." This place, the famous "Newgate" of Connecticut, was, during the Revolution, the place of confinement for Tories, and afterward a general prison.[1]

Newgate.

The ore at Wallingford was considered richer than that of Simsbury from the admixture of silver. But the inability of the miners to keep it free from water, compelled them to abandon it in a few years, and a second attempt to work the mine, long afterward, failed

Wallingford mines.

(1) After having been used for that purpose about fifty years, the whole mine was in 1830 purchased of the State for $1,200, by Richard Bacon, of Simsbury, and gentlemen from New York, who, as the "Phœnix Mining Company," obtained a charter and laid out several thousand dollars upon it. They abandoned it after five or six years, during the financial crisis. In 1855, mining was once more undertaken by the "Connecticut Copper Company," which took out a large quantity of ore, yielding about 5 per cent. and some nodules 50 per cent. of metal, and increasing in richness as they descended. Ten of Bradford's separators, two steam-engines, and other machinery, were erected at much expense. But notwithstanding the greater command of capital, superior machinery, science, and skill, to that possessed by the original proprietors, the work was again suspended in about two years, chiefly, it is said, from failure in the processes of extracting and refining the metal. The ore is of the vitreous kind, and not easily reduced, but it is hoped will yet be worked to advantage.

from the same cause. The great benefit of the steam-engine was first made apparent in pumping and other mining operations. Two steam-engines are said to have been imported into New England before the Revolution, and one for the copper mine of the Schuylers, in New Jersey, where the same obstacles were encountered.

Granby coppers.

In the years 1737 and 1739, copper coins were struck on copper from the Simsbury Mines, by Joseph Higby, an ingenious blacksmith of the town of Granby. They were current for many years, and were known as the "Granby coppers. They were "stamped on planchets of the purest copper, and, in consequence, were in demand by gold-beaters for alloy." They are said to have been well executed for the times. The designs upon some of the pieces represented a sledge-hammer surmounted by crowns, in deference, probably, to the royal prerogative, and with due regard to the conditions symbolized.[1]

In 1736, a foundery for casting large bells was also established at New Haven, by Abel Parmlee, as appears by his petition to the General Court, wherein he states that his own was the first attempt, in the Colonies, to cast bells. A monopoly of the business, which he asks for twenty years, was not granted.[2]

Patent for Steel.

With regard to the iron-manufacture, we find that Joseph Higby, of Simsbury, in May, 1728, previous to his exercising the high function of a coiner of money, in a memorial to the legislature, represented that he had, "with great pains and cost, found out and obtained a curious art, by which to convert, change, or transmit common iron into good *steel*, sufficient for any use, and was the very first that ever performed such an operation in America." He produced the certificates of several smiths, who had made trial of the steel, and pronounced it good. The petitioner asked for himself and Joseph Dewey, of Hebron, the exclusive right, for twenty years, "of practising the business or trade of steel making." A patent was granted them for ten years, provided "the petitioners improve the art to any good and reasonable perfection, within two years after the date of this act."[3]

(1) Like the handiwork of Jenks of Lynn, an elder member of the same craft, in the parent colony of Massachusetts Bay, few coins now remain to attest the artistic skill of Higby, as the impressions were soon effaced from the unalloyed metal. Good specimens of the Granby Copper now command $15 to $25 each. There were several issues with different devices, some having a broad-ax, with the motto, "I cut my way through." His coinage was considered a boon to the community, but not so a later, unauthorized imitation of the coinage of other minters. On the subject of this coinage, and of the Simsbury and Wallingford mines, see a late publication, "The Newgate of Connecticut," by R. H. Phelps, 1860, and Trumbull's Hist. of Connecticut, vol. ii. chap. 2.

(2) Moore's Patent Office, App., p. 304.

(3) Ibid., p. 302.

The most valuable deposits of iron ore in Connecticut are those of the brown oxyd of iron or hematite, in the northwestern part of the State, bordering on New York and Massachusetts, particularly in the townships of Salisbury, Sharon, and Kent, in Litchfield county. These rich beds, which also occur in numerous places in the lower Silurian Limestone, and slate rocks, west of the Green mountain range in the two adjacent States, and near Bennington, Vermont, was early excavated for the supply of charcoal furnaces in each of those States. In Massachusetts, it is chiefly confined to Berkshire County. At Salisbury, Connecticut, then called Weatog and Housatonic, a bed of this ore was explored as early as 1732, in lands appropriated by the Colony to Yale College, and then occupied by one Bissel. Two years after, Philip Livingstone of Albany, N. Y., and others received a grant of the whole tract of 100 acres, and set up a furnace or bloomery to smelt the ore, at Limerock, five miles from the ore bed, where a new furnace, with six fires, was erected about thirty-five years ago. Pig-iron, and various castings, as potash and common iron kettles were made there, it is said, in 1736. In 1740, Mr. Livingston, whose descendants, a few years ago, still owned one half the mine, erected Iron-works at Ancram, in Columbia County, N. Y., about twelve miles north, and a little west of the great ore bed whence they were supplied with ore, and soon became quite productive. In 1762, a Mr. Hazleton and others built a blast-furnace at the outlet of Wanscopommuc lake, two miles east of "Ore hill," in Salisbury. This furnace was rebuilt in 1770; and, in 1831, it was the oldest in the vicinity. It was occupied by the Messrs. Holly and Coffin, who produced annually from 500 to 600 tons of pig-iron. A third furnace was built in 1805. The ore raised for the furnaces, during the first fifty or sixty years, amounted to about 2,000 tons annually. The richness of the ore, which yielded a ton of pig metal to every two, or two and a half of ore, and a ton of bar-iron to about four tons, and the toughness of the iron produced from it, brought the iron-works and mines of Salisbury into high repute, as the most important in the country. As the value of the mine became established, the proprietors laid a duty of twenty-five cents per ton on all ore raised, which was, at first, free from charge, and the tariff was successively raised to 42, 50, 67, 1.00, and at length, to 1.25 per ton, which was the rate in 1831, the cartage being, at the same time, twelve and a half cents per ton for each mile. On the occurrence of the war of the Revolution, which suspended many industrial operations, the Council of Safety expended the sum of £1,450 in fitting up the furnace at Salisbury, to cast cannon and shot, and a corps of fifty-nine men was employed to conduct it efficiently. Cannon from four to thirty-two pounders, and other ordnance supplies were cast

Hematite ores.

Salisbury mines.

there during the war. The guns of many of the old ships of the navy were made there during the last century. For blacksmith's work, and for gun and rifle barrels, the best charcoal cold-blast iron of Salisbury, which is readily converted into steel, was long regarded as superior to any other, domestic or foreign, and has been extensively used in the national and private gun manufactories of the country. In the beginning of this century, between four and five thousand tons of ore were raised annually, and the furnaces at Ancram and Salisbury, with about fifteen forges in the neighborhood, were supplied from the great brown ore or limonite bed at Ore hill. The Salisbury furnace was usually kept in blast four to five months in the year, and ran from eighteen to twenty tons of pig iron weekly.[1] This was formerly sold chiefly in the crude state, at $35 to $40 dollars the ton, at the works. The abundance and quality of the ore, and of wood and water-power for working it, would, it was believed, render Salisbury the Birmingham of America. But the substitution of mineral fuel, and the development of the vast ferriferous deposits near the coal areas of other States, has disappointed this expectation. The iron manufacture, in its several branches, has, however, long been the principal industry of Salisbury, and neighboring towns which obtained ore and metal from that place. Several other beds have since been opened and worked as open quarries near the old mine. In 1830, four or five considerable iron-works at Salisbury, produced, in high charcoal furnaces, 18,000 to 20,000 tons of pig metal, worth $30 to $32 per ton, in addition to several hundred tons each of bar, and other wrought iron, heavy castings, anchors and other forged work, screws, etc. The mines still yield about 20,000 tons of ore annually, and about 11,000 tons of pig iron.

At Lakeville, a furnace was in operation before the revolution, which cast shot and shell for the British troops. That place, and Fall's village were afterward the seat of two refining forges, with ten fires, making iron for the government, but were ruined by a transfer of its patronage to imported Swedish iron. At Furnace village, five miles north of Lake-

(1) Trumbull's History of Connecticut, ii. 108. In 1740, when pit coal and the argillaceous carbonates of the coal measures in England began to take the place of charcoal, and of the red and brown hematites which had previously been used almost exclusively in the iron-manufacture; the average annual product of 59 charcoal furnaces, in England, was 294 tons each, or 5½ tons per week, and the total yearly production was 17,350 tons of iron. In 1788, there remained but 24 charcoal blast-furnaces, which, by the aid of the cylinder blowing machinery, produced a total of 13,000 tons of castiron, equal to 546 tons each per annum, or about 18 tons weekly. Fifty three coke furnaces, at the same time, produced 48,000 tons annually—an average on the whole year of 17¼ tons per week.

ville, is the Mount Riga charcoal cold-blast furnace, erected in 1800 and rebuilt in 1845.

In the adjoining town of Canaan, east of the Housatonic, where specimens, regarded as native iron, lead ore, and other minerals have been found, a forge and slitting-mill of improved construction was built, after the Revolution, and furnaces probably much earlier. At Colebrook, in the same county, a forge and other works were erected, either before or during the war. In 1789, "they took fire and burned down." A loan of £1,200 was made by the Province, in 1761, to Ephraim and John Patterson, and Thomas Russell, to erect a furnace on the Owesatunnuck (Housatonic) river, probably, in Kent, where a bed of brown Hematite, imbedded in gneiss and quartz rock formerly supplied a number of furnaces. Furnaces were early erected there, which were, in part, supplied by the ore of the town, and in part from Beekman and Amenia, in New York, and the spathic ore of Roxbury.

Canaan native iron.

This valuable deposit of spathic ore at Mine Hill, in Roxbury, near New Milford in the same County, was opened about 1750, by Hurlbut & Hawley, for the extraction of silver, and again, about fourteen years after, by the Bronsons Brothers, who sunk a shaft about 125 feet. A German goldsmith, named Feuchter, who carried on smelting operations with secrecy, is believed to have deluded the Bronsons for some time, by occasionally producing silver from his crucibles, and ultimately to have carried off some heavy boxes of the product, whatever it may have been. He is said to have made steel for his tools from the sparry ore, which, mixed with the silicious ore of the Kent bed, makes a tough iron. Several other parties afterward unsuccessfully prosecuted the search for silver, neglecting altogether the more valuable use of the steel ore, which a Mr. Bacon afterward attempted to smelt for iron alone. He erected a furnace at the place, but failed through inexperience. Steel of good quality was subsequently made from the crude metal, by D. J. Styles, which again raised the credit of the mine. It is from the same kind of ore that the German steel is made. The town of New Milford had, before the beginning of this century, seven forges, making about three hundred tons of bar iron annually, besides hollow-ware. The whole County of Litchfield contained, at the same time, fifty bloomery forges, making iron directly from the ore, and three slitting-mills. The manufacture of nails was, at the same time, carried on there to a greater extent than in any part of the Union, with the exception of Plymouth and Bristol Counties, in Massachusetts. Anchors were also forged on a large scale, in South Canaan, by four brothers named Hunt, who likewise manufactured large screws for machinery, and other articles

Steel ores.

to a considerable extent. All the iron used was the product of the forges and furnaces of the county, and was of excellent quality.

Oldmixon (1741) mentions a small iron-mill at New Brainford (Branford), on a small stream running into the Sound, and expresses his surprise that a small iron-work should be found there or anywhere else on the continent, considering the abundance of ore and fuel sufficient to supply all Europe with Iron. Those with whom he conversed, some of whom had sent men to America to carry on the business, were of the opinion that, with proper encouragement, by the withdrawal of the duty and by giving a bounty on importation of colonial iron, as in the case of naval stores, £100,000 could be saved to the nation that then went annually for Baltic Iron, and that the metal could be imported at half the cost of Swedish Iron. He had few fears, such as they expressed, that the Baltic merchants would succeed in opposing the importation of American Iron. There is little doubt that fears of that kind and the disposition to wait for *encouragement* from the parent State, hindered the development of this industry and of the mineral resources of the several Provinces in a considerable degree.

In 1760, the legislature granted Ebenezer Keny, Joseph Hull Jr., and John Wooster of Derby, and Thomas Perkins of Enfield, permission to purchase of the Indians a water privilege for iron-works near the falls of Naugatuck.

On many of the small streams which fall into the Sound, as well as upon the branches of the principal rivers, bloomeries and small works for a variety of manufactures in Iron were established, some of them quite early. Connecticut has long been noted for the extent and variety of its hardware branches, and for different descriptions of small wares, which the ingenuity of its people has rendered peculiarly varied and excellent. Besides the hematitic beds of the northeast, the iron ores of Connecticut are very considerable. The forges in the southern part of the State were chiefly supplied by bog ore, dug near them, or by these and the hematites in part obtained from other States.

Some time previous to 1750, a steel-furnace, and, we believe, a bloomery, was owned by Mr. Eliot, of Killingworth. About the year 1761, considerable interest was excited in America and in England by the manufacture of Iron from a black ferruginous sand found in considerable quantities on parts of the New England coast and interior situations. The attention of the Royal Society had been called to this sand, composed principally of the brown oxyd of iron, on account of its magnetic properties, as early as 1689, and experiments were made with samples of it from Virginia by Dr. Moulin, in that year, to ascertain the presence of Iron. But the reagents em-

Steel.

Magnetic sand ore.

ployed failed to detect any of the metal in the specimen, though highly magnetic, and more than double the weight of white sand. Some fifty years after, the experiments were repeated in the dry way by Mr. Henry Horne, on samples received from Mr. Adams, a Virginia merchant, and, after one or two failures, resulted in obtaining "a very fine malleable metal," exceeding half the weight of the specimen. About twenty years after, in 1761, the Rev. Jared Eliot, of Killingworth, without any knowledge of these attempts, conceived the idea of producing Iron from the black magnetic sand of New England. His project met with every discouragement from those skilled in such matters, to whom he proposed it. "Having," he says, "a persuasion of the practicability of the thing to a degree next to enthusiasm, I could not rest till I had made trial." In a common bloomery forge he succeeded in producing from 83 lbs. of the sand a bar of excellent Iron weighing 50 lbs. About five hours were occupied in the smelting, which experience enabled them to reduce to three. In his son's steel-furnace, above mentioned, a portion of the bar was converted into good steel. Specimens of the steel and bar iron, accompanied by an Essay on the manufacture of Iron, and a letter to the Society in London for the Encouragement of Arts, Manufactures and Commerce, were sent in 1762 to Mr. Peter Collinson, of the Royal Society, through whom Mr. Eliot was informed of previous attempts to extract Iron from the sand. The extraordinary yield of metal from the sand, so much beyond that of ordinary ores, the best of which did not usually much exceed 50 per cent. of pig-iron, was a matter of astonishment to the chemists and others interested in the subject. Deeming his discovery an important one, the Society of Arts, in 1764, awarded Mr. Eliot its gold medal, and appointed him its correspondent in that Province. The quantity of this magnetic sand, which Mr. Eliot conjectured might exceed that of Iron in any other form; the facility with which it could be reduced by admixture with bog or other poor ores or with slag, and the excellence of the iron for steel, wire and other uses, induced the Society, in the following year, to offer a premium of £100 for the greatest quantity (not less than 50 tons) of merchantable bar-iron made from the black sand found in America, and imported into London, and premiums of £60 and £40 for the next largest quantities, not less than 30 and 20 tons.[1]

Iron and steel made from it.

Premiums offered.

(1) During the same year, the London Society awarded a gold medal to Benjamin Gale, of Killingworth, Ct., for the invention of an improved Drill Plow. The invention was, however, claimed by Benoni Hilliard, of Saybrook, who petitioned the Assembly to compel Gale to pay him £50, alleging that Gale had been employed by him to bring the invention to the notice of the Society, and had appropriated the honors.

This heavy black oxyd, the detritus of metamorphic rocks along the Sound from New Haven to Rhode Island, exists in many of the States in great quantities. Many tons of it are sent annually to the large cities to supply the stationers. It is employed to some extent in the manufacture of Iron, the martial constituents being separated by the aid of powerful magnets, which are also used for cleaning magnetic rock ore when crushed. It is from this iron-sand that much of the famous wootz or Indian steel is made by the Hindoo, by the simplest process, in a clay furnace with charcoal, and a bellows made of leaves of the forest.

In May, 1794, the General Court of Connecticut enacted a law to regulate the manufacture of bar-iron in the State. It was required to be stamped with the name of the manufacturer and of the town where it was made, previous to being offered for sale.

There was a slitting-mill and other iron-works at that time in East Hartford. Glastonbury had also a forge, and there were two furnaces at Stafford, which made sufficient hollow and cast iron wares for the whole State.

The first manufacture of Tin-ware in this country is said to have been commenced at Berlin, in Hartford County, in 1770, by Edward Patterson, a native of Ireland.

The emancipation of industry from Parliamentary restraints, and the suspension of commercial intercourse with England by the war, created several new forms of labor in this as in other States, and gave extension to others. In May, 1775, the Assembly of Connecticut passed an Act to encourage the manufacture of fire-arms and other military stores, for the safety and defense of the Province. It provided for the payment of a bounty of 5*s.* for every stand of arms with a good lock made in the Province before October 20th, and 1*s.* 6*d.* for every good gun-lock, all to be purchased by the Colony to the number of 3,000. The manufacture of guns was soon after commenced in Waterbury on a small scale by Lieut Ard Welton, who made them by hand power alone, and furnished some, it is said, for Government. This was about the commencement of the manufacturing business of that busy town.

Manufactures from Iron.

Fire-arms.

The first considerable improvement which the manufacture of fire-arms received in this country was given it by the ingenuity and industry of Eli Whitney, the inventor of the cotton-gin, who, disappointed in his hopes founded upon that machine, turned his attention in 1798 to the manufacture of arms for the United States Government On the 14th of January, in that year, he completed, with the aid of Governor Wolcott, a contract for ten thousand stand of muskets, to be finished in a little over two years. For the performance of this, which,

Eli Whitney.

however, occupied two years in the preparation and eight more in the completion, he entered into bonds in the sum of $30,000, and was to receive $13.40 for each musket, or $134,000 in all. He immediately proceeded to construct a manufactory at the foot of East Rock, two miles from New Haven, at the present village of Whitneyville, where, through successive administrations from that of the elder Adams, repeated contracts for the supply of arms were made and fulfilled to the entire approbation of the Government. The construction of his factory and even of the commonest tools, which were devised by him for the prosecution of the business in a manner peculiar to himself, evinced the fertility of his genius and the precision of his mind. The buildings became the model upon which the national armories were afterward arranged, and many of his improvements were transferred by his workmen to other establishments, and have become common property. His improvements in the manufacture of arms, it is generally conceded, laid his country under permanent obligations by augmenting the means of national defense. It is satisfactory also to know, that though defrauded of his just rights by a portion of the country most benefited by his previous invention, his talents were not unrewarded in this department, though many experienced gun-makers, who, about the same time, contracted for the supply of muskets, which they attempted to make in the English method, were ruined by their engagements. The difficulties encountered at that time by the undeveloped state of many of the mechanic arts were overcome by the accuracy and dispatch of his machinery and tools, much of which was adapted to other manufactures of steel and iron, and may still be recognized in the leading workshops of the country.

(1) Memoirs by Prof. Denison Olmstead. The system by which Whitney was able to succeed where others failed, and which has been adopted with so much advantage in similar establishments, both public and private, was precisely similar to that by which Sir Samuel Bentham, toward the end of the last century, so greatly improved the previously imperfect wood-working machinery, and, to some extent, also the metal-working machinery of England. Bentham "classed the several operations that have place in the working of materials of every description according to the nature of the operations themselves," and not according to the trades or handicrafts for which they are used. In regard to wood particularly, he contrived machines for performing most of those operations, whereby the need of skill and dexterity in the workman was dispensed with, and the machines were capable of being worked by steam or other power. Whitney, in like manner, contrived by machinery to make "the same parts of different guns as much alike as the successive impressions of a copper-plate engraving," and left little for the skill of the workmen to accomplish. He thus found it easier to instruct green hands than to combat the prejudices of those instructed in the English system, where each workman made a certain part of the gun, which required operations often widely distinct in their nature. Whether the plan was original with him or not, it was consonant to the character of his mind and habits as manifested in all his business and domestic arrangements.

The manufacture of lead was, in 1775, deemed no less important than that of fire-arms, and a committee was authorized by the Assembly to purchase what ore was raised from the mine at Middletown, and to cause a greater quantity to be raised and refined. The committee sent to New York, New Jersey, and Pennsylvania to procure a smelter and refiner of lead ore. Competent persons were found at Sing Sing, New York; at Boundbrook, in New Jersey, and at Philadelphia. The last was a German named Fedaband, whom the deputation considered the best in America, but found he was under a pledge to the king not to refine metals in America. A refiner was at length obtained, and the business was ordered to proceed, with what success we are not informed.

Lead mines.

During the same year, the General Court received a memorial from Nathaniel Niles, of Norwich, setting forth the importance to the cotton and woolen manufactures, in the present disturbed state of the country's relations with Great Britain, of the manufacture of iron wire for card teeth. He was willing, with proper encouragement, to undertake the business, and had already made some progress therein, as shown by his memorial on file. A committee was appointed to inquire into the cost of erecting works, and, if they deemed it advisable, were authorized to draw on the treasury for £300 as a loan for four years. With this small aid, Niles erected works and carried on wire-drawing until after the Peace. Norwich, before the close of the century, had other iron-works, and in addition to manufactures of paper, stockings, clocks, watches, carriages, etc., still manufactured wire, bells, anchors, and several kinds of forged work.

Wire-drawing.

About the year 1784, a Mr. Chittenden, of New Haven, contrived a machine for bending and cutting wire for card teeth. By mechanism adjusted to a revolving mandril, the wire was cut, and the teeth doubled, shaped, and finished automatically at the rate of 36,000 in an hour.

Wire card machine.

A proposition was made in 1775 by Leonard Chester, of Wethersfield, to erect a pin factory at that place. Some years later, Dr. Apollos Kinsley, of Connecticut, a man of much mechanical ingenuity, and the patentee of printing, brick-making, and other machines, invented a machine for making pins. But neither of these projects appears to have succeeded. The machinery with which the business is now so extensively prosecuted in the State, and the solid-headed pin itself, are triumphs of later American invention.

Pins.

Nails had long been an article of domestic production by the hammering process. They are said to have been made also without heads, by punching out of iron plates by hand, previous to 1790, between which

time and the close of the century twenty-three patents were granted in the United States for nail-making machinery, including several to in-

Nails.

habitants of this State. A proposition before the Legislative Council of Connecticut in 1786, to give a premium for this manufacture, was rejected. An Act was, however, passed in 1795 for regulating the manufacture of nails made for sale or exportation. The length of each nail, and the weight per thousand of each of the several sizes from two to twenty pennies was fixed by the Act, and all were required to be rose-headed. Inspectors were appointed in each town where nails were made, and received 13 cts. per cask as fees. The statute did not apply to cut nails or those made of cold iron or for individual consumption. Wrought nails were at that time made in nearly every town in the State, and many were exported to other States. Litchfield County was the principal seat of this manufacture.

The people of Connecticut have from early colonial times manifested a proneness to invention and to those finer branches of manufacture and "notions" for which the State is famous. Many of these originated among her people.

Abel Buell, an ingenious gold and silver smith of Killingworth, about 1766, constructed probably the first lapidary machine used in this country,

Lapidary work.

and represented to the Court that his "method of grinding and polishing crystals and other stones of great value, all the growth of this Colony," was likely to be a great saving and advantage to the Colony against the importation of such stones from abroad. In 1769 he presented a memorial, impressed with types of his own manufacture, for aid in erecting a type-foundery, which was granted, and the business commenced in New Haven. About the same time, he made a survey of the coast of Florida for Roman's Map of North America, published during the war, and was associated with Amos Doolittle, an engraver of New Haven, who sketched and engraved four views of the battles of Lexington and Concord, the first series of historical prints, it is thought, made in America, and afterward maps for Morse's Geography, etc. Buell was also employed with others in coining copper money for the State, for which he constructed all the apparatus capable of making 120 per minute. A few years later, while in England, he is said to have been consulted respecting the construction of Iron bridges.

Joseph Hopkins, another silversmith, of Waterbury, before the Revolution, made plated knee and shoe buckles, silver sleeve and vest buttons,

Notions.

and other plated ware, some of which are still preserved.

The wooden clock manufacture was commenced in that town by James Harrison, in 1790, on whose books the first is charged January 1, 1791, at £3 12*s.* 8*d.* In East Windsor the brass clock manufacture was car-

ried on by Daniel Burnap. Specimens which are still preserved are said to be nowise inferior in workmanship to the best English clocks of that or any later period. Clocks were also made in East Hartford by a Mr. Cheeny. In 1793, Eli Terry, who had been instructed by Burnap in the business as practiced by him and Cheeny, removed from East Windsor, where he had carried on clock-making, to Plymouth, in Litchfield County. His subsequent enterprise and improvements in the art in that place entitle him to be considered the parent of the manufacture in Connecticut. At that time, Thomas Barnes, of Litchfield, and Gideon Roberts, of Bristol, were also known as clock-makers. The kinds of clocks made by these were brass and wooden clocks, with long pendulums, and their price was, for a wooden clock and case from $18 to $48, the higher-priced ones having a brass dial, and dial for seconds and the moon's age, and a more costly case. Brass clocks with a case cost from $38 to $60. So limited was the sale at those prices, that three or four constituted a stock in trade, and they were carried out for sale by the maker on horseback, the case being procured by the purchaser at from $5 to $30 according to his taste. Terry made both kinds, using a hand engine for cutting the teeth of the wheels and pinions, and a foot-lathe for the turned work. In November, 1797, he patented an improvement in clocks, watches, and time-pieces, covering a new construction of an equation clock, showing the difference between apparent and mean time. In 1802, in which year Willard of Boston took a patent for his time-pieces, Terry began the business on a larger scale by water-power, and, five or six years after, his success in making them by the thousand, which had been ridiculed as chimerical, enabled him greatly to extend the manufacture, which others now commenced on the wholesale system. In 1814 he introduced a new era in the business by commencing on the Naugatuck river the manufacture of the shelf or mantle clock, which he patented in 1816. The cheapness of these created a wide demand. Several improvements made by him in the mechanism, and the later progress in machinery generally, have increased the annual production in that State to hundreds of thousands, and given to every household a clock, equal to the old ones, at a cost of $2 and upward. His descendants have been engaged in the business to the present time, and his pupil, Chauncey Jerome, since 1821.

Clocks.

Eli Terry.

Mantle clocks.

Apart from the importance of horological machines in every department of life, and especially in relation to science and business, there are few of the mechanic arts which have furnished more numerous and striking examples of great and useful inventions among its members than the clock and watch-making business. Many, both in Europe and

America, have first exercised in this way their ingenuity, which has afterward conducted to discoveries of universal utility. Rittenhouse, Fitch (also a native of Connecticut), Whittemore, who, before any of the above, also constructed without a model an efficient wooden clock, Dr. Franklin, and others, might be named. Clock-makers are said[1] to have been the first who employed *special machines* for their manufactures, the wheel-cutting engine having been invented by Dr. Hooke about 1655, and the screw-cutting lathe by Hindley, a clock-maker of York, England, in 1741. The fusee engine and slide rest, the value of which are known to all mechanicians who use metal, are of later introduction, although the latter, in an imperfect form, was used at Rome in 1648, and attained its present form in 1772.

The Assembly of Connecticut, in October, 1783, awarded a patent for fourteen years to Benjamin Hanks, of Litchfield, for a self-winding clock. It was to wind itself by the help of the air, and to keep more regular time than other machines. The principle was made use of in New York and elsewhere. Two years after, the Rev. Joseph Badger, while a member of Yale College, constructed an ingenious planetarium, without having seen one of the kind. It was deposited in the College Library.

In 1786, Barnabas Deane asked of the legislature the exclusive right of erecting and making use of a steam-engine, professing to have a perfect knowledge of its construction and use. The city of Manchester, in England, was not in possession of that great agent in manufactures until four years later, but the engine had been previously introduced in several places for pumping and locomotion.

Steam-engine.

Several years earlier, Harris Ransom, of Colchester, a prisoner, preferred the modest request of a patent from the Government for one hundred years for a "perpetual water motion," by which water could be made to rise thirty feet high, and be conveyed to towns or cities.

A very useful and ingenious dredging-machine was constructed by a Mr. Culver, of Norwich, by which the channel of the Thames was deepened, and much benefit to the navigation of other rivers in the country expected from its use.

NEW HAMPSHIRE.—We have found little mention of the provincial or very early attempts to manufacture Iron in New Hampshire. There is much valuable ore both in that State and Vermont, and they were amply endowed with all the materials for charcoal furnaces and forges. The magnetic oxyd of iron, of rich quality, exists abundantly in many places in the former, particularly at Winchester and

Iron ores.

(1) Lectures on the Progress of Arts and Science before the Society of Arts.

Hinsdale on the borders of Massachusetts, at Franconia and Lisbon in Grafton County, and in large veins in Bartlett, Coos County. It is from this description of ore that a large part of the excellent Swedish Iron is made. The specular oxyd at Piermont, in the same county is one of the richest ores in the United States, yielding 60 to upward of 90 per cent. of metallic iron. The hydrated peroxyd or swamp ore also occurs in many places. But these and sundry veins of copper, zinc, and lead at Warren and Eaton and about the grand Monadnock, appear not to have been wrought at a very early period. The only deposit of Tin ore (*cassiterite*) of any economical value in the United States, was some years ago discovered by Dr. Jackson, the State Geologist, at Jackson in New Hampshire. It contained from 30 to 40 per cent of that valuable metal, occurring in small crystals in mica slate and quartz.

Tin ore.

Iron ore was early discovered in the vicinity of Portsmouth, and a quantity of it was shipped to England by Gibbons, the agent of Captain Mason, in August, 1634, respecting which he wrote to his principal: "There is of three sorts—one sort that the myne doth cast fourth as the tree doth gum, which is sent in a rundit. One of the other sorts we take to be very rich, there is great store of it. For the other I do not know." He advises that a supply of iron-work, suitable for shipwrights and joiners, should be sent to be sold with the lumber at a saw-mill he was then erecting, and adds, "So I have written unto Mr. John Round to repair unto your worship; he is a silversmith by his trade, but hath spent much time and means about iron,"[1] etc. How early an attempt was made to smelt the ore there we cannot say.

The British Board of Trade, reported to the House of Commons, in 1731, that the Governor of New Hampshire, in his answers to their circular letters, mentioned an Act passed many years before for the encouragement of Iron-works in the Province by prohibiting the exportation of iron ore. But diligent inquiry had failed to discover such an Act on the files of the office. Some of the ore beds near the Massachusetts line give evidence of having been formerly explored, and as ore has been frequently obtained in the adjoining States for furnaces in the latter, such an Act may have been passed during the disputes relative to the boundary between the two Provinces, which, from 1702 to 1741, were united in one government. It is not probable much would be shipped to Europe. Douglass, a few years later, speaks of "the noted Iron-works at Lamper Eel River," which, he says, were only bloomeries of swamp or bog ore, and were soon discontinued

Bloomery forge.

(1) Belknap's New Hampshire, vol. i., App. No. viii.

through deficiency of water and of ore, having never made much bar-iron.[1] The ship-building of the Province required much iron, which formed a considerable item of the expense. The nails imported at the port of Piscataqua for the year ending October 1, 1791, amounted to 16,890 lbs., and the unwrought steel to nearly as much, independent of what was obtained from the neighboring States.[2] Iron-works to some extent were carried on at Exeter about that time, and probably there and elsewhere considerably earlier. Dr. Belknap (1792) simply remarks that the manufacture of Iron, both in forges and furnaces, might be made vastly more productive than it was, and that, instead of being imported, Iron might be an article of export.[3] Several Rhode Island men, Hawkins, Jenks, Arnold, and Cahoon, first smelted the magnetic ore of Winchester at Furnace Village in 1795. But the beds, though abundant, appear to have been abandoned in five or six years. The Franconia Works were built, we believe, by the New Hampshire Iron Manufacturing Company, incorporated in 1805 to work the rich granular ore of that town and Lisbon. A cold-blast furnace was erected in 1811, and a hot-blast in 1844. But they have not been actively worked for some time.

Vermont.—In the territory of Vermont, where the government of New Hampshire had granted between one and two hundred townships before the Revolution, and fiercely contended with New York for jurisdiction, notwithstanding the unfavorable influence of such conflicts upon industry, a number of Iron-works were built before it became an independent State in 1791.

Iron ore exists in nearly every variety and in great quantity in several counties, especially those lying along the western base of the Green Mountain range. The primary magnetic ores and hematites in the Lower Silurian slates and limestones in Franklin, Chittenden, Addison, and Bennington counties occupy numerous beds, and furnish the red and brown oxyds, specular, titaniferous, and chrome Iron, and the ochres for several furnaces at the present time.

In Tinmouth, Rutland County, where there were ten or twelve forges and an active Iron business in 1798, a mine of Iron ore was opened as early as 1785. On Furnace Brook, a branch of Otter Creek, in Pittsford, a forge was built in 1791, and having been rebuilt and enlarged, now forms a handsome stack which produces a large amount of iron and of stove castings from a foundery attached. Several other forges and fur-

(1) Summary of British Settlements, ii. (2) Belknap, iii. 163.
(3) Ibid. iii. 160.

naces were built in the neighborhood within a year or two, and made good cold sheer iron, suitable for nails and castings, from the brown hematites, which yielded from one-sixth to one-fourth of Iron. A pyritous ore at Shrewsbury was formerly used in making copperas. The valuable marble and kaolin or porcelain and pipe clay of Rutland were early noticed and turned to account. The county contained, in 1794, fourteen iron-forges, three furnaces, and a slitting-mill. There were at the same time in Bennington one forge, four in Addison, and two in Chittenden counties. Much bar-iron, nail-rods, and castings were made from these, and the number of such works was greatly increased within a few years. The ore of Bennington is a portion of the magnetic deposit so abundant in the adjoining States of Massachusetts and New York. Iron-works were also erected before the close of the century in some of the towns east of the mountains. Randolph in Orange County had two forges and a slitting-mill, fed by ore mined in the vicinity. Nails were made to a considerable amount, and exported with Iron and iron-manufactures of other descriptions.[1]

New York. — Although the discovery of the ores of Iron and other metals was encouraged by the Dutch colonizers of New York, the manufacture of Iron does not appear to have been attempted during their rule in the Province.

By the charter of "Freedoms and Exemptions," under which, in 1629, the West India Company endeavored to extend the colonization of New Netherlands, the property in all minerals, precious stones, crystals, etc., belonged as a seignorial right to the Patroons, who were to pay the discoverer for his industry and diligence such premium as had been previously agreed upon between them. Some specimens of copper, iron, and lead ores having been discovered and sent to Europe by private persons, Governor Kieft was directed by the Company to turn his attention to the mineral wealth of the country, and to forward samples of the various metals it contained. During the negotiations of peace with the Mohawks at Fort Orange soon after, the Indian interpreter was observed to paint his face after the manner of the natives, with a substance of metallic appearance. A sample of the pigment, which was very heavy, having been obtained and subjected to the crucible, a metallic mass was extracted, and supposed to be "two pieces of gold worth about three guilders." An officer and men were dispatched to the mountain whence it was obtained for a large quantity, which, upon experiment, yielded a similar product. The substance was iron or copper pyrites, which so often misled the seekers

Discovery of ore encouraged.

(1) Williams' Hist. Vermont.

for gold. Other minerals were soon after brought by the Indians from the Nevesink hills, near the Raritan river, and a party was sent to explore the place. The Director-General Kieft, confident that rich metals were to be discovered, purposed erecting a fort to guard the treasure should it prove valuable. Encouraged by the result, which was "a few samples of a certain mineral which yielded gold and quicksilver," an officer and thirty men were sent to continue the search, and to send as much as possible of the mineral to Fort Amsterdam. As the result of these explorations, a quantity of different minerals was shipped at New Haven for Holland; but the vessel with her treasure soon after foundered at sea. Not discouraged, however, the authorities at Amsterdam, in the hope of valuable discoveries, promised to send a person qualified to report on some Iron mines which had been found on Staten Island and near the Raritan, and to prosecute the search for other metals and minerals.

Shipment of ore to Holland.

After the recall of Kieft in 1646, a new charter, with more liberal provisions, gave any colonist who, by himself, his family, or any one in his service, should discover any minerals whatever in the Province, the sole use of them, without any duty or imposition, for ten years, after which time he was to pay the Company one-tenth the proceeds thereof.[1]

These efforts of the Dutch authorities to bring to light the great mineral resources of the Colony, revealed the presence of Iron ore, which is mentioned by Adrian Vanderdonck, who settled under the charter of Patroons, and wrote an account of the Province previous to 1653. But no attempt that we are aware of was made to smelt or mine it.[2] One

(1) O'Callaghan's New Netherlands.

(2) One of the names borne by the Dutch among the Indians is said to have signified "the iron-workers," in allusion, probably, to the operations of the smith and other handicraftsmen. The scarcity of blacksmiths in many of the first English settlements in this country was seriously felt. But the Holland Company and the patroons, notwithstanding the purely commercial character of their enterprises, appear with judicious foresight to have provided a fair proportion of that humble but useful class of artificers in iron, as well as of other necessary mechanics. Several of the craft were among the first grantees of lots on Manhattan. That part of the East River side of the city between Wall street and Peck Slip was long known as "de Smit's valey," afterward abbreviated to "de Vly" and "Fly," as including the residences of Cornelius Clopper and one or two other wealthy blacksmiths on Maiden Lane near Pearl street. William street and Old Slip, in like manner, were known for many years as "Burger's Path," from Burger Joris, who, with others of the trade, emigrated in 1637 to the private colony of Van Rensselaer, on the Hudson, whence he soon after removed to the corner of William street and Hanover Square, where he received a grant of lots, and finally to Long Island. The private accounts of Van Rensselaer furnish some particulars of the price of Iron, iron wares, tools, etc., at that early date. An iron anvil is charged at 100 florins; smiths' coals, per chaldron, 19fl. 10 stivers; a smith's bellows, 47fl.; nails (100 to the pound), 8st. per lb.; steel, 1st.; a kettle, 3 to 6fl.; a chisel, 1fl.; a plowshare, 25fl.; a plow and iron work, 28fl. 16st.; an ax or hatchet, 1½ to 2fl.; a scythe, 2fl. 10st.; a spade, 1½ to

of the earliest settlements of the Dutch was made at Minisink, in the neighborhood of the valuable magnetic ores of Orange County. At this place, above the Blue Ridge, on the New Jersey side of the Delaware, the successors of the first occupants found "mine holes" and the remains of a well-constructed road, extending thence nearly one hundred miles to Esopus (now Kingston) on the Hudson. Tradition ascribes these excavations, of which there were two, and "the old mine road" to a company of miners from Holland, who transported ore of some kind over the road, until the work was suspended, as it is supposed, by the transfer of the Province to the English in 1664. The records of the West India Company also refer to a piece of pure copper from New Netherlands, and to the assurance received from one Kloos de Ruyter, that there was a copper mine at Minisink. It was for that metal that the mining was probably carried on. The copper mine of the Schuylers near New Brunswick, in Jersey, appears also to have been wrought to some extent by the Dutch.[1] Hubbard, about 1680, says in reference to New York, "Staten Island produces tin and store of Iron ore, and the calamine stone is said likewise to be found there."

Mine holes at Minisink.

In the patents granted by the Duke of York, of which that of Minisink, embracing the larger portion of Orange County, was the earliest in that part of the State, the gold and silver mines were reserved in virtue of the royal prerogative. This was the only reservation with regard to mines and minerals in the grant in 1684 of the large manorial estate to Robert Livingston, in Columbia County, where probably the first Iron-works within the present limits of the State were afterward erected by his eldest son, Philip Livingston. These were known as the Ancram Iron-works, a name derived from

First Iron-works at Ancram.

2½fl.; a sheep's bell of copper, 1fl. 6st.; 101 bars of flat iron, 485fl., etc. The florin of 20 stivers was equal to about 40 cents of our money. Wheat was 2fl. 10st. per bushel. —*O'Callaghan*, i. 477.

(1) The abundant deposits of copper ore on the southern shore of Lake Superior were very early noticed by the French Jesuit Missionaries. They are said to have been mentioned in a work by M. Logarde, in 1626, and again by Father Claude Allouez in 1666, who speaks of finding pieces of copper, and that the natives transmitted them from generation to generation as objects of worship. Masses of copper hammered into useful forms have been found in the Western tumuli, which were probably obtained thence. An application for a grant of them was made to the King of England about the middle of the last century, and Sir William Johnson, of New York, was instructed to obtain information respecting them, which he communicated to Lord Hillsborough. The quantity was ascertained to be abundant, and trial already made had proved it to be rich. Estimates had been made of the expense of mining and transporting it. Mining was attempted there as early as 1771 by an Englishman, Alexander Henry, at the forks of Ontonagon river, and afterward on the north side of the lake, but, after an unsuccessful effort, was abandoned. The region was explored by the United States Government under General Cass, in 1819, and afterward by Dr. Houghton, whose Report, in 1841, gave the first definite information respecting these va'uable deposits.

the native place of the family in Scotland. They were erected on the Ancram or Roeloff Jansen's Creek, about fourteen miles east of the Hudson. The ore was obtained principally from the "ore hill" in Salisbury, Conn., which place, was first settled by some Dutch families from New York, and incorporated by its present name in 1741. The mine, of which the Hon. Philip Livingston was one of the principal owners, was about twelve miles distant from the bloomery. The site of the forge was probably chosen on account of a vein of argentiferous galena or lead ore having been previously discovered and opened by Mr. Livingston near the spot. The works were set up as early at least as 1740. That they were the first in the Province, we infer from the official reports to the Lords of Trade. The Hon. Cadwallader Colden, in 1723, assigns as the reason that naval stores, iron, etc., had not been attempted, that it was difficult to persuade people to change their accustomed pursuits for new ones, which were expensive in the beginning and always uncertain in the issue; to which were added the want of capital, the cheapness of land, and the consequent dearness of labor, which was equal to 3s. a day. Governor Cosby, in 1734, alludes to the discovery of rich mines in New Jersey, and of Lead in New York, and to the abundance of both bog and mountain ores of Iron, "but as yet no iron-work is set up in this Province." He considered it desirable that encouragement should be given to the importation of Iron in pigs and bars into England, or "at least that it might be free of duty."[1] Kalm, the Swedish traveler, in 1748 says, "Of late years they (of New York) have shipped a great deal of Iron to England." This exportation doubtless consisted in part of Iron from New Jersey, where Iron-works were erected many years before.

Among the early explorers of the highly metalliferous region of the Highlands of Orange, Rockland, Putnam, and other counties, were a company of German miners, sent out between the years 1730 and 1750, under the direction of Baron Horsenclaver, who was extremely assiduous in prosecuting the search. They made numerous excavations, of which the traditions and more palpable evidences still remain, and made some attempts to turn their discoveries to account, whence many reports of silver and lead mines in the Highlands have originated. Iron-works appear to have been first set up in Orange County about this time.

In 1750, when information respecting Iron-works in the Colonies was called for in reference to the bill before Parliament upon the subject, Governor Clinton reported that at a place called Wawaganda, in Orange County, about twenty-six miles from the Hudson, was a plating-forge with a tilt-hammer. It was the property of Law-

Orange County.

(1) Doc. Hist. of New York, by O'Callaghan.

rence Scrawley, a blacksmith, and was built four or five years before, but was not then in use. It was the only mill of that kind in the Province. There was no rolling or slitting mill or steel furnace at that time in the Province.

In 1750 the first discovery was made of a rich superficial deposit of iron ore at the south end of Sterling Mountain, in the town of Monroe.

Sterling mine and works.

In the following year, Ward & Colton erected at the outlet of Sterling Pond, in the extreme southern part of Warwick, near the Monroe line, a charcoal blast-furnace, which was the first in Warwick. These works were called, in compliment to General William Alexander Lord Sterling, the owner of the land, afterward an officer in the Revolutionary army, the Sterling Iron-works. They were built for the manufacture of anchors, and during the next year Abel Noble, from Bucks County, Pennsylvania, erected a forge in Monroe, near the furnace, at which anchors are said to have been made.[1] From 500 to 1,000 tons of cold short magnetic ore were then taken yearly from the Sterling mine, and an aggregate of about 140,000 tons between that and 1842. The metal was strong and has been largely used for cannon, bar-iron, steel, and other purposes. The Sterling Works were formerly celebrated for their productiveness. Before and during the Revolution, about 1,500 tons of pig-iron, of which 1,000 were made into bar, were the product of the county, which, we believe, had no other works. Mr. Peter

First steel.

Townsend, who became the proprietor before the war, made anchors at the place in 1773, and in 1776 produced the first steel in the Province, at first from pig and afterward from bar iron, in the German manner. The first blister steel made in the State was made by Peter Townsend, Jr., in 1810, from ore of the Long Mine on the Sterling estate. In the manufacture of edge-tools it was considered

Cannon and chains.

equal to the famous Danemora Swedish Iron. The first cannon made in the State were cast by the same person for Government, in 1816, from the metal of these mines. They were from six to thirty-two pounders, and none failed in the proof. The immense Iron chain stretched across the Hudson at West Point, in 1778, was forged at these works. It weighed 186 tons, and was made and delivered in six weeks under the superintendence of Colonel Timothy Pickering.[2] It remained unbroken, we believe, during the war, although others at Fort Montgomery and on the lake above were broken by the British. Links of these chains, weighing 140 lbs. each, are preserved among the Revolutionary relics at Newburgh and in New York.

(1) French's Hist. and Stat. Gaz. of New York.

(2) Dr. Horton's Geological Report of New York, 1839.

A second furnace was erected on the same property in 1777, by the Townsends, who had two forges with eight forge fires. The furnace has been in ruins for fifty years. The hamlet still bears the name of Sterling Works, and now produces daily 12 to 15 tons of pig-iron, the business being still in the family of the Townsends, whose large hot-blast furnace stands two miles north of the old Sterling furnace. Southfield furnace, six miles southeast of the Sterling mines, owned by Peter Townsend & Co., was built in 1806. Several other veins of magnetic ore were opened in the last century in the neighborhood of the Sterling mine, which itself covers, according to survey, 30 acres of ground. The Forest of Dean mine, a very extensive bed six miles west-northwest of Fort Montgomery, as early as 1756 supplied a furnace, which was abandoned twenty-one years after. The vein is over 30 feet thick and 150 broad, and makes good cold short iron. Samuel Patrick cast stoves at this furnace for Government in 1776.

Long Mine.

The Long Mine, belonging to the Townsends, was discovered in 1761 by David Jones, and, during the next seventy or eighty years, supplied on an average 500 tons of ore annually to the Sterling Works. It was the only one at which systematic mining was attempted in that time, and was worked to the depth of 170 feet on a single vein 6 feet thick. The ore yielded 62 per cent. of strong tough metal, from which cannon, muskets, wire, steel, fine malleable Iron, and harness-buckles of good quality were made.[1]

Mountain Mine.

The Mountain Mine, half a mile southwest of Long Mine, was found in 1758 by a hunter, in consequence of a tree having been blown up by the roots. The Iron from this mine was remarkable for its strength and fine polish, and was in consequence chiefly exported to England to be tinned.

Other mines in Orange Co.

Spruce Swamp or Red Mine, of pyritous magnetic ore, three miles south of Long Mine, discovered in 1780 by J. Stupenfell; the Belcher Mine, discovered in 1792 by Jacob Belcher, on the Sterling estate, at the south end of the mountain; the Crossway Mine, near Mountain Mine, a vein 14 feet thick, yielding 50 per cent. of good Iron, found in 1793 by John Ball, with the Patterson, Clove, O'Neill or Nail mine, and many other veins more recently discovered, now supply the anthracite and charcoal furnaces of Orange County with much valuable ore. Vincent Matthews, Esq., was the proprietor of an iron mine in Orange County in 1774.

Many old furnaces and forges for smelting these ores have been long abandoned. A furnace was in operation during the Revolution at Craigsville, in Blooming Grove township. Haverstraw furnace,

(1) Dr. Horton's Report.

in Rockland County, and one or two bloomeries on the west bank of Tappan Sea, which smelted ore on the neighboring creeks, and other bloomeries on the Ramapo, have been long abandoned, the former for fifty years, and the Croton, Orange, and Woodbury furnaces quite or nearly as long.[1] Large furnaces now occupy the Ramapo Valley, which are supplied with magnetic and limonite ores from the mines above named and others in the Highlands.

Abandoned Works.

In 1757, Governor De Lancey, in obedience to the king's proclamation, transmitted an account of the Iron-works in the Province from 1749 to 1756. It contained a statement of the product of the Ancram Iron-works during that time, as furnished by Robert Livingston, Jr., the son of the first proprietor. It was represented to be the only Iron-works in the Province then carried on. Several others had been set up, but were abandoned, through mismanagement or the pecuniary inability of the undertakers. Of these were two furnaces in the Manor of Cortland, and several bloomeries which had not been worked for several years. Iron ore was abundant, especially in the Highlands, and it was probable that, with the return of peace and with encouragement from Parliament, a number of others would be carried on to the great advantage of the mother country, which in time would receive from the Colonies, in exchange for her own manufactures, all the pig and bar iron she required, for which she now paid Sweden in cash. The following is—

Official Report.

An Account of Iron made at Ancram, in the Manor Livingston, by Robert Livingston, Jr., Esq.

					MADE INTO BARS.					
							Castings.			
Year.	T.	c.	qrs.	lbs.	T.	c.	T.	c.	qrs.	lbs.
1750	43	3	3	13	195	15	5	2	3	7
1751	606	6	3	17	164	12	6	1	2	0
1752	354	7	3	0	183	14	3	2	1	14
1753	22	9	2	0	215	16	2	3	0	21
1754					211	5	4	2	2	0
1755	722	2	3	0	149	16	36	2	3	7
1756	267	14	0	14	182	0	10	0	0	0
	2016	4	3	16	1302	8	66	15	0	21
	1302	8	0	0						
Total,	3318	12	3	16			*Pr.* DIRCK JANSEN, *Storekeeper.*			

While many others were unsuccessful, it is matter of surprise that the Ancram Works should have continued to prosper, considering the dis-

(1) Lesley, 414.

tance that the ore had to be transported from the mine, and the still greater distance which the bar-iron had to be carried, to the Hudson in order to reach the market at New York; while the roads and the modes of conveyance were imperfect, and all the operations of mining and manufacture were generally rude. During these years, also, the operations were much impeded by quarrels with citizens of Massachusetts. That Province, in virtue of its charter, claimed jurisdiction westwardly to the Pacific Ocean, and had made grants which brought its subjects into conflict with the Livingston claims. This led to frequent riots, murders, and arrests in the attempt to dispossess the proprietor and his tenants, until the Revolution terminated the disputes. An affidavit was made by Mr. Livingston in May, 1755, that in consequence of the abduction of his men, and the imprisonment in the Springfield Jail of the clerk, forgeman, two founders, and other workmen, he was unable to furnish carriage-wheels and shot for the expeditions fitting out against Niagara and Crown Point. He had put his furnace in order for that purpose at an expense of £400. These works, which were thus engaged in the public service at the most important period of colonial history, had nevertheless become highly advantageous to the owners at the commencement of the war of Independence. The reputation of Salisbury bar-iron was doubtless an element in their prosperity. Besides the Salisbury ore beds, two others of the same kind of ore were also opened in the eastern part of the Manor, one north and the other south, near the Massachusetts and Connecticut lines. The Iron from all these was of superior quality. In addition to the forge and furnace at Ancram, there were also forges north of them at Maryburg, near the centre of the Manor, which had fallen to ruin before the close of the last century.

Quarrels with Mass.

The iron-manufactures of Copake, Hudson, and other places constitute an important branch of the industry of the county at this time.

In May, 1761, William Hawkshurst petitioned the Council assembled at Fort George for the sole privilege during thirty years of making anchors and anvils within the Province. The application was rejected. An advertisement of the same person, in 1765, states that he had lately erected "a finery and great hammer for refining the Sterling pig-iron into bars." His customers, on application to him in New York, could be supplied with a great variety of iron and castings, such as "flat, square, and bar iron, cart, waggon, chair, and sleigh tire, mill spindles, wrines and iron axle trees, cast mill rounds and gudgeons, fullers' plates, forge plates, forge hammers, and anvils, pots, kettles, potash kettles, and plates or hearths for pearlash furnaces, sugar and still house grates, fifty-sixes and smaller weights, sash weights, &c." He

Finery Forge.

still manufactured anchors and pig-iron, and would take in part pay, iron and sundry sorts of edge-tools, viz., "short bitted pole-axes, and Virginia and Carolina made hoes and bills, &c." These we suppose to be the description of Iron wares supplied at that time by the iron manufacturers of the country from domestic Iron.

Society of Arts.

During the year last named, a Society, on the plan of the London Society, was formed in New York to encourage domestic manufactures, which the continued encroachments of Parliamentary power seemed to render it a duty to foster. Premiums were offered for various products of native skill and industry, and a fair was opened for the sale of such articles. Several kinds of home-made hardware, such as scythes, shovels, hoes, etc., were presented, and met with ready sales.

Duchess County.

At this date there were a number of Iron-works in the southern part of Duchess County. The towns of Amenia, Beekman, Dover, Fishkill, and some others in the south and east, abound in very rich deposits of hematite ore, usually of the solid and sometimes of the fibrous varieties, associated with mica slate and limestone. A manufacture of yellow ochre from the pulverulent form of the hematite, was established many years ago. At Northeast a vein of galena was wrought as early as 1740, by a company of Germans, who exported the ore to Bristol, England, and to Amsterdam. The lode is crossed by a vein of copper ore, and both yield silver, the former 45 and the latter 80 ounces to the ton. The working was, however, abandoned as unprofitable, but was resumed during the Revolution by Peter McDaniels, encouraged by the Committee of Safety of Congress. A quantity of lead ore was taken out, but the business was eventually given up once more. Traces of lead are found in other parts of the county.

A furnace and foundery were in operation during the Revolution in Amenia, a mile from the Wassaic station, at which steel and castings were made for the use of the army. Near the site—still known as "the Steel-works"—the manufacture of charcoal iron is yet carried on by hot and cold blast, and the product used for gun-barrels.

About the middle of the last century, Peter Horsenclaver, a wealthy and enterprising German, already mentioned, was the proprietor of several Iron-works in New York and New Jersey. He also expended considerable sums of money in promoting the cultivation of hemp and the manufacture of potash, which then employed much labor and capital in the Colonies. In a letter dated Fort George, January 12, 1767, of which he was the bearer from Governor Clinton to the Lords of Trade, his enterprise in these respects is highly commended, and their lordships were referred to him for information respecting his operations in Iron.

It is stated in the same letter that a foundery for making small iron pots had been lately set up "near this town," but was yet inconsiderable. The Governor also mentions a silver mine, or, more properly, a vein of lead ore of highly argentiferous character, as having been lately leased by order of the British Government to Mr. Frederick Philipse. It was in the Manor of Philipsburg, in West Chester County, where iron ore also existed, for working which last, furnaces were early erected. A large refinery of iron or lead, belonging to Colonel James, was in operation at Sing Sing at the commencement of the Revolution.[1]

Putnam County.

Magnetic iron ore abounds in the highlands of Putnam County. Its value is often much impaired by an excess of sulphur. Townsend's mine at Simewog hill, in Southeast, is the oldest known in that part of the highlands, which was extensively explored by Horsenclaver and his company. Ore was once carted from this mine to Danbury, Connecticut, and to furnaces along the Sound. Though amply productive, the workings were for some reason abandoned forty years ago, after having yielded 150,000 tons. The vein is in some places 20 feet thick between gneiss and hornblende rock. The sulphate of iron, formed by the decomposition of the sulphuret, led to early excavations in many places in early times in search for silver, as at the old "silver mine," so called, northeast of Anthony's Nose. On the top of that promontory, a mine of magnetic iron was also opened formerly, but proved too sulphurous for use.

Long Island.

On the opposite side of the Sound, in Suffolk County, L. I., as elsewhere mentioned, the manufacture of steel was attempted as early as 1655 by a native of Southold. A bloomery forge was built, probably before the Revolution, at Patchogue, in Brookhaven, midway between New York and Sagg Harbor. It was owned at a later period by Jeffrey Smith, and its site is now occupied by other

(1) On 30th October, 1777, Congress directed the Board of War to write to the Government of the State of New York, recommending it forthwith to take measures for having the lead mines in the State worked, and promising, in case laborers were scarce, to supply prisoners of war for that purpose.—*Jour. of Cong.*, iii. 462. The only lead mine in the State which was of any account in the last century, we believe, was the Livingston mine at Ancram. This mine was wrought during the war, but the domestic supply fell far short of the demand in the early part of the war. Congress, in November, ordered the Commissioners abroad to purchase 500 tons of lead, and while churches and private houses in the cities were stripped of their leaden spouts and the weights to the windows, and ladies in many places surrendered their stores of shining pewter to furnish bullets for the soldiery, the leaden equestrian statue which had been decreed by a grateful people to the king in 1770, is said to have disappeared from the streets of New York to make bullets for the destruction of his military subjects. It was melted up in the family of Gov. Wolcott of Connecticut, and made 42,000 bullets.

manufactures. In the primary formations of Long Island, Staten, and New York islands, and the smaller adjacent ones, magnetic iron ores occur in considerable quantity. This mineral underlies some portions of the city, and is distributed throughout the island. It was found there by Mr. Peter Townsend many years ago.

Peter T. Curtenius was the proprietor of a large air-furnace in the city of New York before the Revolution. In February, 1775, as stated in a paper of that date, a large *cylinder* for the steam-engine of the water-works then in progress of erection, was cast at the foundery of Sharp & Curtenius. It was said to be "the first performance of the kind ever attempted in America," and to have been extremely well executed.[1]

Heavy casting.

(1) The city had been previously supplied with water from wells and pumps, in accordance with an Act of Assembly in 1741. This first and early attempt to supply the city by means of aqueducts was proposed and partially carried out by Christopher Colles, an accomplished civil engineer from Ireland, who, in 1774, contracted to build a reservoir on the east side of Broadway, between Pearl and White streets. The completion of the design was frustrated by the war with England. After the peace, in 1785, schemes for supplying water were renewed by Colles and others, surveys were made, and in 1799 a company was formed with large privileges, which were used chiefly for banking purposes. A principal well was, however, sunk at the corner of Duane and Cross streets, whence a limited supply of impure water was raised by a steam-engine, and distributed in pipes. Other projects for wells and open canals were proposed and abandoned by different companies, until the Assembly, on May 2d, 1834, authorized a joint stock company, and the citizens, at the charter election in April, 1835, approved of the survey made by commissioners for an aqueduct to the head of Croton river. This magnificent enterprise was commenced in the spring of 1837, and its completion was celebrated October 14th, 1842. The chief engineer was John B. Jervis, who, before its commencement, succeeded Major D. B. Douglass, the surveyor of the one previously suggested by De Witt Clinton.

The engine for which the cylinder above-mentioned was cast, must have been one of the first attempted in America. Christopher Colles, under whose direction it was probably commenced, is believed to have made the first steam-engine ever constructed in this country. In 1771, as we are informed by Mr. Thompson Westcott, Colles offered his services in Philadelphia as an hydraulic engineer. The next year he delivered lectures in that city on Pneumatics, Hydrostatics, Hydraulics, and lock navigation, illustrated by experiments and working-models of several machines, including the *steam-engine*. As the result, he was employed to build a steam-engine for a distillery, which was reported upon by a committee of the Philosophical Society in August, 1773, but, from the cheapness of its construction, did not prove efficient. In the same year he lectured in New York on canals and steam-engines, and the following year was employed as mentioned in the text. In 1775, he gave lessons in gunnery. In 1784, he presented a memorial to the New York legislature, on the subject of water communication with Lake Ontario by the Mohawk river. During the next year, with meagre aid from the legislature, he explored the country as far as Wood Creek, and published a pamphlet on "The Inland Navigation of New York," showing its advantages and feasibility. His project was considered visionary, but he persevered, and in 1786 again memorialized the Assembly and City Council, on artificial communication between New York and the great lakes by the above route. A bill was re-

We have seen no mention of smelting furnaces or forges in the island at that time. But one furnace and one forge, according to Professor Mather, remained in working order in the counties of New York, West Chester, and Putnam in 1842.

The exports from the port of New York for the year ending July 5, 1766, included 532 tons of bar-iron, valued at £26 sterling per ton; 500 tons of pig-iron, at £7 10*s.* per ton; and 80 tons of copper ore at £100 per ton. Some Iron was at this time shipped to Ireland in the emigrant and merchant vessels in exchange for linen and other manufactures. In 1775, the first year of the war, 200 tons of iron, worth £16 10*s.* (an average, probably, of the prices of bar and pig iron) per ton, were imported, and in 1776 only 40 tons. The shipments of Iron from the port in these years amounted to 2,400 tons of pig and 750 of bar iron in 1775, and to 800 tons of pig and 690 of bar in 1776. The pig metal was valued at 75*s.* and the bar at £17 per ton. Six tons of copper ore were exported in 1775, and only one in 1776.[1]

Exports of Iron.

It was not until after the Revolution that the ferriferous treasures of that section of the State in which its greatest mineral wealth is found, and its most active Iron business is now conducted, were brought to the knowledge of its people. These lie in the vast beds of magnetic and specular iron ore in the valleys of Lake Champlain and the St. Lawrence. The Iron enterprise of this rich agricultural and mineral region is now expanding with great rapidity, and promises ere long, by the aid of modern science, capital, and material agencies, to attain a magnitude hitherto unequaled in this country.

Northern New York.

In the great belt of primary or Huronian and Lawrentian rocks in Northeastern New York, throughout the counties of Washington, Saratoga, Essex, Clinton, Franklin, and St. Lawrence, the supply of ores is almost illimitable, and the greatest affluence of fuel and water-power point to a future development of the Iron-manufacture in that region of no ordinary extent. The richest deposits of these ores are probably those in the counties of Essex and Clinton, where the huge acclivities of the Adirondac hills seem compacted of strata and rocks of iron ore. Immense boulders also strew the surface in many places, and veins,

ported to the House by Jeffrey Smith, but did not pass. He published again on the subject in 1807. De Witt Clinton admitted the first and best practical suggestions for the New York and Erie Canal to have come from Colles, and on the completion of that great work in 1825, four years after his decease, "his effigies were borne with honor." Mr. Colden also commends highly his services in this connection, and speaks of him as the projector and attendant of a telegraph erected during the war of 1812 on Castle Clinton. He was a man of modesty, worth, science, and ingenuity, but died poor and unrewarded.—*See Westcott's Life of Fitch*, p. 153; *Colden's Life of Fulton*.

(1) Sheffield's Tables.

masses, and concretions underlie the valleys of the Saranac, the Au Sable, the Scroon, and of the several head streams of the Hudson and the tributaries of the Lake.

The only settlement made before the Revolution north of Crown Point in this region of forest, was by William Gallilland, a merchant of New York, who, in May, 1765, planted a colony of mechanics and laborers on the Boquet, where they built saw-mills, a smithery, and other improvements. The influence of iron upon the compass was noticed by Gallilland in the following year, and its existence thence inferred. In July, 1780, he notes in his journal that "Joseph Carter, of Scituate, Rhode Island, offers 6*d.* lawful money per ton for iron ore, and raise it at his own expense, 500 to 1,000 tons annually." In March, 1783, it is again recorded that "John Gilbert, owner Berkshire Furnace in Lenox, proposes to be concerned in it at his own expense. Mem. to write him as soon as we may safely visit the place."[1] The iron-manufacture in this important region was commenced some years after by the New England people, who flowed in after the Peace. In 1801, the first Iron-works were built at Willsboro Falls on the Boquet, where George Throop and Levi Highly commenced with Charles Kane, of Schenectady, the manufacture of anchors, of from 300 to 1,500 lbs. weight, under a ten years contract with parties in Troy Mill cranks, for the numerous saw-mills of the region, grist-mill machinery, and afterward steamboat irons, were made at this foundery, which was ultimately changed to a bloomery, and is still in operation It is noticed as a remarkable circumstance, that the ore used in the first ten years, until the discovery of the Arnold ore bed in Clinton County, was principally obtained from Vermont, the only deposit then opened in all that region being at Basin Harbor. Some ore was also brought from Canada, whither one or two unsuccessful attempts were made to export anchors.[2] A rolling-mill was, a few years later, erected by W. D. Ross on the same stream, at which nail-plates in large quan-

First Iron-works in Essex.

(1) Watson's Survey of Essex County.

(2) The immense bodies of iron ore in this section of New York belong to the extended belt of primary ores which stretches in a southwesterly direction from the Cobequid Mountain in Nova Scotia—where it supports the Acadia Furnace at Great Village, on Folly river, with magnetic and specular ore in large quantity, and in close proximity to abundance of bituminous coal—through New Brunswick, Canada East, Maine, New Hampshire, and Vermont. In Canada the French are said to have had an iron-furnace as early as 1717, on a branch of the St. Maurice river, seven miles north of Trois Rivières, in the lower province, where the St. Maurice cold-blast furnace now is. A manufactory of small nails was established at Quebec in 1764, which, in the first six months, exported 300 tons of nails to Florida, the West Indies, and South America.

tities were made, and supplied to the nail-factory at Fair Haven, Vt., at $8 per cwt.

The "Elba Iron-Works," a forge with four to six fires, was built in 1809, at North Elba, on a branch of the Au Sable river, by Archibald McIntyre & Co., using ore in the neighborhood, which, however, proved too refractory. After a few years of prosperous business, and with every other advantage, the works were abandoned on account of the distance from the Arnold mine in Clinton County, which had been substituted, but chiefly owing to their remoteness from the markets reached by way of the St. Lawrence and Lake Champlain. After the construction of the Champlain Canal had furnished an outlet to this region, Mr. McIntyre, with Archibald Robertson and David Henderson, erected the first furnace of the Adirondac Iron and Steel Company, incorporated with a capital of $1,000,000. It was in a secluded spot among the Adirondac hills, where, an Indian hunter had revealed to Mr. Henderson a vast deposit of the richest ore, surrounded by all the materials for an extensive manufacture of Iron. A blast-furnace, with forge fires, a puddling-furnace, etc., were subsequently added, until the business expanded to one of the first class. The Iron made was of rare excellence for toughness and strength, and especially adapted for making nails and steel. At the Adirondac Steel-works of the Company, in Jersey City, the manufacture of *cast-steel* was first successfully established in this country, and their specimens of steel and of the iron from which it was made, received the premium at the great London Exhibition. The ore from some of the beds in this county, as the old Sandford mine, yields 75 per cent. of Iron, and much is yearly exported to Pittsburg and other parts of Pennsylvania, to Maine, Vermont, Ohio, Virginia, and Maryland, to be mixed with the ores of those States. The county now contains a number of furnaces, some 16 or more bloomeries, and other extensive works, and Clinton County an equal or greater number. In all the counties before mentioned are a number of prosperous Iron-works. Several villages and towns, as Keesville, owe their existence and prosperity to the growing importance of the Iron-interest, which is nowhere conducted with more skill and enterprise.

Adirondac Works.

First Cast-steel.

The progress of New York in the various miscellaneous branches of manufacture involving the use of metals, was not so great in the last century as that of New England or Pennsylvania. Some departments of the gun-manufacture were carried on at Albany as early as 1740. Gun-stocks were then made by Mr. Vander Poel, the proprietor of a saw-mill on Beavers Creek. It was an active business in 1748, when

Kalm visited the place. Muskets or rifles were made in considerable quantity for the Indian trade, of which Albany was a principal centre. The stocks were made of wild cherry, red maple, and occasionally of the black walnut of Pennsylvania. The armorers at Albany were employed by the government at the commencement of the Revolution.

Nails had long been an article of handicraft production in several of the Colonies. But the consumption of nails and spikes was enormous, and the importations from England always large in some of the Provinces. During the war, when English nails could no longer be obtained with ease, some were imported from France but were not liked, and the people were forced to increase the domestic production. A future independence for all articles of simple manufacture, like nails and spikes, was felt to be necessary under the new hopes inspired by an independent nationality.

Nail-works.

On the revival of industry after the Peace, a nail manufactory was established in the year 1787 on Orange street, Albany, by Garret Witbeck. He manufactured 8s and 10s at one shilling, and 20s and 24s at eleven pence per pound. The quality was claimed to be fully equal to that of any imported. During the same year, another factory, in which every description of nails was manufactured, was erected in or near the same town by Messrs. Stevenson, Douw, and Ten Eyck. Their nails were also represented to be as cheap as any foreign nails, and superior to them in quality.

Carriage-building has in late years become a considerable business in New York. Among the reminiscences collected from aged citizens by the late Mr. Watson, the annalist, was the statement that before the Revolution, carts were not allowed to have tires upon their wheels. Private carriages were by no means a common thing in most American cities in colonial times. About the year 1768, the manufacture of carriages of all kinds was announced as a new business in New York, by Elkanah and William Deane from Dublin. They brought out their workmen, as they state, at great expense, and were prepared to make coaches, chariots, landaus, phaetons, post-chaises, curricles, chairs, sedans, and sleighs five per cent. below the importation prices.

Carriage-building begun.

Coach springs were first made in the city by a Mr. Williams, from England, who came out as a shopmate of Mr. Grant Thorburn, and for a time prospered in the business.

Jewelers and silversmiths were numerous in New York from an early period. Anthony Lamb was a mathematical instrument maker as early as 1750, and manufactured Godfrey's quadrant in an improved form.

Henry Witeman, from Philadelphia, set up the manufacture of metal buttons near the Fly Market soon after.

John Stevens and steam.

Among those who labored to introduce the era of steam in the Iron-manufacture and all those branches which it subserves, several citizens of New York and its vicinity were early engaged. Its direct agency in the several departments of the iron business has been as a new creation; and its numerous applications to machinery of all kinds has constantly augmented the demand for Iron, and extended the field for labor, capital, and skill to a degree impossible without it. In this connection, Christopher Colles, John Stevens, Chancellor Livingston, and Robert Fulton, appear among the earliest laborers. The name of Stevens is associated with that of Fitch in the first application of steam to navigation; and his patented improvements in the engine of Savery, the boiler, bellows, etc., were among the earliest granted by the new government. In the year following the splendid success of Fulton on the Hudson, the steamboat Phenix, built by John C. Stevens, and navigated by his son Robert L. Stevens from New York to Philadelphia, was probably the first that traversed the Atlantic. When the grand idea of a canal through the State, suggested by Colles, was advocated in New York, Stevens proposed a *railroad* instead, which would, if followed, have given the Empire State the precedence in that unequaled system of internal communication. To her vast system of canals, secured by the efforts of De Witt Clinton and others, and to her magnificent railways in connection with steam, New York owes the devolopment of her great iron resources no less than of the great agricultural capabilities of the State. Her immense foreign commerce is equally the result of steam-power applied to ocean travel.

New Jersey.—The system of Primary and older Secondary rocks, which furnish the immense masses of iron ore in New York, carry with them where they cross into New Jersey in the gneissoid structure of the south mountain range, the same rich veins of magnetic oxyd and brown hematite ore. These, with the bog ore of the Tertiary and Cretaceous formations of the southern portion of the State, have supplied numerous Iron-works from the earliest colonial days. The metallic wealth of New Jersey was partially discovered by the Dutch in the neighborhood of the Delaware and Raritan rivers, and early became the principal source of domestic Iron.

The earliest Iron-works in that Province of which we have any account belonged to Colonel Lewis Morris, a merchant of Barbadoes, whose brother Richard, of Morrisiana, and himself were the ancestors of the Morris family in that and adjacent States. These works were

situated in the town of Shrewsbury, in Monmouth County, and, with other improvements of the owner, formed a large establishment for that period. We are unable to say at what date precisely they were erected. They are supposed by Dr. O'Callaghan to have been purchased of James Grover, who in 1650 was the collector for the poor at Gravesend on Long Island. In 1655, Grover, with other disaffected people, hoisted the British ensign at that place, and read a declaration of independence of the Dutch government. In the following year, he was the bearer of a petition from some of the Yankee inhabitants of the Island to Cromwell asking to be emancipated from the Dutch yoke. He subsequently removed to New Jersey, where he is believed to have been the owner of the Iron-works in question.[1] Shrewsbury was settled by Connecticut people about the year 1664, when the Province was surrendered to the English. Henry Leonard, one of the workmen at the first Iron-works in Lynn, Mass., removed to this part of Jersey near that time, and is said to have set up one of the first forges in the Province.

First Iron-works.

The grant of lands to Mr. Morris is dated October 25, 1676, and embraced 3,540 acres, with full liberty to him and his heirs "to dig, delve, and carry away all such mines for iron as they shall find or see fit to dig and carry away to the iron work, or that shall be found in that tract of land that lies enclosed between the southeast branch of the Raritan river and the whale pond on the sea side, and is bounded from thence by the sea and branch of the sea to the eastward to the Raritan river, he or they paying all such just damages to the owners of the land where they shall dig as shall be judged is done by trespass of cattle, or otherwise sustained by the carting and carrying of the said mine to the work."[2]

The East Jersey Proprietaries, in their account of the Province in 1682, speak of its mineral treasures as remaining to be discovered, but they state that a smelting-furnace and forge were already set up, which made good Iron, and were of great benefit to the country. These were doubtless the works of Colonel Morris, which then employed sixty or seventy negroes in addition to white servants and dependents of the proprietor. Shrewsbury was at that date the most southern settlement in the Province, and had a population of about 400; that of Elizabethtown, the seat of government, being about 700, and of Newark 500.

In December, 1741, Mr. Morris addressed a letter to the Lords of Trade, transmitting an address from the Council and Assembly asking

(1) O'Callaghan's New Netherlands, ii. 342. (2) Whitehead's East Jersey, i. 91.

for encouragement of the manufacture of Iron in the Province. It would thus appear to have already become a promising industry in New Jersey.

The first settlement in Sussex and Morris counties is supposed to have been made about the year 1685, by people from the older towns and from New and Old England, for the purpose of smelting the iron ores in the neighborhood of Hanover, in Morris County. They early erected several forges, and engaged extensively in the Iron-manufacture. The several spurs of the great Apalachian chain which diversify these and the adjoining counties of Northwestern New Jersey were alike remarkable for the abundance and variety of the ores which they embosomed, and for their affluence of wood and water-power for carrying on the manufacture of Iron.

Morris County.

At the close of the last century, ten mines were wrought within the limits of Morris County, which contained two furnaces, three rolling and slitting mills, and about forty forges with two to four fires each. Dr. Kitchell, in his Second Annual Report of the Geological Survey of New Jersey for 1855, enumerates and describes upward of eighty iron mines within the four counties of Sussex, Passaic, Morris, and Warren. These furnish principally the magnetic oxyd, hydrated peroxyd, and other primary ores. The ores of other metals, as zinc and copper, are also found in the same interesting region.

The site first occupied by the settlers of Hanover, still known as "the old forges," was about twenty miles eastward from the mine whence they obtained the ore. This was the celebrated Suckasunny mine in the town of Randolph, one of the oldest in the State. The ore was carried thence to the works in leathern bags on pack-horses, and the iron was conveyed back in the same way over the Orange Mountains to Newark. Forges at Morristown, and some in Essex County, were long supplied in the same way from the rich ore of the mine, some of which is highly magnetic, and yielded, on analysis, over 80 per cent. of iron. The ore was for some time free to all, but in 1717 the land was taken up by Joseph Kirkbride. Early in the present century, the mine became the property of the Hon. Mahlon Dickerson, formerly Secretary of the Navy, who resided near Dover, and was extensively engaged in mining the ore. The mine is still known as Dickerson's, and its ore, mixed with others to correct a cold short tendency, is much used by furnaces at Philipsburg and elsewhere.

Dickerson Mine.

At the village of Troy, in Hanover, a bloomery forge, still in operation, was built in 1743. On the Rockaway and its branches several forges were erected during the next sixty years. Two of these were in the village of Rockaway, and a third, erected in 1805, was in 1856 con-

verted into a steel-mill. Beach Glen bloomery, three miles north of the village, was built in 1760 and rebuilt in 1856. Ætna forge, on Burnt Meadow Brook, three miles further north, was set up about the time of the Revolution near the site of the bloomery of Mr. George E. Richter, and one mile from the Denmark Anchor bloomery, erected in the year 1800. A bloomery forge was also built about the year 1780 seven miles west of Rockaway station, on the Rockaway. Having been twice rebuilt, it is still at work upon the Suckasunny ore, and is known as the Valley Forge. Several others were early erected in the Berkshire Valley. Two or three miles above Milton, and seventeen or eighteen north of Rockaway, the Russia and Hopewell bloomeries were set up, the former in 1775 and the latter in 1780, and both, having been rebuilt, are still in operation with hammers driven by water-power.

Randolph, Mount Hope, Morristown, Boonton, Dover, and other places in the county, have been chiefly occupied with Iron-works for a long period. One of the slitting and rolling mills above referred to, about 1790 occupied the site of Old Boonton Bloomery, six miles east of Rockaway. Boonton is now the centre of the largest Iron business in the State. The works of the East Jersey Manufacturing Company, erected in that village about thirty years ago, are among the largest in New Jersey. The Dover Rolling-mill, near the Dover station of the Morris and Essex railroad, was built by Israel Canfield and Jacob Livey in 1792, when the place contained only four dwellings and a forge. It has been twice rebuilt, and is furnished with a steel-furnace, which has made 1,000 tons of steel in a year. A charcoal furnace at Mount Hope, four miles northwest of Rockaway, cast shot and shell for the army during the War of Independence. It stopped about thirty years ago. This place is the centre of extensive mining operations, having no less than thirty-two ore beds wrought in its neighborhood. The most northerly of this group, which includes the Dickerson, is the Hibernia mine, a magnetic ore bed 9 feet in thickness.

Boonton.

The Hibernia Iron-works, in Pequannock township, received, by an Act of the Provincial Legislature, in 1769, a grant of certain privileges in common with others in Burlington County, for their encouragement. The furnace was employed during the war in casting grape-shot and other ordnance for Government. A letter from the owner or manager, Joseph Huff, dated November 21, 1776, in which he requests a supply of salt to enable him to lay in a stock of provisions, without which he must put the works out of blast, states that it was the only furnace in the Province which he knew to be then in blast, or at which such stores could be supplied for the public service.

Hibernia Iron-works.

A mine of the sulphuret of iron or pyrites, at the base of the Green

Pond or Copperas mountain, in the same town, furnished material for a considerable manufacture of copperas in the last century. At its close, the township had two charcoal furnaces and a number of forges.

Copperas-works.

Several early Iron-works were erected on the Ringwood and Pequannock rivers, which unite at Pompton. A forge was built, about a century since, on the present site of the bloomery and anchor works of the Messrs. Smith, three miles above Bloomingdale, in Passaic County. After entirely disappearing, it was rebuilt in 1847. A charcoal furnace, two or three miles further northwest, also on the Morris County side of the Pequannock, was erected previous to 1770, as shown by a piece of pig metal from it stamped with that date. It was abandoned two years after, and was replaced in 1840 by the large Charlottenburg bloomery and rolling-mill of G. H. Renton, of Newark. Between these, about the former date, were also two forges. At the village of Ringwood, near the State line, a forge also existed formerly. There are 8 mines of rich magnetic ore in this vicinity. The present Ringwood bloomery at Boardville, and Long Pond bloomery, three miles northwest of it, were built by Baron Hass before the Revolution, and now make, the former about 400 and the latter 800 tons of blooms yearly. These, with the Charlottenburg and Mount Hope works, once belonged to one company, at which time there were also two forges between Smiths' and the old Charlottenburg furnace. Methodist bloomery on the Pequannock, twenty-five miles northwest of the Patterson station, in Passaic County, was built about 1780. The following bloomery forges in Morris County were erected about the year 1790, and are still running, viz.: Hard Bargain, near Petersburg; Bartleyville, near Mount Olive, now the oldest in that vicinity; Holsey's forge at Rockaway; Split Rock bloomery on Beaver Lake, and Stickels Meriden bloomery on Beaver Brook. Stockholm and Windham bloomeries on the Pequannock, in Passaic County, still in blast, were erected about the same year. The Pompton hot-blast charcoal furnace in that county, built in 1837, is said by its present owners to be the oldest three tuyère furnace in the Union.

The Morris Canal has long rendered the Anthracite coal of Pennsylvania available for the numerous Iron-works of this metalliferous region.

Furnaces and forges were built at several places in the adjoining counties of Sussex, Warren, and Hunterdon, which included Mercer, at an early date. At Clinton, in the last named, where mines of magnetic ore now yield 25 to 30 tons of ore daily, mining was commenced over a century and a half ago. The Union Furnace, before and at the beginning of the Revolution, was supplied from that

Hunterdon County.

place, but was abandoned in 1778. Steel was made at Trenton during the Revolution.

At Oxford, on a branch of the Pequest, in Warren County, a charcoal furnace was built in 1743. It is said to be the oldest furnace now remaining in the Union, and, being in complete repair, is still running as a steam hot-blast furnace, two-thirds of the year on charcoal and one-third on anthracite. It is 8 feet across the bosh, and 38 feet high, and made, in 1857, 906 tons of car-wheel iron, nearly all made into car-wheels on the spot. Castings from this furnace are found in chimney backs a century old, and pigs with much older stamps. The iron was formerly rafted in Durham boats from Foul Rift down the Delaware to Philadelphia. The ore is obtained from a mine half a mile distant, opened in 1743, and yielding block magnetic ore with 45 to 60 per cent. of iron. Two other beds have been opened since, and supply ore to other works.

Warren County.

At Andover, twenty miles to the northeast, in Sussex County, and forty miles from New York, a mine of magnetic ore was opened and a blast-furnace erected before the war. The works were noted for the superior quality of the bar-iron produced. The smelting furnace is still standing, and on the banks of the Canal, at Waterloo, the puddling furnace and forge are to be seen. By a resolution of Congress, in January, 1778, authorizing the Board of War to contract with Mr. Whitehead Humphreys, of Philadelphia, for the manufacture of steel for the use of the Continental artificers and works, the Commissary-General of Military Stores was directed to stipulate that the iron employed should be that of the Andover Iron-Works, as the only article that would certainly answer for that purpose. It was also directed that a letter should be written to the Governor and Council of New Jersey, requesting them to put a person in possession of the works, that they might be put in blast for the immediate supply of iron.[1] The company which owned the works was a large and enterprising one, and conducted an extensive business for the times. But they appear to have been principally royalists, and hence the order to take possession of the works. The company was dispersed widely during the war, and the mines long remained unclaimed and the taxes unpaid. After the war some of the iron from this furnace was sent to England, and there made into steel, for which purpose it was pronounced equal to the best Swedish and Russian Iron. The best foreign irons from which steel is made in England are the product of ores similar to those of the Andover mine. After remaining long dormant,

Andover works, Sussex Co.

Steel.

(1) Journal of Congress, vol. iv. p. 32.

mining was resumed at the place by Mr. Hewitt, who, in 1847, obtained a title to the mine at a cost of $6,000, and recommenced the manufacture of Iron with Peter Cooper, Esq., of New York, and his son Edward Cooper, who built the large anthracite steam furnaces near Philipsburg, in Warren County, opposite Easton, Pennsylvania.

Philipsburg Furnaces.

Under the intelligent and enterprising direction of Cooper & Hewitt, the manufacture of iron from these ores has been among the most extensive and successful in the country. Over 200,000 tons of the ore have been used at the Philipsburg furnaces, and railroad iron, bars, wire, wood screws, and other articles of iron made by the puddling process with anthracite, have sustained the ancient reputation of the Andover Iron. The first experiments with the Bessemer process in this country were made at their works in 1856; and at the Trenton Rolling-mill of the same Company the first wrought-iron beams for fire-proof buildings are said to have been made for the United States Government.

The Andover Mine, which is in the same range with the Oxford veins before mentioned, is the centre of another cluster of mines, some of them old and celebrated, in the primary gneissoid rocks of the valley of the Wallkill and the Hamburg mountains. The principal mineral wealth of the county is embraced in a range of about four miles north and south from Sparta through Sterling to Franklin. The older metamorphic rocks of this region contain abundance of iron ore, but are chiefly remarkable for deposits of the sesquioxyd associated with the oxyds of zinc and of manganese, which, from its vicinity to the Franklin furnace near Hamburg, has been denominated *Franklinite*. This ore and the red oxyd and silicate of zinc, found in large quantities from Hamburg to Sparta, and especially at Sterling, form the most valuable body of zinc ore probably as yet found in this country. It was early observed, and a quantity of it is said to have been shipped to England as copper ore. Attempts were made just before the Revolution to manufacture iron at the place from the franklinite, but the associated metals rendered them unsuccessful. The ore is rich, containing 66 per cent. of peroxyd, or 46 per cent. of iron, 16 per cent. of zinc, and 17 per cent. of the red oxyd of manganese.

Franklinite, zinc, and Iron ore.

Franklin Furnace, one of the oldest, and, on account of its ore and iron, one of the most celebrated, was built near the franklinite bed in 1770. Having been repaired, it now runs as a hot-blast charcoal furnace, we believe, on other ores; an attempt to make iron and zinc together having failed. Iron was previously made from the ore by Mr. Edwin Post, at Stanhope, by a catalan forge, which, having been tried at the French National Establishment for the manu-

Franklin Furnace.

facture of chains and anchors for the Navy, was found to possess an absolute tenacity exceeding that of any iron ever tried. The Iron and steel made from it, said to possess superior qualities for cutlery and other uses, commanded a higher price than any other. Several companies have been formed for smelting the ore for the extraction of the zinc, and eight to ten thousand tons are now raised annually for that purpose. Shafts have been sunk to the depth of 350 feet. In view of its abundance, the beds being in some places 15 to 30 feet thick, and of its importance for the manufacture of iron, in which it works well as a corrective of red short ores, it is an important deposit. But considering also its value for the manufacture of metallic zinc, zinc white, and other paints, for which it is now almost exclusively used, it must be regarded as of great economical value. The metal has been used in the manufacture of brass for standard weights and measures by Mr. Hassler, of the United States Coast Survey.

There was formerly a furnace, now in ruins, at Hamburg, in Sussex County. A bloomery at Canistear, built in 1796, and since rebuilt, is still in operation. In the town of Newton, there were one furnace and four bloomery forges at the close of the last century.

In many parts of the neighboring Highlands, and in some other portions of the State, are veins of copper ore, of more or less value, which were explored in former times.

The most celebrated and productive of these, in colonial days, was the mine of the Schuylers, in the town of Hanover, in Hudson County. It was discovered about the year 1719 by Arent Schuyler, an early emigrant from Holland, on whose land, between the Passaic and Hackensac rivers, near Belleville, a negro servant picked up a piece of native copper, which led to its discovery. Some hammers and other tools found on opening the mine furnished evidence, however, of its having been explored by the early Dutch settlers. The ore proved extremely rich, and for some time was a source of much profit to the owner. It was transported by a short land carriage to the Hudson, and thence through New York was shipped to Bristol, England, where it sold for forty pounds sterling per ton. It was said to yield 80 per cent. of pure copper, and above four ounces of silver to each hundred-weight of cupreous metal. The richness and celebrity of this ore, according to Dr. Douglass, was the occasion of an Act of Parliament, making copper ore an enumerated article, in order to secure it to the English market. The miners originally received one-third for raising it to the surface. It was packed in quarter barrels, six of which made a ton. The amount thus exported up to 1731 was 1,386 tons. The shaft was sunk before the Revolution to the depth of nearly 200 feet. The mining was fre-

Schuyler's copper mine.

quently suspended on account of the difficulty of keeping the mine free from water by the means then in use, a capital obstacle in the mining operations of that day.

This difficulty induced Col. John Schuyler, the son of the original proprietor, about the year 1745, to engage Josiah Hornblower, an intelligent young Englishman of Staffordshire, to come to America for the purpose of erecting a steam-engine at his copper mines. This engine, which was imported in parts, and put up by Hornblower entirely to the satisfaction of his employer, continued in use for forty years or more [1] No attempt to smelt the ore appears to have been made by the proprietors of this mine.

In February, 1721, Dr. John Johnston & Co., of Perth Amboy, made public proposals to any persons who had copper or other mines upon their lands, which they were not disposed to work themselves, to rent the lands and give the owners one-sixth of the product of the mines free of all charges.

About the year 1750, Mr. Elias Boudinot, of Philadelphia, took a lease for ninety-nine years of a piece of land belonging to Philip French, Esq., within a quarter of a mile of New Brunswick, on which several masses of virgin copper, weighing from 5 to 30 pounds, had been turned up by the plow. Having taken several partners, a pit was opened in the following year in the low grounds near the river, where, at the depth of fifteen feet, they found a vein of bluish stone charged with copper, and also thin sheets, and occasionally large lumps of virgin copper between the rocks. A stamping-mill was erected, and many tons of excellent copper were extracted and sent to England.[2]

New Brunswick copper mine.

(1) This steam-engine was the third one erected in America, two others, according to the biographer of John Fitch, having been imported from England into New England forty years before the Revolution. It was probably upon the atmospheric principle of Newcomen's engine, which was at that time best adapted to such uses. The improvements of Watt had not then been commenced. The industry and genius displayed by young Hornblower in the erection of the engine, and in his knowledge of Mineralogy and other branches of natural science, secured to him unlimited confidence. He married into one of the most respectable families of the State, and lived to an advanced age in the esteem of the community. It was proposed to John Fitch, in 1786, to secure his services or those of Colles in constructing the engine for the first steamboat. Jonathan Hornblower, of Cornwall, England, in 1781 patented some improvements in the steam-engine in that country. The Hon. Josiah Hornblower died in 1809, aged eighty-eight, leaving a numerous issue.

(2) Among the importations of copper from different countries, principally Germany, Sweden, and Spain, into England in 1694, amounting in all to a little over 1,663 hundred-weight, were five hundred-weight from *America*. The product of the English copper mines, which in 1854 was 23,073 tons, was then very trifling, and the total consumption very small. Copper-mining had been nearly abandoned in England, but the scarcity produced by the war about that time caused its revival by several joint

Sheets of nearly pure copper were taken from between the rocks near the surface, and, at the depth of 50 to 60 feet, a vein of solid ore between quartz rocks. The cost of labor was, however, found too great, and the mine was abandoned. A rich vein of copper ore discovered at Rocky Hill, in the same county, was also given up for the same reason, after having been wrought for a time. Very rich deposits of copper ore near Somerville, known as the Bridgewater mine, containing considerable quantities of massive red oxyd and of the green carbonate and phosphate, as well as of native copper, was formerly wrought with spirit. Van Horne's Mountain contains numerous veins of the ore. A smelting furnace was erected before the Revolution near Boundbrook by two skillful German refiners, who made a profit by reducing the ore which the inhabitants collected upon the surface, and by partially digging in the side of the hill. The works were destroyed during the war. A shaft was also opened in the side of the mountain by a company, who obtained much valuable ore and a quantity of virgin copper. Two masses of the latter, weighing 1,900 pounds, were found in the year 1754.[1]

Bridgewater copper mine.

The Franklin copper mine, formerly wrought with some zeal, is situated near Georgetown, on the Delaware and Raritan Canal, in the same county. A shaft was sunk at that place to the depth of 90 feet.

Franklin copper mine.

In the southern part of New Jersey, the principal iron ores are the bog deposits of the greensand and tertiary formations of the seaboard. Of these the swamps and low grounds contain very large quantities. The most abundant collections are found in the cedar swamps and pine barrens on the several branches of the Little Egg Harbor river in Burlington County, whence considerable quantities were exported in the last century to New England and to Maryland to mix

Bog iron ores.

stock companies, of which the principal bore the name of Dockwra, from William Dockwra, of London, the originator of the penny-post system in that city. Mr. Dockwra was one of the Proprietaries of East New Jersey, and owned large estates on each side of the Millstone Creek, in Middlesex or Somerset counties. We are not aware whether he was interested in copper-mining in the Province, but the Dockwra Company in England produced about 80 tons of copper yearly in 1697, which was about one-half of all that was raised. It sold for £100 to £120 per ton. He is also said, about the same time, to have commenced with others at Esher, in Surrey, the first manufacture from English copper of *battry*, such as kettles, etc., and soon after a manufactory of wire for pin-making. They had then the only *brass wire* works in England, drawing by water-power, with twenty-four benches, at the rate of about one ton per week, which sold at £8 per cwt. They also made copper farthings and halfpence from Swedish copper, which had been previously used for wire-making at Esher. The domestic production of copper became equal to the demand about the year 1725.

(1) Morse's Univ. Geog.

with the cold short sand and other ores of those places. Owing to the sulphur they contain, these run mostly red short, but the marl beds in many places also contain phosphatic ores producing iron of the cold short kind.

The percentage of Iron in these, and their fitness for the forge, differ somewhat with their position in the sedimentary mass. *Loam*, *seed*, and *massive* ores are described as occupying relatively the top, middle, and bottom of the deposits. The "massive ore" forms a cake or pan at the bottom, being a honey-comb deposit of crystallized or hydrated peroxyd of iron, with its cells filled with yellow clay. It yields from 47 to 53 per cent. of metallic iron. The "seed ore" contains about 45 per cent. of iron, and the "loam" or upper portion is composed of oxyd of iron mixed with vegetable mould, at first soft and easily fluxed, but as the iron accumulates, subsiding toward the bottom. The ferruginous green-sand and marl furnish a silicious ore, which, when mixed with the bog mine, makes excellent Iron. Many furnaces were built in the last century for smelting these ores with charcoal from the pine plains, and, taken in connection with the primary deposits of the northern section, they became the principal source of wealth to the State. The anthracite iron-manufacture has caused most of the furnaces to be abandoned, or converted into founderies only.

Furnaces in Southeastern New Jersey.

On Wading River and its branches, at the eastern border of this ferriferous district, the Martha, Speedwell, and Union furnaces were fed by the ore beds of the neighborhood. The Batsto furnace, near the junction of the Batsto and Egg Harbor rivers, was known for considerable operations in the last century. It was built about the year 1766 by Charles Reed. During the Revolution it was the property of Col. John Cox, and was employed in casting cannon-shot and bomb-shells for the American army, boilers for salt-works, and a variety of other castings.

Batsto, Atsion, and Hanover furnaces in Burlington County are now out of blast, as are also Bergen furnace in Monmouth County, Weymouth furnace in Gloucester, Tuckahoe in Cape May, and Cumberland in Cumberland counties.

On Atsion river and its branches, another tributary of the Little Egg Harbor, still larger quantities of bog ore exist, from which the Atsion Iron-furnace was supplied. Several furnaces were early built also in the western part of the county. An Act of Assembly in December, 1769, invested the owners of Iron-works in the townships of Evesham and Northampton with certain privileges for their better management.

Thomas Mayberry carried on the manufacture of sheet-iron at Mount Holly in 1775. In May of that year, Congress ordered from his manu-

factory five tons of sheet-iron for the use of Thomas Bales, a blacksmith, who proposed to supply the Continental troops with camp-kettles of that material, provided he could have credit for that quantity of sheet-iron.

Sheet-iron.

Steel was made at Trenton during the Revolution, but the business afterward declined.

A nail manufactory was in operation at Burlington in 1797.

By a return made in 1784, New Jersey was ascertained to have 8 furnaces and 79 forges for the manufacture of Iron. The production of Iron in the State, about ten years later, was estimated at 1,200 tons of bar-iron, the same quantity of pig-iron, and 80 tons of nail-rods annually, exclusive of hollow-ware and various castings, of which great quantities were made. Iron in pigs and bars was exported to a large amount.

So numerous were the charcoal furnaces and bloomeries of the State, that a writer, about this date, observed that it was impossible to travel across the Province without meeting with some little Iron-forges. If a proprietor had a tract of marshy woodland which he wished to clear up, he threw a dam across the upper part where the streams entered, and there fixed the wheels for an Iron-work. In a few years, in place of a vast pond filled with green or blasted pines, well-inclosed fields and green meadows met the eye of the traveler, and the sounds of rural labor replaced the noise of the furnace and the forge-hammer.

PENNSYLVANIA.—The immense mineral resources of Pennsylvania have long been a principal source of her prosperity. The ore existing in large quantities in close proximity to the coal measures, both anthracite and bituminous, give her unequaled advantages for the manufacture of Iron, which, at an early period, became a staple product of her industry.

Campanius states that traces of Gold were found in the times of Printz, and that silver, copper, iron, and lead, with marble, jasper, emeralds, and other precious stones, were known to exist in the days of the Swedes. The discovery of the mineral treasures of the South River or Delaware Colony was enjoined upon the first Dutch Governor by the authorities at Amsterdam; and the inhabitants, as an inducement, were allowed for ten years the sole use of any valuable minerals they might discover. At Minisink, above the Kittatinny mountains, where the first European settlement of equal extent on the soil of Pennsylvania is supposed to have been made by that people on the flats on each side the Delaware, "mine-holes" and an expensive

Search for minerals.

mine road thence to the Hudson remain as the sole indications of its ancient occupation.

William Penn mentions, in a letter to Lord Keeper North, in July, 1683, "Mineral of Copper and Iron in divers places" in the Province. Gabriel Thomas, a resident of the Province from about that date, writing in 1698, states that iron stone or ore had been lately found, which far exceeded that in England, being richer and less drossy, and that some preparations had already been made to carry on an Iron-work. He also mentions copper "far exceeding ours, being richer, finer, and of a more glorious colour." "Backward in the country," he elsewhere observes, "lies the mines where is copper and minerals, of which there is some improvement made already in order to bring them to greater perfection, and that will be a means to erect inland market Towns, which exceedingly promotes traffic."

The copper and iron above alluded to, and other minerals mentioned, were probably found in Chester County, one of the first counties erected by Penn. This county included Delaware and several others, and was the seat, it is said, of the first Iron-works in the Province.[1]

The copper spoken of was doubtless on the lands of Charles Pickering, an Englishman of property, who purchased the township in Chester County which, from him, took the name of Charlestown, in which copper was mined. The proprietor was, in 1683, tried before the Council on a charge of uttering base money, which was made by one Robert Felton. The Pickering mine was situated on Pickering Creek, twenty-five miles from Philadelphia, and in 1705 belonged wholly or in part to Samuel Carpenter, a wealthy land and mill owner. It was offered for sale in 1725.

Pickering copper mine.

In 1708, William Penn wrote to James Logan to "remember the mines,

(1) Thomas mentions a variety of other minerals, as limestone, loadstone, isinglass, "and (that wonder of stones) the salamander stone, found near Brandywine, rare, having *cotton* in veins within it which will not consume in the fire though held there a long time." All these and numerous other interesting minerals are found in that county. The tremolite above referred to is found in two varieties, asbestos and amianthus, in the talcose rocks of Goshen and other towns. He noticed the runs of water to have the same color as those which issued from the *coal* mines in Wales. Among the tradesmen and artificers already established in the infant city, which was destined to be the great seat of manufactures, were several workers in metal. Silversmiths received from half-a-crown to three shillings an ounce for working silver, "and for gold equivalent." There were braziers, pewterers, cutlers, gunsmiths, locksmiths, nailers, file-cutters, watch and clock makers, and, most useful of all, blacksmiths. One of the last named, his next neighbor, he states, earned with his negro man 50 shillings a day, by working up 100 lbs. of iron at 6*d.* a pound, the common price. In the accounts of Penn, Cæsar Griselm is mentioned as a goldsmith. D. Vaughn, a watch-maker, and Francis Richardson received £2 for a pair of Buckles for Lætitia.

THE STATE HISTORICAL SOCIETY OF WISCONSIN
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1846

which the governor makes yet a secret even to thee and all the world but himself and Michell, pray penetrate that matter, and let us see the oare in as large a quantity as thou canst." Oldmixon, who published the same year, mentions the deposit of iron ore called Iron Hill, in Newcastle County (now Delaware) between Brandywine and Christina, and that samples of most kinds of ore had been obtained in every county.

Sir William Keith had Iron-works in that county, erected previous to 1730, and probably during his administration from 1717 to 1726. In his scheme for the government of the Colonies addressed to the king in 1728, he stated that the Colonies were then in a condition, with a little encouragement, to supply England, among other things, with as much copper ore and pig and bar iron as she might need.

In July, 1718, Jonathan Dickinson mentions in a letter that "the expectations from the Iron-works forty miles up Schuylkill are very great."

Coventry Iron-works.

The reference here was probably to the Coventry forge on French Creek, in Coventry township, Chester County. This bloomery was built by a person named Nutt, who made other large improvements at the place. It is said to have gone into operation about the year 1720, and to have made the first iron manufactured in Pennsylvania.[1] The manufacture of Iron was carried on there after the Revolution by Col. Philip Benner, who subsequently erected the first forge in Centre County. Having probably been rebuilt, this bloomery is still in operation with three fires and one hammer driven by the water-power of Rock Run.

A forge is also mentioned, in March, 1719–20, at Monatawnoy, then in Philadelphia, but now in Berks or Montgomery County. It was attacked by the Indians in 1728, but they were repulsed with great loss by the workmen.

In 1723, the proprietors of Iron-works in the Province petitioned the Assembly to prohibit the retailing of liquors, except cider or beer, near their works to the workmen.

In 1728, Mr. Logan wrote that there were four furnaces in Pennsylvania in blast.[2] One or more of these were within the present limits of Lancaster County, which was set off from Chester in the following year. The mineral wealth of that fine county has been industriously improved by the thrifty German population from that time to the present, and many of the descendants of its early families are still identified with its extensive iron-manufactures.

Furnaces in 1728.

The first Iron-works in the county is supposed to have been built by a person named Kurtz, in 1726. The enterprising family of Grubbs com-

(1) Day's Hist. Coll. of Penna., 224. (2) Watson's Annals, ii. 426.

menced operations in 1728. In a petition from some of the inhabitants to the Council in January, 1736–37, praying for a road from the borough to the Coventry Works on French Creek, they ask that one branch of it may go to the new furnace called Redding's, then erecting on the same creek.[1] The last-named furnace was owned by a company consisting of William Branson, who was, a few years later, the proprietor of a steel-furnace in Philadelphia, a Mr. Vanleer, and others. It is said to have been abandoned ultimately for want of ore. Many of the surface deposits of brown and other hematitic ores in the limestone valley, west of the Schuylkill, are not very extensive, but have nevertheless employed many furnaces in Eastern Pennsylvania. The Warwick, Cornwall, and Chestnut Hill ore beds in Berks, Lebanon, and Lancaster counties, have been long wrought, and yield each several thousand tons yearly. The Warwick was mined in colonial times, and is worked as an open quarry over several acres, and by a shaft 180 feet deep. The Chestnut Hill mine also covers ten or twelve acres, and has a shaft of 100 feet. Many smaller banks are worked in the slate and limestone basins of those counties, and supply hematite ores of different kinds. Some copper is found in the Warwick. The Warwick charcoal blast-furnace, on the south branch of French Creek, was built in 1736. It was somewhat larger than the ordinary size of such furnaces at the present day, and, having been reduced from 9 to 7½ feet in the boshes, and consequently in its make of iron, is still running in other respects unchanged. It produced in 1857, from ore of the Warwick and neighboring mines, 759 tons of boiler-plate iron. In 1776, the Warwick and Reading furnaces were engaged in casting cannon for the State. These furnaces were blown by long wooden bellows, propelled by water-wheels, and when in blast made 25 to 30 tons of iron per week. The famous Cornwall cold-blast furnace, in Lebanon County, was built about the year 1742 by Mr. Peter Grubb, of Chester County. It was of the same size as the Warwick furnace, and still remains in active use of its original size. Its stack was 32 feet high, 21½ feet square at the base, and 11 feet at the top. Its bellows were 20 feet 7 inches long, 5 feet 10 inches across the breech, and 14 inches at the insertion of the nozzle. Having been blown three years by the owner, it was, in 1745, leased for twenty years, along with the Hopewell forge, which belonged to Mr. Grubb, to twelve persons, who managed it, for a few years only, under the name of the Cornwall Company. For the remainder of the term it was conducted by Jacob Giles, a Quaker gentleman of Baltimore. At the expiration of the lease, Mr. Grubb managed it until

Redding and Warwick Furnaces.

Cornwall furnace.

(1) Colonial Records.

1798, when it became the property of Robert Coleman, who realized a very large fortune from it. All its late owners are said to have become wealthy. Mr. Grubb resided at the Hopewell forge, which was also a very profitable concern, and remained, some fifteen years ago, still the property of the family. Mount Hope charcoal furnace, six miles south of Lebanon, in Lancaster County, was built in 1785 or '86 by Peter Grubb, Jr. Having been several times rebuilt and reduced in size, it is still owned by the Grubbs, who are also the proprietors and managers of several others in the county. This furnace yielded from 800 to 1,000 tons of pig metal per annum, which is about its present production. The price of pig-iron in 1780 was £300 Continental currency, and in 1789 £6 10*s.* Pennsylvania money, equivalent to $17.33\frac{1}{3}$. In 1800, when pig metal was worth £10 per ton, or $26.67\frac{2}{3}$, Henry B. Grubb built the Mount Vernon furnace on the Conewago, which produced from 50 to 52 tons of good pig-iron weekly, or about 2,800 tons per annum, by a continuous blast without blowing out. This was recently using the hot-blast, and has the same owners as the last, but stopped in 1852.

Mount Hope furnace.

The books of the Hopewell forge, preserved since the year 1765, exhibit, it is said, an accurate knowledge of the business, and an economy of management and productiveness which compare favorably with its present results. From this and other evidence, Mr. Thomas Chambers, a well-informed and experienced iron-master of Pennsylvania, from whose account we have drawn many of the foregoing particulars, was convinced that our early iron-manufacturers, even before the separation, introduced into the business as much skill as prevailed at that time in England, and that their furnaces, in 1788, were in size and construction not much inferior to many charcoal furnaces of the present day. The abundance of wood, obtained at a merely nominal cost in the process of clearing the lands for tillage, was an important element in the cheap production of pig-iron. The ores which supplied these furnaces principally belonged to the belt of primary magnetic ores, which, extending from Maine to Georgia, occupy vast areas, and have fed a multitude of furnaces, some of them, as we have seen, among the oldest in the country, in several of the New England States, in New York and New Jersey. Entering Pennsylvania near Easton, these ores occupy, in a much smaller extent, the gneissoid formation of the South mountain range, whose rugged hills were everywhere clothed with dense forests, requiring only the cost of felling and charring. The most abundant deposit of the magnetic ore in Lebanon County is at the Cornwall mine, which is also one of great richness. This vast body of ore furnishes, according to Professor Rogers, 70 per cent. of

Hopewell Forge.

Cornwall mine.

iron. This mine also affords frequent specimens of copper, and now yields iron ore at about 10 cents per ton. With ore of this quality, or the argillaceous oxyd and hematite of the limestone and slate basins of the Schuylkill and its branches, aided by ample water-power and fuel at hand, and labor at a moderate cost, the early German settlers were able, by frugality and industry, and a fair practical knowledge of the business, to make good iron at a remunerative price, and to establish the early reputation of Pennsylvania in this department of industry.

At Colebrookdale, a few miles west of the Cornwall ore hill, a large charcoal blast-furnace was erected in 1745. As the property of one of the Colemans it is still in use. It uses the Cornwall gray magnetic ore, which then supplied the Mount Hope and several other works; and at this time all the furnaces on the Schuylkill and Susquehanna use it mixed with the hematites. This ore bed is owned by different persons, and is worked as an open quarry.

Elizabeth furnace, fourteen miles north of Lancaster, near Litiz, was built about 1756. It was at one time owned by Benezet & Co., of Philadelphia, and was managed by one of the proprietors, Henry William Steigel, of that city. Steigel was a German baron of some property and much skill and enterprise in the mechanic arts, but was too speculative and pretentious for the times. At the village of Manheim, in Lancaster County, which he founded in 1762, he erected large glass and iron furnaces. At this place, and near the Elizabeth furnace, he built castles or towers, and mounted them with cannon, which were discharged on his visits to the country as a signal for his friends to assemble, and for his workmen to quit the smoke and labors of the furnace to wait upon his guests with music and other feudal accompaniments. One of these, near Shaefferstown, is still pointed out as "Steigel's Folly." Becoming involved, and cut off from his resources in Europe by the war, his property passed into other hands. He afterward superintended the Iron-works of Mr. Robert Coleman, one of the most extensive and successful iron-masters of that day, who became the proprietor of Elizabeth Furnace. This furnace is still owned by one of the family, which has been extensively connected with the iron interests of Pennsylvania for more than a century. It was abandoned four years ago for want of wood, having made, the previous year, 1,424 tons of pig metal by steam and hot blast.

Elizabeth Furnace.

Some of the first stoves cast in this country were made by Mr. Steigel, relics of which still remain in the old families of Lancaster and Lebanon counties.[1] The Speedwell forge, six miles from Litiz, in Lancaster

(1) These were probably the same as the "Jamb stoves" made by Christopher Sower, of Germantown, some of which were cast at or near Lancaster. They were, it is prob-

County, now abandoned, was built in 1750, and one in Martic township, still used with the addition of a steel-furnace, in 1755. Windsor forges on the Conestoga, twenty miles northeast of Lancaster, are still older, having been built in 1745, and since rebuilt. Several others were erected on that stream during the next fifty years, viz., Poole forge, near the Speedwell, in 1760, and Spring forge, three miles from the former, in 1793. Brooke forge, on the Pequea, dates from 1795, and Newmarket forge, in Lebanon County, is of the same age. Sally Ann charcoal blast-furnace, on the Tacony, five miles south of Kutztown, was first blown in 1791; the Joanna, on Hay creek, in 1794; and Mary Ann furnace, eight miles southwest of Trexlerstown, in 1797.

Steigel's stoves.

In 1786, there were, within thirty-nine miles of the borough of Lancaster, 17 furnaces, forges, rolling and slitting mills, and, in or near it, two boring and grinding mills for gun-barrels. In 1798, the county contained 3 furnaces and 11 forges, making about 1,200 tons of pig and nearly the same amount of bar iron annually.

Copper ore is said to have been found in Mine ridge in this county, and the remains of an ancient shaft shows it to have been mined either by the French or by early settlers of Maryland not later than the time of Penn. In Chiques ridge, near Columbia, traces of gold were once met with.

Governor Morris, of New Jersey, in a letter to Thomas Penn, in May, 1755, speaks of the copper mine at the Gap, in Lancaster, in which Penn, Mr. Allen, and others were interested, and that the company thought it could be advantageously worked by the help of a fire-engine such as the Schuylers had erected at great expense at their mine in New Jersey. Mr. Morris was in treaty for some small shares, and proposed to lease the proprietary's share, to which he as-

Gap copper mine.

able, the first stoves cast in America, and are described as similar in construction to the box form of the old *ten plate* stoves which superseded them, but they were without a pipe or oven. They were set in the side or "jamb" of the kitchen fire-place, and passed through the wall so as to present the back end in the adjoining room. This, though often red hot, but imperfectly warmed the rooms, which, though small, were less impervious to cold air than those of the present day. Dr. Franklin published, in 1744, with a copper-plate illustration, an account of the open stove, or "newly invented Pennsylvania Fire place, &c," which bears his name. It was afterward improved by Count Rumford, a native of New Hampshire, who also investigated the subject of heating houses by steam conveyed in metal pipes, which, about the middle of the last century, was proposed by William Cook, of Manchester. Our hardy ancestors, however, depended little on stoves, which were not in general use in dwellings until near the present century, and still later in churches. Cannon stoves were, in 1782, provided as an article of luxury for Christ Church, Philadelphia. The *air-tight* stove is said to have been invented by Isaac Orr, of New Hampshire, who died in 1844, at the age of fifty.

sented, but declined to sell. Mr. Morris believed the vitriolic water of the mine could also be turned to account. This mine was discovered by a German named Tersey, about the year 1732, and a grant of the land was made by John Penn to Governor Hamilton and others. An account of the copper springs was in 1756 communicated by John Rietty, M. D., to P. Collinson, of the Philosophical Society of London, and published in the 4th Volume of the Transactions of the Society, Part 2, page 648. The mining operations were discontinued after a few years for want of an engine to drain them. In 1797, proposals were issued in pamphlet form by Benjamin Henfrey to work mines in the United States, in which this was included. It was reprinted a few years since by those interested in the mine, which a new company was, in April, 1851, chartered to work.[1]

On the Manatawny Creek a forge appears to have been very early erected, and others were built on that and the Perkiomen before the Revolution. Green Lane forge on the latter, twenty miles north of Norristown, now owned by Mr. Schall, was built in 1733, and Glasgow forge, on the former, just within Berks County, in 1750. The Oley charcoal-furnace and Oley forge on the same creek, near Princetown, were set up, the furnace in 1770 and the forge in 1780; and Mount Pleasant forge, fourteen miles north of Pottstown, in 1799. These were all recently in operation.

Philadelphia County.

Two bloomery forges were also built in Rockland township, Berks County, six miles southeast of Kutztown, one in 1788 and the other in 1790, and are still in use, as are the two District forges on Pine Creek, in Pike township, built in 1799 and 1800. Berks County had in 1798 six furnaces and as many forges, several of which were in Reading.

Berks County.

Pottstown, at the junction of the Manatawny with the Schuylkill, derives its name from John Potts, a large land-owner at that place, and an enterprising proprietor of Iron-works in Chester and Berks counties. He was a descendant of one of the early settlers of Burlington in the days of Penn. The ancient forge at the entrance of Valley Creek into the Schuylkill, which gave the name of Valley Forge to the memorable glen around which Washington established his winter quarters in the darkest period of the Revolution, was owned by him and afterward by his son, Isaac Potts, whose stone house was the General's head-quarters. The forge has long since disappeared, and a cotton factory stands near its site. The family of its proprietor has had a long connection with Iron-works in the Province. There were anciently, we believe, forges at

(1) Pennsylvania Archives, ii. 311.

Yellow Springs, which have also disappeared. The Cheltenham Rolling-mill of Rowland & Hunt, on Tacony Creek, was established in 1790.

In addition to the very early Iron-works in Chester County, already mentioned, and probably others, a rolling and slitting mill, which was, no doubt, the first in the Province, was built in 1746 in Thornbury township by John Taylor, and was in operation from that time to 1750, when a particular account of such establishments was called for by Parliament.[1]

First rolling-mill.

A bloomery forge was erected on the north branch of the Brandywine, two miles north of Downingtown, in 1785. It is still in use, and is known as the Mary Ann forge. Springton forge, five miles north of it, on the main branch, was built five years later; the Hibernia forge (and rolling-mill), four miles north of Coatesville, on the west branch, in 1792; and Rokeby rolling-mill on Buck Run, four miles south of Coatesville, in 1795. Chester County had, three years later, six forges, estimated to make about 1,000 tons of bar-iron annually.

In Bucks, one of the three original counties established by Penn in 1682, a furnace and forges are said to have been erected between the years 1692 and 1743, by a company who purchased a large tract of land at Durham, within the limits of the famous "Indian Walk." The ore of the Durham and Easton hills, coming within the range of the primary belt of the South Mountain, is chiefly a magnetic oxyd, occurring in lodes or veins, in some places of considerable thickness, in gneissic and quartz rocks. At the junction of the primary with the sand and limestone formations, brown hematite and argillaceous ores also occur in sporadic form, which, for some time, were the chief dependence of furnaces about the "Forks" of the Delaware. The old Durham mine, on the hill south of Durham Creek, as well as the old furnace have been long abandoned, although the ore and iron are both said to have been of excellent quality. It is not known whether a de-

Durham mine.

(1) Pennsylvania Archives, ii. 57. This was the only establishment of the kind returned by the sheriffs of the counties under oath, in obedience to the proclamation of Governor Hamilton, made on 16th August, 1750, in conformity with the Act of Parliament requiring certificates of all rolling or slitting mills, plating forges, and steel-furnaces erected in the Colonies previous to June 24 of that year—an Act which met with much opposition in Pennsylvania and Massachusetts.

The Sheriff of Philadelphia County returned one plating forge to work with a tilt-hammer, which was in Byberry township. It was the only one in the Province, and belonged to John Hall, but had not been in use for twelve months. In the same county were two steel-furnaces, those of William Branson and Stephen Paschal, both in Philadelphia. Paschal's furnace was built for that purpose in the year 1747, on a lot at the northwest corner of Eighth and Walnut streets.

ficiency of ore, its hard and obstinate character, or a want of fuel caused the mines to be neglected. The present Durham steam-furnace, and the Philipsburg, Crane, and other large steam-furnaces on the Lehigh, now use anthracite, which more easily and cheaply overcomes the resistance of the compact, primitive ores of the neighborhood, and those of central New Jersey, where most of the companies also have mines of magnetic ore, which they combine with the brown hematite of the Lehigh valley.

Durham boats.

For the transportation of their iron and agricultural produce to market, in early times, a species of flat-boat or barge was contrived at Durham, about the year 1750, and thence known as the "Durham boat." These were about six feet long, eight feet wide, and two feet deep, and with fifteen tons freight, drawing only twenty inches of water. They carried two sails, and were manned by five men, and in the navigation of the Delaware, Susquehanna, and other rivers, were of much service until the State provided other means of transportation. Pig-iron was thus conveyed from the Forks to Philadelphia for twenty shillings a ton, wheat at 7*d.* a bushel, and flour at 2*s.* 6*d.* a barrel.

Chelsea forge.

At the Chelsea forge at Easton, the price of Iron in July, 1778, as appears by a letter from Robert Levers, was £200 per ton, an advance of 100 per cent on the price paid by the State a short time previous. In the following January, the same person informed the Council that bar-iron could probably be sold to blacksmiths in his neighborhood for £300 per ton. It was stated, about the same time, that iron-masters could give one ton of bar-iron for four of disabled guns, or old iron, delivered at Chester on the Delaware.

York County.

In York and Cumberland Counties, west of the Susquehanna, furnaces and forges began to be erected for smelting the primary ores at the base of the South mountain, previous to the Revolution. Spring forge in York County, built in 1790, had two fires and two hammers, but is now abandoned. In the same year, the Pine Grove hot-blast charcoal furnace, of large size, and still productive, was built on Mountain Creek, a branch of the Yellow Breeches, fourteen miles southwest of Carlisle, in Cumberland. It is fed by brown hematite, obtained near it. An establishment, called the Carlisle Iron-works, was, about that time, managed by Mr. Thomas James, afterward in charge of a forge in Virginia. Holly hot-blast furnace, on the same stream with the Pine Grove, but several miles below, was set up in 1795, but has given place to a paper-mill. Cumberland cold-blast furnace, on the main creek, four miles nearer Carlisle than Pine Grove, was erected in 1794. It used hematite ore from Dillston, near the York County line, where a prolific vein exists.

Cumberland County.

William Denning, a blacksmith of Cumberland County, during the Revolution endeavored to serve his country by the construction of a wrought-iron cannon of curious description. One of these is said to have fallen into the hands of the British, at the battle of the Brandywine, and to be preserved in the Tower of London, as a monument of his ingenuity and patriotism, and another unfinished specimen in the Philadelphia Arsenal.[1]

Curious cannon.

The first furnace built in Franklin County was the Mount Pleasant furnace, in the Path Valley, four miles south of London. It was erected soon after the peace of 1783, by three brothers, William, Benjamin, and George Chambers, sons of Col. Benjamin Chambers, from whom the county seat of Cumberland derives its name. The elder Chambers, with four brothers of the Scotch-Irish stock, more than fifty years before adventured as Pioneers of the Conocheague settlements. He is said to have had his dwelling burned soon after his settlement on the present site of Chambersburg and during his temporary absence, for the sake, as it was afterward ascertained, of the nails it contained, few of the houses, at that time, having any such article about them. The village was, many years after, almost the frontier settlement, and even at the time his sons erected the forge, all the nails, mill irons, iron

Franklin County.

(1) These singular pieces of ordnance were made "of wrought iron staves, hooped like a barrel, with bands of the same material, excepting there were four layers of staves breaking joint, all of which were firmly bound together, and then boxed and breeched like other cannon." An obituary notice of Denning, who died in Mifflin township, in 1830, at the age of 94, states that he was an artificer in the revolutionary army, and that his was the "only successful attempt ever made in the world to manufacture wrought-iron cannon, one of which he completed in Middlesex, Pennsylvania, and commenced another, and larger one, at Mount Holly, but could get no one to assist him who could stand the heat, which is said to have been so great as "to melt the lead buttons on his clothes." The British, it is added, offered a stated annuity, and a large sum to the person who would instruct them in the manufacture of that article, but the patriotic blacksmith preferred obscurity and poverty in his own beloved country, though the country for which he had done so much kept her purse closed from the veteran soldier, until near the close of his long life. Barber & Howes, Hist. Coll., N. J.

A Mr. Wheeler of Philadelphia, afterward engaged in the manufacture of lanterns for light-houses, and work for sugar-mills, etc., also made wrought-iron cannon, during the war, "of a new construction, invented by him."

A still rarer specimen of field artillery was exhibited at Fort Henry, on the Wheeling creek, in 1777. A large party of Indians, soon after nightfall, advanced within sixty yards of the fort, with a hollow maple log, converted into a field piece, by plugging one end with a block of wood, and encompassing it from end to end with iron chains, from a blacksmith's shop, to give it strength. It was heavily charged with powder, and filled to the muzzle with bits of stone, slugs of iron, etc., and was carefully leveled at the gate of the fort. On applying the match it burst into fragments, killing and wounding several of the Indians, who manifested their disappointment in a loud yell.—*American Pioneer*, ii. 311.

wares, and household utensils, were transported from the seaboard to these, and more remote western settlements, with the salt, groceries, and other necessaries, at much expense, upon pack-horses, over the rugged steeps, and through the wild gorges of mountains infested by hostile Indians, and more civilized freebooters. Chambersburg lay upon the route from Philadelphia and Baltimore to the west, and was a depot for Indian traders, with whom guns, hatchets, and iron-wares of various kinds were important articles of traffic. Hence the value of such enterprizes as the erection of furnaces and forges near the frontiers may be conceived. The brothers, by means of the furnace and a forge at the same place, established a considerable manufacture of Iron there. The works were destroyed in 1843. Col. James Chambers, the elder of the brothers, who had served in a military capacity throughout the Revolution, also erected, soon after the war, a forge at Loudon, and with his son-in-law, A. Dunlap, Esq., established a furnace about one mile distant; both of which were demolished in 1840. There has been a succession of iron masters in the same family to the present time. Soundwell forge, sixteen miles from Chambersburg, was built in 1790, but is now abandoned.

The carbonaceous and fossil iron ores of the coal basins north of the Blue mountains, now become so important from their juxtaposition to mineral fuel, began to be developed during the latter half of the last century. In the valuable tables of Mr. Lesley's recent manual on the iron manufacture,[1] the Maria forge, on Pohopoco creek, three miles north of Weissport, Carbon County, is mentioned as having been built as early as 1753. Having been rebuilt, it is still doing good service. At that date, the wild valleys of the Lehigh were the recent Indian missionary ground of the Moravians, who made the first settlements in the country only seven years before. Their hamlets soon after experienced the merciless inroads of hostile and alienated tribes in the French interest, who hovered on all the western and northern frontiers, rendering them most unpromising fields for any industrial enterprises.

Middle Pennsylvania

The principal mineral wealth of Carbon and the adjacent counties, lies in the exhaustless riches of their anthracite coal fields, which were discovered about the year 1791.[2] In 1826, a furnace

Anthracite coal.

(1) The Iron Manufacturer's Guide, etc., by J. P. Lesley, Sec. of the American Iron Association, and published under the authority of the same. We are indebted to this volume for many particulars respecting the ores and iron-works mentioned in this chapter.

(2) This most important event in the industrial history, not only of Carbon Co., but of the Union, and one especially affecting the iron-manufacture, is said to have been the accidental discovery of a solitary hunter, Philip Ginter. Returning late, after a day of fruitless hunting in the autumn of 1791, to his cabin on the hills, while crossing the Mauch Chunk

was built or refitted, at Mauch Chunk, to smelt iron with this coal. But, like many other earlier and later attempts, did not succeed. The first experiment in this country which fully established the practicability

mountain he stumbled upon a black substance, which, from traditionary accounts, he suspected to be "stone coal." Having shown it to Col. Weiss, residing at Fort Allen, it was by him submitted to the examination of several persons in Philadelphia, and in the beginning of the following year, John Nicholas, Michael Hillegas, and Charles Cist of the city, with Mr. Weiss, associated themselves by the name of "The Lehigh Coal Mine Company," and, without a charter, took up several thousand acres near the spot, but did not open the mine. The coal was, however, used by blacksmiths to some extent, until 1806, when an ark load of two or three hundred bushels was taken to Philadelphia by Mr. William Turnbull, the proprietor of a western furnace, and sold to the water-works for the use of the Centre square steam-engine, but it was discarded as unmanageable. During the war of 1812, when bituminous coal was at a high price, the mine was opened by J. Cist, C. Miner, and J. H. Chapman, but was again neglected at the close of the war, when the price of coal declined. The mines were then leased to different persons. About the same time, some cart-loads of anthracite from the Schuylkill valley, where it had been discovered, and also used as early as 1795, by a blacksmith named Whetstone, but vainly recommended to public attention, were brought to Philadelphia by Messrs. Shoemaker & Allen. The owner narrowly escaped prosecution for swindling by those who had made unsuccessful trials of the "stone." A more successful attempt was made by Messrs. Bishop & Mellon, at their rolling mill in Delaware County, and White & Hazard, proprietors of a wire-mill at the Falls of Schuylkill, hearing of their success, tried a cart-load, but could not raise a heat. Having tried a second load, with no better success, the workmen closed the furnace and went away. One of them, returning accidentally soon after, found the furnace in a white heat. The men were summoned, and four parcels of iron were heated and rolled without renewing the fire. The plan of "letting it alone" was repeated, with like success, and its utility became thenceforth established.

Dr. Thomas C. James, of Philadelphia, employed it as fuel from the year 1804, and was one of the first to use it for that purpose, and to recommend it to others in the city. Anthracite had, however, been used several years before the Revolution, in smiths' forges in Wilkesbarre, and a grate for burning it in dwellings was devised by Judge Fell, of that place, in 1808. But O. Evans preceded both with the "luminous" grate stove for coal, with talc lights, patented in 1800.

Some early attempts were made by Mr. J. P. Wetherell, at his lead works in Philadelphia, to generate steam from anthracite, but without much success. It was first accomplished, it is said, in 1825, at the Phœnixville Iron-works, in Chester County.

For the development of this most important branch of her mineral resources, Pennsylvania early projected the construction of her system of internal improvements. The practicability of uniting the Schuylkill and Susquehanna rivers, was first suggested, it is said, by William Penn, in 1690, before any such thing as a canal or turnpike existed in England. The measure was also urged by Drs. Rittenhouse and Smith, who, as early as 1762, surveyed and leveled a route for a canal between the Swatara and Tulpehocken creeks. Robert Morris, Robert Fulton, Matthew Carey, and many other eminent citizens afterward used their influence to the same end. The canal company was not incorporated until 1791, and another the following year, which two were united in 1811, as the Union Canal Company, authorized to extend their work from Philadelphia to Lake Erie. The work, which was completed about 1828, covers a part of the route surveyed 65 years before, and the first ever surveyed in the colonies.

of employing anthracite in the manufacture of iron, was made in the Pioneer hot-blast steam-furnace of Mr. William Lyman of Boston, at Potts-

First Anthracite Iron.

ville, in Schuylkill County, built in 1837, about the time that the numerous attempts made in England and France resulted in the success of Mr. George Crane, of the Gniscedlyn Iron-works, in South Wales. The Pioneer furnace was managed by Mr. Lyman and Benjamin Perry, an experienced and skillful English furnace manager, acquainted with the operations of Mr. Crane, aided by Mr. David Thomas, now, or recently, of the great Crane Works on the Lehigh. It was blown in early in October, 1839, and a continuous blast of ninety days, with pure anthracite and argillaceous ore alone, without any old metal, wood, or charcoal, except in the first ignition, secured to the proprietor a premium of $5,000, subscribed by citizens of the State. In October of the same year, Messrs. Baughman, Guiteau, & Co., had in operation, at Mauch Chunk, a furnace making iron, which they were selling at $18 per ton, which about paid the current expenses of the furnace. These successes, occurring at a time when this country was importing annually from ten to twelve millions worth of Iron, with an increasing demand for railroad iron, excited unusual expectations of profit and general benefit among all classes. Deposits of Iron were everywhere sought for, and other furnaces were built to use the anthracite. The Lehigh Coal & Navigation Co. offered a premium for the discovery of iron ore upon their lands, by allowing any who found it to make use of the same for five years, at ten cents per ton. Early in the following year, Messrs. Biddle, Chambers, & Co., built, upon the same principle, one or two of the extensive furnaces of the Montour Works, at Danville, and soon after, the large furnaces of Reeves & Whitaker, at Phœnixville, were altered to make use of anthracite.

In Luzerne County, where this description of coal was earlier found and employed by smiths and others as fuel, a bloomery forge was built

Luzerne County.

about the year 1778, on the Nanticoke creek, near the lower end of the Wyoming Valley, by John and Mason F. Alden. It contained a single fire and one hammer. The hammer was carried on a wagon from Philadelphia to Harris' Ferry (Harrisburg), and thence up the north branch in a boat, at no little expense and trouble. The bar-iron made from ore obtained in the township of Newport, was of superior quality, and

The Lehigh Company, and Lehigh Navigation Companies were formed in 1818, and united under one charter in 1822, and were the foundation of the Lehigh Coal & Navigation Company.

The Railroad, four miles long, to the Summit mines at Mauch Chunk, completed in three months, in 1827, was the first in the United States, except one at Quincy, Mass. The Reading Railroad, and other internal improvements of later date, and high cost, prove alike the value of her mineral wealth, and the public spirit of her citizens.

was, for some time, the sole dependence of smiths in the valley. The Iron was sold by the proprietor, Col. W. Lee, in 1828, shortly before the works were abandoned, at $128 per ton of 2,000 lbs. Another bloomery forge was erected on Roaring brook, near Scranton, in 1789, by Dr. William Hooker Smith, and James Sutton. It continued to make bar-iron and blooms from the carbonate ores of the Lackawanna valley, until 1828.

First use of anthracite.

The first use of the anthracite coal in a forge fire or grate, appears to have been made at Wilkesbarre, in the Wyoming coal basin. In a communication to Silliman's Journal, by Judge Jesse Fell, dated May, 1830, it is stated that, as early as 1768 or 69, this coal was first used in a smith's forge, and that it continued to be used by blacksmiths in the neighborhood, from that time. His informant was Judge Obadiah Gore, an early Connecticut settler of Wilkesbarre, by whom it was first employed in that way. Mr. Fell also made use of it, he says, about the year 1788, in a nailery, and in 1808, contrived a grate for burning it as fuel in his house, in which he believes he preceded all others.

Ores of central Pennsylvania.

Throughout the range of counties in Central Pennsylvania, from the Delaware to the Maryland line, a variety of iron ores are met with, in deposits or outcrops, in the limestone and shale valleys between the numerous ridges of hills. Brown hematite, red fossil ore, and the argillaceous oxydes in a variety of forms and qualities, bog-ores and ochres, etc., in connection with mineral and vegetable fuel, are the basis of a staple industry of these fine valleys, which are also rich in agricultural resources. In Montour's ridge, in the neighborhood of Danville, through Northumberland and Union Counties, red fossiliferous ore, both of the hard and soft varieties, is abundant, and, with the coal in its vicinity, supports a large number of anthracite furnaces, some of them the most extensive in the Union, in addition to many charcoal furnaces, producing Iron of superior quality. These ores consist principally of the peroxyd associated with oxyd of manganese, alumina, silica, and occasionally carbonate of lime or magnesia, and yield from 22 to 60 per cent of metallic iron. The Juniata valley, in the neighborhood of Lewistown, is rich in these descriptions of ore, and has long been noted for the quantity and quality of its iron. At the base of Tussey's mountain, and in other situations in Huntingdon and Mifflin counties, fossil ore is met with in several places.

Franklin lead mine.

Huntingdon County, now extensively engaged in the manufacture of Iron, appears first to have attracted attention to its lead ores, in the Bald Eagle or Sinking Spring valley, between Canoe and Warrior ridges. There is evidence of extensive explorations having been made in the valley at an early period, probably by the French, whose

object was the discovery of precious metals. Some of the first permanent settlers were also engaged in the same pursuit.

During the scarcity of lead, in 1778, General Armstrong informed President Wharton, that Mr. Harman Husbands, a Member of Assembly, had knowledge of a mine of lead, near Frankstown, on land formerly surveyed for the Penn family Within a month or two, Col. Roberdeau, and a company, encouraged by the State, undertook to work the mines, and immediately erected a large fort of logs and a furnace, at what was called the upper mine. Several regular shafts were sunk to some depth, and levels driven in, and a considerable quantity of rich ore was obtained. A quantity of lead was extracted, of which we find an order from Col. Roberdeau, in May, 1779, for 500 lbs., for the use of the State. The most productive vein was opened a mile nearer Frankstown than the fort where they first sunk a shaft. But fear of the Indians, who infested the neighborhood, and the intrusion of water into the mine, soon caused the business to be abandoned. The lower mine, a mile from the Little Juniata, in the same valley, was worked some years after, by a Mr. Sinclair, a Scotch miner, from the neighborhood of the Carron Iron-works, but was given up on account of the richer discoveries of lead in the West.

A few hundred yards from the fort, a remarkable bog of iron ore was found, some of which was used in fluxing the lead ore and yielded a malleable metal. But along the Bald Eagle ridge near Frankstown, and at other points the fossiliferous ore crops out and supplies many charcoal and coke furnaces in the iron region of the Juniata.

The first air-furnace or foundery erected in Western Pennsylvania, is said to have been the Bedford furnace, in Aughwick valley, four miles south of Shirleysburg. It has long since gone to ruins, and the town of Orbisonia has been laid out upon its site. But other furnaces and forges have taken its place, to an extent which renders this one of the most important iron regions of the Union, both on account of the quantity and quality of the iron manufactured. The Huntingdon Furnace, which has been the parent of many others, was built in 1795–6, about a mile above the present hot-blast charcoal furnace of that name, by a company composed of Judge Gloninger, of Lebanon, George Aushutz, of Huntingdon, Peter Shoenberger, of Alleghany Counties, and Martin Dubbs, of Philadelphia, who commenced with a small investment in fifteen acres of land, one horse, and a pair of oxen. The original site proved to be a bad one, and a second furnace was erected at the present location. It was managed with that care, economy, and skill which everywhere enabled the Germans to achieve success with the most slender resources. From the proceeds and profits

First furnace in Western Pennsylvania.

of this furnace, in time arose the Tyrone Iron-works, consisting of two forges, built in 1804, rolling-mill, slitting-mill, nail-works, saw and grist mills, with large bodies of farm and woodland attached. The Tyrone forges again produced the Bald Eagle charcoal furnace, and a forge on Spruce creek. The Coleraine forges, three in number, three miles southeast of Spruce creek, belonging to the same owners as the last, were built in 1805, and the two Barre forges on the little Juniata, in 1800. The county, which then included Blair, had, in 1810, four furnaces and six forges, which were increased, in 1837, to sixteen furnaces, and twenty-four forges, and one rolling-mill, making 13,750 tons of pig-iron, and 9,309 tons of blooms annually. The Elizabeth furnace, in Blair County, is said to have been the first in the country to use gas for the production of steam.

Centre County.

The first forge in Centre County was built about the year 1790 by General Philip Benner, who, for several years following the war of Independence, carried on the manufacture of iron at Coventry forge in Chester County, and in 1790 purchased the present site of Rock furnace in Bellefonte. To the first forge he subsequently added a second forge, a furnace, and a rolling-mill, and by his example stimulated his neighbors in the development of the rich mineral wealth of the county. As all the supplies for such undertakings could only be obtained by the most slow and expensive mode of *packing*, or by carriage over almost impassable roads, and his iron had to be conveyed in the same way to the eastern markets; he conceived and carried out the idea of a communication with Pittsburg, and thence of supplying the Western Valley with Iron and nails. For several years he enjoyed without competition the trade in what he designated "Juniata Iron." He thus opened up a market that has become one of immense importance to a product which, under its original name, has obtained a wide commercial celebrity. Bellefonte in other respects bears evidence of the industry and enterprise of its first Iron manufacturer. The Centre cold-blast furnace, nine miles southwest of Bellefonte, was also built in 1790.

Philipsburg, the centre of a rich mineral district of coal, iron ore, limestone and fire-clay, and of timber land, owes its name and existence to an enterprising iron-master, who erected there many years ago extensive Iron-works and a screw factory. Milesburg has also been the seat of Iron-works for sixty years or more.

The demand for Iron created by the rapid emigration to the West after the establishment of Independence, and the extreme cost of transportation by the ordinary methods, amounting in 1784 to $249 per ton from Philadelphia to Presqu' Isle (now Erie), led to the early discovery of iron ores, and to the erection of furnaces and forges in the Western

counties. The first furnace west of the Alleghanies is said to have been built by Turnbull & Marmie, of Philadelphia, on Jacob's Creek, between Fayette and Westmoreland counties, fifteen miles above its entrance into the Youghiogeny river. It was first blown in November 1, 1790, and produced a superior quality of metal both for castings and bar-iron, some of it having been tried the same day in a forge which the proprietors had erected at the place. This event was justly considered one of much importance to the whole western country. Colonel Craig of Pittsburg, in 1792, ordered balls to be cast at this furnace for the defense of that place.

First furnace west of the Alleghanies.

Fairchance charcoal blast-furnace, seven miles south of Uniontown, belonging to F. H. Oliphant, was built in 1794. It is now abandoned, but the steam-furnace (and rolling-mill) of the proprietor, one mile distant, built two years later, is still running on ore from the Chestnut ridge. A forge was also built near the place, which has been owned by the Oliphants, father and son, for sixty years or more, but it is no longer used.

Union furnace on Dunbar Creek, fourteen miles east of Brownsville, in the same county (also claimed to have been the first blast-furnace in Western Pennsylvania[1]), was built in 1792–3, by Col. Isaac Meason, a man of note in border history, John Gibson, and Moses Dillon, the last of whom afterward erected a forge on Licking River, near Zanesville, Ohio, possibly the first in that State. Union furnace is still making iron by steam and hot-blast out of the carbonaceous ores of the coal measures. In the tables of Mr. Lesley, the Mary Ann cold-blast furnace, thirty miles from Uniontown, in Greene County, is said to have been built by the elder Mr. Oliphant as early as 1777(?). At Brownsville, or Redstone Old Fort, which, toward the close of the last century, was actively engaged in building boats for the lower navigation, the first nail factory west of the Alleghanies was established by Jacob Bowman. Wrought nails, manufactured by hand, were the kind produced. The workmen were brought from Hagerstown in Maryland.[2]

First Western nailery.

Pittsburg, which now furnishes a market for immense quantities of charcoal iron from the Juniata and Alleghany regions, from Ohio, Kentucky, Tennessee, and Missouri, and coke and anthracite from the western and central counties of Pennsylvania, owes its industrial prosperity mainly to the great bituminous coal seam in its vicinity, to the abundance of iron ore in the adjacent counties, and to its geographical position as the gateway of the West.

(1) American Pioneer. (2) Ibid. i. 380.

The coal of this neighborhood had long been known to be good and plentiful. A vein near the town took fire about 1765, and was burning sixteen years afterward.

Pittsburg Coal mining.

The privilege of mining coal in the hill opposite the town, where the "great seam" was struck, was granted in lots extending as far as the centre of the hill, at £30 each, by the Penns, about the year 1784. The tract had been purchased by them some years before for the Pittsburg Manor for $10,000, and was that year laid out in town and out lots. The product of this rich stratum of coal, regarded as the largest in the western coal field, along with that received by slackwater and rail from the neighboring counties, give Pittsburg a large export trade and superior advantages for working up by steam-power the crude iron of the West into a multitude of forms for the supply of the whole western country.

Foundery business begun.

Furnaces, founderies, rolling-mills, nail-works, wire-mills, and manufactories of metallic and other materials had therefore an early and rapid growth. The establishment in 1790 of the first furnace amid the argillaceous oxyds of iron on the Youghiogeny, by William Turnbull & Co., was regarded as an important event to the inhabitants of Pittsburg. Within two years after, the town had a large corps of mechanics and artisans engaged in a variety of trades.[1] A furnace was built before the close of the century within a few miles of the town, and in 1804 an air furnace for casting pots, kettles, mill irons, etc., was erected in the borough by Joseph McClurg. He also built a cannon-foundery in 1814. The foundery business has ever since been a considerable branch of the iron-manufacture of Pittsburg. In 1812 the first rolling-mill was erected there at the corner of Penn street and Cecil Alley, by Christopher Cowen. The steam-engine was in use in the town as early as 1794. It was first employed in the navigation of the Western rivers upon the steamboat New Orleans, built at Pittsburg in 1811. Two years after there were two manufactories of steam-engines in the place.

In the border county of Beaver an iron-furnace was established on the west side of Beaver river falls at Brighton, four miles from the Ohio,

(1) Pittsburg, in 1791, in 130 families contained 37 manufacturers, including 5 blacksmiths, 2 whitesmiths, 3 wheelwrights, 2 tinners, 1 clock and watch maker. In 1808, the town contained an air-furnace (McClurg's), 4 nail factories, a wire factory, a brass foundery, 2 gunsmiths, 1 bell-maker, 1 scythe and sickle maker (five miles up the Alleghany), 2 tinners, 5 watch and clock makers and silversmiths, 17 blacksmiths, 1 machinist and whitesmith "equal if not superior to any workman in the United States," 1 cutler and tool maker, 2 spinning-wheel, spindle, and crank makers, in addition to glass-works, cotton factories, and other non-metallic branches.

in 1803, by Hoopes, Townsend & Co., and was the commencement of an active iron business in that place.

Exports of Iron.

The amount of Iron exported from Philadelphia in the year ending April 5, 1766, was 882 tons of bar at £26 per ton, and 813 tons of pig iron at £7 10s. per ton. In the three years preceding the war, ending January 5, 1774, the exports were respectively 2,358, 2,205, and 1,564 tons. The proportions of pig and bar iron are not stated.

Various manufactures of Iron.

In the manufacture of steel, nails, fire-arms, machinery, and other branches of metallic manufacture, Pennsylvania early acquired the same prominence she had in the production of the raw material. Some attempts in these branches have been already referred to in their local relations, and others in previous chapters, in connection with the departments to which they were subservient.

Philadelphia Steel.

Philadelphia, as the principal commercial city of this country, possessed a varied industry and a large proportion of skillful artificers, as well as many persons who were industrious promoters of all the mechanical arts. Her ship-building created a large demand for nails, iron, and steel, material for which was chiefly furnished by her furnaces and forges. We have seen that a rolling-mill was built in Chester County as early as 1746, and a steel-furnace in Philadelphia in the following year. The steel-furnace of Stephen Paschal, at Eighth and Walnut, was probably the first in the Province, and Taylor's rolling-mill the first of its kind. In August, 1787, this steel-furnace, which then belonged to Nancarrow & Matlack, was visited by General Washington, and is mentioned as "the largest and best in America."[1] The partnership was dissolved in 1790, and the furnace, house, and lot offered for sale. The furnace was in good repair, and capable of making twenty-two tons of steel at a blast. White Matlack soon after conveyed the property by deed to John Ireland, and his former partner, John Nancarrow, a Scotchman, removed to Seventh street below Arch, where he continued the business of steel-making. There was also an air-furnace at an early period at the northwest corner of Ninth and Walnut, belonging wholly or in part to Nancarrow, who is said at one time to have made steel under ground at that place.

Newly invented boxes for carriage-wheels were in 1785 made at the air-furnace, Eighth and Walnut, by William Somerton.

(1) Thompson Westcott, Esq., of Philadelphia, has kindly furnished us with interesting facts relating to the arts in the city from his manuscript collections.

Whitehead Humphreys was in 1770 the proprietor of a steel-furnace on Seventh street between Market and Chestnut, where he also made edge-tools. He received £100 from the Provincial Assembly for his encouragement, and in 1772 set up a lottery to raise £700 to assist him in his steel-works. In 1778, Congress authorized the Board of War to contract with him for the manufacture of steel for the Continental artificers, from the Iron of the Andover Works, New Jersey. The State legislature, in April, 1786, appropriated £300 as a loan to Humphreys for five years, to aid him in making steel from bar-iron "as good as in England."[1]

In the debate on the Tariff in Congress, in April, 1789, when the duty on steel was discussed, Mr. Clymer, of Pennsylvania, stated that a furnace in Philadelphia (probably that of Humphreys), with very little aid from the legislature, had made 300 tons of steel in two years, and was then making at the rate of 230 tons annually. Although an infant manufacture in this country, he believed this furnace could, with a little public encouragement, soon supply the whole Union with steel. The importations of steel into the port of Philadelphia had then decreased from one-fifth to one-fourth within two years, mainly on account of the improvements in the domestic manufacture of the article. The perfection it had then attained in the city, and the reduced price of steel, were regarded by the Society instituted in 1787 for the Encouragement of Domestic Manufactures as insuring the success of workers in that material. It had already restored the manufacture of some articles, and had introduced new ones. Notwithstanding the State impost laws, and a special Act of 20th September, 1785, laying additional duties on the importation of certain articles for the encouragement of domestic manufactures, foreign wares had been virtually free, inasmuch as Burlington was a free port, and merchandise readily found its way thence into the State. The local tariff ceased in August, 1789, by the Act of the Federal Congress. Some valuable improvements in the manufacture of steel are said to have been made in 1793 by Henry Voight, a watchmaker of Philadelphia.

Nails.

The manufacture of *Nails* at this time employed many persons in the city and interior towns, but it was altogether a handicraft art. It was, however, sufficient to afford a surplus for exportation.

As early as 1731 we find George Megee, Nailer, at the corner of Front and Arch streets, Philadelphia, advertising for sale, wholesale and retail, all sorts of deck and other nails of his own manufacture. The aggregate of nails produced throughout the Province, in small

(1) Journals of Congress: Laws of Pennsylvania.

naileries conducted by common blacksmiths or others, was, as in New England, probably very considerable. It was one of those branches in which the country earliest became independent of British supplies, and in which the effects of the war were first felt among British manufacturers, as stated by Lord Dudley in the House of Peers in 1776. In 1789, Samuel Briggs, of Philadelphia, memorialized the legislature and the General Congress on the subject of a machine for making nails, screws, and gimlets. He had, three years before, made the patterns for the castings of Fitch's steamboat, and now deposited with the executive of the State, the model of his nail-machine, in a sealed box subject to the order of the State or Federal legislatures. He and his son, in August, 1797, received the first letters patent for nail-making machinery issued under the general Patent Laws of the United States. The second was granted in February, 1794, to Thomas Perkins, residing in the same place.

David Folsom also, in 1789, asked the General Assembly of Pennsylvania to protect his invention of a new method of making nails, sprigs, and brads by cutting them without drawing. The business of cutting nails and brads was some years after established in the State by Thomas Odiorne, of Massachusetts, who introduced Jesse Reed's machine, and set up two manufactories. The low price of rolled iron and nail-rods, for some time after the peace,[1] when much was imported from Russia, in addition to what was made in the State, fully established the nail-manufacture in Pennsylvania. There were, in 1797, three manufactories of cut nails and one of patent nails in Philadelphia.

Anchors.

An anchor forge was set up in Front street opposite Union about the year 1755. It was owned and managed by Daniel Offley, who employed a number of workmen, and over twenty years after, during the war, was still in the business.

Wire and wire cards.

Works for drawing wire were erected in or near the city as early as 1779 by Nicholas Garrison, Valentine Eckert, and Henry Voight, who in that year proposed to transfer them to the State. Hand cards were made by Oliver Evans and others before the Revolution. The invention of Evans for making the teeth is claimed to have

(1) The usual price of bar-iron before the Revolution was $64 per ton, to which price it again fell after the war. The large exportations of pig and bar iron which ensued, and the rapid increase of domestic consumption, raised it again. The wholesale prices-current of iron in Philadelphia, as quoted in the General Advertiser, published daily by Benjamin F. Bache, was, on November 9th, 1790, as follows: Iron castings, 22*s.* 6*d.* to 30*s.* per ton; bar-iron, £29 to £30; Pig-iron, £8 10*s.* to £9; sheet-iron, £60; nail-rods, £35. This was probably Pennsylvania currency. A considerable rise in the price of Iron took place again in 1796, and gave an impulse to the manufacture in England and America.

been the foundation of the subsequent patents, by which the manufacture was so greatly extended. There were three manufactories of cards in the city in 1797.

Cannon was cast at a number of furnaces in the State during the Revolution, particularly at the Reading and Warwick furnaces. Small arms were also made in considerable quantity at Philadelphia, Lancaster, and elsewhere. The general insecurity of the frontier settlements, especially during the French and Indian wars, the temptations of the chase, and particularly the Indian trade, rendered fire-arms a necessary appendage to every household, and created a steady demand for rifles and other defensive weapons. The manufacture received a great impulse during the Revolution. The exportation of fire-arms, gunpowder, and other military stores from Great Britain was prohibited in 1774, and Congress recommended their manufacture in each State. A letter from Philadelphia to a member of Parliament, in December of that year, soon after the Proclamation was received, informed him that the Act would be of no avail, as there were gun-makers enough in the Province to make 100,000 stand of arms within a year at 28s. a piece, if needed, and that a manufactory of gunpowder had been already established. Governor Richard Penn, in his examination before the House of Lords in November, 1775, stated, in reply to the inquiries of the Duke of Richmond on the subject, that the casting of cannon, including brass, which were cast in Philadelphia, had been carried to great perfection; and also that small arms were made in as great perfection as could be imagined. The workmanship and finish of the small arms were universally admired for their excellence. Some fire-arms were that year imported from the French and Spanish West India Islands, and pikes were recommended until arms could be made. Rifles were made in many places in the Provinces at that date, which were thought equal to any imported.

Fire-arms.

In February, 1776, the Committee of Safety deemed it expedient to establish a Provincial gun-lock manufactory, and requested a conference with Mr. Benjamin Rittenhouse, of Norrington, whom they thought a suitable person to superintend it. In March, commissioners were appointed to erect, superintend, and conduct the manufactory, and contract for the manufacture of arms.[1] The factory, we are informed, was established in Cherry street, with Mr. Peter De Haven as principal gunsmith. In April, 1778, the gun manufactory, under Mr. De Haven as contracting superintendent, was in operation at Hummelstown, eight miles from Harrisburg. In July, after the tragic events at Wyoming, he recom-

(1) Pennsylvania Archives, iv. 712; Col. Rec., x. 506.

mended its removal to French Creek or to Philadelphia. The Council, in November, 1776, fixed the price to be paid to gunsmiths for good gun-barrels, delivered at the lock manufactory, at 24*s.* apiece. Brass gun mountings were then made by Lewis Prahl. The committee also advanced £300 to Lawrence Birnie to enable him to erect an air-furnace and mills for the business of file-cutting in connection with the gun-lock factory. Contracts were also made in York and Lancaster for a quantity of arms for the State. The price of a musket with bayonet and steel ramrod, made according to pattern, was £4 5*s.* (Pennsylvania currency).[1] But it was found difficult to make contracts at less than £4 10*s.* or £4 15*s.*, as materials were scarce, and workmen were unwilling to quit the manufacture of rifles, for which the demand was great. Muskets were also made at Carlisle and in Bedford and other counties. The latter had but one regular gunsmith.[2] There were two boring-mills for gun-barrels in the vicinity of Lancaster in 1786, and the borough contained 7 gunsmiths, 7 nail-makers, 2 brass-founders, 3 coppersmiths, 5 silversmiths, 4 tinners, 6 clock and watch makers, and 25 black and white smiths. Washington County had 3 gunsmiths.[3] John Kerlin contracted to make muskets and bayonets at 85*s.* each.

Cannon.

In April, 1776, Benjamin Loxley made proposals for casting brass eight-inch mortars, howitzers, cannon, and shells for Congress or the committees of safety. Some of the brass guns of Major Loxley were tested by Daniel Joy of the Reading furnace, who was also engaged in casting and boring iron nine-pounders at the rate of one daily, to be followed by others of larger size. The iron pieces appear to have stood the proof better than the brass. Joy, in the same year, proposed a method of constructing fire-rafts for the defense of the Delaware. Congress, in the following April, called upon all the legislatures or executives of the States to exempt from military duty all persons employed in casting shot and manufacturing military stores of any kind; and in June the Board of War recommended that eleven men employed by Mark Bird in the cannon foundery and nail-works in Berks

(1) In recommending to the several Assemblies in November, 1775, the manufacture of fire-arms and bayonets, Congress directed that each firelock be made "with a good bridle lock, ¾ of an inch bore and of good substance at the breech, the barrel to be 3 feet 8 inches in length, the bayonet to be 18 inches in the blade, with a steel ramrod, the upper loop to be trumpet-mouthed, and the price to be given be fixed by the Assembly or Convention of each Colony; and that until a sufficient quantity of good arms be manufactured, they import as many as are wanted by all the men in their Province."—*Jour. Cong.*, i. 164.

(2) Pennsylvania Archives, iv. 708, 712, 717, 777; vi. 453, 475, 633.

(3) Coxe's View of the United States.

County, carried on by him for the use of the United States, be discharged from the militia, into which they were draughted. During the same month James Byers, who had cast brass guns for the Government, was requested to hold himself in readiness to remove with his apparatus and utensils at a moment's warning on the approach of the British. Morgan Busteed, Samuel Potts, and Thomas Rutter each made proposals to cast cannon in the course of that year. There was at this time a cannon-foundery in Southwark, but we do not know who owned it. In August, 1777, the Board of War informed President Wharton that the furnace for casting cannon stood idle for want of copper, and requested permission to use a load which had been sent from French Creek (the mine before mentioned), but was claimed by the State. There was also some dispute respecting the furnace as well as the material.[1]

Brass-founding.

Brass-founding and copper, brass, and tin work of all kinds for distilleries, breweries, sugar-mills in the West Indies, and refineries of sugar, and for household use, employed many tradesmen in Philadelphia from an early period.

In May, 1717, Austin Paris and Thomas Paglan, "ffounders," were admitted to the freedom of the city, a process necessary to entitle tradesmen to carry on business for themselves. Paris was a founder either in brass or iron in the city ten years after. Brass-founding was carried on in 1723 in Front street near Market, by John Hyatt, and in 1759 by Daniel King, at the upper end of Second street. In the federal procession, on the ratification of the Constitution, July, 4, 1788, Mr. King rode in a car, with a furnace in full blast during the whole procession, and finished a three-inch howitzer, which was mounted and fired with the artillery on Union Green. His journeymen and apprentices also neatly executed other brass work at his expense. The coppersmiths also made stills and tea-kettles under the direction of Benjamin Harbison, and numbered twenty masters of the trade.

Money scales and weights were made by James Allen, goldsmith, in 1719.

Buttons.

Caspar Wistar was a brass button and buckle manufacturer in Philadelphia previous to 1750, when one of his apprentices set up the business in New York. The first of the name in this country established a glass factory in New Jersey, and in 1769 Richard Wistar united the two branches at his house in High street

(1) Pennsylvania Archives, v. 698, 731, 738; vi. 62, 121, 369.

above Third, where he made glass lamps and bottles and brass buttons.[1]

The establishment of a tin-plate manufactory was proposed by a convention assembled from the several counties at Philadelphia in January, 1774, to consider the state of manufactures and trade. But it was not then found practicable. Tin could not be had in 1776 sufficient to make canteens and kettles for the army.

A sheet-iron manufactory was established in 1776 on Water street, at the corner of Arch, by Murray, Griffin, & Bullard, who made camp-kettles, blaze pans, tea-kettles, and other wares. Camp-kettles were also made for the army by Thomas Bales, out of sheet-iron made at Mount Holly by Thomas Mayberry.

Sheet-iron, etc.

Pewter dishes, spoons, and other household wares of pewter and block tin, then in general use, were made many years earlier by Cornelius Bradford and others.

Gold and silver smiths, whitesmiths, and manufacturers of buttons, shoe-buckles, and such small wares, were numerous.[2] In 1767, the silversmiths of Philadelphia petitioned for the establishment of an assay office to regulate, assay, and stamp gold and silver.

Gold and silver smiths.

Screws for paper-mills — which were numerous — and many heavy

(1) Benjamin Randolph, at the Golden Eagle, Chestnut street, in 1770 manufactured wooden buttons "of apple, holly, and laurel wood hard and clear." There were two button factories in the city in 1797.

(2) Among the tradesmen admitted to the freedom of the city in 1717 and 1718, were George Plumly, Joseph Trotter, and Richard Gosling, *cutlers;* James Everet and Simon Edgell, *pewterers;* Peter Steel and James Winstanly, *braziers;* Francis Richardson, William England, and Edward Hunt, *goldsmiths;* Edmund Billington, *whitesmith,* and fourteen *blacksmiths.* In June, 1718, in consequence of a petition "from several tradesmen and manufactors," complaining that notwithstanding their having taken out their freedoms, many strangers daily came in and settled who were not entitled to carry on business,—the Common Council gave permission to such trades as desired to frame and bring in an ordinance whereby they could be incorporated.—*Minutes of Common Council.*

In the Federal procession in 1788, a carriage drawn by nine horses contained the Federal blacksmiths, whitesmiths, and nailers in full employ. The blacksmiths completed during the procession a full set of plow irons out of old swords, worked a sword into a sickle, turned several horse-shoes, and did other jobs on demand. Mr. I. Goodman, whitesmith, finished a complete pair of pliers, a knife, and some machinery. The nailers finished and sold spikes, nails, and broad tacks. They were followed by two hundred others of their trades, with the device—"By hammer and hand, all arts do stand." The goldsmiths, silversmiths, and jewelers followed their senior member, William Ball, to the number of thirty-five.

How different the spectacle we witness at this hour, when that *Union* which was everywhere hailed as the greatest blessing to the productive classes, after having fulfilled its high promise, is rashly threatened with destruction, and the plowshare and sickle are being once more beaten into swords for fratricidal conflict!

castings and forged work were made in the city before the close of the century. Military articles of all kinds were made.

In the invention and construction of machinery and instruments for practical and scientific purposes, Philadelphia mechanics early acquired a reputation for skill. The records of original American invention contain few names more distinguished than those of Godfrey, the inventor of the quadrant, of Rittenhouse, who made the first telescope constructed in America, and whose orrery and other scientific instruments displayed unusual mechanical and mathematical genius; of Franklin, Evans, Fulton, Fitch, and others, whose inventive and constructive skill have added to the permanent wealth of the State and the Union.

Machinery and Inventions.

The employment of a fire-engine for the greater security of property was recommended by Samuel Preston, an early mayor of the city, and in December, 1719, payment was ordered to be made to Abraham Bickley, a member of Council "for ye ffire engine" previously ordered. It does not appear where it was made. In April, 1730, three fire-engines of the value of fifty, thirty-five, and twenty pounds respectively, were ordered from England, and arrived the same year. A fire-engine was also made for the city by Anthony Nichols, previous to July, 1735; but it was said to be "very heavy, unwieldy, and required much labor to work it."[1] In 1768, Richard Mason, at the upper end of Second street, undertook the manufacture of fire-engines. He was a native of the Province, and the first who introduced the improvement of the Philadelphia levers at the ends and not at the sides of the engine. Mason & Gibbs were, in 1785, builders of fire-engines of the newest construction.

Fire-engines.

The first experimental *steam-engine* built in America was made in Philadelphia in 1773, by Christopher Colles, an educated and ingenious Irishman, the pupil and protégé in early life of Dr. Pococke, Bishop of Ossory, after whose death, in 1765, he came to America. In the spring and summer of 1772, Colles delivered two courses of lectures in the Hall of the American Philosophical Society, on Pneumatics, Hydrostatics, and Hydraulics, in which he experimented with an air-pump of his own invention, and exhibited the centrifugal and steam-engines, and other machines. He was consequently engaged to construct a steam-engine to pump water for a distillery, which was done, but on so cheap a scale and of materials so slight that it was of no practical use. A committee of the Philosophical Society never-

Steam-engines. C. Colles.

(1) Minutes of Common Council. Three years after, Benjamin Franklin organized the first fire company in the city.

theless reported that it evinced the builder's knowledge of the principles, and his ability to construct the machine, and that he was therefore deserving of encouragement. The career of Colles, who obtained some repute as an engineer and mechanician in this department, has been compared to that of John Fitch, who in 1786, assisted by Henry Voight, constructed the first working steam-engine built in the city. "Both," says Mr. Westcott, "were ingenious beyond their time, and both reaped a reward in poverty." Fitch is said to have first applied to John Nancarrow, the proprietor of a steel-furnace before mentioned, who had some reputation as a machinist, and afterward made some improvements in the engine of Savery, which were published in the fourth volume of the American Philosophical Transactions. His drafts were, however, rejected by Fitch, who was advised to apply to Hornblower or Colles of New York. But having become impressed with the mechanical abilities of Henry Voight, a Dutch watch-maker, he made him a partner, and the two jointly constructed a model with a one-inch cylinder, the first steam-engine Fitch had seen. This was immediately followed by a larger three-inch cylinder model, with which a skiff was moved on the Delaware in July, 1786, by means of oars attached to a crank. An engine on the principle of Watt & Boulton's with twelve-inch cylinder, was built the next year, which, after receiving several improvements by Voight, propelled a steamboat on the Delaware in the presence of the Federal Convention then in the city. Another still larger was built, for which an eighteen-inch cylinder was cast at Warwick furnace. Numerous improvements in the pipe, boiler, condenser, and other parts of the machinery by Voight, Fitch, Thornton, Hall, Evans, and other ingenious persons, resulted in an efficient engine, with which a steam packet and freight boat was, in 1790, run between Philadelphia and Burlington. Voight afterward became chief coiner at the Mint, and the inventor of a steamboat with paddles in three rows.[1]

Fitch and Voight.

Two steam-engines were also built and in operation at the water-works in Philadelphia—the largest then in the country—before the close of the century, one near the Schuylkill, the other at Centre square. They were both double engines, the one with a thirty-nine-inch and the other a thirty-two-inch cylinder, and six-feet stroke and wooden boilers, and capable of supplying 4,500,000 gallons of water daily, if required. One or both were built by Nicholas I. Roosevelt, who, in 1798, patented, with J. Smallman, a double steam-engine, and afterward built the first steamboat on the Ohio at Pittsburg. His contract

Roosevelt.

(1) Westcott's Life of Fitch.

was for one million gallons daily, and the surplus power of the lower engine was leased for the use of a slitting and rolling mill and other manufacturing uses. Several valuable modifications of the steam-engine were made by the Philadelphia mechanics, the most important of which were those of Evans, who, in 1803, became the first regular steam-engine builder at the Mars Works, Ninth and Vine streets.

Many kinds of machinery of minor importance were devised and improved in Philadelphia before the General Patent Office was organized.

Donaldson's Hippopotamus.

The dock accommodation of Philadelphia having become much impaired by the collection of mud previous to the war, a dredging-machine for cleaning and deepening the docks was invented by Arthur Donaldson, of which a cut and description are given in the first volume of the Pennsylvania Magazine for 1775. It was recommended by a committee of the American Philosophical Society, to the attention of the Assembly, which awarded the builder £100 for his ingenuity. In answer to an application from New York, he was the next year sent thither, with workmen by the Committee of Safety, as one every way qualified to superintend the construction of a water *Chevaux-de-Frise*. Similar defenses were sunk in the Delaware at Billingsport, in aid of which Mr. Robert Smith presented the Committee, through Owen Biddle, the model of a machine for raising and lowering ballast, for which he received the thanks of the Board. After the Peace, Donaldson was employed to remove it, which he accomplished by the aid of that or some other curious machine invented in the city. The Assembly, in 1785, granted him the exclusive privilege for a term of years of making and using in the Delaware his machine for cleaning docks, called the "Hippopotamus," which had proved to be highly efficient. He also invented a balance-lock. His constructive abilities procured Donaldson considerable reputation and property, and in the following year John Fitch offered him a partnership in his steamboat scheme. To this invention he soon after set up independent claims, based on the construction of a pump-boat on the principle of Bernouilli's. For some time he strongly contested with Fitch the originality of that and other modes of applying the power.[1] The use of steam for that purpose, in whatever way applied, was the strong point of the latter, and his priority could not be fairly disputed. This useful agent was applied to dredging purposes by O. Evans, in 1804, who constructed the "Eruktor Amphibolis" for that use.

Wagstaff & Hunt, mustard manufacturers, had in operation, in 1760,

(1) Westcott's Life of Fitch.

a mustard-mill, claimed to have been invented by Wagstaff, and made in England from drawings sent thither. The machine was also said to have been immediately adopted in England by the mustard makers, and afterward obtained by others in Philadelphia. Benjamin Jackson also at that time made flour of mustard "superior to English Durham," by machinery driven by water, in a rival establishment at the Globe Mills in Northern Liberties.

Mustard-mills.

George Brassine, the inventor of a snuff-mill, asked for encouragement in 1785, and William Sheppard for a mill for sawing and polishing marble. The grant of privileges to James Rumsey, the same year, for a boat to go against the current of rivers, was contested by Abner Cloud and Hugh Cunningham, who each claimed the invention of the pole-boat.[1]

Carding machines, cotton gins, spinning jennies, and other textile machinery were early made in Philadelphia. We have in a former chapter mentioned a spinning frame introduced in 1775 by Christopher Tully, which we supposed to have been imported. That machine, and another by Joseph Hague, we have reason to believe were made in the country, and were the first of the kind in America. In April, 1776, previous to which a spinning-machine was in use by the United Society for promoting American Manufactures in Philadelphia, a committee of the Assembly reported "that upon examination they find the said machine was made and used in this Province by both the persons above named nearly at the same time, but unknown to each other, and that the committee think they are therefore alike deserving of reward." They recommend that £15 shall be awarded each. On the recommendation of the Society above named, the Assembly resolved to distribute one machine to each county at the expense of the Province.

Textile machinery.

First jennies.

John Marshall, an English thread-maker in the employ of the Society in 1776, asked patronage for a silk twisting and throwing mill of his invention. An appropriation of £40 was recommended for his encouragement by a committee. James Hazle also in 1775 advertised a machine to go by clock-work to run 48 spindles. The encouragement given to such inventions by the State legislature, the American Philosophical Society, and by associations for promoting general or special manufactures, was such that, in 1789, some machinery of the kind was made in Philadelphia as well as in England. A law of the Assembly, in March, 1788, prohibited under certain penalties the exportation of manufacturing machines for the space of two years.

(1) Westcott's Life of Fitch.

THE STATE HISTORICAL SOCIETY OF WISCONSIN shs 1846

Mr. Robert Leslie, who was the father of C. R. Leslie, the artist, Major Leslie, of the United States Army, and Miss E. Leslie, the authoress—a Scotchman by birth, but resident in Philadelphia from 1745—was a clock and watch maker of great ingenuity. He was granted by the Assembly, in 1789, a patent for certain improvements in the mechanism of clocks and watches, and afterward under the laws of Congress. A powerful combination of the trade was formed to oppose his innovations. He also patented improvements in the construction and tone of bells, in the weaving of wire, and, in addition to several improvements in pendulums and time-pieces, he invented or improved machines for threshing and cleaning wheat, tide-mills, wind-mills, blowing machinery, machines for managing vessels, carriage springs, dies for coin, and several other things. Some of these are described in the early volumes of the American Philosophical Transactions, in which are several memoirs by Dr. Rittenhouse on improvements in time-pieces and other horological and philosophical instruments, and papers on other inventions by him and Godfrey, Franklin, Hopkinson, Colin, Mr. Henry of Lancaster, Rumsey, and others. George Wall, Jr., in 1787, received from the State a patent for a mathematical instrument invented by him. Dr. Hopkinson made some improvements, there described, in the construction of the harpsichord, which were introduced in an instrument made for him in London.

Leslie's inventions.

The piano-forte, which has now superseded the harpsichord, appears to have been first made in Philadelphia by John Belmont, Third street below Green, whose card, in 1775, states that he "has just finished an extraordinary instrument by the name of the Piano-Forte, of mahogany, in the manner of a harpsichord, with hammers and several changes." In 1785, James Juliann, Fourth and Arch, also announced "the great American Piano-forte of his own invention." The General Advertiser, in 1790, speaks of American musical instrument making as having arrived at great perfection in Philadelphia, and says an ingenious artist had lately completed several piano-fortes, in point of workmanship nothing inferior to the imported. Their superiority was in part due to the fact that wood seasoned in London did stand this dry climate, and also that Philadelphia-made pianos were put together with screws, while the foreign were only glued.

Piano-fortes.

In 1763, a new organ for Christ Church was ordered from Philip Feyring, who had previously built one for St. Peter's.[1] It was finished

(1) The propriety of using musical instruments in public worship was in the same year called in question in a pamphlet published in Philadelphia. Organs had

and put up in 1766, and remained seventy years, until the present one was erected. It contained three sets of keys and pedals, two octaves from foot C upward, twenty-seven stops, and about 1,607 pipes. An organ was built for the German Lutheran Church in Philadelphia, a few years later, by Mr. D. Taneberger, a Moravian, at Litiz, in Lancaster County, and a man of much mechanical ingenuity.

Organs.

Robert Leslie, in 1789, proposed to establish a Museum of models of machines, etc., in Philadelphia. The models of many other machines and instruments, in addition to some of those above named, were presented to the American Philosophical Society. But the first professed collection of the kind in the city, of which we have any knowledge, was the model room in Peale's Museum, commenced in 1785 by one who himself possessed considerable mechanical as well as artistic talent, as the records of the Patent Office show. This now forms an important feature in the various institutions for practical mechanical instruction. It is mentioned to the credit of Henry IV. of France that he proposed such a magazine of models, which was not, however, carried out until 1775 in the Conservatory of Arts and Trades founded by Vaucanson. And when our mechanics and artists proposed such a thing, however imperfect in plan, we believe a collection of the kind did not exist in England.

Museum of models.

A bold project for the employment of Iron on the extended scale now so common for architectural purposes, was conceived in 1787 by Thomas Paine, whose taste for mechanical and philosophical studies had induced Dr. Franklin to persuade him to come to America. While pursuing his favorite speculations in mechanics, mineralogy, and the uses of Iron, a permanent bridge over the Schuylkill was proposed, to be built without piers, and Paine offered to construct an Iron bridge, with a single arch of four hundred feet span. It was not then deemed practicable. Notwithstanding that casting could be done cheaper and with better iron than in England, plans for an iron superstructure on stone piers, prepared by Mr. Weston, an English engineer, were also thought too hazardous, and the present covered bridge on Market street, then regarded as a structure of no ordinary kind, was erected instead. Paine, however, immediately renewed his proposals in France and England, and in one or both coun-

Iron bridges.

been in use in Massachusetts since 1714. The Episcopal church at Salem had one made by John Clarke in 1743, and another by Thomas Johnston, of Boston, in 1754. But the "lawfulness and advantages" of instrumental music were also questioned in a publication issued there in 1771.—*Felt's Annals.*

tries actually carried it into execution. His efforts were mentioned by Mr. Jefferson, then American minister at Paris, in a complimentary way; and Mr. Stephenson, the eminent engineer, said of the bridge over the Wear at Sunderland, erected in 1794 partly out of the materials of an earlier one by Paine, that the boldness of the attempt leads us "to wonder at rather than to admire a structure which, as regards its proportions and the small quantity of materials employed in its construction, will probably remain unrivalled."

CHAPTER XVIII.

COLONIAL INDUSTRY IN METALS—CONTINUED. EARLY EFFORTS IN THE SOUTHERN COLONIES, WITH A GENERAL SUMMARY OF LEGISLATION RESPECTING IRON, TABLES OF COLONIAL IMPORTS AND EXPORTS, ETC.

DELAWARE.—Some early Iron-works were built within the present territory of Delaware before its erection into an independent State. They were principally for smelting the bog ores which are deposited in several places in the sand and clay of Tertiary age in all the Atlantic States.

It has been mentioned that Governor Keith, of Pennsylvania, was the proprietor of Iron-works in Newcastle County as early as 1726, but we are unable to say where these works were situated. They were probably at Newcastle, the oldest town in the State, or on the White Clay Creek or its branches, near the headwaters of which, at Iron Hill, is a mass of ferruginous clay, sand, and quartz, yielding nodular and ochreous iron ore.

Early Iron-works in Delaware.

A rolling and slitting mill was erected in the county in the latter part of the last century, when Wilmington was already one of the most active centres of several branches of industry in the Union. The iron-manufactures of the County have long given employment to a large amount of capital; and its rolling-mills and other large works are widely known.

In Sussex County also, at the southern extremity of the State, where bog ore in the shape of a very pure hydrate, yielding from 55 to 66 per cent. of iron, exists in large beds in the vicinity of Georgetown, and on the branches of the Nanticoke and Indian rivers, the manufacture of iron and castings was carried on before the Revolution to a considerable extent. The compact hydrated peroxyd of some of these beds has, since the early part of this century, been raised in quantities for exportation, and the local production of Iron is consequently less than it might have been

MARYLAND. — Throughout the whole Eastern Shore of Maryland, particularly in portions of Caroline and Dorchester and the greater part of Worcester counties, occur extensive deposits of bog iron ore. The same ore is also met with in Prince George County on the Western Shore. These, and the more valuable deposits of brown oxyd and carbonate ores at the upper limits of the Tertiary formation, furnished materials for those early operations in iron which first made England acquainted with the capabilities of her Colonies produce Iron in any desired quantity. Harford, Anne Arundel, Baltimore, and most of the counties between the Chesapeake and the South mountain ridge, contain deposits of argillaceous ore, in nodular, kidney-shaped, and concretionary forms, often containing cavities lined with brown oxyd and yielding 40 to 50 per cent. of Iron. In Harford, Carroll, Frederick, and Washington counties are also valuable beds of brown hematite, some of which have been long wrought and make excellent bar-iron. At Deer Creek, in Harford County, and some other localities, titaniferous iron ore, which, though refractory, is smelted by admixture with more lean and fusible ores, yields a product of good quality. As a corrective, the bog ores of New Jersey are frequently obtained in exchange for the hematite and other primitive ores of the State. Chrome iron is also obtained in Montgomery County and elsewhere, and specular oxyd of iron in Frederick County.

Iron ores of Maryland.

The facilities afforded by ample supplies of ore and fuel contiguous to water-carriage for the manufacture of Iron, were early remarked by the English settlers of Maryland. Plantagenet, who described this section of the country in 1648, under the name of New Albion, estimated the saving to the iron-manufacturer in mining (the deposits being superficial) and in land-carriage at three pounds per ton. Another five pounds would be saved in fuel, by using drift-wood and timber floated down the rivers, and thus the labor of each man would yield him 5*s.* 10*d.* *per diem*, Iron being valued at £12 per ton. The arts were not, however, very early introduced into Maryland. The legislature, in 1681, endeavored to turn the industry of the Colony in that channel, and among other laws enacted for the purpose was one laying a duty on the exportation of old iron, intended for the protection of smiths. The manufacture of Iron appears to have been commenced not many years after.

About the year 1718 the first samples of Iron were received in England from Maryland and Virginia. In the latter Province, according to Anderson, pig and bar iron "of a very good staple or kind" began to be made about the year 1715. But as Maryland appears to have been first possessed of a forge for bar-iron,

Commencement of the business.

and the exports of the two Provinces are classed together, it is doubtful which had the precedence in the permanent establishment of the manufacture.

In 1719, however, in consequence of the encouragement given by Act of Parliament in that year to the importation of pig-iron from the Colonies, the legislature of Maryland passed an Act, authorizing 100 acres of land to be laid off to any who would set up furnaces and forges in the Province.[1] This measure was followed by the erection of eight furnaces and nine forges during the next thirty years;[2] and large quantities of wood land were taken up on the Western Shore by the owners. For the encouragement of industry about this time (1721), execution upon judgments was suspended for a limited period for the benefit of the agricultural classes; and soon after, the workmen at furnaces, forges, and mills were exempted from labor upon the highways, which at the time were kept in repair by assessment of the labor of taxable inhabitants.

Early laws.

Among the earliest forges in Maryland of which we find any mention, was the Principio forge at the head of the Bay, two or three miles east of the Susquehanna, in Cecil County. This was in operation previous to 1722. In 1730, the Principio Works were the property of John Ireland and Company, principally Englishmen. They were managed by Mr. Ireland, who also superintended a furnace on a branch of the Potomac in Virginia, which was owned by him in common with several persons in England, and was conducted with enterprise and skill. The Iron from that and other furnaces in Virginia, which then had no forge, was converted into excellent bar-iron at the Principio forge. The Principio hot-blast charcoal furnace of the Messrs. Whitaker, of Philadelphia, stands on or near the site. It employs ore from the neighboring counties of Maryland and Delaware. A body of ore, laid down in the early map of Herman Moll as Iron Hill, near the Maryland line, in Newcastle County, probably supplied ore to the ancient forge. Some good ore has been obtained for these works near Northeast, and a ferruginous quartz or jasper, too flinty for use, exists near Elkton. On Big Elk river, five miles north of Elkton, where the Elk rolling-mill of Parke Smith & Co. was built in 1810, a rolling-mill was in operation at the time of the Revolution. It is supposed to have been connected with copper-works. Such works were erected in the Colony as early as 1742, in which year their proprietor, Mr. John Digges, of Baltimore County, was patronized by the legisla-

Principio forge.

Rolling-mill.

(1) Griffith's Sketches of the Early History of Maryland.

(2) McSherry's Hist. Maryland.

lature, which released his workmen from taxes, highway labor, and trainings. Mr. Digges held, under a title from the proprietor of Maryland, an estate on the Conewago of nearly 7,000 acres of land, over which Pennsylvania also claimed jurisdiction; and when the survey of Mason and Dixon's line, in 1768, terminated the long and violent disputes between the proprietaries of the two Provinces respecting the boundary, "Digges' Manor" fell within the last named, and included the present site of Hanover, in York County. His copper-works were probably near the borders and possibly in Cecil County, although copper is found on the Monocacy, in Frederick County, south of the State line. The iron rolling-mills in the northeastern part of the State are now numerous and extensive.

In Baltimore County, which originally included the rich mineral region of Harford, the manufacture of Iron from the ample deposits along the Patapsco, on both sides, from the Elk ridge to Deep Creek in Anne Arundel, was early commenced. It was one of the earliest enterprises attempted on the present site of the commercial capital of the State, where it is now a flourishing industry. Soon after the year 1723, and previous to the founding of the city, according to its annalist,[1] Messrs. Carroll, Tasker, and others, under the name of "The Baltimore Company," erected a furnace at the mouth of Gwinn's Falls, and a forge on Jones' Falls, at the site occupied one hundred years after by the mill of General Stricker. The land on which the furnace and ore were, belonged to Mr. John Moale, an English merchant, and a member of the Provincial Assembly, who carried on business extensively at the Point. An application was made to him by the inhabitants for a grant of land for a town at Gwinn's Falls, and a bill for that purpose is said to have been introduced in his absence. But fortunately for the future mercantile interests of the town, the measure was defeated by Mr. Moale, who, fearing the loss of revenue from the ore, or jealous of a transfer of business to that place, hastened to his post and opposed the bill. A more eligible site at Coles Harbor on the basin was, in 1729, purchased of the heirs of Mr. Carroll, and the town laid off in the following January. The iron ore of the abandoned site became a source of much profit to the owner during his lifetime, though less profitable to his heirs than town lots would have been.

Baltimore County and town.

The abundance of stone, iron ore, limestone, timber, and water-power, soon attracted population and enterprise to the place, and after the Revolution few towns grew more rapidly than Baltimore. The water privileges on the Patapsco, Back river, Gunpowder, and other streams

(1) Griffith's Annals of Baltimore.

were soon occupied by Iron-works and other mills, whose product swelled the export trade of the city. At the head of Back river, a few miles north by east from the city, on the Kingsbury lands, purchased in 1734 by Colonel Sheridine, a furnace was afterward erected. Patapsco furnace, on the south side of the basin, has been abandoned some time. A slitting-mill was established in or near the town in 1778 by Mr. Whetcroft. About the same time a nail factory was set up there by Mr. George Matthews, and another by Mr. Richardson Stewart, and a card factory by Mr. McCabe. Cannon were cast in 1780 at a furnace called Northampton, probably the same as Hampton furnace, ten miles west of Baltimore, which is said to have run seventy years upon a single deposit of brown ore in the neighborhood, contiguous to the primary limestone. There was an early furnace, belonging to Charles Ridgely, Esq., on the falls of the Great Gunpowder, in the same county, which produced superior Iron from the same kind of ore. The Avalon Iron-works, near the Relay House, now one of the oldest in the State, is said to have been built over sixty years ago by the Dorseys, and has been lately rebuilt. An old nail factory stood near it. An air-furnace was built on the south side of the basin in Baltimore, about the same time, by John Morton, and another, ten years after, in Calvert street by William Baker. Four furnaces and two forges were erected and in operation within the county before the close of the last century, which manufactured pig and bar iron, hollow-ware, and other castings extensively.

Ridgely's Iron-works.

In Anne Arundel County, two furnaces and two forges were erected in the same time. At Elk Ridge Landing, seven or eight miles from Baltimore, on the Washington railroad, where a large iron business is now done, Dr. Howard owned a tilting-forge in 1783. The site of the old Howard furnace at that place is now occupied by the steam and water hot-blast charcoal furnace of the Great Falls Iron Company, producing forge-iron in large quantity. Curtis' Creek furnace, eight miles southeast of Baltimore, is very old and in ruins; and a puddling furnace on the Little Patuxent, three miles below Annapolis, was destroyed many years ago.

Howard's tilting-forge.

On Deer Creek, in Harford County, a forge and slitting-mill was also built in the last century. The titaniferous ore which occurs in talc and serpentine rocks in that neighborhood, requires more fusible ores to be mixed with it, but affords an excellent Iron. At Joppa on the Little Gunpowder, and near Abington on Bush river, are large deposits of brown hematite, for smelting which works were early erected. Hone ore of the best quality is raised on Bush river, and produces castings of great strength.

Harford County.

The several ridges of the South Mountain Range, throughout the counties of Montgomery, Carroll, Frederick, and Washington, are highly metalliferous, and in several places furnished magnetic iron ore and brown hematite for furnaces before the Revolution. Near Sykesville, and at several points further north in Carroll County, magnetic ore occurs in connection with the sulphuret of copper. Lead was also discovered many years ago near Unionville. But the most remarkable deposit is one of brown hematite or limonite in the vicinity of the Point of Rocks, on the Potomac, in Frederick County. It extends back along the Cotocktin mountain, and is supposed to cover an extensive vein of copper ore, so generally met with in that range of hills. The iron ores here embrace the red and brown hematites in their compact and pulverulent forms, the argillaceous and specular oxyds, pipe ore, the phosphate, and other varieties separate and mixed. In some places these are strongly impregnated with zinc and manganese. They, however, yield a good metal, and near the places above named on the Monocacy and its branches, brown iron ore was once mined to considerable extent.

Primitive ores.

Copper.

Several furnaces and forges were built in the last century in Washington County. The proximity of ore, limestone, wood, and water-power at the western base of the South Mountain invited to the manufacture of Iron, and much pig and bar metal, castings, etc., for the supply of the fertile and well-cultivated Conecocheague Valley and western counties were produced. Three forges were built on Antietam Creek, which also supplied power to fourteen merchant flouring-mills before the close of the century. Antietam furnace, at its junction with the Potomac, seven miles above Harper's Ferry, was built as much as a century since. It was the only one of the old ones in operation twenty years ago. It obtained ore from both sides of the river between it and the Ferry. Its site is now occupied by the hot-blast charcoal and coke furnace of the same name. Mount Etna furnace, on the same stream, near Hagerstown, cast cannon for the army during the Revolution, a specimen of which is preserved at Fredericktown. Cotocktin furnace, three miles from Mechanicstown, on the Monocacy, in Frederick County, was built in 1774, rebuilt in 1787, and again more recently, and is still running upon ore raised in its neighborhood.

Antietam furnaces.

Mt. Etna and Cotocktin furnaces.

The vigorous preparations which were everywhere made in the summer and autumn of 1776 to provide the sinews of war, were nowhere more apparent than in the furnaces and gun-shops throughout the country. At the time the bill was before Parliament, in 1750, to restrain the use of slitting, plating, and steel mills in the Colonies, which was one of the

acts for which the latter were about to seek redress, there had been erected in Maryland, according to the report made by the Governor and Council to the Board of Trade, eight furnaces and nine forges. Virginia and Maryland together at that time exported yearly to England over two thousand five hundred tons of pig-iron. When the war commenced, the number had probably somewhat increased. There does not appear to have been many furnaces in a condition to cast cannon, for which an imperative necessity had suddenly arisen.

Iron-works in 1750.

Messrs. Daniel & Samuel Hughes were the proprietors of an air-furnace in Frederick County. On the 1st of July, 1776, the Maryland Convention authorized the Council of Safety to lend the proprietors for nine months the sum of two thousand pounds, common money, to encourage them "to prosecute their cannon-foundery with spirit and diligence." They had then nearly completed a contract for casting cannon for the State, and were, a few days after introduced to the Continental Congress by a letter from the Convention, which states that the Messrs. Hughes had been at much expense in fitting up their works. Although their first guns did not stand the proof, the foundery was then in condition to make very good ones in greater number than the Province would probably require. They proposed to enlarge their works if Congress would take all the guns they could make during the next year. A contract was accordingly made with them for one thousand tons of cannon, toward which $8,000 were advanced. In the course of the same year, the people of Alexandria, Virginia, applied to Congress for permission to purchase cannon at the Messrs. Hughes' furnace, stating that they were "the only persons in this part of the continent to be depended on for cannon." Congress promised compliance so soon as its own pressing wants were supplied.[1] In May, 1777, Congress by resolution allowed them $22\frac{2}{3}$ per ton, in addition to the sum mentioned in the contract.

Cannon-founderies. Hughes'.

General Thomas Johnson and his brother were also at this time the proprietors of a furnace in Fredericktown. In answer to application from the Provincial Council, in July, for cannon, he stated that their furnace was not then in blast, but they intended to get it in readiness to cast such cannon and swivels as were wanted, and if they succeeded in making good guns they would deliver them at Baltimore for forty pounds per ton, after they had been proved at the works at the public expense. They had on hand and could supply of their manufacture some pots, kettles, and Dutch ovens. He also stated that Mr. Butler was getting his furnace into blast with all diligence.

Johnson's furnace.

(1) American Archives, 4th Series, vol. vi. 1494; 5th Series, vol. i. 219, 1587.

The cylinder and other castings for Rumsey's first steamboat were made or attempted at the foundery of the Messrs. Johnson, ten years after.

Small cannon and swivels were also ordered in July, 1776, from Ridgely's furnace and from the Nottingham Iron-works in Baltimore County. The pig-iron of Ridgely's furnace was reported to be the best in the State at that time, and some of it was purchased for the use of gun-makers of Massachusetts at £10 per ton. The Nottingham Company's furnace was in the town of Baltimore, we believe, and under the care of John Skinner, who stated that it blowed out five weeks before, and would require the next six months to prepare stock and get ready for another blast. Small cannon were also cast by Samuel Dorsay and others.[1]

Ridgely's furnace.

The price of Iron in Maryland previous to the Revolution, as quoted in 1773, was for bar-iron £26 per ton, and for pig-iron £8, exchange being at $65\frac{2}{3}$ to $62\frac{1}{2}$. It was said to be cheaper in Baltimore during the war than in Philadelphia, probably on account of the demand for cannon, fire-arms, etc., in Pennsylvania. In 1780 an export duty of 3*s.* 9*d.* a ton on pig, and 15*s.* on bar iron, real money, was laid by the Assembly of Maryland.

Price of Iron, 1773.

There are few reliable statistics either of the number or product of Iron-works in any of the States in the last century. The Abbé Raynal, who published during the Revolution, speaks of seventeen or eighteen forges as the extent to which the manufacture had been carried in Maryland. This was perhaps exclusive of furnaces for pig-iron and castings, which were numerous toward the end of the eighteenth century. Iron-works then existed in six counties in the State.

It was not until about that time that furnaces and forges began to be erected in Alleghany County, near Cumberland. This county now comprises the richest mineral and iron producing region in the State, on account of the contiguity of vast bodies of carbonate and fossiliferous iron ore to the semi-bituminous coal strata which underlie them. The Chesapeake and Ohio Canal and the Baltimore and Ohio Railroad, which are among the most important internal improvements in the Union, have opened the coal and iron of this section of country to the markets of the world, and rendered them a principal source of wealth to the State.

Western Maryland.

A great and growing industry of varied character has been created on the western borders of the State, and large quantities of coal and iron thence exported East and West. Rolling-mills and furnaces are now

(1) American Archives, 5th Ser., vol. i. 491, 114; vol. iii. 1523; vol. i. 364.

numerous in the county. The Mount Savage Iron Company's Works, eight or nine miles west of Cumberland, in the Frostburg coal basin, consisting of three very large steam hot-blast coke furnaces, and a rolling-mill with twenty-seven furnaces, and two trains of rolls driven by steam—is one of the great works of the country. It is a creation of the railroad enterprises of 1839, and has at times employed several thousand persons in its various operations. The coal in its neighborhood, as that of the Parker vein on George's Creek, is for many manufacturing purposes considered superior to any mined in the United States.

Mt. Savage Works.

Maryland, in common with the other United Colonies, extended a general encouragement to manufactures during the disputes with Great Britain. In addition to the casting of cannon, the manufacture of small arms and ammunition received the earliest and most constant attention.

In August, 1775, a Committee of the Maryland Convention appointed to inquire into the practicability of establishing a manufactory of arms in the Province, and the expense and best means of carrying it into execution, reported against the scheme as involving too much expense and delay for the exigencies of the times. They recommended instead that proper persons be appointed in each county to contract with gunsmiths, so as to engage all acquainted in any way with the business in the immediate manufacture of arms, and that money be advanced to them to enable them to fulfill their contracts with expedition. They reported twelve gunsmith-shops then in the Province, of which three were in Baltimore town; one in Georgetown; four in Fredericktown; one near Fredericktown; two in Hagerstown, and one in Jerusalem town. Each of those shops, they were informed, could in one month complete twenty substantial muskets (42 inches in length, $\frac{3}{4}$ inch clear in the bore, $\frac{1}{2}$ inch in diameter at the breech, and $\frac{7}{8}$ of an inch at the muzzle), with steel rammers, and bayonets 20 inches in length, including the stock. The price of a musket with its bayonet would be about £4, and the accoutrements about 20*s*. By this plan they could have 240 muskets furnished monthly at about £5 each. There were also some gunsmiths on the Eastern Shore, and the number would probably be much increased by the encouragement given. Rifles could also be had, it was supposed, if necessary (which were recommended to be 3 feet 4 inches in length, and $\frac{1}{2}$ inch bore), and would cost about £5 each. Swords and tomahawks, they believed, might also be made in the Province. The word "Maryland" should be stamped on the gun-barrels.

Manufacture of fire-arms.

Gun-shops in Maryland.

Persons were accordingly appointed in Frederick and several other counties to make contracts for muskets to be made according to a prescribed form, with accoutrements,[1] at a price not exceeding $10\frac{2}{3}$ each in bills of credit. An advertisement was inserted in the Maryland Gazette on 31st August, by the Council of Safety, offering liberal encouragement to any who would engage in the manufacture of fire-arms, or erect a gunpowder-mill near Baltimore, or salt or saltpetre works elsewhere, and inviting proposals for that purpose.

Isaac Harris was ordered to receive $4\frac{2}{3}$ in bills of credit for every proved musket-barrel he should deliver according to a sample furnished by him.

In October, William Whetcroft, of Annapolis, was encouraged by the Council to import in the ensuing spring a sufficient number of workmen to make and deliver every week during the next two years fifty complete muskets, which the public would agree to take at £4 each, common money. In case the differences with Great Britain were brought to a close before that, they would compensate him for his expense and trouble. He was allowed to use imported locks of not less than 7*s.* each, prime cost, for the first 800 stand.

In December, the Convention resolved to establish a gun-lock manufactory at Fredericktown or its vicinity, for which it appropriated twelve hundred pounds, common money, and authorized one dollar (7*s.* 6*d.*) to be paid for each musket-lock made thereat. A committee appointed to receive proposals for the establishment of manufactories about the same time, reported in favor of several appropriations, including £1,000 for a powder-mill, and £500 to Frederick County and £300 to each of the other counties for linen and woolen manufactories. A loan of £200 was recommended and granted for one year to Frederick Gaunt, who proposed to supply the Province with lead from two veins of lead ore which he had discovered between Fredericktown and the Cotocktin mountains.

Gun-lock factory.

Several proposals had been made to the committee for the erection of a sheeting and slitting mill, and in January the Convention, by their advice, granted £600 in bills of credit as a loan for two years, without interest, to William Whetcroft above named, who contracted to build, within six months, at his own risk, a rolling, sheet-

Rolling and slitting mill.

(1) The contracts were for "good substantial proved muskets, 3½ feet in the barrel, ¾ inch bore, with good double bridle locks, black walnut or maple stocks, and plain strong brass mountings; bayonets with steel blades, 17 inches long; steel ramrods, double screws; priming wires and brushes fitted thereto, with a pair of brass moulds for every 80 muskets to cast 12 bullets on one side, and on the other side to cast shot of such size as the musket will chamber three of them."

ing, and slitting mill within twenty miles of Baltimore, or such other place as the Convention should designate. He engaged to supply the public and individuals with slit or sheet iron at the current price in Pennsylvania or Virginia, and that it should never exceed £35, common money, per ton. He also engaged to slit, roll, or make into sheet or flattened iron of any quality iron brought to the mill, at the rate of £5 for the public and £6 for private individuals per ton. It went into operation in or near Baltimore about two years after.

In February, 1776, Henry Hollingsworth, at head of Elk (Elkton), Cecil County, made proposals to manufacture arms, and was advanced £500 in May, to be repaid in gun-barrels at 20*s.* each and bayonets at 8*s.* each. At the same time money was advanced to Elisha Winters for 600 stand of muskets at £4 5*s.* each. John Yost also contracted to make muskets at the same price, and rifles at £4 15*s.* Priming wires and brushes were made by Christopher Rabreck, of Baltimore town, at 7*s.* 6*d.* a dozen. Richard Dallam also made guns for the Province, and Robert Read, of Chestertown, sought a contract for making muskets. Samples of gun-locks were presented in May by one Messersmith, who could make ten a week, for which he expected about $3 each.

In August of this year, Elisha Winters, who was making forty muskets per month according to contract, proposed to undertake the control of the Frederick gun-lock factory, which had cost over £1,000, and by mismanagement had been of little account. The works were put in order and furnished, and in October were transferred to Winters, who was to pay 6 per cent. on the appraised value of the concern. But it does not appear to have been successful, and in June, 1778, an Act of the Assembly authorized it to be sold.

Henry Hollingsworth appears to have been principally depended upon for gun-barrels. Some of his bayonets were complained of as being too soft, which he ascribed to the bad quality of the American steel with which they were pointed, and which he had since found to be little better than raw iron, and not at all converted into steel. This objection he had taken care to avoid by contracting with Shoemaker & Humphreys, of Philadelphia, for flat burr or blistered steel of their make. We have not met with the mention of any steel furnace in Maryland at that time.

There was at this time also a gun manufactory in Dorchester County. Guns were made on the Eastern Shore at £4 5*s.* each, and probably in several other parts of the Province.[1]

(1) Amer. Arch., 4th Ser., vol. iii. 130, 448, 449; vol. iv. 726, 947; vol. v. 1591; 5th Ser., vol. i. 155, 614, 1331, 1337, etc.

Raynal mentions a Mr. Stirewith who had established several manufactures, such as silk and cotton stuffs, hardware of all kinds, and fire-arms, which branches were then united in one at considerable expense and with much sagacity. The encouragement given to these and other kinds of industry during the war produced favorable results upon the useful arts in Maryland. Although that Province and Virginia had previously been by far the largest exporters of Iron of any of the Colonies, and many common castings had been made, the manufacture of Iron into its ultimate forms had been little attended to, particularly in Maryland. From this time very good progress was made, not only in the metallic, but in most other branches of industry. Baltimore became at an early period after the war the seat of a growing manufacturing and commercial enterprise, which soon raised it to the third rank among American cities. Fredericktown and Hagerstown were also prosperous towns, in which the mechanic branches were very generally represented, and were sustained by a flourishing trade with the agricultural settlements of the State and of Western Pennsylvania. On the Monocacy and its branches, within Frederick County, in 1796, besides a forge and furnace, there were 37 grist-mills, and the Etna Glass-works, of large size, occupied the Tuscarora branch of the same, four miles above Fredericktown. Copper, brass, iron, and various other metallic wares were manufactured in the town.

Progress of Baltimore.

The effects of the British Act shutting the West India ports against American vessels, and of the heavy importations of all kinds of hardware and other manufactures, threatening destruction to the domestic production of many articles which were already made in considerable quantities, caused great exertions to be put forth in behalf of home industry, particularly in Baltimore. A committee of tradesmen, in 1786, commenced a correspondence on the best means of protecting and promoting domestic manufactures, and the ship-builders soon after petitioned for a Navigation Act similar to the English.

As already mentioned, a slitting-mill, two nail factories, a card factory, and several other manufactories, were already in operation in or near Baltimore. The ship-building, mills, and trade of the town created a steady demand for forged and cast iron work, nails, etc., and its progress in population and the arts was rapid. One of the earliest patents for making cut nails in this country was granted to Peter Zacharie, of Maryland, for a machine for cutting nails and brads.

The steam-engine, which is now the great dependence of the manufacturer, was early brought into use in the factories of Baltimore, and its different parts received several modifications at the hands of her mechanics. The improvements of James Rumsey, of Cecil County, and

those of Oliver Evans, including his project for a steam-carriage, were promptly patronized by the legislature, and some of them were soon introduced into the mills and manufactories near the city. As early as 1789, Englehart Cruse, whose father, with S. Colver, of Connecticut, had already essentially contributed to the harbor accommodations by improving upon a dredging-machine of the Messrs Ellicott, petitioned Congress for the exclusive privilege of making and vending an improved steam-engine invented by him for raising water for manufactories, grist-mills, and the like. In the same year he erected a steam grist-mill near Pratt street wharf, but the enterprise was not fully successful. On the 26th August, 1791, Mr. Cruse, Rumsey, and John Stevens, of New York, each received letters patent for improvements on Savery's steam-engine. Rumsey's patents for improvements on mills, the bellows, the generation of steam, and in the propulsion of boats, and Fitch's for marine propulsion by steam, all bear the same date.

Steam and other engines.

Mineral coal, also a prime agent with the manufacturer at this time, and a great source of wealth to Maryland, was discovered upon the lands of General Ridgely, six miles northeast of Baltimore, by Benjamin Henfrey, an Englishman, in 1801. He did not then succeed in bringing it into use, but made some experiments there and in other cities to manufacture gas from mineral coal and wood, for which he obtained a patent from the United States Government in the following year. He is said to have lighted the city of Richmond, Virginia, soon after with wood gas. The first permanent introduction of carburetted hydrogen from coal for the illumination of cities was in Baltimore, by a company, composed of the late Rembrandt Peale and others, chartered for that purpose. In the same year another company made an unsuccessful attempt to bore for coal in the vicinity of the city.

Coal and gas.

VIRGINIA.—The first attempt to manufacture Iron in Virginia, and probably on this continent, as early as 1620, and its disastrous termination, has been already mentioned, with the remark that it was not renewed in the Colony for nearly a century. Anderson, in his History of Commerce, and other writers following him, give the year 1715 as about the date of its permanent commencement in Virginia. In the manuscript journal left by Colonel William Byrd, of Westover, entitled "A Progress to the Mines," and first published, with other diaries of the author, in 1841, a lively and entertaining account is given of his visit in 1732 to the Iron mines and furnaces of Colonel Alexander Spottswood, on the Rappahannock, in Spottsylvania County. The writer, who was in quest of practical information, apparently with a view to engaging in the

same business, says he was informed by Colonel Spottswood that he "was not only the first in this country, but the first in North America, who had erected a regular furnace. That they ran altogether upon bloomeries in New England and Pennsylvania till his example had made them attempt greater works." The date of the construction of this furnace is not given, but it is mentioned in a very rare work, "The Present State of Virginia," by Hugh Jones, in 1724, and was possibly built some years before. Mr. Byrd learned from the proprietor that there were then four furnaces in Virginia. But there was no forge, although there was a very good one in Maryland, the Principio forge before mentioned.

Spottswood's furnaces.

The principal furnace of Colonel Spottswood was at Fredericksburg upon a large tract of 45,000 acres of barren land, abounding in iron ore in several places. The mine, from which the ore, of good quality, was raised by blasting, was thirteen miles from the residence of the proprietor at Germanna, an ancient settlement of German Palatines above the falls of Rappahannock, and one mile nearer than the furnace. He had also a very complete air-furnace with two fires, recently erected for melting sow metal for foundery work, situated at Massaponux on the Rappahannock, fifteen miles distant, to which the metal was carted from the smelting-furnace. The mine tract which lay in the belt of primary magnetic and brown hematite ores of the Blue Ridge and its eastern declivity, was originally taken up by Mr. Fitzwilliam, who drew into the enterprise Governor Spottswood, Captain Pearce, Dr. Nicholas, and Mr. Chiswell, the manager of the furnace. Having thus disposed of his land at a good price, he sold his own share for £500 to a Mr. Nelson; and of these persons and Mr. Robert Cary, an influential capitalist in England, the company was then composed. Mr. Chiswell, the only one practically acquainted with the business, was the manager, at a salary of £100 per annum. From him and Governor Spottswood, who was endeavoring to shake off his partners, Colonel Byrd obtained much information of a practical kind respecting the expense and management of a furnace. Some of the advice was highly judicious, and suggested precautions which had been neglected by the company, as well as by the proprietors of other early colonial Iron-works, whereby they were sometimes abandoned or rendered unprofitable.

The works at Fredericksburg had been for some years unproductive, and were nearly ruined by mismanagement during the owner's absence in England, but were then becoming remunerative. They were, moreover, built too far from navigation and upon too small a stream, and were managed with too strict economy for complete efficiency.

The company had then expended nearly £12,000, including the cost of 15,000 acres of land, negroes, and cattle. The number of negroes employed was about 80, which was forty less than were required. The standing charge for hired labor was about £200 per annum. The blast in the furnace was maintained by two vast bellows, which cost £100 each, and were driven by an overshot water-wheel, 20 feet or more in diameter, to which the water was conveyed in wooden troughs over 1,000 feet. The supply of water often failed and put out the furnace. The ore was raised by contract at 1*s.* 6*d.* per cart-load of 26 cwt. The contractor was obliged to employ laborers belonging to the company at 25*s.* a month. The ore was mixed with that of poorer quality, and roasted before smelting. The flux employed was limestone brought from Bristol as ballast, and cost 2*s.* 6*d.* a ton at Rappahannock river, whence it was conveyed twenty-four miles to the works in the carts returning from carrying down Iron. It was used in the proportion of one ton to ten tons of ore. The wood for charcoal, of which the best was red oak, and next pine, walnut, and hickory, was felled, cut, and delivered at the pits by contract for 2*s.* a cord, and was charred for 5*s.* a load of 160 bushels. Two square miles of woodland would support a furnace. The furnace when in blast ran about 20 tons of iron per week, and the founder was paid 4*s.* for every ton of sow iron made. A good furnace could be built for £700 ready for use, and could easily run 800 tons of metal in a year. The necessary hired workmen, including founder, mine-raiser, collier, stock-taker, clerk, smith, carpenter, wheelwright, and several carters, would cost annually £500. The freight (7*s.* 6*d.* per ton) and customs duty in England (3*s.* 9*d.* per ton), with commission and other incidental charges, amounted to 27*s.* a ton, which the merchants contrived to increase so that the total cost was about £2 per ton. The market value in England was £5 to £6, leaving a profit of £3 to £4 per ton.

Price of Iron.

Mr. Chiswell, an experienced iron master, informed our author that a Mr. Harrison in England possessed, through his extensive dealings in every kind of Iron, so complete a control of the market as to be able to keep the price of American below that of English make, to which it was considered superior, so that American Iron brought but £6 when English sold for £7 or £8 per ton. The duty on bar-iron in England was 24*s.* a ton, and its price from £10 to £16 per ton, which would abundantly pay the cost of forging. But he was of opinion that Parliament would soon forbid that, lest they should go further, and make it into all sorts of iron ware, as they already did in New England and Pennsylvania. He even doubted if they would be allowed to cast any iron, as they could do in their furnaces.

The air-furnace at Massaponux, five miles from Fredericksburg, it is said, was "a very ingenious and profitable contrivance." It was intended for the production of castings for the use of the surrounding country, such as backs for chimneys, andirons, fenders, plates for hearths, pots, skillets, mortars, rollers for gardeners, boxes for cart-wheels, etc., which, one with another, could be delivered at people's doors at 20*s.* a ton. Being cast from sow metal, they were better than those from England which were mostly made directly from the ore. The chimney and outside of the furnace were built of freestone, and the lining was of Stourbridge brick.[1] Seven mines of iron ore were worked in Spottsylvania County in 1839.

Blast-furnace.

On the opposite side of the Rappahannock from Fredericksburg, in King George County, twelve miles distant, were also iron mines upon lands belonging to Mr. Washington, and called England's Iron Mines after the chief manager. Two miles distant from the mines was a furnace for smelting the ore, which was raised and carted to the furnace by Mr. Washington for 20*s.* the ton upon every ton of metal. The crude metal was thence carted six miles to the Potomac, on a branch of which the furnace stood. Besides Mr. Washington and Mr. England, who also had the chief management of a forge at Principio, in Maryland, there were several other proprietors of these works resident in England.[2] No expense was spared to make these works profitable, and they were well managed. This furnace and that at Fredericksburg were built by a Mr. Taylor, who was engaged in Gloucester, England, for that purpose, at 3*s.* 6*d.* a day from the day he left home until his return.

These particulars exhibit in some measure the amount of skill and enterprise with which the manufacture was introduced in the Colony. There is reason to believe, although the details of early operations are few, that many of the colonial enterprises in this branch were not far behind the existing state of the business in England. The want of ships of their own to carry their Iron to England, compelled the Virginia Iron manufacturers to confine themselves principally to the home market. But the four furnaces then in operation were believed to be of much

(1) A fine quality of clay, which made fire-bricks nearly equal to Stourbridge, was afterward found on the Tuckahoe, a branch of James river.

(2) The historian Oldmixon says he was about this time concerned in a project for Iron-works in Virginia, which did not fail from any scarcity of ore or fuel, for the cliffs of the rivers were full of Iron, and the highlands everywhere were a mere rock of it. Sufficient Iron could be made in the Colonies to supply all Europe. The principal drawbacks were the duty and freight and the prohibition of forges. The cost of raising an Iron-works and the addiction to the tobacco culture, were additional reasons for its neglect.

service to the Colony, circulating a large amount of money, and withdrawing many men from the cultivation of tobacco to more profitable labor. They also lessened the importation of bar-iron from the continent, and enabled England to dispense with all other pig-iron than the colonial. She paid for it in her own manufactures, and transported it in her own ships, and thus derived much benefit from the industry.

This view of the importance of these early Iron-works is substantially that of several English commercial writers of the period. Iron in pigs is named by Macpherson, in 1731, among the commodities which rendered Maryland and Virginia the most valuable acquisitions to Great Britain. The tobacco alone of these two Provinces was worth annually £375,000, and the whole net gain to England upon the transportation, customs, and sale of their produce, which was all paid for in merchandise, was set down at £180,000 per annum.[1] The two Colonies from this time until the Revolution exported to England annually between two and three thousand tons of pig-iron.

Iron and other ores.

The older secondary and metamorphic rocks of Eastern and Middle Virginia above tide water, especially throughout the whole extent of the Blue Ridge, abound in Iron and other metallic ores. Rich surface indications of cupriferous ore, which have not been extensively explored, are found along the Blue Ridge from Manassah Gap nearly to the Carolina line. The proto-sulphuret, red oxyd, and carbonate of copper occur in graywacke and epidotic rocks in many places.

In his "Journey to the Land of Eden," in 1731, Colonel Byrd mentions sundry mines and veins of copper ore, which he visited on the branches of the Roanoke in the southern part of the Province. At one of these, called Cargill's mine, between the Bluestone Creek and James river, the appearances of copper were so numerous that the inhabitants seemed to be all "mine mad," and neglected their husbandry to search for mines. On his return to his estate of Westover on 19th September, he adds, "we laid the foundation of two large cities," Richmond and Petersburg.[2]

Copper ore exported.

Thirty hundred-weight of copper ore with forty tons of Iron, are mentioned by Anderson as having been received, along with some hemp, silk, and beeswax, from Virginia in 1730. Most of them were new and unexpected productions. The copper ore was probably from some of these early diggings. In Mecklenberg County, on the Roanoke, not very distant, a mine of copper which promised considerable gold was opened about seventy years ago on the lands of Solomon Draper.

(1) Macpherson's Annals of Commerce.

(1) Westover Manuscripts.

The deposits of brown hematite iron ore in the great limestone valley of Virginia, west of the Blue Ridge, appear to have been opened in several places early in the last century. Zane's charcoal furnace on Cedar Creek in Frederick County, said to be the oldest in that region, has been abandoned over thirty years. A forge attached to it has been some time in ruins. Pine forge, three miles and a half north of Newmarket, in Shenandoah County, was built, according to the tables of Mr. Lesley, in 1725, and is still in use, having been but once rebuilt. On Mossy Creek, one of the head streams of the south fork of the Shenandoah, fifteen miles north of Staunton, in Augusta County, is also a forge which was built in 1757, rebuilt in 1767, and again in 1836. It is still making bar-iron from these ores, with a refinery and chafery and two hammers moved by water. Mossy Creek charcoal furnace, about a mile from the forge and two and a half from the Manassah Gap Rail-road, was built in 1760 and burned down in 1841. It was $8\frac{1}{2}$ feet in the boshes and $28\frac{1}{2}$ high. Isabella furnace on Hawksbill Creek, near Luray, in Page County, was built and abandoned in the same years with the last. Union forge, near Waynesborough, in Augusta County; Gibraltar forge, on North river, nine miles north of Lexington; and Buffalo forge, the same distance south of Lexington, on Buffalo Creek, in Rockbridge, were all built about the year 1800. A furnace on Smith's Creek, in Rockingham County, is still older, and was abandoned nearly half a century ago. Moore's charcoal furnace on Steele's Creek, Rockbridge County, has been nearly as long neglected, and lies in ruins.[1]

Early forges.

Lynch's Ferry, now the prosperous manufacturing town of Lynchburg, situated on James river below where it passes the gorge of the Blue mountains near the loftiest summits of the range, was the centre of a cluster of charcoal furnaces erected in the last century to smelt the primary iron ores and hematites of a region rich in metalliferous products of different kinds. These are now nearly all abandoned.

Abandoned furnaces.

The "Notes on Virginia," published in 1781, contain the following observations on the subject of mines and iron-works:

"The mines of Iron worked at present are Callaway's, Ross's, and Ballandine's on the south side of James river, Old's on the north side in Albemarle, Miller's in Augusta, and Zane's in Frederick. These two last are in the valley between the Blue Ridge and North mountain. Callaway's, Ross's, Miller's, and Zane's make about 150 tons of bar-iron each in the year: Ross's makes also about 1,600 tons of pig-iron annu-

(1) Lesley's Iron Manufacturer's Guide.

ally; Ballandine's, 1,000; Callaway's, Miller's, and Zane's about 600 each. Besides these, a forge of Mr. Hunter's at Fredericksburg makes about 300 tons a year of bar-iron from pigs imported from Maryland; and Taylor's forge, on Neapsco of Potomac, works in the same way, but to what extent I am not informed. The undertakers of Iron in other places are numerous, and dispersed through all the middle country. The toughness of the cast-iron of Ross's and Zane's furnace is remarkable. Pots and other utensils cast thinner than usual of this iron may be safely thrown into or out of the wagons in which they are transported. Salt pans made of the same and no longer wanted for that purpose, cannot be broken up in order to be melted again unless previously drilled in many parts."[1]

Ross's Iron-works, above mentioned, were on Beaver Creek, seven miles south of east from Lynchburg, and were abandoned nearly twenty-five years ago. They are mentioned by Mr. Lesley under the name of Oxford furnace. A forge and bloomery by that name in Bartley County were advertised for sale in December, 1772, by Robert Harper, and Thomas Callaway's were near Rocky Mount or Franklin Court-house. Saunder's furnace, at the same place, is mentioned by Mr. Lesley as having been abandoned as early as the year 1800.

Many other furnaces and forges were built in these counties before the end of the last century. In Loudon County a furnace was owned by Mr. Clapham, who cut a canal through the end of Cotocktin mountain, 500 feet through solid rock and 60 feet beneath the surface, to obtain water for his furnace and mill. On Chestnut Creek, in Carroll County, a forge was built about 1790, which has been abandoned fifty years, and another on Little Reed Island Creek, has been nearly as long neglected. In Craig, Wythe, Grayson, Washington, and other counties of the southwest, iron-works were erected soon after. The brown hematite ores in their several varieties are abundant throughout the great Winchester Valley, are generally rich in metal, and, though frequently associated with manganese, yield a very good Iron. The frequent sulphur

(1) Nevertheless, Mr. Lesley considers "the manufacture of Iron in the country of the Blue Ridge and to the east of it, where the primary Huronian (and perhaps Laurentian) system is developed, although very old for the New World, has been as unsuccessful as in Pennsylvania. Of 18 furnaces east of the Blue Ridge, only one was in blast in 1856, and that but for half the year, making 760 tons in a region where the standing capacity was at least 20,000 tons per annum." Of the great number built along the great valley, he further observes, "but 21 made any Iron in 1856, and these only 13,000 tons instead of 30,000, as they should have done; and not one of these are reported as using any ore but the brown hematite of the valley Limestone Lower Silurian No. II. It is not to be imagined that this immense stretch of Huronian rocks is barren magnetic iron ground. The resources of the Blue Ridge must some day be explored."—*Iron Manufacturer's Guide*, 445, 446.

springs in this region denote the presence of pyritous Iron in the slate and limestone rocks.

"In the Western country," writes Mr. Jefferson, "we are told of iron mines between the Muskingum and Ohio, and of others on Kentucky between the Cumberland and Barren rivers, between Cumberland and Tennessee, on Reedy Creek near the Long Island, and on Chestnut Creek, a branch of the Great Kanahway near where it crosses the Carolina line. What are called the Iron banks, on the Mississippi, are believed by a good judge to have no Iron in them. In general, from what is hitherto known of that country, it seems to want Iron."

Western Virginia.

Such was the caution with which it was thought proper to speak of the great deposits of the carbonate and peroxyd of iron which everywhere occupy the vast areas of the coal measures of Western Virginia, Kentucky, Tennessee, and Southeastern Ohio, then principally included in the territory of Virginia. Associated as these ores are with the mineral fuel of the Western country, they are already more extensively wrought in these newer States and in Pennsylvania than in Virginia, but are capable of a development throughout a large portion of the West to which there is at present no assignable limit. Iron was discovered in several places throughout this region before the end of the last century, and a number of furnaces and forges were erected for smelting it. A few adventurers had penetrated beyond the Cumberland mountains before the Revolution, but it was not until after the Peace that the agricultural and mineral resources of the Western country attracted settlers in large numbers from Middle Virginia and Pennsylvania. Population and improvements rapidly increased from that time, and Kentucky was separated from Virginia in 1786, and Tennessee from North Carolina in 1790. They were admitted as States of the Union, each in six years after its organization as a territory. Previous to this, several Iron-works were erected within their borders.

Kentucky.

The first in Kentucky are said to have been the old slate charcoal furnace erected by Government troops in 1791 on Slate Creek, a branch of Licking river, in Bath County, then Bourbon. It was thirty-two miles southeast of Paris, and a few miles northeast of Owingsville. It ran forty-seven years on magnesian limestone ore of the Upper Silurian rocks, and blew out in 1838. A large number of furnaces and forges were built within a few years after in Estill, Edmondton, Greenup, and other counties in Eastern Kentucky, which have been long abandoned. The carbonate ores and limonites of Western Kentucky have called into existence a great number of works, some of them, as the Great Western in Stewart County, of large size. In the northern

First Kentucky furnace.

part of the State, connected with the Ohio navigation, are now about seventeen furnaces.

In the southern part of Ohio, where Virginia also claimed extensive jurisdiction to territory, much of it, as that on the Muskingum and its branches, known to abound in coal and iron, are now between forty and fifty furnaces seeking an outlet for their product by the same channel.

Ohio. These lands, with the claims of New York and Connecticut, were all ceded to the United States by those States previous to the erection of a Territorial Government in 1787. The immense coal field which underlies the surface of twenty-eight counties in a broad belt between the Ohio and Lake Erie, comprising a body of mineral fuel many times the extent of that of Great Britain, and a very considerable iron ore field, embracing many varieties of the burrstone and other argillaceous, carbonaceous, and bog ores, have been industriously developed during the last fifty years. Numerous charcoal and coke furnaces have rendered the iron interest of Ohio one of great magnitude. Raw bituminous coal is said to have been first used in the Iron-manufacture in America in a furnace of that State. We are not aware that any Iron-works were erected within its limits in the last century.

Among the metals of Virginia reference has been made to the early discovery of copper ore in the Red Sandstone formation east of the Blue Ridge and along that range, which furnishes cupreous ores throughout almost its whole length from New England to Carolina. Two mines of copper are mentioned by Mr. Jefferson as having been opened along James, one on the north side, in Amherst County, and another opposite to it on the south side. For some reason, however, the mining had been discontinued.

A lead mine near Fincastle, in Botetourt County, was wrought during the Revolution. There was also a lead mine on the Great Kanawha,

Lead mines. in Wythe County, opposite the mouth of Cripple creek, and one in Montgomery County, about twenty-five miles from the Carolina line. Two mines were worked in these places which yielded about 25 tons of lead yearly. Thirty men had produced 60 tons in a year, besides raising their own corn. The ore was sometimes found mixed with earth, and sometimes in rock which required blasting. It produced, on an average, 60 per cent. of lead, with a small proportion of silver, not worth extracting. The furnace for reducing the ore was on the opposite side of the river from the mine, and a mile distant. The ore was taken to the river in wagons, carried over in canoes, and thence wagoned to the furnace. This expensive arrangement was made to secure a good site for a pounding-mill on the creek, which end could have been better attained by a short canal to bring water to the other

side. From the furnace the lead was transported over a good road one hundred and thirty miles through the Peaks of Otter to Lynch's ferry or to Winston's, on James river, and thence about as far, by water, to Westham, six miles above Richmond. A mine in Wythe County is still worked by several shafts exclusively for lead ore, though much iron ore is also met with. Of three principal veins which are worked, one had been mined in 1854 for 1,000 feet, and 150 feet below the surface to water level, and another nearly 200 feet deep, the dip varying from 15° to 60° southeast. The principal ore is the sulphuret or galena, with occasionally the compact carbonate, and from 500 to 700 tons of lead were annually obtained. The carbonate of lead in these mines was in early times thrown away as white clay. These lead deposits near the sources of the James river were more extensively mined in the last century than any others in the country, and notwithstanding the bad economy of their managers, furnished lead to the greater part of the Union.[1]

Lead mines were also opened in several other places between the Alleghany and Cumberland mountains, particularly on the French Broad river and south of the Green river in Kentucky.

A lump of gold, yielding 17 dwts. of very ductile metal, was found near the falls of Rappahannock. But it did not lead to any further discovery of the metal at that place. Some granules of gold were afterward found between the James and Appomattox. But the certainty that the rocks in different parts of this State and North Carolina are highly auriferous has been more recently ascertained. In 1839, no less than sixty gold mines (so called) or diggings were said to be worked in the State, of which twenty-six were in Spottsylvania

Gold mines.

(1) The lead mines of Missouri were discovered about the year 1719, and in 1723 were granted to M. Renault, who had made the first diggings, by the celebrated Mississippi Company, whose schemes were principally based on the reputed mineral wealth of Louisiana. The company is said to have sent 500 men to search for minerals, but Renault, finding few of the precious ores, turned his attention to the lead which was found abundantly near the surface on the Maramak and other rivers. They are believed to have raised great quantities of ore, and made some attempts to smelt it. The mining did not amount to much under the French and Spanish domination. But the old diggings and new mines were wrought after the territory was purchased by the United States in 1804, and in 1811 twelve diggings around St. Genevieve were worked, and each had a rude open or ash furnace attached. Only one, the Mine à Burton, had a shaft, which was sunk 80 feet by Moses Austin. Austin had also the first and only air-furnace then erected at the mines. The twelve mines produced about one and a half million pounds of lead annually, and employed 350 men, besides smelters and some other workmen.

At least 3,000 square miles in Missouri are occupied with lead deposits, and Dr. Owen states that the Western lead region covers also four townships in Iowa, ten in Illinois, and sixty-two in Wisconsin.

and fifteen in Orange County. Still more recently machinery was somewhat extensively introduced by Commodore Stockton, for reducing the gold-bearing quartz of a rich vein in Fluvanna County; and quartz-mills have been erected in Buckingham County and other places by different companies.

But the gold mines of Virginia are greatly subordinate in value to her Iron and coal. The latter had been observed in so many places throughout the Western country, that, as mentioned in the "Notes on Virginia," the whole country between the Laurel Ridge and the Mississippi was supposed to be underlaid by it. It was also known in many places north of the Ohio and on the branches of the Monongahela. On both sides the James river for several miles, and fifteen or twenty above Richmond, coal seams had been long opened. The pits were owned by different persons, and were worked to an extent equal to the demand. The coal was superficial, and is stated to have been first found by a boy in digging for crayfish, and was found adhering to the roots of upturned trees. It was exported to Philadelphia and other places in 1789 in considerable quantities, and sold in the former by retail at 1*s.* 6*d.* a bushel.

Coal mines.

To render available for market the valuable semi-bituminous coal deposits of the Richmond and Chesterfield coal basin, and the mineral resources of the western counties, the improvement of the navigation of the Potomac and James rivers so as to interlock by canals and short portages with the head-waters of the Great Kanawha and Monongahela, received early attention. In 1785, the Assemblies of Virginia and Maryland passed Acts to encourage a company, in which General Washington was a large stockholder, to reach Will's creek near Fort Cumberland, at the foot of the Alleghanies, by means of the Potomac river and a canal 30 feet wide with 8 feet of water, estimated to cost $50,000. About the same time the legislatures of Virginia and North Carolina jointly incorporated a company to construct a canal between the navigable waters of Elizabeth and Pasquotank rivers, thus uniting Albemarle Sound with Philadelphia, except a short passage between Elk river and Christina creek. This canal passed through a portion of the Dismal Swamp, whose terrible solitudes were first penetrated by a portion of the company which surveyed the line between Virginia and Carolina in 1728.

A canal was soon after completed around the falls of James river, opening direct water communication with some of the finest portions of the interior. The ample water-power of the falls, which have a descent of 80 feet within a few miles above Richmond, had been some time before appropriated to various manufacturing purposes. An excellent air-

furnace was built at Westham, six miles above the city, on the north side of the river, during the Revolution. Some of the largest and best-constructed merchant mills in the country were built on the canal and falls near the city a few years later.

A rolling and slitting mill was afterward built at the same place to work the Iron which came down from the upper country. This was probably not the first in the State, although we have seen no mention of an earlier one. Although the States south of Pennsylvania were supposed to make more pig-iron than those to the northward, the manufacture of that metal into its various forms for use had made less progress, and most of their iron wares were imported from England or the northern Provinces before the war.

Manufactures from Iron.

The erection of mills and Iron-works was encouraged by the Assembly of Virginia at different times. The Revolution forced upon all the Southern Colonies an increased attention to domestic manufactures. Employment was furnished in many of the manual arts, and several branches of metallic manufacture were introduced by that event. The non-intercourse resolutions were early adopted and faithfully carried out.

A committee of the Virginia Convention previously appointed to report a plan for the encouragement of arts and manufactures, reported, March 27, 1775, a series of resolutions, which were unanimously adopted, urging the people to promote the manufacture of cloth, salt, gunpowder, nails, wire, etc., and largely to encourage the making of *steel*, as there would be a great demand for the article. Wool combs, cotton and wool cards, and heckles, which had been for some time made in some neighboring Colonies, were also commended to their attention. The formation of societies and the giving of premiums for the promotion of these and other useful objects was recommended.

In August a resolution was passed "that in case the British Ministry attempts to enforce the Act of Parliament preventing the erection of plating and slitting mills in America, the Convention will recompense to the proprietors of the first two of such mills as shall be finished and set to work in this Colony all losses they may respectively sustain in consequence of such endeavours of Administration." An ordinance was also passed to encourage the manufacture of saltpetre, gunpowder, lead, the refining of sulphur, and providing fire-arms for the use of the Colony. The industry of the Virginians in that and the following year in some kinds of domestic manufacture, and their zeal in promoting the use of home-made goods, are described as almost surpassing belief. To provide lead for the troops, the Convention, in

Rolling-mill.

May, 1776, reprieved a number of condemned negroes, and sent them to work in the lead mines in Fincastle on the public account.

These efforts doubtless secured some attention to the branches indicated. But for cannon, small arms, and other munitions of war, Virginia appears to have depended less in the early part of the war on her own resources than Maryland and some other States. An order for some small cannon for the State was sent to France early in the year 1776. An application was also made to Congress for leave to purchase cannon at Hughes' furnace in Maryland, whence the State would appear not to have been well provided with the facilities for making cannon at the outset. One of the best cannon-founderies in the country was, however, in operation before the end of the war at Westham, a few miles above Richmond, and, with a large quantity of cannon and other military stores, was destroyed when Gen. Arnold invaded the State in January, 1781.

Cannon.

Cannon and small arms were made in some other parts of the State, but we cannot say to what extent. The price for iron cannon was about £35 per ton, Virginia currency, and for muskets £4 5*s.* each. At New London, in Bedford County, and probably in several other towns, were a number of workshops for the manufacture and repair of fire-arms during the war.

Small arms.

After the peace (1786), Mr. Jefferson and Marquis de Lafayette were commissioned to purchase fire-arms in France for the Virginia militia. France is said by M. de Warville to have withdrawn the prohibition resting on the exportation of fire-arms and ammunition in consequence of this order, which was made at a time when there was a strong foreign competition for the trade of the American States.[1]

(1) Congress at different times obtained supplies of arms from France. A letter from Barbue Daborg to Dr. Franklin, in June, 1776, speaks of obtaining from the king's arsenal, as an assumed mercantile transaction of the manufacturer, 15,000 muskets of the model of 1763, for the use of the United States. He alludes to an improved musket invented by one Reynard, which it was hoped would first be employed in the service of liberty in America. Mr. Jefferson, in a letter from Paris to John Jay, in Aug., 1785, and afterward to the Governor of Virginia, mentioned a valuable improvement which had just been made in the manufacture of muskets in Paris. It had been approved of by the Government, which was then establishing a large manufactory to put it in execution. It consisted "in the making every part of them so exactly alike that what belongs to any one may be used for every musket in the magazine." It had then been applied only to the manufacture of the locks, but would soon be extended to all parts of the gun. The principle is so analogous to that adopted a few years after by Eli Whitney at New Haven, and subsequently in public arsenals of the Government, that it seems probable the idea was obtained from abroad. Mr. Jefferson alluded to it, he says, in case Congress should wish to purchase arms,—whence it may be inferred that he did not consider his own State or the country as affording any scope for its introduction. He was not at that time, however, an advocate of Manufactures.

In accordance with the Act of May 4, 1798, Harper's Ferry, in Virginia, was selected as the site of one of the public armories and gun-manufactories of the United States, where the latest improvements in the manufacture were introduced.

Public armory.

Under the old Confederation, in January, 1788, Virginia enacted a State impost law, which laid the following duties on Iron and its manufactures: On bar-iron pots and other castings the duty was 4*s.* per hundred-weight; on nail-rods, 6*s.*; on axes per dozen, 8*s.*; on hoes, 6*s.*; and clocks paid £5.

The manufacture of these articles had probably received an impulse during and subsequent to the war. Virginia and Carolina made hoes had been for sale in New York several years before the Revolution. Nails, which had always been imported in large amount, were now made in considerable quantity. Many of the planters had taken pains to instruct their negroes in that and other handicraft branches, and in some sections their labor went far toward supplying the demand. Mr. Jefferson, who had much of his domestic coarse clothing, cabinet-ware, masonry, bricklaying, smith-work, etc., thus done by his own slaves, also employed about a dozen of the younger ones in the manufacture of nails, who made about a ton of nails a month at a considerable profit. His mechanical tastes also led him, previous to the time that he assisted in the organization and presided over the Patent Board of the General Government, a little into the field of invention. While in England, in 1786, he contrived a portable copying machine, on the principle of a large one then in use, and in Paris he set a workman to make them, who had his hands full, such was the demand for them. He also devised a mould board of improved construction for a plow.

Progress of household industry.

In illustration of the progress made in domestic and particularly household manufactures in the ten years following the peace, some facts were carefully collected and furnished to Mr. Tench Coxe, and appended to his review of Lord Sheffield's pamphlet in 1792. From several parts of Virginia and other Southern States, where the results were expected to be less striking than in the Northern ones, the evidence seemed to prove that, even in towns accessible to shipping, the advance in necessary manufactures had been as visible and rapid as in agriculture. The progress in Frederick and Elizabethtown, in Maryland; in Staunton, Virginia; Lexington, Kentucky; and some other interior towns of the South, there was reason, to believe, had been nearly as great as in the counties of Lancaster, York, and Berks in Pennsylvania, which were the most advanced in manufactures of any in that State, and perhaps in the Union. Winchester, Virginia, was remarkable for the number of its

manufacturers, as also several interior towns of Pennsylvania, and Philadelphia, where one-fourth of the adult males belonged to the classes which could properly be called manufacturers.[1] One communication represents that the manufactures of Iron exceeded all others in Virginia, which was supposed to be exclusive of the household manufactures of every kind. In ship-building, Virginia then exceeded New Hampshire, and in merchant mills her progress was greater than that of any other State, though still behind some in that class of machinery. These branches were a support to the iron interest. Of the facilities afforded by Richmond for some of those branches of manufacture in which it has since become so prominent, Mr. Coxe makes the following observation at a time when the coal deposits of other parts of the Union had not been discovered: "There are but two scenes in the Atlantic counties in which coal, iron, and water-falls are yet found together in abundance. These scenes are therefore peculiarly qualified for the iron branch of manufactures. The city of Richmond on the bank of James river, in Virginia, which is one of the places contemplated, may be considered in a permanent view as having an incontestable natural advantage over any more northern *seaport* in this interesting branch. How profitable would it be to Virginia were all her pig and bar iron passed under the tilt-hammers or through the rolling and slitting mills which might be erected at that place."

Richmond.

North Carolina.—In the Provinces south of Virginia the manufacture of Iron was not attempted either as early or as extensively as in those further north. And notwithstanding the abundance of excellent ore in some of them, and plenary facilities for its manufacture, the production of Iron is still relatively inconsiderable.

Within the limits of North Carolina probably the first discovery of iron ore in this country was made by the colony of Sir Walter Raleigh, left in August, 1585, on the island of Roanoke, under Captain Lane. Amidas, and Thomas Heriot, the inventor of the system of Algebraic notation. Lane and his men, impelled by the hope of golden discoveries, which was certainly as excusable in that age as in this, explored the country along the Roanoke and on both sides from Elizabeth

Early explorations.

(1) Winchester contained about 200 houses and had 4 or 5 tan-yards; 1 large ropewalk; 1 or 2 coach-makers; 3 or 4 distilleries, and many others in the neighborhood; several oil-mills; numerous grist-mills; 1 coppersmith, whose business was extensive; 3 tinplate workers; 8 or 10 hatters; 12 or 15 saddlers, who, as well as the hatters, did a large business; 5 or 6 blacksmiths, one employed in plating saddle trees; 3 or 4 wheelwrights; 8 or 10 tailors; 8 or 9 shoemakers; 4 or 5 weavers; 2 spinning-wheel makers; 3 or 4 saddle-tree makers.—*Coxe's View of the United States.*

river to the Neus, and obtained the first knowledge of several indigenous productions, such as tobacco, maize, the potato, and sugar cane. At two places, one fourscore the other sixscore furlongs from their settlement, Heriot, the historian of the Colony, says they found near the water side rocky ground, "which, by the trial of the mineral man, was found to hold iron richly. It is found in many places of the country else. I know nothing to the contrary but that it may be allowed for a good merchantable commodity, considering there the small charge for the labour and finding of men, the infinite store of wood, the want of wood and dearness thereof in England, and the necessity of ballasting ships."[1] Copper and silver ornaments were found with the natives, who discovered in the strangers credulous and willing listeners to many fictions of rich mines in the far interior.

The second charter to Lord Clarendon and his associates in 1665, confirming to them under the title of Carolina, and extending the former patent to the whole territory of the two Carolinas, with palatinate rights and jurisdictions, granted the proprietaries "all veins, mines, and quarries, as well discovered as not discovered, of gold, silver, gems, and precious stones, and all other whatsoever, be it of stones, metals, or any other thing found or to be found within the Province, territory, inlets, and limits aforesaid." They were to pay, as a feudal acknowledgment, a rent of twenty marks, and one-fourth of the gold and silver that should be found therein.

Though less important every way than the baser metals contained within it, the limits of this patent embrace the principal gold-producing region of the Atlantic States. If the proprietaries made any effort to promote the discovery of the precious or useful ores the metallurgic knowledge brought to the investigation does not appear to have been adequate to its detection. Although many of the earlier adventurers doubtless kept a vigilant watch for traditional treasures in the soil, it was not until a comparatively recent date that Carolina and neighboring States were found to hold gold and silver in appreciable amount. Gold is first mentioned in Mr. Jefferson's Notes as a known constituent of the porphyritic structure of the Appalachian chain. It is confined in the United States to the newer metamorphic series, and where the "Appalachian gold field" crosses the western part of North Carolina, it occurs in auriferous quartz, pyrites, and other crystalline forms, associated with silver, copper, lead, iron, barytes, etc., some of them also in useful proportions. It is not known how early it was found in this State, but a large lump was discovered in 1799, which, when melted at the Mint, is said to have yielded 25 lbs. of gold 23

Gold mines.

(1) Heriot's Narrative in Dr. Hawk's Hist. N. Carolina, i. 158.

carats fine. It was first obtained in any considerable quantity in this State.[1]

Iron ores.

The iron ores of this State embrace the bog deposits of the alluvial seaboard counties, which are common to the cretaceous, tertiary, and drift formations of the whole Atlantic slope, and to similar formations elsewhere, as well as to those of earlier age where circumstances are favorable to their deposition. Beds of brown hematite are met with in the older and newer secondary contiguous to the primary series. At Egypt, in the Deep river coal basin, which is a continuation of the Richmond coal field, fossil or black band ore occurs in juxtaposition with the coal, and in workable quantity. The middle and northeastern counties are crossed by three considerable belts of primary magnetic, specular, and pyritous ore, charged in many places, as already observed, with gold, silver, and other metals in economical proportions. Some of these have been long worked for the production of Iron. In the transmontane territory of Carolina, now the State of Tennessee, the carbonate and Dyestone fossil ores come up in the upper Silurian and Devonian system, with numerous beds of brown hematite on the limestone valleys between the mountain ranges.

Iron-works.

Several Iron-works were in operation in the Province before the revolutionary war, some of which were put out of blast by that event. They were situated on the primary ore belts of the middle and western districts, principally Salisbury, on branches of the Cape Fear, Yadkin, and Dan rivers. John Wilcox was the proprietor of a furnace and Iron-works on Deep Run in the beginning of the war. Its site is not definitely mentioned. There were also Iron-works in Guilford County, probably on the same stream. In April, 1776, the Provincial Congress sent commissioners to treat with Mr. Wilcox for the use of his furnace and works for two years, or to purchase and repair those in Guilford, for casting ordnance, shot, etc., and empowered them to draw

(1) Of the gold coinage of 1804 about eleven thousand dollars were the produce of virgin gold from Cabarrus County, N. C. From that time to 1827 all the gold in this country was obtained from this State, amounting in all to $110,000. The Gold Hill mines in Rowan County are the richest in the Atlantic States, and now yield about $200,000 worth annually. It is extracted from iron pyrites contained in talcose slate, quartz, and other rock, which is worth usually from one to three dollars per bushel, and occasionally $1,000. The "Washington Silver Mine," in Davidson County, furnishes gold, silver, lead, and iron. A bar of silver from one of these mines in the New York Exhibition in 1853–4, is said to have been the first smelted from the ores in the United States. Several counties of this State produce gold in various association with other metals. The copious yield of gold by the mines of the Southern States induced Congress in 1838 to establish three branch mints, one at Charlotte, North Carolina, one at Dahlonega, Georgia, and one at New Orleans, the first two for gold coin only.

on the treasury for £5,000 for that purpose. At Ore Hill, on Deep river, near which Wilcox's furnace probably stood, and in Guilford County, the Chatham or eastern belt of primitive ores furnishes magnetic, specular, and hematite iron in great quantity, and excavations in their neighborhood show them to have been mined long ago. On the western belt of the same ores, a furnace and forge was also built before the war on Buffalo creek, in Cleveland County, not far from King's mountain on the southern border of the State. A bloomery forge near its site and several others in the county now obtain ore from a magnetic vein forty feet thick, on the west side of the mountain. In the adjoining county of Lincoln, rich veins of this ore have been long wrought, and furnished in early times a metal of high repute. At the end of the last century, four forges, two bloomeries, and two furnaces, were in operation in the county. One of the furnaces, the Vesuvius, built in 1795, was on Anderson's creek, ten miles east of Lincolnton, and, having been rebuilt, is still in use. In Stokes County, where these ores spread out in broad seams and maintain several forges, Iron-works were built on Iron creek, and conducted with spirit nearly seventy years ago. A magnetic ore bank was early opened about three miles from Danbury and ten miles from the Dan river coal basin. Magnetic ore from a shaft near the town yields 77 per cent. of iron. On Snow creek, ten miles northeast of Danbury, a bloomery was built in 1780; another on Town Fork, ten miles southwest, in 1796, and one on Tom's river, nineteen miles west of the same place, in 1791. These have each been rebuilt within a few years, and all but the last are still in operation. In Surry County, where Moravians from Pennsylvania, many of them tradesmen, made settlements as early as 1753, Iron-works were erected a few years after the Revolution near the Yadkin. It now has six forges and a furnace. On the same stream, in Wilkes County, a forge was also built near the same time. A furnace and forge was erected also on Troublesome creek, in Rockingham County, to work up iron ore found in several parts of it. Catawba County contains some specular iron ore. The remains of a shaft and of old crucibles and furnaces near Trogden mountain are supposed to attest the misguided enterprise of some one who, before the days of the present settlers, was tempted by the deceptive lustre of the specular oxyd to hope for certain wealth.

In Burke County, Morgan district, twelve miles from Morgantown, at the foot of the Blue Ridge, were two bloomeries and two forges before the close of the last century. Twenty miles from the same place was also a lead mine.[1]

(1) In Linville mountain, in this county, has been found accompanied, as in Brazil the rare mineral flexible spar (ita columite) and the Ural mountains, by diamonds, of

The name of the Great Iron Mountain, given by the first settlers to that portion of the Blue Ridge which is prolonged on the western boundary of this State, indicates their knowledge of its great abundance of magnetic iron ore, and red and brown hematite. The whole region is rich in other valuable ores. The Hiwassee, Ducktown, and other copper mines in Polk County, adjoining the Georgia line, are celebrated as among the richest in the country, affording the black oxyd and sulphuret of copper for which they are wrought, in great amount. They are equally rich in hydrated peroxyd of Iron, resulting from the decomposition of the pyritiferous rocks, and carry their veins of both metals into the State of Georgia. A furnace was once built to smelt iron from these ores. The streams which flow westward from this elevated dividing ridge into the great valley of the Tennessee, are now studded with numerous iron-works. The hardy emigrants from Virginia and neighboring States, and from Europe, who, on the restoration of peace with England and the indigenous Indian tribes, penetrated, chiefly, by way of the Cumberland Gap, into the fertile limestone valley of the West, erected several Iron-works within the present limits of the State, before it obtained a separate federal existence. Their first operations appear to have been made in the northeastern corner of the State, on the head streams of the Holsten, the main branch of the Tennessee. They are said, however, to have rejected the richest of the brown hematite ores of this section, mistaking it for the *black jack*, (sulphuret of zinc) of the English miners.

Western Territory.

A bloomery forge was built in 1790, at Emeryville, eight miles southeast from Washington College, and the same distance south of Jonesborough, in Washington County and district. It is now known as the Pleasant Valley Rolling-mill and Nail-works, to which use it was converted in 1833. At Elizabethtown, on Doe river, a branch of the Watauga, in Carter County, the bloomery of Messrs. Carter & Co. was built in 1795. It is now surrounded by a number of similar works. A bloomery was also erected on Camp Creek, of the Nolachucky, seven miles southeast of Greenville, Greene County, in 1797. It was rebuilt in 1856, and still makes Iron from hematite in its neighborhood. Wagner's bloomery, a working forge on Roane's Creek, a few miles from Taylorsville, in the extreme northeastern corner of the State, in Johnson County, is said to have been built in 1795. Two bloomeries in Jefferson County, the Mossy Creek forge, ten miles north, and Dumpling forge, five miles west

Furnaces in East Tennessee.

which some small ones have been found in this State and Georgia. The same mineral is found in Stokes and Wilkes counties in North Carolina, and also in South Carolina and Georgia.

of Dandridge, were built about the same year, and were both abandoned nearly fifty years ago.

About the same time, if not earlier, Mr. David Ross, the proprietor of Iron-works in Campbell County, Virginia, erected a large furnace and forge at the junction of the North fork of the Holsten, with the main stream near the Virginia line. It was on the great road from Knoxville to Philadelphia. A bloomery was also set up, at this time, below the mouth of the Watauga, and another 25 miles above the mouth of French Broad, and 30 above Knoxville. Good ore was found in several places on the Holsten, and had been worked to advantage in one or two. Boats of 25 tons burden could ascend to Ross' Iron-works, nearly 1000 miles above the mouth of the Tennessee, and about 280 above Nashville. At Long Island, a short distance above, on the Holsten, where the first permanent settlement in Tennessee was made in 1775, boats were built to transport Iron and castings made in considerable quantities at these works, with other produce, to the lower settlements and New Orleans. A lead mine, yielding 75 per cent. of metal, was worked on the French Broad, and galena was found elsewhere in the valley. Salt was made by boiling at Campbell's Salines, 70 miles up North Holsten, and in 1795, several tons of saltpetre, collected from the nitrous caves in the county, were sent to the Atlantic markets. Coal had also been discovered not far from Campbell's Salines.

Adventurers had also passed the wilderness between these frontier settlements and the vast ridge of the Cumberland or Laurel mountains, and had founded Nashville in 1780. In the sub-carboniferous limestone region, south of the Cumberland river, iron ore was discovered a few years later, about 30 miles below Nashville, in Mero district. Between the years 1790 and 1795, a charcoal furnace was erected near the place, on the iron fork of Barton's creek, in Dickson County, and seven miles west of Charlotte. This furnace, called Cumberland, now uses steam, and made, in 1857, over 1,800 tons of cold-blast foundery metal out of brown hematite. This part of the State is now one of the most productive in charcoal Iron in the country. The hematized carbonate ores of the coal series here furnish abundant outcrops, throughout an area 115 miles long by about 50 broad, across the entire State, and occupying about a dozen counties, between the Cumberland and Tennessee rivers, well supplied with wood and water-power, and with mineral coal easily accessible. The ore is worked chiefly by open quarries, and levels in the spurs of the hills, which project numerous digitations and knobs of ferruginous material into the valleys and ravines along the several rivers and creeks of the great valley. These ore banks furnish the argillaceous carbonate, changed, by exposure to the hydrous

Middle and West Tennessee.

peroxyd, in a variety of forms, from the most compact liver ore to masses of honey-comb, and ochreous brown hematite, granular, nodular, pot, and pipe ores. These varieties also strew the surface in many places, and yield of metallic Iron frequently over 60 per cent. Though often containing sulphur and other modifying elements, they make, we believe, a better quality of Iron than the clay iron-stone of the English coal measures, from which the Kentucky and Tennessee limonites differ somewhat in constitution, and in geological relations. They are particularly abundant in Stewart, Davidson, and in one or two other counties in the angle between the Cumberland and Tennessee rivers, where an extensive iron business is done. The ores at the eastern base of the Cumberland mountains are principally of the red fossiliferous variety. These valuable deposits extend, also, southward into Alabama, where they are wrought to some extent. The Iron and coal deposits of Western Tennessee and Kentucky alone, to say nothing of those north of the Ohio, and the almost illimitable masses of rich magnetic, and specular Iron ore contained in the Pilot Knob and Iron mountain of Missouri, and those of the northwest form a vast future resource for the great Mississippi basin, the development of which has yet only just begun.

Engaged, like her sister provinces of the South, during colonial times, principally in the production of tobacco, grain, tar, pitch, turpentine, etc., which were their staple exports, Carolina had made no great progress in the mechanical arts, and derived her principal supplies of metallic, and other manufactured wares, from England. The impulse given to domestic, and particularly to family manufactures, by the suspension of foreign trade and the events of the war, was considerable. The necessity of this, early forced itself upon the Convention and Congress of the Province.

The Convention assembled at Newbern, on the 3d April, 1775, resolved, "from common prudence and regard for the Colony," to encourage arts, manufactures, and agriculture, and every kind of economy, and to use their influence to that end. With this view, the Provincial Congress, on the 10th September of the same year, endeavored to stimulate several branches of the most needful manufactures, including that of saltpetre and gunpowder, by a series of premiums.

To the first who should erect a rolling and slitting mill, to prepare for making nails, the sum of £250 was pledged, provided it were set to work, and slit five tons of Iron, within two years from that time. A further sum of £200 was offered for the second mill put in operation in like manner.

Rolling-mill.

The sum of £50 was offered for the first fifty pairs of cotton cards, worth two shillings a pair, manufactured in the province, of wire made

and drawn in the province, and a like premium for the first hundred pairs of wool cards, worth 15*d.* a pair, made within twelve months.

The manufacture of pins and needles was encouraged by the offer of £50 for the first twenty-five dozen of the former, equal to British imported pins, costing 7*s.* 6*d.* a dozen; and to the manufacturer of the first 25,000 needles, sorted from one to twelve inclusive, and equal to needles from Great Britain of the price of 2*s.* 6*d.* sterling per thousand, the same reward, if made within twelve months.

Steel.

To the first who should erect a furnace for manufacturing good merchantable steel, equal in goodness to British steel, £100, provided it was set to work, so as actually to make, within eighteen months, one ton of steel. For the second steel-furnace, erected in like manner, £25.

Air furnace.

A premium of £500 was offered to any person who would build a furnace for manufacturing good merchantable pig-iron, and hollow iron-ware, and other articles necessary for the use of the inhabitants of the province—proof of its adequate accomplishment to be presented to the Council within two years.

The sum of £250 was pledged for the erection of a paper-mill; £100 and £50 respectively for the encouragement of the woolen and linen cloth manufactures, £750 for the erection of a salt-work on the sea shore, and £150 for the extraction of the greatest quantity of refined sulphur, fit for gunpowder.

In the following April, the Provincial Assembly, in committee of the whole, on the means of providing ammunition and warlike stores, adopted measures to promote the erection, at the public expense, of saltpetre works and a powder-mill, in Halifax County, and of salt-works in the province.

Guns.

Commissioners were, at the same time, appointed in the districts of Washington, Newbern, Edenton, Halifax, Hillsborough, and Salisbury, empowered to direct the establishment, in their respective districts, of good and sufficient muskets and bayonets. For this purpose, they were to collect together all the gunsmiths and other mechanics accustomed to, or capable of assisting in such manufacture, and to employ them at the public expense. They were to be paid for each complete musket and bayonet made according to the prescribed pattern, not over £5, and each district was allowed to draw on the treasury for £1,000, for that end.

For casting cannon and shot, Wilcox Furnace, on Deep Run, or one in Guilford County, was to be fitted up as before mentioned.[1]

(1) Amer. Archives, 4th Series, vol. i. 270; vol. iii. 209, 210; vol. v. 1338. 5th Ser., vol. i. 1384.

On the representation of the commissioners appointed in the district of Hillsborough, for the above object, that Iron proper for guns could not be obtained in the State, and that the provincial currency would not purchase it in any other, the Council of Safety, in October of the same year, granted them an order for £100 on the Continental treasury, to be deducted from the contingent (£1,000) voted by Congress to the State for that purpose.[1]

How far these measures were successful in promoting the particular objects intended, does not appear. At Salem, in the Moravian settlement of Wachovia, in Stokes County, a paper-mill was established, previous to 1791, and aided by a loan from the State. It was the most remote from the sea of any in the United States, and Mr. Coxe states that no such manufactures as those, established by the tradesmen of the place, existed in any part of the Union, equally distant (300 miles) from the coast. Shipbuilding was actively carried on in some of the ports, and it is probable that wrought nails, hoes, axes, etc., were made in considerable quantities by slave labor and otherwise. But, notwithstanding a considerable emigration of European mechanics, after the war, and a household manufacture in the interior counties, amounting to more than their consumption of imported manufactures, the State still remained essentially agricultural, and depended on foreign sources for its principal supplies of all, except the coarsest metallic wares. Its recent progress, particularly within the last decennium, in the Iron branches, has been very considerable.

South Carolina.—Of the manufacture of Iron in South Carolina, there is not much to record in this place, as well on account of the late commencement, and limited extent of that industry within the period under review, as, from the absence of accessible information on the subject. It appears not to have begun in the province until after the difficulties with Great Britain rendered a separation probable. Various causes have retarded its development until the present time. The genius of the people inclined them wholly to agriculture. The profits of servile labor in the maritime sections of the South, furnished the means of purchasing every description of manufacture which could minister to convenience or luxury. Skilled labor was dear, and met with little encouragement, and the expense of Iron-works was more profitably invested in land and slaves. With the small farmers of the interior, the demand for Iron and its manufactures was limited, and confined to the coarser descriptions of wares, much of which was manufactured among

(1) Amer. Archives, 4th Series, vol. i. 270; vol. iii. 209, 210; vol. v. 1338. 5th Ser., vol. i. 1384.

them. The mineral resources of the State, though not extensive, are, nevertheless adequate to a considerable production of Iron, and other facilities are quite ample. Yet these still remain but partially improved under the overshadowing importance of one great commercial article, which has displaced nearly all the early staples of Carolina, and appropriated most of the productive forces of the State.

Iron Ores.

In adddition to the bog ore deposits of the tertiary formation of the tide-water section, the primitive series of the high country toward the Blue Ridge, afford considerable quantities of magnetic and specular Iron ore. One of the belts of magnetic oxyd, before mentioned as traversing the central counties of North Carolina, crosses the divisional line on the north side of King's mountain, into York, Spartanburg, and Union districts, and furnished several valuable ore banks on Broad river and its branches. Magnetic ore is also found in Chester and Abbeville districts. The ore is imbedded in talcose slate, and is underlaid by flexible spar and limestone. It is of three varieties, the dark pulverulent kind, in favor with iron-makers for its facile working and smelting, the richer granular semi-crystalline ore, yielding 60 per cent., and the pure, compact, highly magnetic peroxyd, yielding 63 per cent of Iron. Outcrops of red oxyd, and specular iron ore, are also described as contained in a belt of mica slate, overlying the talc slate, in which the gray magnetic oxyd beds are found, and extending from both sides of King's mountain, across the line into Union and York districts. The same kind of ore is abundantly met with on the north side of Gelky's mountain, and in some other places. Nearly all the iron-works in the State are in this region, having their ore banks of greater or less thickness in these primary slates. And here the first furnaces and forges in the State were built. Iron pyrites is also an invariable constituent of the gold bearing rocks of Carolina. Several mines of the latter metal have been wrought in this State; but, with the exception of the Dorn mine, discovered a few years ago, which gave promise of extraordinary productiveness, they have been far less prolific in gold than those of neighboring States.

Gold.

Cobalt, which is found in but few places in the United States, is met with at Silver Bluff, on the Savannah river below Augusta.[1] There is,

(1) The only discovery, as yet, made in this country, of much practical value, of the ores of cobalt—the oxyd of which, in the form of *Smalt* and *Zaffre*, is so valuable in the manufacture and enameling of glass, porcelain, and earthenware, on account of the magnificent blue it imparts—is in Missouri. At the lead mine called Mine la Motte, it occurs in considerable quantity, as black or earthy oxyd, with the oxyds of manganese, iron, copper, and nickel, and with sulphur and arsenic. A mine, at Chatham, Connecticut, is also worked for cobalt, but both it and Mine la Motte contain nickel—another metal valuable in the arts, hitherto found in no great quantity in

also, some silver, lead, and copper in the State, but little skill was used in their extraction in early times.

The first Iron-works in South Carolina are stated, by Dr. Ramsay, to have been erected in the upper country by a Mr. Buffington, in the year 1773, and to have been destroyed by the tories, during the Revolutionary war. The Carolinas suffered much during the latter part of the contest, and the battles of King's mountain and the Cowpens were in the immediate vicinity of the ore district above mentioned. Several forges and furnaces were erected after the peace.

First Iron-works.

At the commencement of the Revolution, in 1775, a committee consisting of influential citizens, was appointed by the Provincial Congress to take into consideration the state of manufactures, and report what branches were proper to be encouraged and established in the colony, and the best means of effecting it. They reported, in November of the same year, through the Rev. Mr. Tennent, and the Congress thereupon resolved to offer premiums of £200, £150, £100, and £50 to the persons who should erect the first four saltpetre works in the province, and produce fifty pounds of good merchantable saltpetre each; and like sums for as many works for refining sulphur, on producing 100 lbs of sulphur, of which the public would purchase all that was made, at 5*s.* per lb.

To encourage the Iron manufacture, a premium of £1,000 was offered for the erection of a bloomery in the colony that should first produce one ton of good bar-iron. For the second and third forges of the same kind, the sums of £800 and £700, respectively, were promised, the premiums to be paid over and above the common price of Iron.

Bar-Iron.

The sum of £500 was offered as a reward for each of the first three works erected for manufacturing good bar steel, on their producing, severally, five hundred pounds of steel.

A premium of £700 was set apart for the manufacturer of the first 1000 lbs. of nail-rods, made at a proper rolling and slitting mill, erected by him in the colony, over and above the common price of such iron.

The sum of £150 currency, in addition to the common price, was

the United States—though in larger proportion than cobalt.

About 100 years ago, the Society of Arts in London, among a number of premiums offered for the advantage of the British American Colonies, and English manufactures, including the production of magnetic sand Iron, pearl-ash, cochineal, scammony, vines, silk, barilla, nitre, etc., pledged £50 to the discoverer of cobalt in His Majesty's dominions in America, in quantity probably sufficient for a manufacturer of Zaffre and Smalt. The metal was afterward discovered in the mines of Cornwall, in consequence of the premiums of the same Society. *Transactions, vol.* 1. In 1770, the proprietors of a chinaware manufactory, established in Southwark, Philadelphia, advertised for Zaffre, and offered a reward for its production.

offered to the person who would make fifty large and substantial gun-locks, of the kind commonly called bridle-locks, which sold at 35*s.* to 40*s.* each, the manufacturer engaging to proceed in the business.

Lead.

For the first proper work erected for manufacturing lead, the owner, on producing 1000 lbs. of lead made thereat, was to receive £500, and sums of £200 and £100 were appropriated for the next two works which produced each a like quantity.

Sums of £300 and £200 were pledged for the first two salt-works erected, and for the manufacture of linens and cottons the same premiums were given as had been allowed by an Act of the General Assembly, in 1770, and for woolens in proportion.[1]

The pressure arising from the interruption of a prosperous commerce with the West Indies, by Sir Charles Whitworth's Bill for restraining the trade of the Southern Colonies, passed in March of that year; the general resentment of the revenue acts of Parliament, and the stimulus thus applied by the local authorities, may be supposed to have produced some good influence upon domestic industry: how far the manufacture of iron, steel, nails, guns, etc., were promoted, we have no means of knowing.

Camden Iron-works.

Four or five years after the peace, Iron-works, on a pretty large scale, were erected in York County, in the district of Camden, on a creek flowing into the Catawba or Wateree, and about two miles west of the river. They consisted of the Æra furnace, built in 1787, and the Etna, erected the following year. They were on the road leading from Charlotte, in North Carolina, to Yorkville. Ore which was easily smelted, was abundantly obtained within a circuit of two miles from the works. It was obtained, massive, in such quantity above the surface, that it was thought there would be no occasion to resort to shafts or levels for half a century. The only preparation it required was roasting. Nests of ochre and seed ore were found in the cavities of the rocks. The metal was esteemed good for mill-irons, hammers, and machinery generally, and for hollow-ware. It also made tolerable bar-iron, and was tried for steel with promises of success. Mr. William Hill, one of the principal proprietors of the works, devised a new blowing apparatus. By the aid of simple and cheap machinery, and a fall of water, he contrived, it is said, to blow "all the fires, both of the forges and furnaces, so as to render unnecessary the use of wheels, cylinders, or any other kind of bellows." He thus obviated, likewise, all accidents from freezing.

The nearest landing to these works, in 1795, was at Camden, 70 miles below. The proprietors of the works, with others, had, previous to that year, obtained a charter to open the navigation of the Catawba to the

(1) Am. Arch., 4th Ser., vol. iv. 65, 71, 72.

North Carolina line, and another charter from that State empowered them to extend their improvements 80 miles further within its borders, which would enable boats of 30 tons to come within two miles of the furnace. By opening the navigation of the creek, they could go quite up to the works, which were carried on with considerable spirit. A canal, along the same river, afterward formed an important outlet to the Iron-works of North Carolina.

These were the principal, if not the only Iron-works in operation in the State at that time. Others were soon after erected, in different places, including several in the mountain district of Washington, where Iron, the only article made for sale to any extent, was manufactured, at the beginning of this century, as cheap and good as the imported. Bar-iron had long been wrought up, by the blacksmiths of the upper country, into plowshares, hoes, axes, and farming utensils of all kinds. Some rifles were also made in that part of the country, where considerable zeal was manifested, about the year 1790, to encourage domestic manufactures. Cotton, flax, and woolen machinery, of the improved construction, were soon after set in operation, and flour-mills, and similar works were undertaken upon an enlarged scale. The country people already manufactured a large proportion of their own clothing and necessary supplies. In the lower maritime and plantation districts they still remained greatly dependent upon the Northern provinces and European commerce.

Carolina, during its colonial state, had enacted several general laws to encourage the arts and the introduction of useful machines and engines for the benefit of its principal staples, which were also fostered by the parent government. Between the years 1732 and 1756, legislative encouragement was extended by the Assembly to four different persons, for machines for pounding and cleaning rice. Under the Old Confederation, in 1784, a law was passed, securing to authors and inventors of useful machines the exclusive benefit of their labors, and a number of persons availed themselves of its immunities, previous to the transfer of such powers to Congress, in 1788. The invention of Whitney met with a more liberal appreciation in this State than in some others not less benefited by his genius. But, though legislatures may do much to encourage or obstruct the progress of the arts, they can rarely create the enterprise which gives them vitality, where the general sentiment is not in their favor, and freedom of labor is wanting to secure its rewards. Where the mechanic arts do not flourish, the manufacture of Iron cannot be expected to prosper.

GEORGIA.—In Georgia, adjoining the Carolinas and Tennessee, are now several furnaces, forges, and rolling-mills. But in this, the youngest of the original States, with staples and industry similar to those of Caro-

lina, the manufacture was of still later introduction. The mineral resources of the State in iron, gold, and coal, are very ample. They lie in the northern mountainous districts of the State, among the terminal and outlying ridges of the Alleghany chain. The furnaces which occupy the head streams of the Chattahoochee and Alabama rivers, at present chiefly use brown hematite. This ore, and the specular and magnetic oxyds, exist in great richness and abundance. The primary ore belts of Carolina are, on the one hand, prolonged into Georgia through Habersham, Lumpkin, and other counties, in the northeast, and the Ducktown Tennessee veins, on the other, through the northwestern counties into Alabama. The hematite beds are often in close proximity to the gold-bearing, metamorphic slate and quartz. Two or three of the northern tiers of counties are well supplied with ore from them. In Cass County, particularly, north and west of the Allatoona hills, on both sides of the Etowa river, and extending, on either hand, into Cherokee and Paulding Counties, the distance of 40 miles, are very extensive beds of superior hematitic ore. It much resembles the ore of West Stockbridge, Massachusetts, and that which produces the Salisbury and Juniata Iron. It is easily smelted, and yields an excellent iron, either for heavy castings or bar-iron. Very pure specular peroxyd, like that of the Iron mountain of Missouri, and frequent veins of magnetic ore abound in that vicinity. These great deposits of rich ore are, moreover, contiguous to silicious limestone beds, which furnish the flux, while numerous rapids among the hills, supply excellent water-power, and the hill sides and river bottoms are densely clothed with timber, for a cheap supply of charcoal for years to come. The bottom lands are fertile, and the distance from the seaboard markets, which has been a principal impediment to the iron manufacture, hitherto, renders provisions cheap for a manufacturing population. A railroad to Chattanooga, in Tennessee, brings the bituminous coal field within 80 miles of the Etowa, whence the railroad extends southwest to Atlanta, and thence westwardly to Montgomery, Alabama, and, in the opposite direction, to Augusta and to Charleston, and centrally to Mason, and other parts of the lower country. This northern part of the State has already become the seat of a considerable, and increasing manufacturing industry, and the facilities are such that its metallic resources must prove an important element of its future prosperity.

Mineral resources.

The gold mines of this portion of the State, until the richer placers of California withdrew attention from them, were among the most productive in the country, and occasioned the establishment of a branch mint for gold coin at Dahlonega, Lumpkin County, in 1838, at which time, 6,000 or 7,000 persons were engaged in washing for gold in the State.

General Observations.

The facilities possessed by the colonists in the abundance of iron ore, fuel, and water-power for the manufacture of Iron, and their early entrance upon the business were differently regarded in England, according to the views taken of the ultimate effects upon the prosperity of the parent state. The jealousy of those classes who were opposed to the establishment of any description of manufactures in the dependencies, particularly those in the Iron interests, procured, as early as 1719, when Iron first began to be received from America, a prohibition of the manufacture of any iron wares, or of bar-iron, or nail rods, by forges or other works. In February, 1731–2, when returns of the manufactures set up in the Colonies were made by the governors, in pursuance of an order of the House of Commons, New England was reported to have six furnaces, and nineteen forges, one slitting-mill, and a nail factory. In Massachusetts, iron-works had existed for many years, but did not supply one-twentieth part of the Iron required for the country's use. There were Iron mines in Rhode Island, but not one-fourth part enough to serve their own use. There is no account of iron-works in the other Colonies, and the returns probably give a very imperfect idea of the enterprise of the provinces in this branch.

British Legislation.

Much discussion arose, in 1737, respecting the policy of encouraging the importation of Iron and hemp from the Colonies, and petitions in favor of the plan were presented to Parliament.

It was urged that England then imported 20,000 tons of foreign Iron, annually, 15,000 tons of which were from Sweden, costing £150,000 in money, and 5,000 tons from Russia, most of which was also paid for in specie. All this, it was said, could, with a little encouragement, be obtained from the Colonies, of equal quality,[1] and could be paid for in British manufactures, at a saving of £180,000, annually, in the balance of trade, and this amount could be much increased by such encouragement. The amount of bar-iron then made in England, was computed at 18,000 tons, annually, and, on account of the high price of cord wood, produced by Iron-works, could not be increased; but the same quantity of wood, employed in refining American pig-iron, would produce a much greater

(1) From copies of several returns made to the Commissioners of the Navy by the officers of the several Navy Yards, pursuant to an order of the House of Commons, of 4th March, 1736, it appears that a warrant for six tons of American bar-iron, of different sorts, imported by a Mrs. Crowley, from America, was given in July, 1735, to His Majesty's yard, at Deptford for trial, and one ton of it sent to each of the other yards. The first certificate received was from Woolwich, dated Sept. 3, 1735, and was as follows:

"We have lately received, from His Majesty's yard at Deptford, barr-iron flatts of two and a quarter inches broad, and half an

quantity of bar-iron. To encourage such crude manufactures, as pig, sow, and bar-iron, hemp, etc., would be the most effectual means of preventing such manufactures as would interfere with their own, and might prove as beneficial to the kingdom as the bounties on tar and pitch had done, since 1703. To this end it was proposed that a duty should be laid on all Iron imported into the Colonies from Europe, and an additional duty on all bar-iron imported into England, except that from America, while, at the same time, the existing duty on American Iron, (viz., £2 1*s.* $6\frac{2}{20}$*d.* per ton on bar, and 3*s.* $9\frac{2}{20}$*d.* on pig-iron,) should be repealed. From the opposition of the proprietors of Iron-works, and woodlands, and other causes, the scheme did not become a law at that time.

The representations of the merchants, however, and of the agents and friends of the Colonies, at length so far prevailed that, in 1750, an Act (23 Geo. II) was passed for the encouragement of the importation of pig-iron from the British Colonies in America. After a full inquiry into the adverse nature of the trade with Sweden, which, after being paid in money for the principal part of the iron and steel imported into Great Britain, expended it in purchasing her supplies of France and other States, and also into the importation of Iron from America, a committee of the whole House, of which Charles Townsend was chairman, resolved that the duties on pig and bar-iron from America should be repealed. The bill entitled "an Act to encourage the importation of pig and bar-iron from his Majesty's Plantations in America, etc.," provided, "That pig-iron made in the British Colonies, in America, may be imported, duty free, and bar-iron into the port of London; no bar-iron, so imported, to be carried coastwise, or to be landed at any other port, except for the use of his Majesty's dock-yards; and not to be carried beyond ten miles from London." While the production and exportation of bar and pig-iron were thus encouraged, another clause in the bill was designed to arrest the manufacture, at that stage. It enacted, "That from and after the 24th day of June, 1750, no mill, or other engine for slitting or rolling of Iron, or any plating forge to work

Act of 1750.

inch thick—15 cwt. 0 qrs. 4 lbs., squares of seven eigths of an inch—5 cwt. 0 qrs. 12 lbs., imported by Mrs. Crowley from America; and, pursuant to your warrant of the 11th July, 1735, have made sufficient tryal of each of the sorts, find the said iron to be very good, and fit for His Majesty's service; superior, in every respect, to Sweed's Iron, and, in our opinion, worth £17 10*s.* 6*d.* per ton."

The return from the other yards generally agreed in representing the American Iron as, in all respects, equal in goodness and value to the best Swedes Iron, excepting one lot of Philadelphia and Maryland iron, tried at Deptford, which proved brittle, and was returned to Mrs. Crowley again.—*Scrivenor's Hist. of the Iron Trade, Appendix B.*

with a tilt-hammer, or any furnace for making steel shall be erected, or after such erection, continued in any of his Majesty's Colonies of America," under a penalty of £200. This prohibition was an enormous injustice to the Colonies, and was reasonably complained of by them.

The governors of the Colonies were ordered to make returns to Government of slitting-mills, plating forges, and steel-furnaces in the Colonies, which was done in the following year. The clause in the bill requiring the governors to examine witnesses under oath, and to cause any such mills, forges, or furnaces to be abated within 30 days, or to forfeit the sum of £500, gave particular offense in the Colonies. The proposition to suppress them was, however, rejected by a small majority.

Certificates were returned, with the following results: Massachusetts Bay contained two slitting and rolling mills, Pennsylvania one, and New Jersey one, not then in use. Of plating-forges, to work with a tilt-hammer, Massachusetts contained one; Connecticut six; New York one; New Jersey one, not in use; Pennsylvania one; and Maryland one, with two hammers. Massachusetts, Connecticut, and New Jersey had each one steel furnace, and Pennsylvania two.

The first Iron imported from the British American plantations was from Nevis and St. Christophers, in the year 1717, and in the following year, a small lot of $3\frac{1}{3}$ tons was received from Virginia and Maryland. Of the amount received, if any, during the next ten years, we have no account. The amount of Iron imported from the Continental Colonies, subject to the above duty, from 1728, when its regular exportation appears to have begun, to the date of the inquiry respecting the repeal of the duty, appears from the following statement, compiled from Scrivenor's Tables from the Custom House Returns:—

Colonial Iron Exports.

AN ACCOUNT OF THE BAR AND PIG IRON EXPORTED TO ENGLAND FROM THE BRITISH NORTH AMERICAN COLONIES FROM 1728 TO 1748.

		New England.	New York.	Pennsylvania.	Maryland and Virginia.	Carolina.	Total of Bar and Pig Iron.
Year.	Iron.	T. c. q. lb.	T. c. q. lb.	T. c. q. lb.	T. c. q. lb.	T. c. q. lb.	T. c. q. lb.
1728–29	Pig.			274 6 1 21	852 16 1 11	5 1 0 0	1127 3 3 4
1730	Pig.			188 16 0 20	1526 15 1 15	10 3 1 0	1725 14 3 7
1730–31	Pig.			169 3 2 15	2081 2 0 27		2250 5 3 14
1731–32	Pig.			106 11 1 15	2226 3 2 0		2332 14 3 15
1732–33	Pig.			95 5 1 18	2309 11 3 22		2404 17 1 12
1733–34	Bar.		11 3 0			2 12	11 5 12
	Pig.			147 7 3 11	2042 2 2 3	7 0 0 0	2196 10 1 14
	Bar.			10 17 3 0	44 9 0 21		55 6 3 21
1734–35	Pig.	6 0 0		195 11 2 22	2362 8 0 17	3 9 0 0	2561 14 3 11
1739	Pig	3 18 1 0		170 5 3 19	2242 2 2 14	1 9 2 27	2413 18 1 4
1740	Bar.	4 1 21			5 0 0 0		5 4 1 21
	Pig.	94 0 1 12		159 4 2 22	2020 2 0 22	2 0 0 0	2275 7 1 0
1741	Bar.				5 0 0 0		5 0 0 0
	Pig.	42 16 1 16		153 4 1 25	3261 8 1 5		3457 9 0 18
1742	Pig.	5 0 0 0		143 16 3 18	1926 3 1 5		2075 0 0 23
1743	Pig.	25 11 1 17	81 4 2 7	62 12 0 25	2816 1 1 15		2985 9 2 8
1744	Bar.				57 0 0 0		57 0 0 0
	Pig.		5 16 0 0	87 15 0 0	1748 4 1 3	20 1 0 19	1861 16 1 22
1745	Bar.				4 5 2 14		4 5 2 14
	Pig.	2 0 0 0	18 12 0 0	97 7 1 7	2130 16 1 10	25 9 3 0	2274 5 1 17
1746	Bar.			3 9 1 0	193 8 3 12		196 18 0 12
	Pig.		29 0 0 0	103 1 3 11	1729 1 0 2		1861 2 3 13
1747	Bar.				82 11 2 11		82 11 2 11
	Pig.		13 0 0 0	24 14 3 20	2119 0 3 24		2155 15 3 16
1748	Pig.		22 9 1 20	114 10 0 0	2017 11 3 10	1 4 1 21	2155 15 2 23

The repeal of the duty elicited, during the progress of the bill, various remonstrances and representations from iron masters, proprietors of woodlands, merchants, and others in England, whose interests were likely to be affected by its provisions. The interest manifested by these classes in the subject shows that the provincial Iron-manufacture was thus early regarded as a rival to that of the mother country.

Discussion renewed.

Iron-masters, tanners, and owners of coppices in the neighborhood of Sheffield were alike apprehensive that the Iron-works erected at great expense would be ruined; the laborers be rendered destitute or forced to emigrate; and the tanneries be left without bark from the woods remaining uncut, or the land being converted to tillage, unless the number of forges should be increased and of furnaces lessened by removing the duty from pig-iron only. The plenty and cheapness of wood would enable American Iron to undersell the British, and thus ruin the trade, while the iron manufactures, rendered wholly dependent on so distant and precarious a source for material, would probably decay, and reduce thousands of workmen to want and misery. The iron-mongers and smiths of Birmingham, on the other hand, petitioned in favor of the bill as a benefit to their trade and to the colonists, who could exchange larger quantities of their own produce for British manufactures. The importation of Iron from America could no more affect the Iron-works and freeholders than the same quantity from any other country, and the home production was not more than half the amount

required. At the same time, they prayed that the erection of slitting or rolling mills or plating-forges might be prohibited, as an interference with British manufactures. It was doubtless at the instance of this class and merchants in the export trade, that the clause was inserted with that view.

Petition of the outposts.

In 1756, the society of merchant adventurers in the city of Bristol, which was largely engaged in colonial trade, petitioned that American bar-iron, which, by the Act of the 23d of His Majesty's reign, was admitted without duty into the port of London, but was not allowed to be carried coastwise, or more than ten miles inland, whereby several manufacturing towns were deprived of its use, and the outposts lost the advantage of exporting it, might be imported duty free by all His Majesty's subjects. This produced other petitions, counter-petitions, pamphlets, and discussions, which evinced a deep national interest in the subject. The chief opposers of the measure were those interested in Iron-works and the supply of fuel. They represented that 109 forges in England and Wales (exclusive of Scotland) produced 18,000 tons of iron, and consumed 198,000 cords of wood, grown on barren land, which was nearly valueless but for the use of iron-works and tanners; that American iron could never supply the place of the Swedish for edge-tools, anchors, chain plates, and other articles for ship-building, or compete with Russian iron in cheapness, and therefore, even duty free, could only interfere with British iron, the manufacture of which would be stopped and a great number of families, dependent thereon, be reduced to beggary. To this it was responded, that a manufacture is much more valuable than the raw materials, and as these could not be produced at home in such quantity and at such a price as to maintain the manufacture, it was the duty of the legislature to encourage the free importation of materials if it should arrest their production in the island; that the increased attention among neighboring nations to the production of rough materials rendered it more than ever necessary to obtain them at a lower price or lose the manufacture of fine articles of steel and iron; the only way to do this was to reduce the duty on foreign iron, or make it necessary for the iron-masters to reduce their price by raising up a rival in America; that iron could not be produced as cheap in the plantations as in England, on account of the high price of labor and of the interest on capital, the cost of freight, insurance, etc., especially in time of war; that the coppices grew on barren land, unfit for tillage, and improved the pasturage, and were always worth something for wood or timber, and therefore the tanners had nothing to fear.

A bill was at length reported for extending the privilege of importation to the other ports of Great Britain and with a clause for the relief

of the proprietors of coppice woods, passed both houses, and received the royal assent in 1757. The House also, in an address to the king, desired that returns might be laid before them at the next session, of the quantity of Iron imported from America in each year from Christmas, 1749, to January, 1756, of which the following is a statement:—

PIG AND BAR IRON EXPORTED FROM THE NORTH AMERICAN COLONIES FROM 1750 TO 1756.

		New England.	New York.	Pennsylvania.	Maryland and Virginia.	Carolina.	Totals.
Year	Iron.	T. c. q. lb.	T. c. q. lb.	T. c. q. lb.	T. c. q. lb.	T. c. q. lb.	T. c. q. lb.
1750	Bar.				5 17 3 0		5 17 3 0
	Pig.	21 1 2 8	75 12 1 4	318 9 3 11	2508 16 1 25		2924 0 0 20
1751	Bar.		2 0 0 0		3 4 2 9		5 4 2 9
	Pig.	9 16 2 13	83 0 3 22	199 15 2 22	2950 5 3 15	17 14 0 12	3210 13 1 0
1752	Bar.			64 16 2 5	16 10 2 21		81 7 0 26
	Pig.		41 5 0 0	156 8 2 26	2762 8 0 4	20 0 0 0	2980 1 3 2
1753	Bar.	2 8 0 19		147 13 2 1	97 18 0 19		247 19 3 11
	Pig.	40 10 1 7	97 4 3 2	242 15 1 0	2347 9 2 18	10 0 0 0	2737 19 3 27
1754	Bar.		6 10 0 0	110 9 3 24	153 15 1 8		270 15 1 4
	Pig.	4 16 0 22	115 16 2 0	512 19 3 12	2591 4 3 17	20 0 0 0	3244 17 1 23
1755	Bar.		11 12 0 0	79 5 0 20	299 1 3 0		389 18 3 20
	Pig.		457 8 0 14	836 6 1 0	2132 15 1 22	14 13 0 0	3441 2 3 8

In addition to the foregoing, there were exported to Scotland during the last sixteen years the following quantities, viz.:

	Bar-iron.	Pig-iron.
	T. c. q. lbs.	T. c. q. lbs.
In ten years, from 1739 to 1749,	10 13 2 11	263 18 2 0
In six years, from 1750 to 1756,		228 13 1 10

In 1765 a further modification of the law was made, allowing the Colonies to ship their Iron to Ireland. From about this period to the Revolution, there was a considerable increase in the exportation, especially of bar-iron, as appears from the following table.

AMOUNT OF BAR AND PIG IRON EXPORTED FROM ALL THE CONTINENTAL COLONIES TO ENGLAND IN EACH YEAR FROM 1761 TO 1776.

	Bar Iron.	Pig Iron.		Bar Iron.	Pig Iron.
Year.	T. c. q. lb.	T. c. q. lb.	Year.	T. c. q. lb.	T. c. q. lb.
1761	39 1 0 0	2766 2 3 12	1769	1779 13 1 23	3401 12 2 2
1762	122 12 2 14	1766 16 0 2	1770	1716 8 0 21	4232 18 1 18
1763	310 19 3 2	2566 8 0 25	1771	2222 4 3 24	5303 6 3 13
1764	1059 18 0 10	2554 8 3 21	1772	965 15 0 23	3724 19 2 25
1765	1078 15 0 16	3264 8 1 22	1773	837 15 0 6	2937 13 0 2
1766	1257 14 3 9	2887 5 1 15	1774	639 0 0 23	3451 12 2 19
1767	1325 19 0 18	3313 2 1 19	1775	916 5 2 11	2996 0 2 24
1768	1989 11 0 6	2953 0 2 14	1776	28 0 0 0	316 1 2 8

Much bar-iron, steel, and nails were imported into the Colonies before the war. By far the larger proportion of the bar-iron and steel went to the New England Colonies, and of the nails to the Southern Provinces. The steel and nails imported were principally made from Swedish and Russian Iron, as being tougher and better than those made of English coke iron. For several years before the peace, England imported from Russia alone an average of 30,000 tons of Iron annually, so greatly had the Iron-works increased in that country within a few years. The duty on foreign Iron imported into England was about £2 16*s.* 3*d.* a ton, and the drawback on exportation about £2 10*s.* a ton. In Ireland foreign Iron paid 10*s.* a ton duty, to which a duty of 10*s.* a ton was added on manufactured iron exported to the Colonies. No drawback was allowed on foreign iron or steel exported from Great Britain or Ireland from March 25, 1711, as by 9th of Queen Anne. Nails of foreign Iron were shipped in large quantities from Glasgow to the Southern Colonies, and cost 15 per cent. more than nails from Bristol made of English Iron.

Importation of wrought iron.

The following table exhibits a statement of the amount of Iron, wrought and in bars, imported by the Colonies from 1710 to 1735.

WROUGHT AND BAR IRON IMPORTED FROM GREAT BRITAIN BY THE NORTH AMERICAN COLONIES FROM 1710 TO 1735.

		Carolina.	New England.	New York.	Pennsylvania.	Virginia and Maryland.
Year.	Iron.	T. c. q. lb.	T. c. q. lb.	T. c. q. lb.	T. c. q. lb.	T. c. q. lb.
1710-11	Wrought.	1143 0 27	4596 2 6	567 0 19	987 2 0	3014 0 8
	Bar.		200 19 3 7	10 2 1 10	12 10 2 21	1 10 1 1
1712	Wrought.	1551 0 7	5344 3 24	639 1 7	540 0 20	5653 2 4
	Bar.	4 13 0 0	281 13 3 19	32 3 0 0	2 0 0 0	5 3 2 14
1713	Wrought.	1406 2 7	4883 0 13	985 2 21	1040 0 9	2859 2 21
	Bar.	27 5 0 0	211 9 0 2	49 8 2 16	7 4 3 26	8 5 2 4
1714	Wrought.	1051 1 18	4633 0 9	1136 3 15	923 2 1	6597 2 12
	Bar.	8 10 0 0	279 6 3 0	98 7 0 18	24 12 0 7	8 5 0 0
1715	Wrought.	691 0 21	5795 2 24	1379 3 0	987 3 4	8946 3 15
	Bar.	1 18 0 0	372 16 1 16	110 19 0 20	8 5 0 20	16 17 0 14
1716	Wrought.	670 1 7	5397 2 2	1094 0 14	962 2 0	7446 0 22
	Bar.		372 19 3 11	147 0 0 21	10 0 0 0	8 19 0 6
1717	Wrought.	866 1 11	3819 0 5	1145 0 5	1147 0 26	8728 1 27
	Bar.	4 2 0 0	140 16 3 20	42 14 1 23	8 15 2 18	10 0 1 8
1718	Wrought.	969 0 21	3110 1 1	1396 1 26	887 0 2	6734 2 3
	Bar.	2 0 0 0	154 4 0 0	2 18 2 18	3 10 0 18	26 10 3 14
1729	Wrought.	1342 1 21	7393 3 0	1903 2 23	851 0 14	4866 0 23
	Bar.	3 10 0 0	337 12 2 23	58 0 0 25	4 0 0 0	1 1 0 0
1730	Wrought.	1479 3 23	7329 2 24	2775 0 0	2628 3 20	6389 2 24
	Bar.	5 10 0 0	149 13 1 5	91 10 2 13	2 3	2 9 0 7
1731	Wrought.	1770 0 11	9727 1 7	2627 2 7	2946 0 7	9681 3 11
	Bar.	10 18 1 7	243 8 2 7	101 11 1 1	5 0 0 0	3 18 0 0
1732	Wrought.	2167 3 7	8597 2 4	2380 0 24	2207 2 26	7445 3 27
	Bar.	9 0 0 0	413 5 2 17	58 5 3 27	2 16 0 21	4 14 0 0
1733	Wrought.	2692 3 11	7104 3 14	1609 3 7	2419 2 8	8815 1 10
	Bar.	25 0 0 0	370 14 2 7	55 0 0 0	2 0 0 0	12 0 0 0
1734	Wrought.	2880 2 19	6191 3 5	2291 0 6	3149 2 21	8641 0 7
	Bar.	7 15 3 21	263 8 3 0	90 6 3 20		1 15 3 2
1735	Wrought.	3353 1 23	6543 2 23	2136 2 7	2102 0 0	9709. 1 24
	Bar.	5 19 0 14	101 9 3 0	108 8 1 5		2 13 0 0

With the Revolution terminated the legislation of Great Britain over the trade and manufactures of the Colonies. That legislation, which was the cause of the separation, had, for several years before the war, produced numerous efforts in the Provinces to lessen the dependence upon foreign sources for manufactured products. The market for their pig-iron being cut off by the war, and the importation of British iron and manufactures necessarily suspended, capital was turned to the creation of supplies for the public service, and to the conversion of Iron into various articles of ironmongery previously imported. The production of steel and different descriptions of hardware was recommended, and in some cases encouraged by bounties, by the General Congress and the local assemblies or conventions. Many Iron-works and small manufactories were called into existence, some of which were as quickly ruined by the flood of foreign Iron and manufactures at the close of the war. The inefficiency of the old Confederation left to the separate legislatures the duty of protecting their interests in this respect as they might see fit.

Domestic Iron-manufacture.

A dangerous rivalry to British iron interests was apprehended in the American States, not only in the production of rough iron, from the cheapness of fuel and the quality of the iron, but also in the articles of steel cutlery, and other finished products, from the dexterity of Americans in the manufacture of scythes, axes, nails, etc. In these they exceeded the French and most European nations, as well in the style and finish as in the quality of their articles, being made from the best iron, which in Europe was reserved for finer manufactures not attempted in America. Some of the political writers of England recommended the removal of all duties on foreign iron in order thereby to secure the control of the American and Russian markets for her manufactures of Iron.

The great improvements which had been made in England in all branches of the Iron-manufacture, and the competition springing up in Europe and America in the production of raw iron, doubtless prompted the Act of 1785 (25 Geo. III. c. 67) to prevent, under severe penalties, the enticing of artificers or workmen in the iron and steel manufactures out of the kingdom, and the exportation of any tools used in these branches to any place beyond the seas. This Act, embracing as it did not only nearly every description of tool, engine, or machine, or parts of such, used in making or working up iron and other materials, but also the models and plans of such machinery and implements, created no small difficulty in the introduction of many new branches of the practical arts. It was the supplement to numerous Acts affecting colonial manufactures.

It was not until conflicting State legislation, an almost total drain of

specie for foreign manufactures, a worthless national currency—of which several thousand pounds could only purchase a ton of iron, it not being lawful to refuse it,—and a languishing state of trade and manufactures, proved the necessity of endowing Congress with power to protect the national industry and redeem its credit, that the Iron-manufacture and its allied interests received any protection from Government.

Protection by first Tariff.

The Tariff enacted in July, 1789, laid a duty higher than upon most other articles upon slit and rolled iron and castings, steel, nails and spikes, and wool cards, and a few articles in other branches, evincing thereby the disposition of its framers to give special encouragement, limited though it were, to those important interests. On bar, bolt, and pig iron the rate was $7\frac{1}{2}$ per cent. on the invoice value. Upon steel the duty was laid at half a cent per pound, and upon nails one cent per pound.

Mr. Hamilton, in his Report on Manufactures in 1791, stated that manufactures of Iron, though generally understood to be extensive, were found to be much more so than was supposed. Iron-works had greatly increased, and were much more profitable than formerly; the price of Iron having increased from about $64 per ton, before the Revolution, to $80 a ton at that time. The rise in price was chiefly attributed to the increased manufactures from that material. He recommended special encouragement to this branch of industry by increased duties on foreign iron and its manufactures, and by the establishment of national armories for the public service. In the following year, the duty on steel was therefore raised to $20 per ton, and on iron cables from Great Britain to $30 a ton. The tariff on rolled iron and steel imported in American vessels was, in 1794, fixed at 15 per cent., on hardware at 10 per cent., and on all other manufactures of Iron at 15 per cent., with an addition of 10 per cent. when imported in foreign bottoms. These rates were retained until 1816, when the tariff was adjusted with special reference to the encouragement of manufactures, of which the iron branch received an extraordinary impulse during the war of 1812, to be again remarkably depressed by the influx of foreign Iron and the manufactures of that material.

INDEX TO PORTRAITS

OF

OLD PRINTERS & EMINENT TYPE FOUNDERS.

George Bruce, New York,

One of the most eminent of American Type Founders, was born in Edinburgh, Scotland, June 26th, 1781. When scarcely fourteen years of age, he left his native land for the United States, where his elder brother David had preceded him, and arrived in Philadelphia in 1795. Here he commenced to learn the trade of book binder, but rebelling against the excessive exactions of his master, he left the city, determined to follow the sea. By the persuasion of his brother, he relinquished this purpose, returned to Philadelphia, and entered the office of Thomas Dobson, as a printer's apprentice, where he served two or three years.

About 1798, Mr. Dobson's office was destroyed by fire, and the yellow fever prevailing in the city, the brothers left that place. Arriving at Amboy, George sickened with the fever, but under the care of his brother, his life was preserved, and they continued on through New York to Albany, where they obtained employment in the printing office of the Webster Brothers. In the fall they returned to New York, walking the whole distance. In 1803 he became foreman and occasional contributor to the *Daily Advertiser*, and in November of that year, the name of George Bruce appears on the paper as "printer and publisher for the proprietor."

The extent and state of the printing business at the opening of the present century, have been alluded to elsewhere. In 1806, when David and George Bruce opened their Book Printing Office at the corner of Pearl street and Coffee House slip, now Wall street, in New York, there were less than three hundred book and newspaper offices in the whole Union, where there are now over four thousand five hundred. Their commencing business at this particular time, was rather accidental. The printing of "Lavoiser's Chemistry" was offered them, and they resolved to try to do it. Having no office, they hired the use of a font of type and a press, and the work was executed by their joint personal labors. To give greater satisfaction, they decided to procure a standing-press to press the sheets, and, on explanation of their prospects to Adam Ramage, of Philadelphia, he forwarded one to them on credit, directed to the care of D. & G. Bruce, which was assumed as the title of the firm, and so continued until its dissolution.

This was the first standing-press used in the printing business in New York, and some of the printers considered it an unnecessary innovation. The printing of this book, giving great satisfaction, an abundance of work flowed in upon them; and by close attention to the economies of the business, and unremitting industry, they soon began to accumulate the materials of an extensive office, so that, in 1809, when they moved to Sloat Lane, near Hanover Square, they had nine presses in operation. They occasionally printed and published a work on their own account.

In 1812, David Bruce went to England. Earl Stanhope, who was celebrated for mechanical investigations, had recently perfected his method of stereotyping by immersion. David purchased the secret, and learned the process in part. Returning the next year to New York, the brothers made their arrangements to introduce the process in this country. They had a large share of obstacles to surmount in their first efforts, as every thing was experimental. But they were not men to abandon an undertaking, once decided upon, where success was possible. To David's genius the art owes the application of the planing-machine, which overcame the objection that the plates were of irregular thickness as cast. The English used a turning-lathe to within a few years, and their plates were never true until they adopted the American machine. Mahogany shifting-blocks, to bring the plates to type height, were also his invention. Type had heretofore been cast with a bevelled shoulder, and this was so low that it interfered with the moulding and weakened the plate. To remedy this, they began that year manufacturing type for their own use, adapted to stereotyping. The first book stereotyped by them was a New Testament, in Bourgeois, completed in 1814. They made two sets of plates, publishing from one themselves; the other they sold to Matthew Carey, of Philadelphia. This was followed the next year by the Bible, in Nonpareil. These were the first school editions of the Bible and New Testament issued in America, and except the "Westminster Catechism," the first works stereotyped here. The following year, 1816, the American Bible Society was founded, and they stereotyped their first issues. Subsequently they stereotyped and published a series of Latin Classics. In 1815, they moved their office to William street, near Garden.

In 1816, they sold out the printing department, and bought a building in Eldridge street for the foundry. George devoted his exquisite taste and energies to enlarging the type business, while David gave his thought and genius to stereotyping. From costly experience, George had learned that to be independent of the caprice of workmen who understood the art of punch-cutting and casting, he must acquire a thorough practical knowledge of the manufacturing process in all its details. The first attempts of Mr. Bruce at punch-cutting, were crude and imperfect, though they clearly indicated the germs of that correct taste and accuracy of eye which his subsequent artistic design and mechanical skill in typography displayed.

In 1818, Chambers street was opened, and they bought the lots and erected a house for the foundry, which, with the adjoining building, Mr. Bruce continued to occupy till his death.

The first Specimen Book of "The New York Type Foundry" issued by

D. & G. Bruce, 1817–18, was a thin pamphlet, exhibiting a variety of Roman fonts, from Nonpareil to English, with a fair assortment of plain job type and borders. Enlarged editions have been issued at various periods, until now the "Specimen Book" of this foundry is a bulky volume. The last edition contains specimens of plain and ornamental type, borders, cuts, etc., that have required the cutting and fitting up of probably two hundred thousand distinct punches and matrices.

The health of David Bruce becoming impaired by excessive application to business, he purchased a farm in New Jersey, and the firm was dissolved in 1822. George relinquished stereotyping that he might devote his time and skill entirely to systematizing, improving, and enlarging the Type foundry. It would greatly enlarge our memoir to notice all his labors in this direction. Up to 1822, there had been no uniform standard of bodies for type in the several foundries. Mr. Bruce undertook to harmonize and graduate the size of the different bodies as they ranged in the eleven series from Pearl to Canon, by enlarging some and reducing others, giving them a relative proportion. This was a difficult task, involving great labor and expense. But the system of steel gauges he then established, has generally prevailed as the standard among the American founders. He then introduced the Agate body for the first time into the series.

Scarcely had the manufacture of type begun in this country, before thought and ingenuity were brought into exercise to devise a machine for casting more rapidly. The prevailing idea among the experimenters was that this must be attained by casting a number of type at the same time. The first invention of this class was patented in 1805, by William Wing, of Hartford, Connecticut. It cast twenty or thirty type at once—the type projecting from the shank like the teeth of a comb. This patent he sold to Elihu White, who spent large sums in efforts to perfect it, but was finally compelled to abandon it. But solidity and sharpness of outline could not be obtained in that direction. Several other machines of like character were patented in the succeeding thirty years. Large sums were expended, and much time and talent employed.

Inventors now conceived the idea that a machine might be constructed to cast singly, on the principle of the hand-mould. The earliest of these was William M. Johnson, of Hempstead, L. I. He was followed by Starr & Sturtevant, of Boston. The eccentric type founder, George B. Lothian, brought an original and somewhat complicated machine to great perfection. At the same time, David Bruce, Jr., a thorough artizan and ingenious inventor in all that pertains to type making, had been encouraged by his uncle George to devote his mind to the subject. After five years' study and experiment, in 1838, he produced the machine, that with some improvements of more recent date, has superseded the others, and is now in general use in all the type foundries of the world. One of the chief difficulties to be overcome in rapid casting was the danger of the mould overheating. Mr. Lothian remedied this by the ingenious device of a continuous stream of water through the mould. Mr. George Bruce met the same objection, and devised a way to cool the mould, by driving an artificial blast of wind through it, which he patented

in 1854. This improvement established the success of the invention. He also devised a plan for substituting steam instead of hand power, so that one man can attend two or more machines. An expert workman can only average fifteen type a minute by the hand process, while each machine will cast one hundred in the same space of time, and more uniformly perfect.

In 1833, Peter C. Cortelyou became a partner with Mr. Bruce, and remained as such until 1850. On his retiring, Mr. Bruce gave his son David an interest in the foundry, and he mainly conducted the business in the later portion of his father's life, though his name did not appear until the firm was changed in 1866, to George Bruce's Son & Co.

Many of the novelties and improvements introduced into the trade, to increase the facilities for printing and to elevate the standard of excellence, through new styles of type, borders, ornaments, etc., were designed or invented by Mr. Bruce, who also cut the punches and fitted up the matrices with his own hands. The Roman faces he produced in successive years were so superior that they gave his foundry a commanding reputation among printers. In 1830, he received a patent for combining printing type for music. The lines of the stave were formed by brass rules, and the characters were cast in sections to occupy the spaces between, thus forming music of any required description more perfectly than by the old method. Kerned type were avoided, and the number of characters reduced.

As early as 1832, his Scripts had become famous among printers. No one ever equalled him in beauty of design and neatness of finish in any thing pertaining to his various styles of Calligraphic art. The last set of punches he cut was for a Great Primer Script, when in his seventy-eighth year, and is unsurpassed by the best artists. The first issue of the Patent Office, under the Act of 1842, for protecting designs, was granted him for one of his incomparable scripts. His designs for fancy type, combination borders, and ornaments, show rare artistic merit. He was never so happy as when he could leave the details of business, and sit quietly at the bench in his private office, devising and cutting something new in typographic art. To bring out something new and useful was his ambition. For this he would devise and labor with unwearied perseverance, and would reject, without a murmur, that which had cost him months of patient toil, if it did not please his fastidious taste.

He was ready with his profound advice and means, if need be, to encourage and assist in developing any substantial improvement in the art. Several years since he desired to stimulate inventive genius to the production of a power-press that should do for the country papers what "Hoe's Lightning" has done for the large dailies—a press that should be comparatively inexpensive, economical, and rapid. He offered a handsome premium to the successful inventor. Several new presses were the result.

Some eight years before the death of Mr. Bruce, his sight began to weaken, and he was compelled to relinquish his mechanical labors from that cause. But he continued his daily walk of two or three miles to the foundry, and his oversight of business with sound discernment until the year before his decease. Gradually his strength continued to decay, though his intellect remained

clear, until the final termination of his long and useful career, on the 5th of July, 1866, in the eighty-fifth year of his age.

Of slight frame, Mr. Bruce had the appearance of a man of infirm health, yet he was seldom sick. No doubt his extreme regularity of habits in exercise and diet, prolonged his life. His white cravat and neat, simple attire and serene countenance, gave him the appearance of a venerable clergyman. He was endowed with marked positive individuality. He had much of the simplicity, humor, self-control, and direct plainness of speech of the Quaker, combined with the unbending integrity, tenacity, and self-will of the Scotch. The peculiar deliberate and concise tone in which he spoke, always left the idea he wished to impart distinctly on the mind of the hearer. He was eminently a practical man, but slow of decision. Every thing submitted to him, or his own self-originated plans, was only decided on after mature deliberation. But when once decided, it was the end of controversy, until time or experience had found them wrong, when he was equally frank to acknowledge an error. He was not naturally devoid of temper, and had underneath his calm, cold exterior, a warm, forgiving, and generous nature. But so thorough had been his self-discipline, that all his faculties were under subjection. He never could be thrown off his guard, however great the provocation, though his sharp, cutting retorts would often be more painful and humiliating than an outburst of passion.

He was ever anxious to enhance the prosperity of the craft, both mechanical or moral. He took a warm interest in the welfare of the Typographical Society, and was the first and most liberal patron of the Printer's Library, connected with that society. His own library was rich, containing a number of rare works of the earliest period of black letter print, with illuminated initials, and also in MSS. of the same character of an earlier date. During the existence of the Mechanics' Institute, of which he was for several years president, and the earlier years of the American, he was an active member, and at their scientific conversational meetings and lectures, frequently gave interesting and instructive talks on some mechanical subject. He was also an early member of the Historical Society, and as late as 1863, he served on the committee for the celebration of the two hundredth birthday of William Bradford, the pioneer printer of Pennsylvania. He was a member and officer, for many years, of the General Society of Mechanics and Tradesmen, and aided in the establishment of the Apprentice's Library. He was also the senior member of the St. Andrew's Society, having joined it in 1804, and a member of the Masonic fraternity. Soon after the rebellion commenced, the manufacturers of type, in the various cities of the North, organized a Type Founder's Association, for the regulation of their business. Mr. Bruce was elected president, and filled the office during the remainder of his days.

The life of Mr. Bruce was cotemporary with the rise and progress of typography during the present century. He found the art of printing insignificant, type founding undeveloped, stereotyping unknown, the hand-press imperfect, power-presses not conceived, American literature unwritten, and the newspaper but a handbill, and retired from the scenes of his activity with the Press the mightiest potentate of the nations.

James Conner, New York,

A practical printer, but better known as the originator of the extensive Type foundry in New York, bearing his name, was born in Duchess county, near Hyde Park, April 22d, 1798. In 1814, he was apprenticed to Samuel Brower, publisher of the *Public Advertiser*, which counted among its contributors many well-known politicians of that day, among others, Henry Wheaton, who, it is said, never altered, even by a single word, the original manuscript given into the compositor's hands. In this office James Conner first learned the art of setting type while also performing many of the other duties incident to the publication of a newspaper at that time. Before completing his apprenticeship, he made an arrangement for cancelling the articles of indenture, and entered as a half pay hand, the office of Major M. M. Noah, then issuing the *National Advocate*, but imbibing the idea that the business would be but half learned in a newspaper office, he decided upon an application to Abraham Paul, then a celebrated printer, who accepted him as a two-third compositor. His next engagement was with Ephraim Conrad, a much esteemed printer of his time, and whose office was on the corner of Chatham and Frankfort streets, where French's Hotel now stands. While in Mr. Conrad's employ he advanced rapidly in a practical knowledge of fine job work, and became also a first class pressman.

An Englishman named Watts, was his next employer, and while in this office, he worked in the capacity of an ordinary compositor, on the first quarto Bible ever stereotyped in America. It may be proper to state that this Mr. Watts, in conjunction with Mr. Fay, the father of the recent minister to Switzerland, was among the first, if not the very first, who brought the art of sterotyping to any degree of perfection in the United States. It was probably here that he learned the rudiments of finishing stereotype plates in which he afterward so greatly excelled that he confined himself exclusively to the stereotyping business. Not long after this, he was induced to remove to Boston to take charge of Timothy H. Carter's stereotype foundry with a promise of a large weekly salary, which was soon changed to a contract at a certain price per thousand ems for composition and finishing plates for the press. To this the addition was subsequently made of the supervision of the press rooms in which several of the Treadwell power presses (being almost the first power presses ever used in this country) were run. Here he labored from ten to eighteen hours a day for nearly three years, and then returned to New York to engage in business on his own account with a capital of some three thousand dollars, the net accumulation of his personal labors.

Mr. Conner at first located himself in Frankfort street near Pearl, but soon secured a lease on the building No. 1 Murray street. It was while in this location that he made an important advance in type founding, by taking old stereotype plates and cutting an alphabet of some sixteen-line Pica Antique which was much wanted at that time for large posters. Of these he stereotyped and sold immense quantities, blocked on wood. From Murray street Mr. Conner removed to Spruce street near Gold, where he erected a new building for the casting of plates to accommodate his increasing business. In addition to his ordinary custom, that of the Episcopal and Methodist

Societies had recently accrued to him. The occasion, he thought, was opportune for the publication of a folio Bible, being the first ever stereotyped in the States, or any other country. For this, long before he had finished it, he found a customer, in Silas Andrus of Hartford, Connecticut, who readily agreed to the price first asked, five thousand dollars. Elated, as he well might be, by his success in this connection, and anxious, as he ever was, to keep good faith to the very moment, Mr. Conner was compelled to devote himself eighteen hours daily to the personal supervision of the work.

About this time he was induced to embark in the casting of type, more with the view of manufacturing such as he required in his own business than with any idea of sale, and he was also elected by his fellow printers to the Presidency of the New York Typographical Society, a chartered institution with considerable capital. Not long afterwards he erected a five story type foundry on Nassau street corner of Ann, and commenced the issue of his *Miniature Specimens of Light-face Printing Types*, exhibiting in Latin some ten or fifteen lines of Roman, from Nonpareil to English, on a sheet of India paper, folio page. So highly was this appreciated that the introduction of light faced type became quite an epoch in founding. He also embarked largely in stereotyping standard works for his own account, selecting *Maunder's Treasury of Knowledge*, *The Million of Facts*, *Shakspeare's Works*, and an improved edition of the *Common Prayer*. He also undertook the stereotyping of a *Polyglot Bible* and for this purpose prepared a new size and style of type called Agate, cut in a condensed and compressed manner with a view of admitting a certain number of figures and points within a given space, the whole included in a centre column of notes, otherwise the notes would not come on the same page as the text to which they referred. Of this Bible he made several sets of plates from the same composition, then took out the references and centre column of notes, and completed many sets of an eighteen mo. Bible, and a proportionate number of plates for the New Testament.

The publication of Sir Walter Scott's entire Works, which consisted of seven octavo volumes of closely printed matter, was his next undertaking. In connection with this, it is said that, after completing Scott's works, his impression was that there was an additional volume. Determined that nothing coming from his hands should be imperfect, he took hold of, and stereotyped half a volume before he discovered that Sir Walter was not the author of the book! consequently, it was abandoned. An idea may be formed of the extent of his dealings at this time from the fact that on this work alone, he invested from forty to fifty thousand dollars. At this period his Type foundry had so enlarged that he was induced to dispose of his stereotyping establishment, and devote himself entirely to the manufacture of type, and the publication of Scott's Works, in parts.

It would be impossible to follow the subject of our sketch through all the incidents of good and evil fortune that attended him, or the various changes of location that were made before he became established at 28 Centre street, where Conner's Type Foundry is now a most conspicuous object. Among the most noticeable of the experiments made by him, was an attempt to cast

letters from an electrotyped matrix by the process of chemical precipitation. Previous to his successful efforts in this direction, Messrs. Mapes and Chilton, chemists, had experimented to produce a *fac simile* of a copper plate which Mapes wished to use for his magazine. Ascertaining the perfect success of the experiment under other hands, he was anxious to have their battery tried on a copper plate. It was, to his and Mr. Chilton's joint delight, successful, and a very favorable report was inserted in many of the European scientific periodicals.

In the course of his experimenting, Mr. Conner took a Long Primer Italic capital T, and inserted it through a piece of stereotype plate. This was attached to a copper wire by soldering; some zinc was attached to the other end of the wire; a weak solution of sulphuric acid was made and placed in a vessel; a solution of common blue vitriol in another apartment; then the matrix and the zinc were placed in their respective apartments, and the process of extracting the copper from the sulphate, through galvanic action, commenced, and the copper obtained was thrown on the intended matrix.

He and his assistants then took a small cut of a *Beehive*, and setting this also in the same way, obtained a perfect matrix, which is now in use at his sons' foundry. These successes encouraged him to attempt other experiments on a larger and more valuable scale. Mr. Conner, therefore, ordered a fancy font of type, which he originally had cut on steel, selecting therefrom a perfect alphabet, points, and figures, and then shaved a stereotype plate on both sides. This he lined off into sizes, equal to the matrices he desired to make. He then made the necessary openings through the plate, and inserted the types designed to be precipitated on, which he cut off and soldered on the back. This proved a highly successful experiment, as it gave him a perfect set of matrices at one precipitation. This plate is still to be seen at Mr. Conner's establishment, as originally made, and is regarded as a great curiosity—being supposed to be the first alphabet thus made, in this or any other country.

His next experiment was made on a more extended scale, and, to this end, the apparatus was enlarged so as to admit three fonts of fancy types, which were placed in communication with the precipitated copper at the same operation. Between each letter was inserted a piece of wood, made to the height necessary to separate each matrix from the other, as it came out, it being impossible to connect the wood along with the precipitated metal. Thus divided, each matrix would fall apart without the labor of sawing. This experiment, however, was by no means successful. From the circumstance of wood being introduced, as dividing lines, and becoming wet, it swelled—such swelling causing the type to spring from the bottom of the trough. In the process of precipitation, only a very thin shell was found on the face of the type; about the same quantity having found its way to the bottom, in consequence of the springing of the dividing lines, and the throwing of the types off their feet. All these difficulties have been since overcome, and this establishment has several thousand precipitated matrices that can scarcely be told from those made from a steel punch.

When David Bruce Jr. had invented his machine for casting type, which

was far in advance of any that had preceded it, Mr. Conner was among the first to perceive its advantages and he secured not only a certain number of these new machines but the privilege of manufacturing as many more as his business wants might require. The firm are now the owners of the extended patent and have introduced them successfully in several of the type foundries of England and Germany. In these and other diligent labors he passed a long life until the messenger of death summoned him away, on May 30th, 1861.

Mr. Conner possessed, in a large degree, those personal qualities that win esteem and command popularity. In 1844, he was elected to the office of County Clerk for three years, and on the expiration of the first term, was re-elected for the same period. Affable and courteous, and abounding in anecdote, yet possessed of courage and determination, he exhibited many of the attributes that constitute true manhood. Since his decease, the business established by him has been carried on by his two sons, James M. & William C. Conner, located at the corner of Reade and Centre streets, who have made many important improvements, especially in machines for finishing electrotyped cuts, also improvements in machines for casting type. They have now in their foundry about thirty type casting machines, and employ in all the departments over one hundred persons.

John C. Clark, Philadelphia,

Who is now the oldest living printer in the City of Philadelphia, was born in New York city in the year 1787. Whilst the memory of his early life is somewhat dim and faded, he remembers having lived in Orange Street, so called at that time, and unpaved, running from Broadway to the North River, beyond which street, he thinks there were no wharves. He recollects standing in Chatham street previous to the close of the year 1794, as the ball was being put up on the steeple-rod of St. Paul's Church.

About that date, he removed to Philadelphia and picked up his first type in the printing office of his step-father, Mr. William Ross, then printer for Congress, in the old Loganian Library building, on Sixth street, opposite Independence Square. Drawing a case from the rack, he learned the boxes, and set up an anecdote of a sailor, which, pleasing his childish fancy, probably engendered a taste for the profession, which nine years later he adopted. During those early years, he frequently saw General Washington, then President of the United States, and witnessed the mournful ceremonies which commemorated his death in 1799.

Some idea may be formed of the growth of Philadelphia, when he states that, in 1795, Sixth street below Chestnut was not paved, and even Market street had but few foot-pavements west of Tenth street. Even at that time there were the remains of a post and rail fence at the north-west corner of Seventh and Chestnut streets, and beyond Eleventh, on Chestnut, only one house on the line of the street, very near the Schuylkill river, that of Mr. Esling, brick-maker.

In the year 1800, Congress sat in Washington, and Mr. Ross, still their printer, took his step-son with him to that city, having removed his office

there. At the fire which destroyed the Treasury Department, Mr. Clark stood beside the then venerable President, John Adams, standing in line, passing water to extinguish its flames, and he also recollects seeing Thomas Jefferson take his oath of office, as President of the United States, from the gallery of the Senate. Returning to Philadelphia in 1801, he was apprenticed in 1803, being then sixteen years old, to Robert Carr, to learn the printing business. At this period, Mr. Carr's office, (though it contained but four screw presses,) was one of the largest in the city. Whilst working as a compositor here, he set up nearly the whole of Wilson's American Ornithology, in Great Primer type, making the accents with his penknife from a hair space, no foundry as yet having cast any. He also set up from the original manuscript a volume of Thomas Moore's poems, the author then being in the city, and worked on Deidrich Knickerbocker's History of New York, when first published, Washington Irving calling (incog.) at the office to superintend it.

During the year 1805, the publication of Rees' Cyclopœdia, in 46 vols. 4to, was commenced by Samuel H. Bradford, the heaviest undertaking in the publishing line of any then known in this country. The first and many subsequent volumes were printed in Mr. Carr's office.

The book-printers of the time, amongst some others, were Hugh Maxwell, Thomas S. Manning, Fry & Kammerer, T. L. Plowman, James Maxwell, Bartholomew Graves, and Robert Carr.

Mr. Clark formed a co-partnership in 1817, with his friend M. Raser, and under the firm of Clark & Raser, pursued his vocation with moderate success. They printed the first Sunday-school book issued in the United States, probably the first anywhere. This was ordered by John P. Bankson, Hugh De Haven, and Ashton Claxton, three young gentlemen, teaching in St. Paul's Sunday-school. Mr. Bankson was sent by the American Colonization Society as the first missionary to Africa, but died soon after his arrival there. Mr. De Haven died in this city. Mr. Claxton is still living.

About the year 1817, Mr. Adam Ramage, press maker in Philadelphia, imported the "Ruthven Press" from Scotland, and manufactured a number of them. This press, and the "Clymer Press," invented by George Clymer, of this city, were probably the earliest improvements on the old screw press introduced into Philadelphia. In the year 1831, Mr. Clark removed his office to Dock street, and opened in connection with it a stationery store, and commenced the printing and sale of Commercial and Law blank forms. There he has since remained, and with his two sons, still carries on the business.

Mr. Clark has lived to see astonishing improvements in the art of Printing. The beauty and great variety of fancy type, the improved presses, and other facilities for the convenience and efficiency of the craft, have placed the printer of 1867 on a highly elevated platform, when compared with the printer of 1804. A single printing office of the present time, with its fifteen or twenty power presses, will do more work in one day than could have been done by the combined offices of the city, when Mr. Clark commenced business in the year 1817.

John Fagan, Philadelphia,

One of the old printers and stereotypers of Philadelphia, was born in that city on the 28th of December, 1799, and began to learn the printing business at the early age of thirteen, or about the end of the year 1812. It may well be supposed that such an era was not likely to be one of favorable progress, for the second war with Great Britain was just beginning, and during its continuance of two years and a half, little progress was made in the peaceful arts. There was but little machinery in use, steam power was only in limited operation, capital was scarce, skilled artizans few in number, and inventive genius sadly at a loss as to the means of testing or carrying out its most promising suggestions. The typographical art was almost in its infancy, in the city of Brotherly Love, and although some iron printing presses had been introduced, the simple old screw press of Adam Ramage was chiefly used by the fraternity, and their awkwardly cut types were manufactured by Binney & Ronaldson, near the corner of South and Tenth streets. Some heavy works, however, had been printed in Philadelphia, including quarto Cyclopedias, Hume's History of England, Robertson's Historical Works, embracing India, Scotland, America, and Charles V. Some books, too, aspiring to a good degree of elegance, had issued from the Philadelphia press; such as Barlow's Columbiad and Wilson's Ornithology, both in the quarto form, and Marshall's Life of Washington. But in these early days of the Republic, wealth or competence was not so generally diffused as to make such publications profitable; and on each of the works comprised in the above list, the enterprise involved a considerable loss.

But when, a few years afterwards, the country began to accumulate capital, and the new art of stereotyping came in to supplement that of printing, there was a decided change for the better. The bookseller had more customers, and he was not obliged to pay for setting the type anew for each edition. So books were cheapened, and purchasers increased, making the publishing business more steady as well as more profitable, and enabling some publishers to realize competencies and fortunes.

It was in 1823, that Mr. J. Howe came to Philadelphia with his stereotyping machinery, where Mr. L. Johnson had preceded him in the same vocation, and both had a fair share of business in stereotyping Bibles, school books, and other standard works. In 1827, Mr. Fagan entered Mr. Howe's establishment as proof-reader, and, on the death of Mr. Howe, in 1834, took the foundry, and conducted it with reasonable success until 1863, when he retired from the business, relinquishing it to his son.

The respective stereotype foundries of Messrs. L. Johnson and J. Fagan were, for many years, almost the only ones in Philadelphia. But as the city advanced in population and resources, enterprising young men entered into the business, and the establishments have quadrupled in number. Electrotyping, or stereotyping in copper, gives superior sharpness in casting woodcuts, and in that respect is a valuable adjunct to stereotyped works, besides being often employed for an entire work, where immense numbers of copies require greater durability in the plates. But most books are still stereotyped, few reaching sales amounting to hundreds of thousands.

In the twenty-nine years comprehended within this period, the art of printing had made great strides. Aided by Stereotyping and Electrotyping, which saved much expenditure in the way of type-setting, and the invention of the Adams press, the great book printing machine of the United States, which brought the agency of ingenious mechanism, propelled by steam power, to play an important part in the great advancement, the production of books was immensely cheapened, whilst in elegance and finish they contrasted strongly with the homely appearance of the old editions. If further improvement in book-making seems to have received a temporary check by reason of the multiform taxation resulting from the great Civil War, let us hope that a vigorous National growth in the future will tend to restore the former rate of progress.

It may not be inappropriate to add, in connection with the subject of this memoir, that, apart from his special interest in the art typographical, Mr. Fagan has been for many years an earnest and active advocate of home industry, with all its varied interests. He has constantly endeavored, through the editorial columns of a leading daily journal, to procure such a change in public sentiment as shall lead to an explicit National recognition of the justice and policy of full protection to all American industries, whether agricultural, mining, manufacturing, or commercial.

Lawrence Johnson, Philadelphia.

A printer, but eminent especially as a type founder, was born January 23d, 1801, in the city of Hull, England, where he received the rudiments of an ordinary English education. When quite a youth, he removed to Bungay, for the purpose of entering the printing office of Messrs. John Childs & Son, as an apprentice. During his seven long years of service, that energy, quickness of perception, and self-reliant judgment which characterized his whole after life, became measurably developed. While yet a boy, he became so reliable and finished a workman, that to a considerable extent he was entrusted with the direction of the affairs of the office; and by his devoted attention to his employers' interests, he completely won their confidence and esteem.

His term of service ended, he at once decided that the United States was his proper field of labor, as affording all the scope which his ambition craved. He induced his parents, with their numerous family, to emigrate with him, and on July 4th, 1819, they arrived in New York. The unhealthy appearance of the inhabitants of that city made so unfavorable an impression upon the parents, that they resolved to proceed at once to Albany. There Lawrence left his parents (who, a few months later, purchased a farm in Cayuga county, N. Y.), and returned to New York city, to engage as a compositor in the printing office of Mr. Gray. He devoted himself to his business with a diligence almost incredible. He boarded in the house in which the office was located, and for weeks together did not go out of the house, except to church on Sunday, and often would protract his labor sixteen and eighteen hours per day.

About the year 1820, his attention was directed to the comparatively new art of stereotyping, and with a view of obtaining a knowledge of it, he entered

the employ of Messrs. B. & J. Collins, of New York. This knowledge obtained, he removed to Philadelphia, and with his small capital set up a Stereotype Foundry. Owing to his imperfect knowledge of its details, and his very limited means, he met with many difficulties; but with that indomitable perseverance which never forsook him, he overcame them all.

In 1833, Mr. Johnson added type founding to his previous calling. The original proprietors of the Philadelphia Type Foundry, Messrs. Archibald Binney and James Ronaldson, had withdrawn from the business with considerable wealth, and Mr. Richard Ronaldson, brother of one of the preceding firm, who then held it, felt himself unsuited to the progressive demands of the age. Mr. Johnson thought he saw what was needed, and in connection with Mr. George Smith, (a former workman in the foundry), purchased the establishment on accommodating terms.

Connecting stereotyping with type founding, and throwing all his energies into the business, Mr. Johnson soon found he was not mistaken in his calculations, and that the foundry was susceptible of resuscitation; and the Philadelphia Type Foundry once more, under his judicious management, began to emerge from the "slough of despond" into which it had hopelessly drifted previous to his taking the helm, and has continued steadily to sail before the breeze of public appreciation from that day to the present. Availing himself of the newly-discovered art of electrotyping immediately on its development, he bore down all rivalry in the production of a new quarto Specimen Book that has no superior, and but few equals, in the world of typography.

Mr. Johnson was aware that there was no stand-still in type founding. All must be onward and progressive. He was ever a patron of improvement, and an encourager of the mechanic and artisan; and while his Specimen Book exhibits a liberal draft on "the public domain" of type founding, to his memory be it spoken, he was never known to appropriate to himself the labors of an artist by electrotyping where he could procure the matrix by purchase. Indeed, one of the last acts of his life—in conjunction with other leading type founders in this city—was to procure, by petition to Congress, such a modification of the copyright law as to afford protection to letter-cutters, engravers, and originators of designs.

As his business increased, he foresaw the advantage, and almost absolute necessity, of enlisting in the interest of his foundry's growing greatness that species of talent which would tend to the development of its highest excellence; and with that view, in 1845, he associated with him Mr. Thomas MacKellar, Mr. John F. Smith, and Mr. Richard Smith—all of whom had been in his employ for many years. About this time the health of Mr. Johnson became very precarious. Under the new arrangement, however, a large portion of the burden that was pressing him to the grave being removed, he rapidly recuperated, and to some extent enjoyed a fair share of health once again. His connecting these gentlemen with him in his general business was another evidence of his far-seeing wisdom as a business man. Under their united efforts the Philadelphia Type Foundry continued to prosper; and when "the grim messenger of death" called him away on the 26th of

April, 1860, the new partners had become familiarized to the extensive trade of the establishment, and its business glided on smoothly and uninterruptedly as before.

A friend who, for more than thirty years prior to Mr. Johnson's death, enjoyed his uninterrupted friendship, travelled with him in foreign lands, and in our own land, and for months was his only companion, has furnished us with the following excellent analysis of his character and proper tribute to his worth.

"Mr. Johnson's *mental* character was strong and well balanced. He possessed a vigorous understanding, great mental resources, and remarkable powers of concentration and abstraction. Although not favored with what is termed a 'liberal education,' he had, nevertheless, a well cultivated mind. In the true sense of the word, he was a student; for in his active and useful life, he studied men and things continually, and thus became a precise and logical reasoner. Those who have had intercourse with him, especially of a business kind, cannot but have noticed how largely *decision* of character was developed. His mind was not only rapid in its operations, but of great grasp. While listening to the recital of any thing in which he was concerned, his opinions (which he rarely found it necessary to change) were made up, so that when the statements were finished, he was ready to to act on the matter in hand at once, although involving large interests.

"Mr. Johnson was a *liberal* and a *benevolent* man. After his decease, it became the duty of the writer to examine critically his books of accounts and papers. The goodly array of figures of his 'charity' account abundantly attests that with his increasing means his charities extended. There was no ostentation in his benevolence. Many a widow's heart has leaped for joy on receiving a ton of coal, or a barrel of flour, from an unknown donor; many a poor man's rent has been paid, and the landlord's acknowledgment been anonymously forwarded; many a poor boy has been benefitted by his counsel and assisted with material aid, of which his own family, much less the world, knew nothing.

"Mr. Johnson was a *just* man. While he expected and insisted on punctuality and strict probity from others, he was prompt and scrupulously exact in rendering to every man his due. All who knew him relied implicitly on his word, from which he was never known to swerve. Where his confidence was reposed, no amount of misfortune or business difficulties could shake it; but when once forfeited by trickery, breach of faith, or otherwise, it could never be regained. In compounding or arranging with honest, but unfortunate debtors, his large liberality became almost proverbial; and many instances could be cited where, in meetings of creditors, his manly and liberal course so moved his fellow creditors, that arrangements were effected on the spot, whereby the unfortunate debtor was enabled to go on with his business, and in many cases afterward, to attain prosperity.

"Mr. Johnson was a *successful* man. In his early business career he had many difficulties to overcome, arising chiefly from the want of means, and friends who could assist him. By his own unaided efforts and his sagacious talent in business affairs, as well as by his skill as a workman and his indomitable energy and industry, he surmounted them all. His large estate, and a business which has now become one of the institutions of Philadelphia, are left as monuments of his far-sightedness and skill. In this connection it may not be improper to state that although Mr. Johnson engaged largely in business matters outside of his own calling, it does not appear from his books of account that they contributed *in any degree* to his prosperity.

"Finally, Mr. Johnson was a *good* man. The many corporations and societies in Philadelphia with which he was connected, have spread on their minute books their estimate of his value as a citizen, and the personal loss

they sustained when his wise counsels were withdrawn. At a meeting of book publishers, held immediately after his decease, the venerable chairman, Henry C. Carey, Esq., said of him: 'I have known him, perhaps, longer than any of you—one of his first business operations was undertaken for me. I have found him, in all his relations, honest, intelligent, and upright. We could scarcely find a better man, and I have no hesitation in saying that he was as worthy as any man I ever knew.' Among the resolutions adopted at that meeting was the following: '*Resolved*, That in his decease the community has lost one of its worthiest citizens; for with an unsullied personal integrity, and a heart of the kindest promptings, he united clearness of judgment, activity of enterprise, faithfulness and diligence in an extensive business, and thus presents, in his finished character, a union of qualities rarely combined, which we shall ever cherish as an incentive and an example.' As a husband, father, and friend, he was eminently affectionate, indulgent, and true. The venerable and universally esteemed Rev. Albert Barnes, his pastor, standing by his open grave, in the beautiful cemetery of Woodlands, briefly and feelingly recounted his life and many virtues, and expressed his belief that he died with a well-founded hope of a glorious and blissful immortality.

"The family of Mr. Johnson, preferring a last resting-place beyond the rapid advances of the city, subsequently selected a beautiful location in the cemetery of Mount Vernon. Indicative of the character and taste of the departed is the plain but substantial granite shaft, which marks the spot where lies all that is mortal of a man who was useful to the world while living, and at his death left a name and character more enduring than the stone which tells the simple story of his nativity and death." M.

Conger Sherman, Philadelphia,

One of the old and most wealthy printers in the United States, was born in New Scotland, near Albany, New York, August 7th, 1793. His father, Job Sherman, a native of Massachusetts, was a soldier in the Revolutionary War, and was wounded at the battle of Saratoga, though he continued in the army until the end of the war. After his release from military service, he married Miss Anne Conger, of New Rochelle, New York, a lady of Huguenot descent, took up land near Albany, and commenced farming, in which pursuit he continued until his decease, in 1832. It will thus be perceived that the subject of this sketch combines in his blood the French Protestant and primitive English Puritan, than which there is no better ancestral stock.

Before he was thirteen years of age, young Sherman left his country home and entered the printing establishment of Barber & Southwick, then publishers of the *Albany Register*, and State Printers. In this office all the Department and Legislative printing for the State was done, and during the session of the Legislature it was part of his duty in his new vocation to carry from the printing office to the State House the printed bills and journals of the previous day's proceedings, and consequently he had access to all parts of the Legislative halls, the Committee rooms, and Governor's mansion, in all of which he was a welcome visitor. He has furnished us with a condensed account of his professional life, and some memoranda of his recollections of a few of the eminent men of that day, that are quite interesting, and we cannot do better than give them in his own words:

"It was at this time," he says, "that I had frequent opportunities of seeing some of the public men of that day, among others, Daniel D. Tompkins and

De Witt Clinton. In person, manners, and mind, Clinton was a splendid man. Sedate and reserved, he yet appeared to me always cheerful and kind. He had just been appointed by the Senate of New York one of the Board of Canal Commissioners, and was engaged in perfecting the plan of the Erie Canal, of which he was the originator. I was sent to him one morning at his room for copy. When I entered I doffed my cap, made my bow, and said, 'Please, sir, I was sent for some copy.' 'Sit down, my son,' was the kind and encouraging reply. He took up from the table before him a neatly prepared manuscript, fastened at the top of the leaves like a lawyer's paper-book, and asked me if I could read that. I looked at it; it was written in a clear round hand as plain as print. 'Yes, sir, I can read it,' was my reply. He said, 'I have here a duplicate copy which I wished to verify before I give you the original; stand up before me and read.' This was the first Report of the Commissioners appointed to survey the route of the great Erie Canal. I did my best at reading. I was accustomed to reading copy—bad manuscript generally; this was good. I read on in a clear, firm tone, and with emphasis, pronouncing every word correctly, until I came to the estimated cost of the work—*five millions of dollars*. I drew a long breath, more, perhaps, from some natural cause, than a comprehension of the enormous sum of money in those days. The grave statesman looked at me as if I did understand it financially. 'Large figures, sonny,' said he; 'I may not live to see the work finished, but you will, and paid for, too, I hope.' I then read on to the end of the document, put the copy in my pocket, felt highly honored, and returned to the printing office with it, where I came very near getting a good thrashing for loitering about the State House, which I sometimes did, for it was a very agreeable place for me to spend my time.

"I look back with pleasure to my boyhood. What I learned then made a good and permanent impression on my mind. Some one has said 'the boy makes the man.' I have always felt that it was for me great good fortune that my lot was cast among exemplary men, and in a profession where study and mental improvement were my daily business. Big figures I never expected to make, but for a respectable figure I have always had an abiding ambition.

"In the summer of 1811, I left my employers in Albany, to whom I was never indentured, and went to New York, where I staid about two months. Business of all kinds was then very dull in New York, and the printing business especially so. Sherman & Co. in Philadelphia, now in 1867, are using more paper for book printing in one day than was then required to supply all the book presses in New York for the same period of time.

"In September, 1811, I arrived in Philadelphia, and here began another epoch of my life. Fifty-six years are nearly gone since my advent in this city. Time flies fast. I cannot realize it. It seems but a few years. But when I recall all the eventful changes in the past years, memory revives many incidents personally impressive—the War of 1812, the subsequent depression of business, the years of toil and tuition as a journeyman printer from 1812 to 1830.

"Infancy very well expresses the state of the printing and publishing trades

a half century ago. Yet there were, at that time, both printers and publishers who were solid men and men of enterprise. The pioneers were Johnson & Warner, Mathew Carey, and Philip H. Nicklin. Their successors were the Careys, John Grigg, Carey & Hart, Blanchard & Lea, T. & J. W. Johnson, most of whom have amassed fortunes and retired from business. The improvements in the art of bookmaking, such as stereotyping and steam power presses, came just in time to insure prosperity to many engaged in the publishing business from 1835 to 1860; certain it is these were prosperous years for those engaged in printing, publishing, and the kindred professions.

"I say improvements came just in time; I should say that these improvements had their origin in the rapidly increasing requirements of the day for books and newspapers. *Necessity is the mother of invention*—the old hand press would no longer suffice. The Adams press was invented, and is still the approved machine for book printing. Hoe's great invention, the eight and ten cylinder press for newspapers, is now indispensable in America and in Europe. Stereotyping was done here long before 1835, the date I have given as a marked period of prosperity.

"In May, 1830, I purchased the printing establishment of Messrs. Towar & Hogan, booksellers of Philadelphia, and began business with four or five hand-presses, printing for that firm the Bible and Henry's Commentary. I have said above that my probationary years as a journeyman were years of tuition; those years of toil prepared me for the future years of business, which required skill in my profession, constant industry and economy in all things; for I may as well here tell it—I began business on borrowed capital.

"For the first four or five years after my commencement, in 1830, my progress was very slow. In 1835, the country generally began to feel the reviving influence of trade. In 1837, I put up my first steam press—the second press of the kind for book printing in Philadelphia. From that period to the breaking out of the Rebellion, in 1861, there was a gradual increase of business, attended with moderate success, which I shared in common with my professional contemporaries.

"In 1845, the first volumes of Commodore Wilkes' Exploring Expedition were printed for the Library of Congress at my office in St. James street. Wilkes' Narrative consisted of five volumes, quarto, with an Atlas of Plates. Then followed in succession, Hale's Philology, Dana's Geology, Gould's Mollusca, Dana's Crustacea, Gray's Botany, with an Atlas of Plates, Pickering's Races of Man, Dana's Zoophytes, with Atlas of Plates. Some sixteen volumes in all have been published in the same style for the Library of Congress. Separate editions of all of these works were printed for different publishers in Philadelphia, New York, and Boston, immediately following the volumes for Congress. Of the five volumes of the Narrative, many thousands were printed for a publishing house of this city—Messrs. Lea & Blanchard, a portion of them in quarto, but considerably the largest number in super royal octavo. These are the only works of public notoriety that have issued from my press.

"Many of the latter years of my professional life have been agreeably passed. I loved my business, and I was happy and contented. Frequent

social evenings at home with some of our typographical friends—Johnson, Clark, Fagan, James Kay, and others—were in every way beneficial, happy, and agreeable. Time is a great leveller. Johnson, the youngest of the party, was the first to fall."

In 1864, Mr. Sherman sold his printing business to his only son, Roger Sherman, who has associated with him as copartners Messrs. M. F. Benerman and Andrew Overend, under the firm style of Sherman & Co., whose establishment, which has been recently refitted, is now one of the largest and most complete in Philadelphia.

INDEX TO PORTRAITS

OF

EMINENT MODERN PRINTERS.

C. A. Alvord, New York,

Who has the reputation of being the best printer of illustrated works in the United States, is a native of Litchfield county, Connecticut. He was early apprenticed to learn the typographer's art, and worked as journeyman for many years before he became a master printer. During this period he acquired such proficiency in all branches of his profession, that when he fitted up his first printing office, in 1844, he was able to direct the proper arrangements, not only of the presses, but of the engine, boilers, and shafting, and, in fact, performed a large part of the work with his own hands. He first commenced business at the corner of Dutch and John streets, from which he removed to Gold street, where he remained until 1857, when he removed to No. 15 Vanderwater street, which is among the largest and best arranged edifices for the printing business in the United States.

This building is five stories in height, about sixty feet in front, and nearly one hundred feet in depth. The greater part of the basement, which extends under the entire building, is occupied as a paper wareroom, while a small portion is appropriated to an engine of thirty-five horse power, that drives the machinery. The boilers are placed in a court on the outside of the main building. One peculiar and distinctive feature of this establishment is the immense vaults for the storage of stereotype plates of publishers whose works are printed by Mr. Alvord. Of these there are four, which extend under adjacent buildings, are separated by thick walls and wrought-iron doors, and locked and guarded as a sub-treasury. The air in these vaults is cool at all seasons, and the roar of the great city is unheard. Here are thousands of books in metal—a mammoth cave of literature; with intricate and winding passages in which the inexperienced explorer is in danger of being lost, without the services of a guide.

Leaving the vaults and wareroom, and ascending to the first floor, we come to the composing room. Here about eighty men are constantly employed in setting type, and sometimes the force is increased to one hundred. The room contains over three hundred pairs of cases of type, among which are fonts of Hebrew, Greek, Old English, and a sufficient variety of old-style type to make reprints or fac-similes of old newspapers, which has been done here in many instances.

The press room is on the second floor. Here are sixteen Adams' presses, two cylinder presses, and eleven hand presses, which are employed on the finest illustrated works. Even these, however, are worked by steam. All the book work is dried by steam after what is known as the laundry method, and it is then pressed in hydraulic presses. The upper stories are occupied as a book bindery, while there is also on the premises a stereotype and electrotype foundry, so that all the operations necessary and incidental to converting a manuscript into a finished bound book are carried on under one roof.

To enumerate all the fine works that have issued from the Alvord Press within twenty-two years, would involve the compilation of a small catalogue. It is presumed that more work is done at this office for publishers of books sold by subscription, than at any other in the United States, and the list of fine holiday books, annually printed here, is a very comprehensive one. A writer in one of the New York dailies makes the following remarks on the subject:

"A book which was issued by this house a few weeks ago, will be of great interest to read about, although the reader will never see a copy, since it is not offered for sale, being intended for private circulation only. Mr. Alvord considers it one of the finest books he ever printed, and Mr. Matthews, the binder, was so pleased with it that he bound a copy in superb style, and sent it to the Paris Exposition. The book is called 'Armsmear,' and was prepared by Henry Barnard, LL.D., of Connecticut. As it was intended for a holiday present for friends, it was produced without regard to cost, being printed with beautiful type, on extra calendered paper, with open, free margins. Each volume was valued at twenty-five dollars when they were completed. The book contained an autobiography of Colonel Colt, written by his widow, and a full description of "Armsmear," the name of her residence at Hartford. It was splendidly illustrated, giving views of the house, deer park, grounds, conservatory, picture gallery, the pistol manufactory, etc.

"Many wealthy people publish books for their own amusement, and some of the residents of our Fifth avenue have indulged in the luxury. Some time ago Mr. James Lennox gave an order through his agent, Mr. Randolph, for the republication of the second voyage of Columbus, with copies of the original drawings made on board the ship. Mr. Lennox wished to have the book produced in the highest style of the art, and he was fearful it would have to be sent to Whittingham, of London; but when he saw Mr. Alvord's proofs, he decided they would do, and so the book was printed in America. Two copies of it were issued in folio, one of which, it is understood, found its way to the British Museum, while the other reposes in the library of Mr. Lennox, on Fifth avenue. A few were issued in octavo form, and some in quarto. The paper on which it was printed was imported Scotch paper, as hard as steel. A 'History of Vassar College and its Founder,' by B. J. Lossing, Esq., is a very beautiful illustrated work, brought out by Mr. Alvord recently.

"Another elegant book, well known to those curious in such matters, issued by this house, is James Wynne's Private Libraries of New York. It is as fine a specimen of printing as ever came from the American Press. This

house frequently reprints old newspapers, with the discolored paper and the old-fashioned type. When Mr. Warren was in the Recorder's hall, he commenced to issue the old records of the city of New York, but the book was never finished, owing to some change in the Recorder's office."

Mr. Alvord is an active member of the New York Typographical Society, and President of the Typothetæ, a society formed of master printers for the purpose of perfecting the art and promoting good fellowship among the craft. This society, which keeps itself informed of all the improvements in the art of printing that are brought out in different parts of the world, through correspondence with similar societies in Paris, and London, and Germany, has been of great advantage to printers in the United States, enabling them to keep pace with their brethren in Europe. Mr. Alvord has recently purchased a farm near Hartford, Connecticut, which he is now adorning, and it is probable that he will, in a few years, retire from the profession of which he is one of the most distinguished members, leaving the extensive business that he has built up to his son, who is now associated with him.

Samuel Bowles, Springfield, Massachusetts,

Is entitled to a place among distinguished American printers. Though more properly a journalist, yet he is the head of one of the most extensive, comprehensive, and successful Printing Offices and Binderies in New England, and is entitled to rank alike as a professional man, an artisan, and a manufacturer. His grandfather was Samuel Bowles; his father was also named Samuel; and a fourth of the same name is well advanced on the way to manhood.

The present Mr. Samuel Bowles was born in Springfield, Mass., in 1826, soon after his father, coming from Hartford, Conn., had commenced there *The Springfield Republican* newspaper; and there has his home always been, and probably always will be—a rare fact in the history of the American man. He went to school there, never elsewhere, and at sixteen turned in as a boy of all-work in his father's printing office, folding and carrying papers, rolling the type, attending the counting-room, dabbling with pen and scissors for "copy" for the weekly paper.

In 1844, when he was eighteen, he persuaded his father to start *The Daily Republican*, and from its beginning, he has been its constant and substantial conductor. It was a "wee" affair at first, with only a hundred or two subscribers, but the Mexican War came in 1846, and the Telegraph began to dot and carry news about the same time, and the paper grew into position and profit by 1848. In these early years, Mr. Bowles was omnipresent in the business. He slept on a sofa in the office, gathered and prepared the general and local news of the paper, marshalled the compositors at four o'clock every morning for the late "copy," superintended the "make-up" of the paper, took his turn at the wheel of the Adams' press that worked it off, despatched the town carriers, and prepared the mail and railroad packages—all before breakfast. Such perseverance and industry rapidly told in producing success.

In 1849, Dr. J. G. Holland ("Timothy Titcomb,") came in as associate

editor, the senior Mr. Bowles devoting himself to the business management, and the *Republican* at once assumed rank as the best written and most enterprising provincial newspaper in the country. Dr. Holland remained with the paper and firm until about 1860, proving a large element in its popularity and success, and retired from active participation in editorial labors, only to devote himself more exclusively to purely literary work; but meantime, and since, the editorial staff of the *Republican* has grown by various excellent additions, until it now numbers six to eight different persons. Chief of them, and longest in the service, is Mr. J. E. Hood, a graduate of Dartmouth College, and the leading editorial writer of the *Republican* for the the last ten years. The paper has become a model in journalism, and a power in politics and society. It fills its niche so completely and satisfactorily, that no rival has yet lived in its neighborhood; and its daily circulation in Springfield averages a copy to every family, and is more in proportion to the inhabitants than that of any other paper in any town or city in the land. The aggregate circulation of the *Daily Republican* is now seven thousand five hundred; that of the *Weekly Republican*, which is spread extensively all over New England, and in the West, is fifteen thousand. These aggregates are far in advance of those of any Journals outside the largest cities of the country.

In 1853, the senior Mr. Bowles having died, Mr. Clark W. Bryan was added to the firm, and, under his direct superintendence, an extensive Book and Job Printing Office and Book Bindery was planned and gradually built up. By his energy, tact, and other high business qualities, this has grown to the first rank in manufactories of this description, and is indeed a model in New England. Then the firm employed fifteen workmen; now its list of workers is swollen to two hundred and seventy-five, and its monthly payments for labor amount to from $10,000 to $13,000. Seventeen printing presses are in constant use, and fifty to sixty machines of different kinds, some of them invented for special purposes in the establishment itself. A steam-engine of twenty-five horse power drives the whole. All descriptions of printing and binding are done by the firm. Photograph Albums of all kinds, and Blank Books, are specialties of the Binding department, under the superintendance of a partner—Mr. J. F. Tapley. At one time, perhaps still, Messrs. Bowles & Company were the largest Album manufacturers in the country, their sales of Albums in a single month being $30,000. Three hundred tons of paper are used up in the establishment in a year, one book that they manufacture requiring six tons of paper for a single edition. In the winter of 1865-6, the office manufactured twelve hundred copies of Dr. Holland's "Life of Lincoln" each day.

At this time Mr. Bowles and his partners occupy a new and extensive building, erected expressly for their purposes. Located on a central corner in Springfield, it extends fifty-two feet on Main street, with a brown stone front, and runs back one hundred and forty-five feet, four stories in height, the whole, save a banking-house in one lower corner, being devoted to their extensive operations. Electrotyping has recently been added, and now the establishment is perhaps as various, well-appointed, and complete as any

in the country. Their tools and machinery, and materials on hand, are valued at between one hundred and two hundred thousand dollars, and the capital required in the whole business is not far from a quarter of a million of dollars.

The success of the establishment is very largely due to the liberal course adopted in the beginning by Mr. Bowles, and followed since, of giving an interest in the business to every one, who, after trial, proved equal to leadership in any department. Thus there are now six partners in the firm, including those mentioned, two of the editorial assistants, and Mr. Bowles's brother, who has charge of the counting-room and finances. All the capital in the concern has been made out of it, none has been brought into it from without; and the experience of Mr. Bowles, in dealing thus liberally with associates and assistants, is a praiseworthy example to all business men.

Aside from the growth of his paper and this extensive connected business, Mr. Bowles's life presents few salient features for a biographer. He has shrunk from all public life so called. Journalism has furnished him enough association with public affairs to satisfy his ambition, and he has greatly strengthened his paper and its influence by refusing to use it for any outside personal advantage. He has been repeatedly urged to undertake journalism in a larger field, but is quite content with his present triumph and position. In 1857, he undertook the charge of a newspaper enterprise in Boston; but being disappointed in the character and purposes of some of his associates, left it in a very few months, during which he still continued his control of the *Republican*, and his residence in Springfield. The hard, exhaustive life of his business has greatly broken his nervous system of late years; but he stills continues at the head of the paper and its connected establishment. In 1862, he spent the summer in Europe for the benefit of his health, and in 1865, he joined Speaker Colfax in a summer tour overland to the Rocky Mountains, Utah, and the States of the Pacific coast. His letters to the *Republican*, describing this journey, attracted so much attention and praise, that they were revised and published in a book form, with the title of "Across the Continent," and fifteen thousand copies of it speedily sold. Mr. Bowles has gained more reputation from this volume than from any other circumstance or performance of his life. It is regarded as by far the best account ever written of Nature and Life in the Western half of our continent, and by many critics has been commended as the most interesting book of modern travel. The style of the volume, and the characteristics of its pages, are perhaps the best illustration of the author's mind and capacities. He writes fluently, but tersely, and compactly and graphically. His quick instincts, and his trained powers of observation and scrutiny among men and things, give him rapid and thorough comprehension, and discarding superfluous details, he goes at once to the heart of his subject, and presents the marrow of every thing of which he treats. Without the scholarship of the college, without extensive reading of books—few men, perhaps, have read fewer volumes—he has acquired, by long reading of newspapers and intimate connection with people of larger culture, by a close observation and a quick and natural power of appropriation and absorption,

much of the results and advantages that these give to men, and few of our journalists write more gracefully and scholarly than he does.

Though only forty-one years of age, Mr. Bowles has had a long career as a business and professional man—two more years will complete a quarter of a century since he became the conductor of the *Daily Republican*. He has been part and parcel in the birth and growth of modern American Journalism, and no one man has, perhaps, contributed more to its development and elevation. His ideal of the Public Journal is still far from realization; he looks to see it still more the great instrument, guide, and protector in the growth of our political and social system, disseminating knowledge, disarming ignorance and vice, and defending order and justice. There remains only to add to our sketch that Mr. Bowles was married as early as he began business life, has a large family of children, and lives in a home of taste and elegance in Springfield, respected and honored most by those who have known him longest and best.

Newton Case, Hartford, Conn.,

Whose printing establishment is the largest in Connecticut, and one of the largest in New England, was born in the town of Canton, near Hartford, in the year 1807. His boyhood and youth were spent in attending the common schools of his neighborhood, and in farm labors, and not until after he was of age did he have any connection with the profession of which he is now a prominent member. When he had attained his majority, he left his father's home, and went to the city of Hartford to learn the art of plate printing, with a compensation merely sufficient to pay his board. After spending nearly a year in what may be called an apprenticeship, he removed to New York, where he was employed in the same pursuit; but an opportunity presenting to engage in the business on his own account, he returned to Hartford and set up a small establishment for printing school maps, bank notes, etc. From 1830 to 1836, he employed from two to six persons in this business, when Mr. J. Hubbard Welles, a book and job printer, with some six or eight hand presses, and a proportionate amount of type, offered his establishment for sale, and Messrs. Newton Case, Edwin D. Tiffany, and Alanson D. Waters, under the firm name of Case, Tiffany & Co., purchased it for $4,500, mostly on credit. Being young and ambitious, the members of the new firm devoted themselves with energy to their business, the result of which was soon manifest in an increase of patronage, demanding additional facilities, to supply which, one Adams Power Press, of the first patent, was purchased. This for nearly two years was propelled by an Irishman, who considered it a great priviledge to run it *eleven hours* a day. The result of the first years' business was quite satisfactory, the net income amounting to nearly fifteen hundred dollars. The year 1837 was one of disaster to business men generally; but the new firm, by careful management and close attention, were enabled to close the year without loss.

In January, A. D., 1838, Mr. Philemon Canfield, having had, for a long time, the largest printing office in the State, offered it for sale. At this time

Mr. Alanson D. Waters retired from the firm of Case, Tiffany & Co., and Mr. Leander Burnham was admitted. The new firm, retaining the name of Case, Tiffany & Co., purchased of Mr. Canfield his entire establishment, consisting in part of five Adams Power Presses, nine hand presses, with a large quantity of book and job type, and a steam-engine, the whole being valued at about $6,000. Wishing to unite the two establishments, they leased the premises on the corner of Pearl and Trumbull streets, formerly occupied as a county jail and hotel. The building was about forty by sixty feet, three stories high, with basement and attic. After making the necessary alterations to adapt it to their business, they removed to the new location April 1st, 1838.

In September, 1840, the firm purchased the steel and stereotype plates of the Cottage Bible, a popular commentary, edited by the Rev. W. Patton, D.D., The year 1841 proving a prosperous one, they printed and sold nearly ten thousand copies of this valuable work. They also purchased, in the course of the year, the premises they occupied, for $10,000. This Cottage Bible, of which they have sold 150,000 copies, was the first of many valuable publications issued by this firm.

On the 9th of June, 1848, the firm was dissolved by the sudden death of Mr. Burnham. The remaining partners continued the business in the former name of Case, Tiffany & Co., and as their business steadily increased, in the year 1850, they erected a building south of and nearly adjoining the one then occupied by them, the main part of which was fifty by sixty-four feet, with an L twenty by twenty feet, and five stories high. In this they placed a new engine of larger size than the one before used by them, and added to their business that of Bookbinding, devoting a large part of this new building to that department. They were thus enabled to print, bind, and sell such works as they published, as well as to do printing and binding for other parties. In the year 1853, they admitted to the firm James Lockwood and Albert G. Cooley. Mr. Lockwood, being a practical printer, devoted himself chiefly to that branch of the business.

In January, 1857, Mr. Cooley retired from the firm, and in August, of the same year, Mr. Tiffany also retired. The retirement of Mr. Tiffany, who had been associated with Mr. Case more than twenty-one years, necessitated a change in the name of the firm. Mr. Case and Mr. Lockwood continued the business in the name of Case, Lockwood & Co., and on the 1st of January, 1858, admitted Leverett Brainard as an active partner in their firm.

About the year 1850, the firm commenced the manufacture of Webster's Dictionary Unabridged; and up to the commencement of the war in the year 1861, they had produced about 300,000 copies of this work. They also manufactured a large number of Statute and Law books, among which were those for the States of Wisconsin and Iowa, and two editions for the State of Minnesota; and for other parties several hundred thousand School books annually, besides their own publications, and a large amount of job printing.

During these years they prospered and extended their business, until it became necessary to secure more extensive buildings, and they have recently

erected and now occupy one of the most complete establishments of its kind in the Union.

The building is of brick, with basement, and trimmings of Portland brown stone. It is one hundred and thirty-five feet long, by forty feet wide, (exclusive of an L, containing stairways, hoisting aparatus, and closets), and four stories high, beside basement and attic. The basement is occupied by a machine and carpenter shop, and for the storing and wetting of paper, and has on the east and south sides, extensive vaults, properly divided, for the storage of electrotype plates and fuel. On the first floor, in front, is the office of the firm, neatly and richly finished in chestnut and oak, with black walnut trimmings. In the rear of the general office are the private office, and the packing and press rooms. In the latter are twelve improved Adams' Power Presses, adapted to the various kinds of book printing. On the second floor is the composing room, capable of accommodating forty hands; also on the same floor are six of Hoe's Cylinder Job Presses, and three smaller presses. On the third floor is the Bindery, conveniently arranged and supplied with the most modern machinery. The fourth floor is used for folding and sewing books, and will conveniently accommodate nearly one hundred girls. The attic or upper story is used for drying and storing paper, and is supplied with two of the most powerful hydraulic presses for pressing sheets. The building is provided with an improved elevator, by which goods are easily moved from one story to another.

The business of this firm is excelled by few, if any, in New England. Among the many books printed and bound by them, in addition to those already named, are upward of 200,000 volumes of Greeley's American Conflict, besides large quantities of other war books. Their business, although heretofore large, is capable, with their present facilities, of being greatly extended.

Tillinghast K. Collins, Philadelphia,

One of the old and widely known printers of Philadelphia, was born in that city in the year 1802. His ancestors on the paternal side were among the early settlers of Rhode Island, his great grandfather having emigrated there while it was yet a colony, and his father was born at Cranston in that state. His great grandfather on the maternal side was a Welshman, and a lawyer by profession, who resided on and owned an island in the Delaware river known as White's Island. On returning to Wales he was shipwrecked and lost, and the island having been taken possession of by those to whom it did not belong, it was never recovered by the family. Mr. Collins's father died when the sons were quite young, and the mother being left inadequately provided for, it became necessary for the lad to begin the struggles of life early. Before he was thirteen years of age he entered the printing office of the eminent Mathew Carey as a "sheet boy," and not long after commenced a regular apprenticeship with James Maxwell, who at that time had one of the largest printing establishments in Philadelphia, on Fifth street near Walnut. He began his novitiate in the wareroom, and progressed gradually through all the details of a compositor's and pressman's duties, and finished with the reputation of

being one of the best pressmen in the city. After completing his apprenticeship he removed to Washington, and was employed by Peter Force, who has since become noted for having collected the rarest historical library in America. Subsequently he was engaged by Gales & Seaton, and Duff Green, all of them well known printers and publishers. During his residence in Washington he became connected with the Methodist Episcopal Church, of which, for more than forty years, he has been a consistent and prominent member.

A difficulty having occurred between the journeymen printers and their employers induced Mr. Collins to return to Philadelphia, where he soon found employment, though trade at that time was dull. James Kay, the law bookseller, appreciating his merits as a superior and reliable pressman, offered to engage him by the year at what were then considered good wages, viz., nine dollars a week. He accepted the offer and remained in this situation for about eighteen months, when he left it to become foreman for Lawrence Johnson, who had entered upon his prosperous career. Subsequently he was employed in Frankford, and again by James Kay, when, in 1833, his lifelong friend Edward C. Biddle proposed to loan him two thousand dollars as capital to engage in business on his own account, and associating with him Robert Wright, a compositor in Kay's office, they opened a printing office in Prune street with but one hand-press. This partnership, however, continued but for a short period, and in 1835 a new one was formed with his younger brother, establishing the firm of T. K. & P. G. Collins, who by their superior skill attained a position at the very head of their profession. During the existence of this copartnership, which was not terminated until after the decease of the junior member, this firm executed some of the finest specimens of typography of which the art in America can boast. Many of the magnificent publications of the United States Government, for which the Washington presses received credit, were printed by the Messrs. Collins. Rice & Hart's "National Portrait Gallery," and "North American Sylva;" Mr. Isaac Lea's "Naiades," and "Fossil Footmarks in the Old Red Sandstone;" and numerous standard medical works, illustrated with the finest wood-cuts, are among the handsome volumes which bear the Collins imprint. During this period also, the old office in Lodge Alley, now Jayne street, occupied by them from the beginning, was enlarged from time to time until it became one of the most extensive in the city.

The junior partner, P. G. Collins, died in 1854. He was a printer of rare acquirements and general knowledge. His familiarity with every department of the business was intimate and exact. A man of high personal integrity, keen sense of honor, and generous instincts, his loss was deeply felt. After his decease, the business was managed by the senior member, until recently, when he became unable, through ill health, to give it personal and active supervision. The management then devolved upon Mr. J. Wesley Huff, a gentleman of remarkable clearness of intellect and of long experience in the establishment, who has been connected with it as man and boy for over thirty years, passing through all gradations, from an apprentice, compositor, and proof reader, to be the general manager.

The composing room of the establishment is now one hundred and sixty

feet in length and will accommodate sixty compositors with their cases. The fonts of type in this room are unusually large, some of them weighing upwards of four thousand pounds. The job room is thoroughly organized, with several hundred handsome fonts of job type, and every facility for the execution of plain and ornamental work. The press room contains seventeen power-presses and four hand-presses with patent inking machines, and all the improvements which modern ingenuity has developed for facilitating the business. In illustration of the capacity of the press-room, we may state that the average of each week's work done in it is about fifteen hundred tokens, which is equivalent to nine million duodecimo pages; or, in other words, about twenty-five thousand duodecimo volumes of ordinary size are printed on their presses each week. In the wareroom there are two hydraulic and three of Evans' screw presses of the largest size. Over one hundred persons are generally employed in this establishment.

Mr. Collins was for many years a Director of the Public Schools, and has at various times received marked testimony of the appreciation of his fellow-citizens in the community in which he has so long lived. His business success and personal popularity were due in no small degree to the beauty of his moral character and his many excellent social qualities. Kindness of heart, and benevolence, beaming from a round, good-humored countenance, were his distinguishing characteristics, and endeared him to all who were brought into contact with him. Fluent and affable in conversation, abounding in apt stories and illustrations, courteous in business intercourse, to know him was to love him. His intellect also was of more than the average order. He contributed to the profession with which he was identified two improvements of great value to printers—the patent roller-boy for inking hand-presses, and the immovable rules which surround the blocks on which stereotype plates for certain works are placed. Probably no man during an active and long business career had fewer enemies and more friends among rivals and colaborers in the same field, than T. K. Collins of Philadelphia, while in his present affliction and physical disability he has the sympathy of all who prize a most estimable character.

George P. Gordon, New York,

A practical printer, but more widely known as the inventor of new styles of printing presses, now extensively used, was born in Salem, New Hampshire, in 1810.

In early life, he manifested the mechanical and inventive ability for which he afterwards became distinguished; and his capacity, in fact, may be said to have been inherited. He was, for several years, engaged as a practical printer in the city of New York, and through a knowledge of the defects in the presses then in use, was led to attempt improvements. In 1834 or '35, he made his first experiment for the improvement of Card Presses, the best, of which were, at that time, imperfect in construction, unsound in principle, and slow in operation. It was not, however, until 1850 that he applied for his first patent since which time, he has obtained from twenty-five to thirty patents for various additional improvements.

Since the building of his first press, he has continued an uninterrupted series of experiments, and built more than one hundred varieties of presses of various sizes, including more than seventy-five different styles, forms, and combinations. And he has conscientiously cast aside and abandoned any design which has not been found practically satisfactory, retaining only its available features and tested improvements.

This persistent experimenting has been attended with a cost of more than one hundred thousand dollars. Indeed, for years, Mr. Gordon expended every dollar of his income in the prosecution of his purpose.

Among the presses built by him, is one called "*The Fire Fly*," which is driven by the foot or steam power, and is capable of printing ten thousand impressions in an hour, and, with the double feed motion, twenty thousand impressions in an hour. This press performs its own inking, feeding, cutting and counting, and is thoroughly automatic. As a card press, it is unexampled for combining speed and precision of operation.

His last and most perfect invention, is called "*The Franklin Press*," which contains the best features of his presses in their best combinations. For the classes of printing for which his presses are adapted, it is believed they are unequalled.

Mr. Gordon is truly a self-made man. He has risen to his present position as an inventor by virtue of his own unaided industry, integrity, and genius. He is sanguine, and yet patient—indefatigable and inexhaustible in resources, and fertile in invention; he delights to grapple with mechanical difficulties—and has always succeeded in surmounting obstacles.

If the assertion may be hazarded of any man, that he fills the place for which he was designed, it may be said of this inventor, that he has found the sphere for which his natural gifts and his life training have eminently fitted him. "He is the right man in the right place;" for he combines the capacities of the practical printer and the thorough mechanic.

The printing craft is perhaps more largely indebted to him, in the peculiar department to which he has devoted his powers, than to any other single known inventor.

Many thousands of his presses are in use, and the best evidence of their worth is, that they have been submitted to practical tests for years.

Mr. Gordon is still engaged with untiring industry in inventing, improving, building, and selling his presses, for which the demand continues unabated; and, at length, after years of test and expenditure, he is reaping the reward he so richly deserves.

Edward O. Jenkins, New York,

Is an excellent representative of that large class of men who, under free institutions, achieve success by the exhibition of sterling, manly qualities, and the exercise of practical talents. Born in the year 1817, of Welsh parentage, apprenticed at an early age to the printing business, and pursuing the vocation of his life steadily and successfully, he is now ranked among the old printers of New York, and has attained a reputation among the brethren of his craft that is one of the rewards of a useful, well-spent life. As a journeyman, he was noted for expeditious workmanship and clean proofs, and when, in 1844. he commenced business for himself, he at once obtained a fair share of the patronage of the first publishers in the city. His office at this time, though not among the largest in New York, occupies the greater part of a five story building on North William street, and his facilities include every thing necessary for stereotyping and printing books. In the press room are nine Adams presses, including one of extraordinary size, two of Hoe's cylinders, and other job presses. The composing room has ample facilities for sixty compositors. Mr. Jenkins seems to possess the rare faculty of gaining the friendship of those in his service, for we learn that the foreman of the press room has been in his employ twenty-three years ; the foreman of the composing room fifteen years ; a pressman, as man and boy, nineteen years, and others whose terms of service range from ten to fifteen years—a fact that is always creditable to both employer and employee.

With a large spirit of active and sagacious inquiry into all the interests of the art in its various relations, and with an intelligent appreciation of all the improvements made or contemplated, and frequently suggesting important economies or developments, Mr. Jenkins has kept pace with the wants of the trade, and commands the respect of all in any way connected with the press. Clear in his judgment, quick in perception, cautious in undertaking, yet prompt and energetic in execution, he has built up on his original foundation, a strong and lasting structure of character and means which are a just tribute to his worth.

He has never courted or sought notoriety as a public man, nor has he ever solicited or held an elective office, but in the quietude of the social circle, or the intercourse of benevolent institutions, finds exercise for his talents more in harmony with his nature, than the uncertain and troublesome struggles of the publicist or the politician. Earnest in conviction, sincere in friendship, generous in his sympathies, he is an honorable example of private worth, which dignifies the profession to which he belongs.

Robert P. King, Philadelphia,

Eminent both as a printer and a public spirited citizen, was born in the city where he has achieved his honors, in the year 1815. He attended what was called the "Model School" of Philadelphia, of which J. Loxley Rhees was principal, until he was thirteen years of age, when he became a store boy in the china warehouse of Messrs. Read & Gray. During his school novitiate he secured the respect of his teacher, who thus early testified to his worth and predicted his future usefulness and prominence. Before he was sixteen years of age, he was duly indentured as an apprentice to the printing business, in which he served the usual period, until his majority, April 2d, 1836. During the ensuing two years he worked at "case" as a journeyman, and was distinguished both for rapid composition and freedom from errors. In 1838, he formed a copartnership with his present partner, Alexander Baird, and commenced business in the same building now occupied by them on Sansom street above Sixth. Their limited facilities at that time, compared with their now extensive establishment, presented the widest difference. Mr. Baird worked a single hand-press, and Mr. King was sole compositor, solicitor of jobs, bookkeeper, foreman, proof reader, and purchaser of supplies. The young firm found that two of the smallest rooms in their present building were amply sufficient for the accommodation of their infantile business; but by diligent attention and unwearied industry, this gradually expanded, until at present the firm have one of the largest and most complete printing offices in the city of Philadelphia.

They have now in their pressrooms twelve Adams presses on book work, two Hoe cylinder, four Gordon, and one Liberty press on job work, which consume daily about one hundred reams of paper. They employ in the composing rooms over sixty hands, and in all the departments, about one hundred and twenty persons, exclusive of the stereotype foundry, which has just been fitted out with entirely new machinery of the latest improved style, by Messrs. Hoe & Co., and is now in successful operation. This firm was the first, it is said, in this country, to establish an office for printing German books, and they have now what is believed to be the largest and best appointed German printing establishment in the country. The German Dictionaries stereotyped by them are in demand in Germany, where they are noted for their accuracy and typographical neatness. In 1844, they commenced the publication of the *National Clay Almanac*, which was the pioneer of millions of other almanacs since issued by them; their series at present consisting of no less than seven English and three German editions, of which they print one million copies annually. Probably no firm in the Union have equal facilities for printing works in rare languages. They have printed a hymn book in Cherokee, numerous works in Swedish, including a volume of Swedish poetry, several works in Norwegian, and have stereotyped and printed an Episcopal Prayer-book in the Grebo language, under supervision of Bishop Payne, and also a Dictionary of the Grebo dialect. Special fonts of type were cast and prepared for these works.

Mr. King was never a mere politician, but has always been an active and influential member of that party which has made protection to American

industry its cardinal feature. He has held many offices of honor and trust, none of profit. As early as 1849, he was elected by the Councils of Philadelphia, one of the Guardians of the Poor, and re-elected for a second term in 1852. After the consolidation of the several city districts under one municipality, in 1854, he was elected by the people to the same position, after a spirited contest, and served in all for six years, during two of which he was President of the Board. In 1860, he represented the Second Congressional District of Pennslyvania in the electoral college, and in 1864, the First Congressional District, in both instances casting the vote of his district for Mr. Lincoln for President. In 1863, he was appointed by the President of the Select Council of Philadelphia a member of the Bounty Fund Commission. He was elected President, and served for thirteen months, at great personal sacrifice to his business, having, at the time, a son and nephew, who were his assistants in business, absent on active duty in the field. Under the administration of this Commission, the quotas of Philadelphia, in various calls for troops, amounting to over thirty-five thousand men, were filled, bounties being paid to more than twenty thousand men, involving an expenditure of five millions eight hundred thousand dollars. This enormous amount of complicated business was transacted by the Commission at the comparatively trifling expenditure of less than seven thousand dollars.

Among the other offices held by Mr. King, may be mentioned the following: President of the Philadelphia Fire Insurance Company; President of Board of Managers of Mount Moriah Cemetery Association, of which he was one of the projectors; and President of the National Union Club, a Republican organization of Philadelphia. He is also Director of the Union Passenger Railway, member of the Union League, and President of the Soldier's Home. Always an active, zealous Mason, he is the Past-Master of his Lodge, and has been a member of the Grand Lodge for sixteen years. While these numerous offices involve considerable labor, and some of them an absolute outlay of money, from no one of them has he ever received any pecuniary return or reward of any kind, save the satisfaction of doing his duty to his fellow men.

Mr. King's record as a political leader is, in fact, a remarkable one for its many self-sacrificing labors and its unsullied integrity. Though an active and zealous partizan, he has never sought to achieve success by acts and agencies that are "not justified by honor."

Personally, Mr. King has the advantage of possessing physical qualities that not only attract, but cement friendship. His figure is well developed, his bearing dignified, his manners frank and genial, and his countenance beams with intelligence, good-fellowship, and humor. It has been said of him with much truth, that his disposition is of that magnetic, genuine kind, which leaves an impress of liking upon every one with whom he is brought into contact.

Alfred Mudge, Boston, Mass.,

Who may be called the pioneer in job printing in New England, was born in Portsmouth, New Hampshire, in 1809. The family from which he is descended can be traced back for more than two centuries. The earliest member in New England of whom there is any record, was Goodman Mudge, who purchased in 1649, as appears by an old deed, a house and five acres of ground in New London, Connecticut, for "five bushels of wheat and a dog." The subject of this sketch was compelled at an early age to carve his own way in the world, and before he was fourteen had embarked in business, which, however, he relinquished to learn the art of setting type, in the office of Ham Miller, in Portsmouth. In 1825 he left his native home and went to Boston, where he completed his apprenticeship with Samuel H. Parker, at that time a leading printer and also publisher of the Waverly Novels in fifty-six volumes. Six years subsequently he commenced business for himself with less facilities probably than any printer ever before had attempted to do business with, and in 1834 he had the misfortune to lose, by fire, the little he had accumulated. He then removed to School street, where, for over thirty years, his printing office has been established, though at different localities on the same street, and in 1836 he formed a copartnership with George Dexter, the founder of the well known news firm of Dexter and Brother. At that time the leading printers in Boston were Munroe & Francis, and Lillie, Waite & Co., but there were no printing offices organized especially with reference to the speedy execution of commercial and other job work, and Mr. Mudge set himself about supplying the vacancy, in which he has been so successful, that his establishment is now generally recognized as the leading job printing office in New England. The partnership with Dexter continued but for a short time, and with the exception of giving an interest in the profits to his son, Mr. Mudge has carried on business without a partner most of the time.

The office, composition, and press rooms of Messrs. Mudge & Son are now located at 34 School street, opposite the city Hall. They employ about fifty persons in the composition room, and have in the press room five Adams presses, two card presses, one Hoe cylinder, and other smaller presses. They have set up and printed an octavo volume of five hundred and twenty-four pages in nine working days, with but one single typographical error, and it is said they could print a book of a thousand pages in a week. Among the specimens of fine work executed by them, is a "History of the City Hall," published by authority of the City Government of Boston, a genealogical history of the descendants of Hugh Clark of Watertown, printed for the author, and the "Mudge Memorials," a biographical, historical, and genealogical account of the Mudge family. They have also printed a number of law books, and for the last two years have been elected the official printers by the city authorities, which has added to their general business an item of forty thousand dollars a year, but the department in which they excel, is in executing commercial job work with dispatch. In this particular they are without a superior in New England, and their work is also distinguished for neatness and good taste.

Mr. Mudge is a gentleman of prepossessing appearance and courteous manners, and is a worthy representative of the profession with which he is identified.

George F. Nesbitt, New York,

Whose establishment for printing, and the kindred arts, is one of the industrial attractions of New York, and among the largest in the United States, was born in that city in the year 1809. Like most others who have risen to eminence in the various departments of practical life, he has achieved success by the force of natural talents unaided by early advantages. While a mere boy, he was apprenticed to Joseph C. Spear, to learn the art of printing, and before he was fifteen he was entrusted by his employer with the responsibility of the business. With Mr. Spear he remained until he had attained his majority, and subsequently became his partner, a relation however, that was maintained only for a few years.

Early in his business career Mr. Nesbitt gave evidence of possessing that progressive spirit which has made the United States the marvel of the world, and manifested an aptitude for adapting machines to accomplish heretofore unknown results. His disposition to depart from the routine of his profession was manifested in 1835, when he began the introduction of the machine made Wood Type, and originated styles superior in novelty and beauty to any that had before been known. The printing of a combination of colors at one impression next engaged his attention, and about 1840 he devised and projected a machine for the purpose, which superseded the old and slow method of printing one color at a time, and proved an entire success. But his most valuable achievements in this direction have been in the improvement and adaptation of machinery for the manufacture of envelopes for the Government. In 1852 Mr. Nesbitt received his first order from the Postmaster General of the United States, for a large quantity of envelopes with a prepaid stamp combined, for the use of the public. Previous to that time, various attempts had been made in England, to introduce and popularize such envelopes, but owing to the want of proper machinery to manufacture them economically, had not been successful. Mr. Nesbitt undertook the task of overcoming the obstacles, and so far succeeded that these envelopes are now sold at but a small advance on the cost of the stamp. He has made every prepaid envelope that the Post Office Department has issued up to the present time, and has fulfilled his responsible engagements with such fidelity as to elicit numerous commendatory notices from successive heads of the Post Office Department, in their official reports to Congress.

As the manufacture of these envelopes is a novelty in this country, it may be interesting to give an account of the processes adopted in an establishment where a quarter of a million are made daily. The paper is manufactured expressly for the purpose, and bears the water mark P. O. D. U. S., which is so arranged, that these initials appear on each envelope after the paper is cut to sizes. This paper is brought in large sheets from the mills, packed in cases, and carefully counted in divisions of fifty sheets each. After being again counted on its arrival at the envelope manufactory, and carefully compared with the invoice, it is taken to the cutting room, and cut by an ingenious machine driven by steam power. The knife, which is made of the exact size of the envelope before it is folded, is placed upon a pile of four hundred sheets, and being set under the lever of the press, is made to pass easily

through the whole thickness of the paper, producing four hundred envelopes in about three seconds. After this, the envelopes are handed over to a number of young women, whose business it is to place the adhesive self-sealing preparation on the outer flap. So rapidly is this done, that one person is able to prepare and dry many thousand per day. After this the envelopes are passed to the stamping and folding department, where there are about sixty of the most ingenious and perfect machines. A self-feeder is employed, by which the flat envelope is carried forward to an apparatus which embosses it, places the adhesive gum on the side flaps, folds the envelope, fastens and drops it into a tin box, which quietly counts off its contents into layers of twenty-five each, and hands them over to be counted again, banded, and packed subject to the order of the Post Office Department.

The manufacture of envelopes however, extensive as it is, is but a secondary item in the general business of the firm of Nesbitt & Co. No less than eight adjacent buildings are occupied in the various operations carried on under their direction, but these are so arranged and communicating as to seem but one building. The printing department is the most extensive in the country. In the press room there are some fifty-six presses of different sizes and kinds, and all, with the exception of four, worked by steam. Among them is an immense cylinder Napier press, standing eight feet high—a giant among pigmies—and by its side are the so-called lightning presses, for printing cards and circulars.

The composing rooms are stocked with copious fonts of type, which are arranged in the most admirable order and precision. This department, which presents a scene of unusual attraction for a printing office, is provided with apparently every variety of facilities for plain or display printing, from a card to a poster, from a bill head to a book, and we believe even newspapers are set up here. The fourth floor is appropriated to the manufacture of Blank Books. In this branch, which is ordinarily a speciality, this firm do a very large business, supplying merchants, banks, and incorporated companies with all styles of blank work. Here are machines for ruling paper with great expedition. The attics are utilized as drying rooms, and fitted up with racks, and properly ventilated for the purpose of drying the printed sheets as they come from the press room.

This firm are not only Printers, Lithographers, Blank-book and Envelope Manufacturers, but Card Manufacturers and Stationers. They make not merely the cards consumed in their printing establishment, but also a large amount for sale in the market and for exportation, while the store on the lower floor, in the rear of which are the counting rooms, is well filled with every variety of stationery. There are also capacious rooms for the storage of paper and other stock, and a machine shop for the repair of machinery on the premises.

It would be superfluous to eulogize one, who by his energy and practical intelligence has built up an establishment so important and comprehensive as this, and which is now justly regarded as an important constituent in the industrial reputation of America. His best eulogy is the simple story of his achievements, his best monument the record of his success. We pass to say

a word of his coadjutors and partners. Mr. JAMES WHITE, who is chief manager of the printing department, has been associated with Mr. Nesbitt since 1835, and possesses extraordinary capacity for the dispatch of business. Mr. EDWARD P. MARTIN, who superintends the Stationery and Lithographic departments, has also been a member of the firm for many years, while Frederick A. Harter and George F. Nesbitt, Jr., who have recently become partners, are not without experience in the details of the business. This firm furnishes employment to over three hundred persons, and have in active use a capital exceeding three hundred thousand dollars.

John F. Trow, New York,

Is one of the oldest established and most extensive printers in the city of New York. He was born at Andover, Massachusetts, in the year 1810, and was descended from one of the best families in New England. Until he was ten years old, his life was spent upon his father's farm, and in 1824, at the age of fourteen, he commenced his apprenticeship at the printing business, with Flagg and Gould, of Andover. Their office, known as the "Codman Press" (from the fact of its possessing an outfit of Oriental type, furnished by the then late Rev. Dr. Codman, of Dorchester, Massachusetts), was noted in those days as doing the best Oriental printing in the country, excelling even the Cambridge Press, from which it had originally emanated. It was from this "Codman Press" that the first printing and publishing were executed for the now great American Tract Society, when the present venerable Dr. Halleck commenced his editorial labors in the preparation of the series of tracts which have found their way not only to every corner of our own land, but it may be truly said, to every portion of the known world. Here Mr. Trow industriously spent his apprenticeship, receiving thirty-five dollars per annum for clothing and board and lodging, in the family of his employer, Mr. Flagg, who was also his brother-in-law. In addition to this he had a "privilege" of a "stint" of four thousand ems per day, and twenty cents per thousand for all overwork. In this way the boys of that day were enabled to earn their spending-money and to procure the *luxuries* of dress. By rising early, often at two or three o'clock in the morning, a boy could earn by overwork some six dollars per week, which was quite a sum in those old-fashioned times. On these terms he served out his seven years, mostly engaged on the Oriental works published at Andover under the authorship and supervision of such literary and theological notabilities as Stuart, Robinson, Gibbs, Edwards, and others. He remained in the same office for a short time after his majority, but, receiving a proposition to establish a weekly newspaper at Nashua, N. H., he repaired to that place, where, during the winter of 1831–32, he printed and published *The Nashua Herald;* but the enterprise not proving satisfactory to him, he returned to Andover, and, after remaining there for a few months, he came to New York city, in the spring of 1833, under the encouragement, and afterward under the patronage, of the late Jonathan Leavitt.

On the 1st of May, 1833, he commenced business with Mr. John T. West,

whose issues were among the best typographical specimens of that day under the firm style of West & Trow, at No. 144 Fulton street. Two iron hand-presses, one furnished by Mr. West and upon which he had printed the *New York Observer*, and the other by Mr. Trow with a supply of type correspondingly extensive—constituted the office with which they commenced business. This partnership, however, only lasted a few years, and in 1836 the business devolved upon Mr. Trow, and was continued by him at No. 36 Ann street until about the year 1840, when he formed a partnership with his early friend and patron, under the name of Leavitt & Trow, publishers and booksellers, and John F. Trow & Co., printers. This connection lasted until about 1848, during which time they published the complete works of the elder Jonathan Edwards and the classical series of the Rev. Prof. John J. Owen, besides many minor works.

During the time that Mr. Trow carried on business at 36 Ann street, he introduced Tufts' press, worked by mule power. This press and mule power, however, not proving satisfactory, were soon dispensed with, and when the improved "Adams press" was introduced, Mr. Trow adopted it, and in this anticipated all his cotemporaries in New York. As early as 1840 he introduced stereotyping in connection with the printing business, and his foundry, to which an electrotyping department has been added, is now one of the largest in that city.

Mr. Trow has always been foremost in introducing improvements to facilitate the manufacture of books. About 1854, William Mitchell patented a machine for setting and distributing type, which was the first practical machine of the kind ever used in the world. Mr. Trow purchased one of these machines, and finding it a success, saving largely in the cost of composition, he added others until now he has five machines in constant use in setting the type for the publications of many of the leading publishers.

In 1855 a fire destroyed the premises in which he was then located and he removed to 379 Broadway, where he remained until 1860, when he took possession of his present buildings Nos. 46, 48, and 50, Green street. Here he has one of the largest printing offices and stereotype foundries in this country. A fire proof vault under the sidewalk, extending the width of the building, is used for storing stereotype plates; and one room is devoted to the storage of paper. On the second floor is the counting-room, the balance of the same floor, and the first, being occupied by the bindery. The third floor is occupied by the book and job press rooms, containing seventeen presses, besides hydraulics and screw presses for pressing sheets, and a large steam cutting press. On the fourth floor are the stereotype and electrotype foundries and finishing rooms. The fifth floor is occupied by the book and job composition rooms, the type-setting machines, and reading room. The number of workmen employed varies from one to two hundred—the latter number, more especially, during the printing of the City Directory.

For many years Mr. Trow has been prominently connected with the publication of directories. In 1849 he embarked in the issue of *Wilson's Business Directory*, and on the death of the late John Dogget, he purchased the type which had been used on Dogget's City Directory, and commenced

in 1852 the issue of *Trow's New York City Directory* and *Wilson's Copartnership Directory*, both compiled by Mr. Wilson. These works have been continued to the present time, becoming more and more a necessity to thousands of merchants and citizens of the great metropolis of New York, and affording an amount of printed matter equal to eighteen volumes per annum, or during the whole time of their previous publication, of two hundred and seventy twelvemo. volumes of three hundred and fifty pages each. Within the last year Mr. Trow has issued an immense volume, called the *United States Business Directory*, an undertaking of greater magnitude than had ever before been attempted in this country.

As early as 1836 Mr. Trow had imported complete fonts of Oriental type, from the celebrated Tauchnitz foundry, viz.: Greek, Hebrew, Arabic, Syriac, Ethiopian, Coptic, Samaritan, etc., and far surpassing in quantity and variety the famous "Codman press" or any other establishment in the country. His specimen book, published in 1855, a beautiful production of typographic art, contains specimens of these various and elegant fonts. In recognition of the beautiful and accurate classical and Oriental productions that have issued from his press, the University of New York has conferred upon him the title of University printer. It is said that his is the only establishment in the city where this peculiar class of work is done, and in the variety and elegance of its fonts, is unsurpassed by any press in the country.

Albert Judd Wright, Boston,

Now State Printer of Massachusetts, was born in South Hadley, Hampshire county, Massachusetts, in the year 1818. At the age of six years, his father having died, he was adopted by an uncle who was engaged in the printing business in Boston. He was speedily initiated in the mystery of sweeping out a printing office, where there were six Ramage presses in operation, and some dozen compositors employed. He was kept at a public school, until fourteen years of age, employing his mornings and holiday afternoons in doing "chores," setting types, working in the wareroom, and otherwise making himself generally useful. During some of these years, by the kindness of his uncle, he was allowed the use of a room, where he used to assemble some dozen of his boy companions in the evenings for recreation and instruction. Here they had a debating society where national questions were freely discussed. A post office was also established, each boy having his box, and considerable correspondence was the consequence. At length a military company was organized in this juvenile head-quarters, embracing over sixty boys, between the ages of twelve and seventeen years. Young Wright was chosen the captain, and trained the boys for about two years. Captain Wright's "Young Volunteers," armed with pikes, are well remembered by many now living in Boston. At the age of sixteen years, his uncle, whose business at that time was printing music, left him in charge of one half the office, selling out the other half to Mr. Luke Shepley, and they carried on the music printing business under the firm of Shepley & Wright. In about two years more Mr. Shepley sold out his interest to Andrew B. Kidder,

and the business was continued under the firm of Kidder & Wright. At one time this firm monopolized about all the music printing done in Boston. Both partners worked steadily at the case. It involved much labor for small pay, and after two or three years' work in this tread-mill, young Wright notified his uncle to take possession of his interest in the office, as he proposed to get married and branch out into business on his own account. In 1843 he established a small book and job office in Water street, where he finally secured business enough to encourage him to enlarge his facilities until he occupied five large rooms, and was able to keep in operation five Adams Power Presses, and employ a large number of compositors. Business had increased so that he was induced to share its cares and profits—and losses—with a partner. In 1854 he was elected to the House of Representatives, and in 1855 to the Senate of Massachusetts. Attending to politics at that time was not conducive to prosperity, and in 1855, dissatisfied with his partnership he put the concern into Chancery as the only way to free himself, by which means he got delivered of his partner and his office too. For some eight years he had published and edited a weekly paper called the "*South Boston Gazette*," an enterprise which was not pre-eminently remunerative. In a short time afterward he entered into an arrangement with William White, then State Printer for the Commonwealth, to whom he endeavored to make himself generally useful in assisting him to bear the load he had to carry. In 1857 he was again elected to the House of Representatives, when he was able to be of service to his friend White, whom he regarded as one of the best men in the world—by securing for him a renewal of his contract to execute the State Printing for five years. About 1860, Mr. White's health having been nearly destroyed by his devotion to the details of his large business, he proposed to Mr. Wright and Mr. Robert K. Potter, to buy his office and continue his contract with the State. Through the instrumentality of friends the necessary means were obtained, and the bargain consummated, and a new firm, on an old foundation, of WRIGHT & POTTER, successors to William White, State Printer, was ushered into being.

In 1862, when the printing contract expired, Mr. Wright was again elected to the Legislature, and the contract was secured for the new firm. In 1867, Mr. Wright was again a member of the Legislature. The State printing for Massachusetts monopolizes nearly all the material of Wright and Potter's large establishment during most of the time. Their office contains nine power presses, besides numerous job presses, and employs on an average sixty workmen. The employing printers of Boston and vicinity having organized an association known as the New England Franklin Club, Mr. Wright was elected first president of this association, to which position he has been re-elected for three successive terms.

Cornelius Wendell, Washington, D. C.,

Whose fame as a Printer is identified with the public printing office at the National Capital, of which he is the founder, was born at Cambridge, near Albany, New York, in the year 1813. He was early apprenticed to Croswell & Van Benthuysen, State Printers in Albany, and after completing his apprenticeship, was employed as foreman for C. Van Benthuysen, and had control of his entire business.

In 1845, Mr. Wendell removed to Washington, and became engaged on Congressional Printing. After ten years' experience, he determined upon erecting a model public printing office, and so expeditiously were his plans carried out, that though the building was begun in September, 1856, it was ready for occupancy in the following November. It consists of a long, wide, brick edifice, four stories in height, surmounted by a cupola, over which is perched the emblematical eagle. At each end of the roof is a flag staff, from which the national ensign floats on gala days, and the entire square is neatly fenced in, while rows of shade trees overshadow the broad sidewalks. Detached from the main building is an engine house, with an ornamental chimney, that towers above the establishment. It contains a magnificent steam-engine of forty horse power, that operates with the facility of a chronometer. Its large tubular boiler also supplies steam for heating the main building, and for a small donkey engine that pumps water from the adjacent branch. The press rollers, "those mystic compounds of glue and molasses," are also manufactured in the engine house.

There is also a machine shop on the grounds, and commodicus stables within the enclosure, for the accommodation of the horses required in the transportation of work. The Storehouse is also a detached building, sixty feet by eighty, where the paper is deposited until wanted by the public printer. Some forty thousand reams of fine printing paper, pass through this depository in a year, weighing forty-five to fifty pounds per ream of four hundred and eighty sheets, each measuring twenty-four by thirty-eight inches. In addition to this large supply of standard printing paper, large quantities of paper for blank books, etc., are consumed in this office, which after being inspected, counted, weighed, and measured, are also deposited in the Storehouse until wanted for use.

Entering the main building, we find on the lower floor a "wetting room," supplied with troughs and appliances for dampening the immense supply of paper used, with a powerful hydraulic press, for pressing it smooth. The press room, however, is the remarkable feature of the lower floor, containing as it does twenty-nine ponderous machines, each moving with the regularity of a watch, devouring reams of white paper, and throwing off neatly printed sheets. Some of the presses are of the Napier pattern, but the greater portion are the well known Adams press. Two hundred and ten reams, or upward of one hundred thousand sheets, can easily be printed in this room in a day. Adjacent to the press room, on the lower floor, is the drying room, where the sheets, as they leave the press, are hung on large frames which are pulled out on hanging rollers. When one of these frames is covered with damp sheets, it is pushed into the drying apparatus, which is composed of

ranges of steam tubes which maintain a high temperature, while the vapor is carried off by a proper system of ventilation. In the drying room are also five massive standing presses, to which an enormous pressure is applied by hydraulic pumps. When the sheets have thus been pressed, they are taken to the bindery, in the third story, by a steam hoisting apparatus.

Passing to the second floor, we find the private and business offices, and also the proof readers' rooms. The central and much the largest portion of this floor, however, is appropriated as a composing room, which is lighted by sixty windows during the day, and by gas at night. There are about one hundred double "stands" for compositors, with twenty imposing stones, and every other requisite convenience. A portion of the second story is enclosed for the "executive printing." Some of this is of a confidential nature, and when it was executed, as in former years, at newspaper offices, it often became public, to the annoyance of all concerned. Many amusing anecdotes are told at Washington of the strategems resorted to by newspaper correspondents to obtain confidential documents, and on one occasion a President had types and workmen brought into the White House, that he might have his annual message confidentially printed.

The third story is devoted to binding; and in the large "folding room" is a small army of neatly-dressed girls, seated before tables, who fold the printed sheets with astonishing rapidity. The "executive binding room" is fitted up with two powerful machines for trimming the edges of books, shears for cutting pasteboard, and other labor-saving inventions. The furnaces for heating the stamps, and for gilding, are heated by gas, which is safer, cleaner, and steadier than charcoal.

In another room are "ruling machines," by means of which acres of paper are annually covered with faint red or blue lines, laid on with mathematical precision. Some of the larger blank books for the use of Government are master-pieces of accurate ruling and substantial binding. The appointments and fixtures in the binding department are fully in keeping with the typographical arrangements below stairs.

The fourth story is a store room, where stacks of printed sheets are kept in readiness for the binder.

The process of manufacturing Public Documents does not differ essentially from the ordinary methods of making books, except, perhaps, in the quantity of "rule and figure work." The amount of brass rule annually required in this office is without precedent in any other establishment.

In 1861, Mr. Wendell sold the printing office, which he had founded, to the Government, and retired, to devote himself to other pursuits. During his administration, he always maintained the kindest relations with the operatives in his employ, who, on one occasion, presented him with a gold snuff box, inscribed "as a memorial of his worth, and as a testimony of the printers and binders in his employ." He was also distinguished for the facility and accuracy with which he could tell, from a rapid glance over a manuscript, about how many pages it would make when printed, and the shortest time within which the work could be done, if haste were desirable. In 1866, Mr. Wendell was appointed Superintendent of the Public Printing, but

in March, 1867, was legislated out for an alleged charge of political favoritism, to the exclusion of loyal soldiers, which charge a joint Committee on Printing of both Houses of Congress pronounced unfounded. This Committee, after reporting that "the late Superintendent was highly worthy of the post which he had filled," add the testimony that "inasmuch as Mr. Wendell yesterday closed his official connection with the Government Printing Office, it is due to him to say that in courtesy of deportment, in energy, in efficiency, in fidelity to public trust, he has met the highest favor with all of the Committee who have been brought in connection with him."

INDEX TO PORTRAITS

OF

REPRESENTATIVE LEATHER MANUFACTURERS.

John Cummings, Woburn, Mass.,

One of the oldest and most enterprising of the tanners of Massachusetts, was born February 26, 1785. His grandfather, David Cummings, came from Topsfield, in Massachusetts, and settled in Woburn about the year 1757, where he engaged in the business of tanning and farming—pursuits that it was then customary to combine—the former furnishing occupation for the winter and farming for the summer months. At that time, it was considered a large business to tan two hundred hides a year, and these were mostly tanned "at the halves," that is, the tanner took one side for tanning and currying the other. The business thus established by the grandfather was transmitted through his father, Ebenezer Cummings, to the subject of the present notice, who commenced for himself about the year 1804. His hides were mostly obtained from farmers through his own exertions in travelling on horseback for the purpose of collecting them, and the bark was brought in from the adjacent country on teams. As bark became scarce in the immediate vicinity of the tannery, it was a source of no little anxiety and frequent discussion where the future supply of this essential tanning material would be obtained. While the raw material was obtained in this primitive manner, the sale of the finished leather was achieved in much the same way, by carrying it about the country in a wagon, and retailing from one to ten sides in a place.

About the year 1830, however, Mr. Cummings effected a revolution in his business, by engaging in the manufacture of "Chaise Leather," as a speciality. In this he achieved a wide reputation, and for many years supplied the wants of the chaise manufacturers not only of Massachusetts, but of New England. When, however, Enamelled leather came into use and took the place of the common oil finished chaise leather, Mr. Cummings directed his business in another channel, and became one of the largest slaughter leather tanners in the State. He was probably the first to appreciate the advantages of the Splitting machine, which has been of the greatest importance in facilitating the finishing of leather, and was appointed almoner of the fund which was contributed by the leather interest for the benefit of the inventor of this machine.

As a man, Mr. Cummings was remarkable not only for his industry and

perseverance, but for his generous impulses. He probably taught more young men the business of tanning, and aided them to embark in trade for themselves, than any other leather manufacturer of the State, and now has a large circle of friends, who regard him as their early benefactor. For the last sixteen years, he has not been engaged in active business, and has been succeeded by his eldest son, who is also held in high esteem by his neighbors and the citizens of Woburn.

Abijah Thompson, Woburn, Mass.,

Another of the early and eminent manufacturers of leather in Massachusetts, was born in Woburn in the year 1793. At the age of seventeen he was apprenticed to learn the trade of tanning and currying, at which he served faithfully until he had attained his majority, when he commenced business for himself, in the town of Medford, buying leather in the rough, dressing it with his own hands, and selling it thus finished in parcels of from one to six sides to the shoe manufacturers of the adjacent towns. This, however, he continued but for a short time, when he resolved to return to his native town, and engage in the tanning of hides.

Here he built a small tannery of sixteen vats, and commenced collecting his hides from the farmers, grinding his bark with a horse and the old stone wheel or mill, and producing from one hundred and fifty to two hundred finished hides in a year, his only assistants being two apprentices. His leather he transported semi-monthly to the shoe towns of Reading, Stoneham, and Malden in a wagon, which returned loaded with such raw hides as he could procure in the vicinity. At the end of ten years, he found his means had increased sufficiently to enable him to purchase fifteen acres of land near the centre of the town of Woburn, on which was a small power, and here he laid the foundation of what is now known as the "Thompson Tannery." At first, he only put down thirty vats, but these were added to from year to year, as his means and the demand for his leather increased. In 1835, he introduced steam power, and in the subsequent year, associated with him his son-in-law, Mr. Stephen Dow, who is now his successor. Before his retirement from active business, in 1866, his facilities had so increased that he was enabled to tan twenty-five thousand hides per year.

The town of Woburn is probably more indebted to Abijah Thompson—who is called by his neighbors by his military appellation, General Thompson—than to any other one of its citizens for its public enterprises and business prosperity. His success and example attracted to it other tanners, until now it is one of the central points of the leather manufacture of New England. He was the first to secure to Woburn its branch railway, and to establish the Gas Company, and the Bank of which he has been President since its organization. His financial sagacity has made him sought after by other incorporations, and he has been a director of a bank in Charlestown, one of the original directors of the Faneuil Hall Bank of Boston, and for many years one of the active managers in the Middlesex Insurance Company in Concord. His integrity and financial probity are unquestioned, and he belongs to that select

few who achieve success by force of nature and talent, without early advantages, and who use the wealth thus accumulated for the benefit of the community in which they live.

Alfred Loring, South Hingham, Mass.,

Is a descendant of a long line of tanners. His father was Elpalet Loring, of Hingham, who was born July 3, 1774, and died December 20, 1852, aged seventy-eight. He received a tannery located in Hingham, Plymouth county, Mass., from his father, in the year 1800, carried on the business successfully for more than a quarter of a century, and transmitted it to his son in 1827.

The father of Elpalet Loring was Job Loring, who was born in Hingham, February 14, 1740, and died in that town February 10, 1825, at the patriarchal age of eighty-five years. His father, Solomon Loring, purchased the estate, on which the tannery is situated, of the family of Jacob, and set up his son Job in the business of tanning in very early life. The ancestor of Solomon Loring was Thomas Loring, one of the first settlers of Hingham.

It will thus be seen that the Loring tannery has been occupied and the business conducted by the same family for upwards of a century.

Under the management of the present owner, the business has been extended, modern improvements introduced, and the tanning and currying of leather in their various forms, have been so perfected, that Mr. Loring's calfskins and upper leather have an excellent reputation, and meet with a ready sale. He bestows his personal attention upon every part of his business, and, as a matter of course, it is well done. Mr. Loring was probably the first to introduce what was known as Pierce's improved process or art of tanning, with Professor Eaton's improvements superadded, and from various experiments, for the purpose of testing the process, obtained information of which he still avails himself in the manufacture. About the same time, viz., in 1852, he adopted England's patent handles, of which he continues to maintain a favorable opinion, and recently, he tried Towers' patent alcohol process, and thinks it entirely practicable, and very valuable, if the cost of alcohol were reduced.

As a citizen, Mr. Loring is highly esteemed. He is public spirited and liberal; and his life presents a fair specimen of a substantial and enterprising manufacturer, who finds also leisure, as he has the good taste and inclination, to diversify his employments by considerable attention to agricultural and horicultural pursuits.

William Musser, Philadelphia,

Who is one of the oldest living representative men in the Leather Trade of Philadelphia, with which he has been connected for more than a half century, was born in the town of Lancaster, Pennsylvania, August 17, 1789. His progenitors were among the German families who originally settled that county and he inherited from them the qualities of energy, thrift and self reliance which have been distinguishing characteristics in his business career.

His father was a tanner and currier, and for many years carried on the busi-

ness successfully in Lancaster, Penn. In 1803, when only fourteen years of age, young Musser left his inland home and came to Philadelphia, which was then universally acknowledged to be the commercial metropolis of the Union. His brother-in-law, John Singer, was at that time keeping a hide and leather store on Market street in connection with a grocery, and he entered his employment as an apprentice or clerk. This Mr. Singer was the surviving partner of the firm of Casper Singer & Sons, who may be said to have been the founders of the hide and leather trade of Philadelphia, having been the first to introduce the custom of buying Spanish hides from the importers, and retailing them to the tanners. Previous to that it was the habit of the tanners to buy their hides from the importers themselves, and in payment to send their leather to the merchant to be sold or exchanged for other goods.

During the time that Mr. Musser was faithfully discharging his duties as clerk in this store the clamor of war sounded, and all peaceful avocations were interrupted. It was the beginning of the war of 1812, and on account of the position and importance of Philadelphia, it was thought this city would be one of the first objects of attack. Old and young men prepared to shoulder the musket and repel the invader. William Musser was among the first to join the force raised in Philadelphia and vicinity, and accompanied the troops to Camp Dupont. The service performed by these volunteers was simply a tedious routine of duty, not at all varied by excitement and adventure. The British made no attempt to reach Philadelphia. At the close of the war, the volunteers returned to the city, and were welcomed as their protracted service and the sacrifice of their private interests in behalf of the general weal deserved.

Soon after his release from military duties, Mr. Musser was taken into partnership as one of the firm of John Singer & Co., and his attention and talent for trade soon made him the principal manager of the business. All kinds of domestic manufactures had been greatly stimulated by the war, which had the effect of a prohibitory tariff, and the affairs of the house had risen in importance. In 1829, the senior partner retired, when the style of the firm was changed to John Singer Jr. & Co., who continued the business with success until 1836, when the junior Mr. Singer, on account of impaired health, was obliged to withdraw and seek a foreign clime for its restoration. Mr. Musser then conducted the business under the firm of William Musser & Co., having associated with him A. H. Bryant, until 1845, when Mr. Bryant withdrew. Subsequently he took as partners Adam Ruth, and his nephew, Richard M. Greiner, continuing the name of William Musser & Co, which firm is still in existence. Thus it will appear that Mr. Musser has been connected with the hide and leather business, directly and indirectly, since the year 1803, a period of over half a century, although for the past seven or eight years he has not taken an active part in the management of the concern, which has, in the main, devolved upon the junior partners.

As a result of his business career Mr. Musser has been eminently successful in accumulating wealth. At one time it is true the calamity which hangs over all commercial transactions befell him, and the firm, in 1848, to the general regret of all, was compelled to suspend payment, but his character had inspired confidence, and the creditors readily granted an extension. This confidence was well deserved, and, in 1853, every cent of every just demand

was paid. From that period until the present day no house in the leather trade has stood higher in commercial credit and general esteem than the firm of William Musser & Co.

During his life Mr. Musser has been a director in various enterprises of public importance and has been solicited to preside over the affairs of several coal companies, a railroad, and one of our principal monied institutions. This he has invariably declined, not from any defect of public spirit, but from the inherent modesty and diffidence of his nature. He was one of the founders of St. John's Lutheran Church, and has long been President of its Board of Trustees. He has also been trustee for a number of large estates and has discharged the duties incident to the position with rare fidelity and skill. Mr. Musser is now in his seventy-eighth year, and enjoys in competence the rewards of a well spent life, the honor and respect of the community in which he has so long lived, and the attachment of "troops of friends."

Henry Poor, Boston,

Is one of the eminent leather manufacturers of New England whose birth antedates the beginning of the present century. He was born in the town of Danvers, Essex county, Massachusetts, January 16, 1799. Both his father and grandfather were surnamed Joseph, and were prominent tanners in their day, and though the family have been engaged one hundred years in the same pursuit, no one of them ever failed to meet his commercial obligations at maturity.

Henry Poor was instructed in the business of preparing leather in his father's tannery, where he commenced his apprenticeship in 1814, when he was fifteen years of age. He was thus employed until 1830, when he embarked in the hide trade in a limited way, and not long after became connected with Mr. Abel Proctor, of Danvers, with whom he was associated for several years. In 1845 he established himself in Boston in the hide and leather business in association with his son Eben S. Poor, and Alexander Moseley, under the firm style of Moseley, Poor & Co. This copartnership continued until 1851, when Mr. Moseley retired, and the now well known name of Henry Poor & Son became the style of the firm. Since then, two other sons have been admitted into the copartnership, and recently a grandson, presenting the anomaly in American mercantile life of a business being prosecuted continuously and successfully by one family through five successive generations.

Mr. Poor formerly confined his business almost exclusively to the production of Upper Leather but since the establishment of the present firm they have entered largely into the manufacture of Sole Leather, which now constitutes the principal part of their business. They now own and operate three Sole Leather tanneries, besides others which they stock by contract. Their tannery in Winn, Maine, owned by them in connection with Shaw, Kingman & Co., is one of the largest in America. The main building is seven hundred feet long, with a leach house one hundred and twenty-five feet in length, and scrubbing rooms about sixty feet. It contains three hundred

and thirty large pits, and its machinery is propelled by a steam engine about one hundred horse power. The tannery is easily capable of tanning fifty thousand hides in a year. Their other tanneries are in Saratoga county, in the State of New York. These are provided with many of the modern improvements, and are operated by both steam and water power.

This firm also supply some tanneries in Salem and South Danvers, with upper leather hides, the trade in which is still a prominent part of their business. During the year 1866, they erected three leather stores in Congress street, Boston, one of which, on the corner of Williams street, now occupied by them, is one of the largest and most convenient stores in the city.

Mr. Poor is a highly influential member of the trade, and has at various times filled prominent positions of trust and honor, conferred upon him by his fellow citizens. He has held a seat both in the Senate and House of Representatives of the State, and throughout a long life has secured and maintained the respect and confidence of all who know him.

Zadock Pratt, Prattsville, N. Y.,

One of the best known tanners in the United States, was born at Stephenstown, Rennselaar county, New York, October 30th, 1790. He was the son of Zadock Pratt, a tanner, shoemaker, and a revolutionary soldier, and while a boy employed in his father's tan-yard, invented, it is said, an improvement in the three cornered eye-board leather pump, for changing liquors from the old-fashioned vats, which, with some modifications, is still in use. He was early taught the value of industry, and earned his first spending money by gathering whortleberries. While employed in his father's Tannery he spent his leisure hours in braiding whip-lashes, from the sale of which he accumulated a capital of thirty dollars—no small sum for a boy in those days.

In 1810 he was apprenticed to Luther Hays, a saddler, and after serving a short apprenticeship, and working one year as a journeyman at ten dollars per month, he commenced business on his own account, as saddler and harness maker, in a small shop at one end of a bark-house.

His average time of labor then was fifteen to sixteen hours per day. With a system that commenced with his first pursuit in life, he kept an exact account of all business transactions, and every year made an inventory of his possessions, so as to calculate his profits; and it may be remarked, that he has adhered to this plan even to the present time. He made the first year five hundred dollars, and the second twelve hundred, which continually increased until 1815. He sold his store just in time to escape the storm which so frequently and suddenly rises in the commercial world, and which overwhelmed his purchasers. He now entered into partnership with his brothers in the tanning business, which was carried on with such energy and management, that it proved prosperous to all concerned. We will give a little incident that will serve as an illustration of his judgment and energy of character. He knew that the first annual products sold best early in the

season, and he was always among the first in market with his yearly product of leather. One spring, however, one of his partners wished to postpone the sale, which Mr. Pratt insisted should take place immediately. His partner at length yielded to his solicitations, and the result showed the correctness of Mr. Pratt's judgement. Twenty-eight cents per pound were obtained for the leather, which, if the sale had been postponed, would have brought but twenty-one cents and a half per pound; the latter being the price obtained by the tanners who sold at the time that Mr. Pratt's partner wished to dispose of their joint stock.

In 1821 he made an excursion to Canada with leather, for the purchase of furs, and in these and other enterprises accumulated money until 1824, when he determined to locate on the Schoharie-hill, now Prattsville, and build a tannery that would be the largest in the world. This tannery, when completed, was five hundred and thirty-two feet long, forty-three feet wide, with three hundred vats, and a capacity for tanning sixty thousand sides of sole leather annually. During the twenty years it was in operation, Mr. Pratt purchased for the tannery one hundred and fifty thousand cords of bark, at a cost of half a million of dollars, employed some thirty thousand men, paid over two and a half millions of dollars for labor, tanned over a million sides of sole leather, and in various ways used over ten millions of dollars without a lawsuit. Besides this, Mr. Pratt has been interested in eleven other tanneries, containing in the aggregate two thousand vats. In 1837 he received from the New York Institute the first silver medal ever awarded for hemlock sole leather, and in 1839 was elected a member of the American Institute.

The establishment of the Mammoth Tannery, in the wilds of Windham, led to the erection of a village, which has developed into a town of two thousand inhabitants called, after its founder, Prattsville. One hundred of the houses were built by Colonel Pratt himself, and for the erection of the public edifices he subscribed liberally. Of three of the churches of different denominations he contributed more than one third of the cost.

In 1836 Mr. Pratt was elected a Representative in Congress for the eighth Congressional district of New York, comprised of Greene, Schoharie, and Columbia counties, by a majority of over twenty-eight hundred, and in 1842, was again elected for the same position from the eleventh Congressional district. His Congressional career was a highly creditable one to himself, and beneficial to the country. It illustrates in a forcible manner the advantage to constituencies, of sending as their Representatives in the National councils, men of practical ideas. He devoted himself to the utility of legislation, and was the originator of the popular system of cheap postage, which has proved of such vast benefit to the citizens of the United States. He was one of the standing committee on public buildings, and advocated the use of marble and granite, in their construction in the place of the Sandstone that had been formely used. The Post-office in Washington was erected of marble, and in accordance with plans submitted by him. In 1839, he addressed the House of Representatives, for the purpose of having constructed a Dry-dock, at Brooklyn, and in the same year moved for the establishment of a branch

Mint at New York. As chairman of a select committee, he submitted a report on the advantage of a Bureau of the statistics of commerce, with valuable tables, showing the loans and discounts of the banks, imports and exports, and balance of trade for a series of years, of our government with other nations, illustrating the importance of the proposed Bureau, and concluding with a bill to provide for the collection of national statistics.

He also was one of the early advocates of the importance of a national railroad to the Pacific, and in 1845 offered a resolution providing for the engraving of patents, and their distribution through every county in the United States, for the benefit of mechanics, to suggest by a view of different improvements and models a new train of ideas, which would be of the greatest practical use, and might be the germ of future inventions.

He can truly say, looking back to his Congressional career: "I was faithful to the principle of labor, and loved my country so well that I was not less anxious for her grasp of commerce abroad, than for her integrity and efficiency of service at home."

Shortly after his election to Congress the second time, Mr. Pratt established a Bank at Prattsville with a capital of one hundred thousand dollars, and its bills, being secured by United States and New York six per cent. bonds, were always kept at par in New York city. This bank continued in operation until 1853, when it was closed, after doubling its capital in nine years, and using in various ways eight millions of money.

Zadock Pratt is one of the few men who deserve an extended biography, and such a tribute to his worth is, we understand, in course of preparation. We have not attempted more than an allusion to the leading incidents of his career. As a tanner, banker, representative and farmer, he performed his part well, and in all the various relations of life exhibited traits that indicate a true "Nature's nobleman." During his business career, he furnished employment to forty thousand working men; and now, at the close of a long and useful life says, "if I should ask to be remembered by one epitaph of honor, it would be as the friend of the man that labored." He endorsed for his friends, in the course of ten years, to the amount of five undred thousand dollars, and received four hundred protests. In the language of a Memorial now before us, we may say, "He has not only amassed wealth for himself, but has ever been an assistant to others. He has extended his helping hands to individuals when oppressed with want, and to societies and institutions. In his public career he was assiduous in his duties, always at his post. He tells us, in his speech delivered to his constituents, that he was never absent even for a single day, from his duty; and, to quote one forcible expression, he exclaims, 'Wrong I may have done, mistaken I may have been; but I have never *neglected to do*.' View him 'all in all,' in every relation that he has filled—and they have been multiplied and varied enough to test the man—he has been an example to his cotemporaries, and will be held up as a model by posterity. With the practical wisdom of a Franklin, he guided and directed with a master hand the political current of the day, without exciting the envy or enmity of his associates. And this was no doubt owing to his straightforward character; for there is nothing about him

that is doubtful—that has a twilight existence; but all his traits are strong in their native light as summer's day. Whatever he has touched, you have seen at once a change for the better—it flourished and prospered. As the moon affects the tide of nature, so will great minds swell the current of human events. Viewing him as a philanthropist, we can only say that he is the Howard of his time. Like him he has relieved the voice of anguish by his bounty, and assisted the needy to advance in their business; and more than he has, that charity has been exerted in a more munificent sphere."

Thomas Smull, New York,

Another citizen of New York who attained a most distinguished position in the leather trade, was born at Whitehall, Pennsylvania, in 1806. When he was twenty-one years of age, he left his native state and went to the city of New York, and after a clerkship of two years, commenced business on his own account in association with Andrew Robb, as tanners and finishers of calf skins, and dealers in sole and upper leather. This partnership continued but a couple of years and was not prosperous. In 1834 he associated with him William Miles, establishing the firm of Thomas Smull & Co., who did a large business in Calcutta hides, and sold largely of an article of traffic, now obsolete, known as seal-skins, to be used in covering trunks. About this time also he became acquainted with Nathaniel Gilman, of Waterville, Me., a wealthy merchant engaged in importing hides from Africa, who was so much pleased with Mr. Smull's manner of doing business, that he entrusted him with whole cargoes to sell, with power to employ the proceeds in investments at his discretion for joint account. The relationship thus formed, subsequently led to a copartnership under the firm style of Gilman, Smull & Co., and their experience and large resources enabled them at once to attain a leading position among the hide and leather merchants of New York. This association continued until 1848, when Mr. Smull became connected with Jonathan Thorne, who contributed fifty thousand dollars to the capital stock as special partner, a relation that continued after the admission of Aaron Healy, and until 1856, when the firm of Thomas Smull & Sons, was established. The firm style was continued with some change of members until 1865, when Mr. Smull retired from active business, retaining however an interest as special partner in the present firm of T. L. & C. G. Smull, until his death, November, 28th, 1866.

At the time of his decease it was said that among the many prominent men in the leather trade in New York, there was no one whose death would create a greater void. Genial, public-spirited, liberal, progressive, he constituted a most valuable member of the commercial and social circles, and it will be long years before his active form and pleasant countenance shall have passed away from the memories of the members of the leather trade, or the visitors of the "Swamp." Mr. Smull took the most lively interest in all the improvements and inventions appertaining to leather production, and was a contributor of excellent articles to the trade journals on the subject of tanning. In 1855 he erected, at White Haven, Pennsylvania, a tannery that cost sixty thousand dollars, with a view of making it a model establishment for

the production of the best kind of sole leather. As a business man, Mr. Smull was remarkable for sagacity and commercial ability, combining boldness with caution.* For many years he gave a large share of his time and influence to the aid of various public institutions. He was for a long period Vice President and President of the old Mechanic Institute. He was also one of the incorporators and directors of the Metropolitan Bank of New York, and director in the Continental Fire Insurance Co., New York Life Insurance Co., the Clinton Fire Insurance Co., and the First National Bank of Sing Sing. He was also one of the originators of the six-penny Savings Bank, located in Clinton Hall, which it is said was the first bank organized to receive deposits of small sums.

After his decease the various associations with which he had been connected passed resolutions of the most commendatory character, that constitute a priceless family record. It was said of him that he was naturally kind and grateful, and often assisted old friends and acquaintances who had been unfortunate. His former employer, having later in life become in straitened circumstances, received many substantial tokens of his kindness. Another fine trait in his character was a disposition to assist worthy young men. He spent a portion of the night previous to his death in making arrangements to assist, with his influence and capital a young man, who wished to engage in the leather business.

Mr. Healy, who for fifteen years had been connected with him as clerk and partner, testified: "As an employer I always found him generous, confiding and liberal; he made my situation a pleasant and comfortable one. As a partner, being my senior, he treated me with respect and consideration. I cannot recollect an instance when he asserted his opinion, as he had a right to do, in opposition to my own. He never asked me to do any thing which was not strictly just, and which I did not think it right to do; and I may add, that during my whole knowledge of his business career I never knew him to do any act which was not right, both in a business and moral point of view.

"I found him, as a business man, shrewd, energetic, cautious, and very upright and honorable; not over anxious to make money, but careful to keep what he had rather than run much risk to make more. He often said he had no desire to accumulate a great fortune. No differences arose between us, and when we came to dissolve our business relations he re-

* It is recorded of him that when he was scarcely twenty-eight years of age he trusted a tanner with four thousand dollars worth of hides to be tanned on joint account. It was his first contract and he went to a leading Swamp merchant to borrow a form of agreement used in such cases, as a copy. To this he added a clause, not used at that time, to the effect that the hides were not to change ownership, but remain the property of Mr. Smull through all the stages of tanning until the leather was returned to New York for sale. The tanner failed and confessed a judgment to his father, who sold the stock in the tan-yard. Several Swamp merchants were among the creditors and they replevined the stock but upon the case coming to trial, the contracts, being without the saving clause, were ignored by the court. Mr. Smull recovered his stock, but a verdict was given against the other creditors. His carefulness in this transaction saved him from a loss of nearly twice the amount of his entire capital at the time.

marked 'we have been friends so long in business we will separate friends; our dissolution shall be satisfactory.' And so it was."

Another who had known him intimately for thirty-five years, and who had been his partner, remarked that he had a great tact "for drawing around him those who had certain talents which he might not possess; if one was a superior salesman, another a good judge of stock or possessed of financial ability, he was quick to notice and avail himself of such talents," while the pastor of the St. Paul's Episcopal church at Sing Sing, bore witness to his high moral character, and observed—"upright in his aims, direct and open in his measures, he always inspired confidence. I certainly never found that confidence misplaced. He endeavored to satisfy himself respecting the truth and right; and when Thomas Smull had once taken his stand on honest conviction, he stood regardless of all other influences. He was a very kind man; earnest but pacific in his disposition; silent and unostentatious, but generous in his aid for an object which commended itself to his judgment."

Fayette Shaw, Boston, Massachusetts,

Is the head of a firm who, it is believed, are the largest sole leather tanners in the world. His father was among the early tanners of Cummington, Massachusetts, which at one time was the principal tanning district of the State, and here Fayette was born, in 1824, and with his brothers who are associated with him in business, was instructed in the trade. After the decease of their father, in 1846, the three brothers formed a copartnership under the name of F. Shaw & Brothers, and as tanning material had become scarce in their native State, they sought a broader field in Maine, whose virgin forests furnished an abundant supply of bark. They opened a branch house at Dexter, Maine, under the style of C. & B. Shaw & Co., with their uncle as partner, and subsequently at other places, until now they have houses in that State at Dexter, Burnham, Detroit, Plymouth and Winn. About eight years since, they directed their attention to the advantages presented in Canada for tanning hides, and established houses at Montreal, Roxton, Waterloo and Farnham. They are now the most extensive Hemlock Sole leather tanners in Canada, consuming in this department of their business no less than 125,000 hides per annum, and engaging largely in the exportation of this kind of leather from Canada to England. They in fact were the pioneers in this trade, and the only American firm who have made the exportation of hemlock leather to England a regular and permanent business.

This firm have now ten tanneries in operation, several of which are equal in capacity to any in this country, and probably in the world. They consume annually about 250,000 hides, and produce nearly or quite eight millions of pounds of sole leather. This enormous business, so widely extended, is thoroughly systematized, and, under the direction of those fully competent, is carried on with ease, dispatch, and entire success. The greater part of their tanneries are provided with the modern improvements which they have been foremost in introducing whenever convinced of their practicability.

Among these we may mention the "tanburner," which they have perfected so as to render the burning of wet spent tan bark, as thrown from the leech, both practical and successful. This they now use in all of their works, in some of which steam is employed, consuming 10,000 cords of bark per annum. This firm are also largely interested in "Miller's Patent Bark Extract," for the manufacture of which they, in association with other gentlemen of Boston and Canada, have four large works in the hemlock forests, with facilities sufficient to extract the tannin from 50,000 cords of bark per annum. This is the first successful effort ever made to extract Tannin from bark in sufficient quantity and of unimpaired quality, to warrant its general and extensive use, and large quantities are now sent not only to all parts of the United States and the Canadas, remote from the bark regions, but are shipped to England. While avoiding, as a general rule, speculation foreign from their business, they regard the manufacture of an extract of bark so important to the national interests, as well as legitimately connected with their tanning business, that they have not hesitated to engage in it, and prosecute it with the energy that distinguishes them in all their commercial and manufacturing operations.

George K. Pevear, Lynn, Mass.,

Has been selected as a representative of that large class of enterprising men who have made Lynn the largest morocco manufacturing town, with the exception of Philadelphia, in the United States. His history as a tanner, compared with the others whom we have noticed, is quite modern, though his father was also engaged in morocco tanning, and he and his brother Henry, who is still associated with him, were educated to the business. Their first essays in the tanning of goat and sheep skins, were made in 1847, in a small wooden building on Monroe street in Lynn, and the first few years of their business life required all the proverbial energy of the New England character to supply the deficiencies of a want of capital. Their business however graduàlly increased, additional buildings were erected, and in 1854 they opened the store in Boston, at Nos. 67 & 69 Kilby street, which they now occupy. In 1861 they tanned one hundred thousand goat skins, and as the commencement of the War caused a surplus of calf skins in the market, they embarked in this manufacture, tanning them by a novel and improved method into leather peculiarly adapted for ladies' boots. This addition to their former business involved the necessity of erecting a new building, which they constructed of brick, forty-eight by eighty feet, five stories in height, with a fire proof boiler and engine room attached. About this time they also abandoned the old method of tanning goat skins by sewing them in the shape of bags, and then by means of a tunnel filling these bags with tan liquor and piling them one upon another, and adopted their present plan of tanning the skins without sewing them.

After the close of the war, in 1865, the return of the soldiers who required calf-skin boots, in place of the cow-hide shoes which they had worn in the army, so enhanced the market value of calf skins that this firm deemed it desirable to procure something to take the place of their grain or pebbled

calf and found a very good substitute in neat's hide, tanned by a novel method and finished in a manner which never fails to retain its color. As more time is required for tanning hides than either goat or calf skins, they found their tanning facilities inadequate to their increased business, and they sought another locality for their factories. In 1865, they purchased the property known as the "Lynn hermit Estate," and that known as the "Lynn Rubber factory," situated on the main road from Lynn to South Danvers, containing in all about twenty acres, on which were two large factories, a large brick boarding house and several dwelling houses. These factories they remodelled, and also built a new one so arranged as to form three sides of a hollow square, and provided them with all the modern improvements for manufacturing nearly all the different kinds of upper leather known in the market.

In factory No. 1, the first floor is used for liming, milling, beaming and preparing skins for the tan room, and may be called the calf skin tannery, the upper stories being used for drying skins. Of factory No. 2 the first story is used for tanning goat and calf skins, and also the hides, until ready for splitting, while the remaining portion of the building is appropriated almost exclusively to the manufacture of goat and sheep skins. Of factory No. 3 the first floor is used for splitting the leather, scouring and preparing it for the finishers, and tanning out the splits; while the rooms in the upper stories are devoted to finishing splits, pebbled grain, polished grain, buff, wax leather, etc.

These buildings are painted of a uniform color, with slated roofs and a cupola on each, in one of which is a bell. In a brick building, thirty-six by forty feet, is a Putnam built engine of fifty horse power and two large boilers, so arranged that power and steam are carried throughout the factories; and the room above is used for drying in damp weather, being separated from the engine and boiler room by an iron floor, so constructed as to conduct the heat and be perfectly fire proof. In this building is the only fire on the whole premises.

They have in the immediate vicinity, connected with the establishment, tenements sufficient for the most of their workmen. This tannery is one of the largest of the kind in the country and is known as the "Stetsonville tannery."

The Messrs. Pevear, it will be noticed, are an illustration of the enterprising men of the nineteenth century, fertile in resources, ingenious in adaptation, undaunted by difficulties, shrewd, successful and courageous in executing well formed plans.

Josiah M. Jones, Boston,

Is a representative, not only of the great Tanners of the present day but of the old Tanners of Boston. He was born in 1800, in Athol, Mass., where his father, Mr. Prescott Jones, had been a tanner for some years, having commenced in that town shortly after the Revolutionary war. This gentleman did quite a large business for that period, and dealt to some extent in foreign hides, which he sold to other tanners in the vicinity. He pursued the vocation of tanning until the year 1825, when he retired. His two sons, Josiah M. and Frederick Jones, served an apprenticeship of seven years in their father's yard, the business of the former being, for a portion of the time,

to bring the leather to market in Boston and return with a load of hides. In the year 1823, Mr. J. M. Jones went to Boston, and, in company with Luke Brooks, under the style of Brooks & Jones, commenced business on India wharf. The capital of the partners was five hundred dollars each. The connection lasted only two years, when it was dissolved, and another formed under the style of Emerson & Jones. This firm did a business to the amount of fifty or sixty thousand dollars a year; which was considered quite large for that period. A great share of the trade was done on credit, at an average profit of from eight to ten per cent. Large quantities of rough leather were sold to Curriers in Roxbury, which at that time was the chief seat for currying upper leather in the State. In 1832, however, this firm was dissolved, and Mr. Jones carried on the Hide and Leather business, without a partner, for over thirty years, or until 1863, when his son, Clarence W. Jones, entered the firm, and the present style of J. M. Jones & Co., was established.

During the early years of Mr. Jones' business experience he was, as was mentioned before, located on India wharf; from thence he removed to Broad and Fulton Streets, and in 1844 to Pearl Street, being one of the first leather dealers who moved into that street. His store was at No. 72, but after a few years he, with his brother Frederick, and Levi A. Dowley, erected the five granite stores, Nos. 96 to 118, and in 1851 he removed to the present location of the firm, No. 104 Pearl Street. The stores at the time cost twenty thousand dollars each, including the ground.

For the past twenty years Mr. Jones has tanned most of the leather he sold. The firm now stock and run nine tanneries, five in New Hampshire, viz: two in Bristol, and one each in Wilmot, Newport, Danbury, Woodstock, and New London. The others are in West Halifax, and Reedsboro, Vermont. At these tanneries seventy thousand sides of leather are produced yearly. This is finished into wax, kip, and splits, and sold at the warehouse, in Boston. The business of the firm amounts to over a quarter of a million of dollars annually, consisting principally of upper leather of their own tannage and finish.

Mr. Jones has been one of the most successful, as well as one of the most highly respected, members of the leather trade in New England. He is a director in one of the largest banks in Boston, and pays taxes on real estate in that city valued at over a quarter of a million. He has been largely instrumental in improving the architectural appearance of the business streets, having built, beside the five granite stores already mentioned, one of the warehouses in the Richardson block on Pearl Street, between Purchase and High Streets, and in association with his brother he rected in 1855 the fine store at the corner of High and Pearl Streets, and is interested with other persons in a block of eight large granite-front stores now being built in High Street.

Hon. Gerry W. Cochrane, Boston,

Who has been selected as a representative of the great Boot and Shoe manufacturers and dealers for which New England, and Massachusetts especially, is famous, was born in New Boston, New Hampshire, March 22d, 1808. His father, John Cochrane, was a farmer, and his youth was passed in agricultural pursuits and in attending the district schools. He appears to have enjoyed the advantages of a better education than is ordinarily afforded to farmers' sons, for we find a record that he was a student at Pinkerton Academy in New Hampshire, and at the Bradford Academy in Massachusetts, and before he was of age, had qualified himself to be a teacher. After he had attained his majority he entered the store of Jacob How, in Haverhill, Massachusetts, and spent four years in acquiring that knowledge of mercantile transactions for which he has since become distinguished. In 1833 he embarked in the manufacture of ladies' and childrens' shoes, in Methuen, Essex County, and in association with J. W. Carleton, carried on a large store, where, in addition to a varied and miscellaneous stock, they dealt in certain specialities not ordinarily found in stores in the country. They traded largely in Wool Hats, and in wool for manufacturing hats, selling to others of hatters' wool, both foreign and domestic. They purchased upper leather, in the markets of Philadelphia and Baltimore, in its rough state and curried it. They also curried calf skins and sometimes purchased the skins and had the hides tanned for the purpose, preferring the oak tanned leather to hemlock, because of its superior tenacity in retaining the black color.

This varied experience, both mercantile and manufacturing, fitted Mr. Cochrane to enter upon a more extended field of operations. Therefore, after prosecuting for fourteen years a successful business in Methuen, he removed to Boston and entering into partnership with Mr. E. C. Emerson and his brother, prosecuted for ten years a wholesale jobbing trade in leather, boots and shoes, and wool hats. During the last ten years he has also been engaged largely in the manufacture of boots and shoes, and for some years owned and operated a tannery for making upper leather for consumption in the shoe manufactory. At the present time Mr. Cochrane has a large factory in Milford, Massachusetts, where he is manufacturing boots with special care, of a quality superior to the average.

His success in business, combined with his intellectual qualifications, has attracted the notice of the citizens of Boston, who have elected him to several positions of public trust. He has been for many years a director in one of the largest banks in Boston, and in two Insurance Companies. In 1860 he was chosen one of the Presidential Electors of Massachusetts, and in 1862 and 1863 was one of the Executive Councillors of Governor Andrew. While in this position he acted as Chairman of the Committee on Accounts, then one of the most important committees of the Council, from the fact that, during this period, about four millions of dollars were advanced by the State, for raising and equipping soldiers to suppress the Rebellion. He was also a member of the Military Committee during all the period of his official service, and subsequently was elected delegate to the Convention at Baltimore, that renomina-

ted President Lincoln by acclamation. During the rebellion two of his sons were in the field and in many of the most important battles, the one as captain, and the other acting as colonel of his regiment, at the surrender of General Lee.

Mr. Cochrane's political services, it will be perceived, have been limited to the period when the country in its time of trial had special need of such men, and his record is so brilliant and honorable that it is probable he will be called in the future to more exalted positions.

Edwin C. Burt, New York,

Is selected as a representative of the pioneers, who have effected a revolution in the methods of making shoes by the application of machinery. Though not a practical tanner himself, he is the son of the proprietor of the old Sandisfield tannery, in Berkshire County, Massachusetts, and from his youth to the present time, has been connected with the leather manufacture in its various forms. In 1824 his father removed to Hartford, Connecticut, and in addition to dealing in leather engaged extensively in shoe manufacturing, and for several years had the contract for the prison labor, employing in that branch seventy-five to one hundred hands. In 1843, Edwin C. Burt removed to New York to establish a house for the sale of the goods manufactured at Hartford, which at that time were principally gentlemen's fine boots. The firm was, originally, Burt, Sears & Burt, which was succeeded in 1846 by Burt Brothers, who added to their wholesale jobbing business the manufacture of ladies' fine shoes, and this branch became from that time a specialty of the firm. In 1856 the copartnership was dissolved, and Mr. Burt withdrew to engage in business on his own account.

Though the firm had acquired, during this period, a fair reputation for manufacturing superior shoes, particularly fine slippers and gaiters, Mr. Burt was dissatisfied with the old methods of making them by hand, and conceived the idea that shoes could be best produced by a regular organized division of labor, with the aid of machinery. But for several years he was deterred from engaging in it, from the constantly expressed opinion, that it was impossible to produce any but inferior goods in this manner. In the year 1859 he determined to make the attempt, and fitted up a room in his warehouse for that purpose, and commenced the manufacture of ladies', misses', and children's fine channel nailed shoes; and having resolved to make only a superior article, soon found that the goods could be made, not only cheaper but better, than by the old process.

In 1862 the Mac Kay Sole Sewing Machine was introduced, and being well prepared for its use, by the organized division of labor, he was enabled to produce at once very superior sewed work, which, being considered more desirable for ladies' wear than the nailed, soon gained a wide reputation. At this time Mr. Burt has a manufactory at 27 Park Row, on the east side of City Hall Park, which gives employment to two hundred hands, and produces about three thousand pairs weekly, or one hundred and fifty thousand pairs annually, of ladies' and children's fine shoes. The workmen are selected

from the best in their respective departments, and regard is had to their regularity of habits, as well as to their mechanical excellence. They are paid by the piece for their labor, and earn on an average over twenty dollars per week. The system of working is by gangs or teams, consisting of laster, second laster, heeler, trimmer, burnisher and finisher. The bottom sewing is all done by the Mac Kay Sole Sewing Machine, of which there are four in this manufactory, each one of which is capable of sewing two hundred pairs of shoes daily, if driven to its full capacity, though, as excellence, rather than rapidity of workmanship, is aimed at, this rate of production is never attained in this establishment.

At the Paris Exposition of 1867, Mr. Burt received a silver medal, the highest awarded, for a collection of Ladies', Misses', and Children's Fine Shoes.

END OF VOL. I.

INDEX.

Abington, 485, 488.
Agricultural societies, 367, 416; implements, 492, 503.
ALABAMA, first printing in, 179; cotton grown in, 352.
Albany, shipbuilding, 64; saw mills and lumber trade, 106, 108; corn mills, 135; printing, 175, 187; bricks and tiles, 223–226; glass works, 240; breweries, 254–256; indigo culture, 314, 348.
Almanacs, first, 159, 162, 163, 168.
Anchors and anchor forges, 485, 489, 503, 512, 513, 518, 542, 627.
Anthracite (see COAL).
Anvils and forge hammers, 407, 490, 497, 531.
Arkansas, first printing in, 179.
Arks invented, 107.
Arkwright machinery, 384, 397, 399, 400, 402, 403, 410.
Armories, public, 495, 608, 631.
Artificers, condition of, in 16th century, 19; first sent to America, 25; emigration of, prohibited, 396, 397, 630.
Arts and Manufactures in 16th and 17th centuries, 13, 15, 81; in middle ages, 17, 18; causes of slow growth, 22, 23; introduced in America, 24, 27.
Asbestos, paper made of, 207; early mention of, 551.
Axes, 486, 494, 608, 617.

BALTIMORE, shipbuilding, 79, 82; growth of, 79, 81, 229, 586; mills, 112, 146, 147, 595; printing, 176, 187; brickmaking, 229; breweries, 263; cloth making, 336, 396, 398; ladies of, 395; tanneries, 448; iron works, 585, 586, 587, 590, 593, 594; coal, 595; gas light first, 595; exports of, 337, 397; tradesmen, petitions of, 81, 398, 594.
Bark mills, 440, 445, 453, 454.
Barley and Malt, 123, 143, 245, 246, 249, 256, 257, 258, 259, 261, 262.
Beer, Ale and Porter, use of, in early times, 244, 259; first excised in England, 247; in America, 251, 252; prices of at different times, 99, 249, 257, 259, 260, 261, 262; exported, 250, 258, 260, 261, 262; importations of, 261; quality of, 250, 261. (See BREWING.)
Beeswax exported, 337; premium for, 406.
Bennington, Vt., 205, 206, 511, 523, 524.
Berkshire, 102, 128, 420; iron ore and works, 493–495.
Beverly cotton factory, 399.
Bible, first printed in America, 157, 158; first in English, 159, 181, 183.
Bleaching, 204, 205, 397, 405, 406, 407, 408; premiums for, 369, 416.
Boat building, 37, 44, 75, 77, 107.
Boats, Durham, and Arks, 84, 107, 559.
Bolting act, New York, 60, 133, 441; mills, 142.
Books, first printed in British America, 31, 154; first medical, 162; trade fairs established, 189—*blank* first, 192, 197;—*binding* and *binders*, 157, 158, 190, 191, 192, 193; price of, 190;—*sellers*, early, 189, 190; premiums for, 406.
Boots prohibited, 435; limited use of, 454.
Boring mills for guns, 486, 492, 566, 573.
BOSTON, shipbuilding, 39, 40, 41, 42, 47, 48; mills at, 96, 117, 118, 123, 128; printing, 162–167, 177, 183, 184, 185, 187; booksellers and bookbinders, 157, 190, 191, 192, 197; paper making, 197, 200, 209, 210, 237; stops importing, 202, 237, 372, 373, 374, 375, 379; type foundry, 212; first brick house in, 219; described, 220, 221; glassworks, 241; vineyard, 269; salt works, 290; rope-making, 303, 419; solid men of, 314; spinning schools and linen manufactures, 333, 334, 335, 345, 362, 372, 375, 376, 419; hatmaking, 342; port bill passed, 379; card factories, 388, 420, 497; mint house, 477; mechanics, 500; fire engines, 500.
Bounties and Premiums parliamentary, on naval stores and raw materials, 99, 105, 328, 337, 358, 365, 372, 624; on indigo and silk, 323, 358; on exports, 337, 344;—*domestic*, on manufactures and raw materials in Massachusetts, 299, 334, 335, 362; in Rhode Island, 334, 335, 398; in Connecticut, 200, 335, 418; in New York, 367, 368, 369, 455, 532; in Pennsylvania, 206, 316, 336, 363, 381, 402, 406, 407, 409, 578, 579, 619; in Delaware, 346; in Maryland, 592; in Virgina, 320, 321, 382, 383, 606; in North Carolina, 615, 616; in South Carolina, 382, 416, 417, 619; in Georgia, 357; of Society of Arts in London (see SOCIETY OF ARTS AND MANUFACTURES); and drawback effects of, 327.
Bowdoin, Governor, 242, 367, 414, 498, 499.
Bradford, William, 168, 169, 170, 171, 172, 196, 197.
Braintree, 221, 239, 472, 474, 475, 476.
Brandy, first made in America, 250; household manufacture of, 258, 262, 264, 265, 274, 276.
Brass and Bronze, antiquity of, 465; American, 546.
Brass and Bell Founding in Massachusetts, 476, 485, 487, 492, 496, 497; in Rhode Island, 502, 503; in Connecticut, 510, 518; in Pennsylvania, 568, 573, 574; in Maryland, 594.
Brazil, first cotton from, 354.
Brewing and Malting, 244–265; in Massachusetts, 245–250; use of Maize in, 247, 258, 263; in Rhode Island and Connecticut, 250; in New York, 250–254, 257; taxed, 251; in Albany, 254; monopoly of, 255; prohibited, 256; regulated, 249, 257; in New Jersey, 257, 258; in Pennsylvania and Delaware, 258–262; in Maryland and Virginia, 27, 262–264; in Carolina and Georgia, 264; as a household art, 244, 258, 263, 264; of pale ale and porter first, 265. (See BEER, &c.)
Bricks and Tiles, 216–231; first in New England, 217, 221; in Virginia, 28, 220; in New York, 222; in New Jersey, 226; in Pennsylvania, 228; Maryland, 229; Carolina and Georgia, 229; prices of, 222, 223, 224, 226; exports of, 231; duty on, 222, 224, 231; improvements in making, 231.
Bridges, iron, proposed, 519, 581.
Bridgewater, 346, 398, 485, 486, 487, 488, 496.
British Trade acts and policy, origin of, 87, 202, 306, 324, 325, 327.
Board of Trade and Plantations created, 305, 326; reports and suggestions to, respecting colonies, 57, 61, 63, 68, 69 90, 97, 162, 199, 200, 236, 322, 326, 328, 329, 330, 337, 339, 340, 341, 342, 346, 362, 370, 371, 489, 491, 522, 526, 527, 530.
Broadcloth, 331, 344, 366, 371, 372, 375, 377, 383, 418; first fine in Europe and America, 366 423.

Brown & Almy, 399, 401, 402, 403, 404.
Buckles, shoe and knee, 406, 447, 463, 492, 519, 551, 574.
Buck and doeskins, 317, 346, 368, 429, 432, 444, 447, 448, 449, 458, 459; prices of, 429, 444, 446, 458, 459; premiums for, 346, 368, 447; exports of, 447, 449; prohibited, 444, 445.
Buffalo, 64, 65.
Bulls, novel use of, 136, 141; of papal, 198.
Burlington, N. J., 69, 70, 109, 121, 172, 178, 226, 258, 548, 549, 550.
Bushnell's Marine Turtle, 53.
Buttons, 330, 382, 418, 492, 539, 574, 575; silk, 418; gold and silver, 372, 519; wooden, 575; importations of, 406.
Byfield woolen and cotton factory, 404, 421.

Cables, 83; iron, 485, 528.
Calico and linen printing, known to the Egyptians, 307; in England, 81, 397; in America, 377, 404, 406, 407; blocks, plates, &c., not to be exported, 396; cylinders invented, 397.
California, first printing in, 180; paper mill, 205; vine culture, 270.
Camblets, 314, 317, 344.
Cambridge, 39, 40; first printing at, 153, 154, 157, 160, 161, 221, 383.
Canada, first saw-mill in, 101; printers sent to, 186; iron works, 536.
Canals, 124; first proposed, 534, 535, 562; first surveyed, 562; in Maryland, 590; in Virginia, 605; in Carolina, 621.
Candle factories, 55.
Cannon, brass, first in England, 467; first in America, 487, 497, 572, 573, 574; iron and shot in England, 467; first in America, 482, 484; in Massachusetts, 482, 484, 485, 486, 487, 490, 495; in Rhode Island, 502, 503; in Connecticut, 511, 512; in New York, 528, 531; in New Jersey, 542, 549; in Pennsylvania, 553, 567, 568, 572, 573; in Maryland, 587, 588, 590; first bored, 486; inscription on, 487; wrought iron and wooden, 560; prices of, 589.
Carding machines, 384, 398, 399, 400, 401, 402, 403, 407, 408, 409, 413, 417, 421, 579.
Cards, cotton and wool, 333, 388, 405, 414, 420, 434, 494, 497, 518, 571, 606, 615, 616; first stock in United States, 398; machinery for making, 388, 420, 497, 518, 571.
Carey, Matthew, 179, 189, 409.
Carpets, Flemish, 15; none in 16th century, 16; in America, 209, 414.
Carriages, taxed for the support of spinning schools, 333, 335; not to be imported, 372; manufacture of, 445, 518, 538;—*springs* first, 538, 580, 609; boxes, 569, 598; steam, 595.
Carving, ship, 40, 70, 74, 75.
Cattle, domestic, introduction and propagation of, 427, 429, 431, 439, 448; prices of, 298, 429, 430, 431, 439, 443, 444, 448, 449; exported, 297, 341.
Chains, heavy forged, 485, 528.
Charcoal best for smelting, 482, 489; prices of, 489, 525, 597.
Charleston, S. C., shipping at, 85, 86; printing at, 176, 187; bookselling and binding, 190; buildings of, 230; settlement of, 271; exports of, 348, 349, 351, 354, 356, 449, 461; silk filature at, 360.
Charlestown, shipbuilding, 40, 41; mills, 117; first acts at, 152, 220; manufactures at, 221, 303, 304, 433, 439, 470.
Chemicals, first made, 392, 407.
Child, Sir J., 81, 88.
Chimneys, in 16th century, 18; early American, 109, 219.
China, first American ship at, 64; increased trade with, 92, 411.
Chinaware and porcelain, Sevres, 15; duty on repealed, 237; factory established, 238, 619; excluded, 372.
Chlorine, use of, in bleaching, 204, 205, 397, 406.
Chocolate mills, 121, 144.
Cider, 250, 257, 263, 265, 274.
Cincinnati, first printing in, 179.
Clapboards, 25, 26, 95, 96, 111, 112, 222.
Clock and watchmaking in Connecticut, 518, 519, 520; in Pennsylvania, 551, 568, 573, 580; machinery; 520, 521.
Clocks, curious, 501, 521, 579.
Cloth manufacture and its materials, 296, 423; why commenced in Massachusetts, 298; first legal encouragement of, 299; first sample of, 300; begun in Connecticut, 300; scarcity of at Plymouth, 301; first regular manufacture of, 303;—*woolen*, state of in England, 305;—*linen*, household, in New York, 314; New Jersey, 314; Pennsylvania, 315; Delaware and Maryland, 319; Virginia, 314, 320, 343; prohibition of recommended, 322; promoted by laws of trade, 322–327, 367; complained of, 327; proposed means of checking, 328, 329, 330, 337, 341; kinds chiefly made, 330, 331; linen branch improved, 331; importations of British, 344, 367, 389, 451; American silk used in, 33, 360, 414; frugal use of, 380; increased attention to, 381–383; improved machinery introduced, 383; first factory, 385; scarcity of during war, 390, 392, 393; efforts to provide, 391–395; price of woollen, 392; effects of the peace on, 395; renewed efforts to procure cotton and woolen machinery, 396–400; first water mill for cotton, 401–403; state of household production, 411–418; woolen and linen factories, 418–422; duties laid, 423 (see Cotton, Linen, Silk, and Woolen).
Coal, early use of, in England, 20; in smelting iron, 29, 467; Anthracite in smelting, 484, 562; found in Rhode Island, 503; in Pennsylvania, 561; Maryland, 598, 591, 595; in Virginia, 605; bituminous of Pittsburg, 568.
Cobalt and Nickel, 618, 619.
Cochineal, 350, 356, 619.
Coins and Coinage, colonial, 78, 397, 477, 478, 510, 519; and bullion whence obtained, 365.
Colles, Christopher, 534, 539, 547, 576, 577.
Columbium, 505.
Connecticut, shipbuilding in, 49–54, 90; saw mills in, 103–105; corn mills, 131, 132; printing in, 175, 183, 187; paper making in, 200, 205, 207, 210; type foundry and presses, 213, 215; brickmaking, 219; glassmaking, 242; beer and cider making, 250; textile arts and materials in, 300, 313, 329, 335, 339, 340, 360, 388, 389, 413, 417, 418, 419; silk raising, 360, 361; leather making in, 437–439, 462; iron mines and manufactures, 504–521; copper mines, 507–510; non-importation agreements in, 373, 374; imports of, 49, 51, 629; exports of, 51, 104, 242, 300, 341, 346, 436, 438, 439, 509, 626, 628.
Coopers, early, 280; incorporated, 434.
Copperas works, 493, 524, 543.
Copper, use of preceded iron, 465; mines and manufactures of, in England, 21, 508, 509, 548; in Massachusetts, 471, 475, 483; in Rhode Island, 503; in Connecticut, 507–510; in New Hampshire, 522; in New York, 509, 524, 526, 532, 535; in New Jersey, 541, 546, 548; in Pennsylvania, 550, 551, 553, 555, 556, 574; in Maryland, 585, 586, 588; in Virginia, 471, 599, 603; in North Carolina, 610; in Tennessee, 613; in South Carolina, 619; in Wisconsin, 626;—*ores* enumerated, 509, 546; exported, 337, 509, 535, 547, 599;—*smelting*, 483, 508, 509, 547, 548, 585; coins, American, 397, 478, 510, 519;—*kettles* first used in America, 488; made, 548, 574.
Copyright law first, 161; in Carolina, 186.
Cordage, 27, 55, 70, 75, 82, 83, 303, 304, 336, 372, 419, 448, 496, 609.
Cotton, early introduction of in Virginia, 28, 344, recommended, 354; early imports of, 49, 360, 330; first exports of, 337, 349, 351, 354; from South America, 354; its culture in Carolina and Georgia, 354–356; ginning machines, 351, 353, 355,

620; price of, 30, 355, 386, 405, 408; consumption of in England, 397; duty on foreign, 410;—*manufacture*, antiquity of and whence derived, 306; known to aborigines, 307; first in England, 308; in America, 309; early mention of, 369; encouragement of, 381, 383; first jenny and company engaged in, 383–387; in Massachusetts, 396; domestic "unions" first advertised, 396, 398; first New England factory, 399; first water frame, 401; Slater's the first successful one, 403; shirting, checks, &c., first made, 404; Philadelphia manufacture, 404–409; assisted by Act of Assembly, 409; water mill in Carolina, 417; household products of, 412, 413.
Cottons, India, first, 331, 365, 411.
Coxe, Tench, 49, 410; promotes manufactures, 397, 400 405, 408; his plan of a manufacturing town, 410; various statements of, 82, 261, 262, 277, 364, 405, 408, 410, 412, 413, 423, 459, 460, 573, 608.
Crompton, his mule jenny, 397.
Currency, early colonial, 54, 78, 99, 109, 146, 156, 233, 264, 335, 336, 428, 477; paper prohibited, 345, 355, 365; continental, 393, 394.
Curriers, laws respecting, 433, 436, 439, 447; a corporate body in England, 434; prices paid to in Philadelphia, 444; oil, 444, 458.
Cutlers, 391, 502, 568, 575.
Cylinders, steam, first, 534, 577, 590; for calico printing invented, 397.

Danvers, 453, 483.
Dedham, 313, 497.
Deer-skins (see BUCKSKINS).
DELAWARE shipbuilding, 77, 78; mills, 110, 111, 139, 145; printing, 178; paper-making, 201, 207, 210; bricks and pottery, 227, 229; brewing, 258, 262; vines, 270; salt, 285, 286, 290; cloth and its materials, 315, 319, 346, 353, 363, 364; leather and skins, 443, 447, 461; iron works and mines, 552, 583, 585.
Delft ware, 223.
Diamonds, 612.
Dies for coins, 477, 492, 510, 580.
Distaff and spindle, not used in this country, 332.
Distilling, 30, 51, 250, 263, 264, 265, 340, 609; prohibited, 140, 256, 276.
Domestic comfort in England in 16th and 17th centuries, 18, 19; in America, 208, 209, 216, 224, 234, 235, 259, 556.
Dorchester, 39, 122, 221.
Dry dock, 41.
Duffles, frizes, &c., 344.
Duck and sail cloth, premiums for, 334, 335, 340, 419; patent for, 335; bounty on export of, 337; British only to be used, 337; manufacture recommended by Congress, 391; importations of, 411, 412, 496; household manufacture of, 413, 419; factories, 371, 373, 419, 420.
Duties, parliamentary, proposed, 337; first laid, 365, 482; on stamps, 201, 203, 337; on tea, glass, paper, &c., 202, 237, 372, 375, 379; on sugars, wines, calicoes, &c., 365, 367; on iron and its manufactures, 597, 624;—*domestic* on tonnage, 41, 54, 62, 71, 72, 78, 92; on cordage, 84; first excise, 251; on barley, hops, and malt, 246, 249, 260, 261; on liquors, 250, 251, 259, 269; on glass, 242; on salt, 285; on cotton, 410; on imports generally, 54, 60, 423, 631; on leather and its manufactures, 463; on iron and its manufacture, 499, 500, 590, 631; on exports, 60, 109, 590.
Dyeing and dressing of cloth, in England, 81, 305; in America, 330, 333, 366, 376, 392, 415, 417, 418, 420; price of, 400, 408; of leather, 458, 459.
Dyestuffs, native, 319, 348, 350, 351, 356, 382; enumerated, 87 (see INDIGO, MADDER, &c.)

Earthenware (see POTTERY).
East Indies and China, importations from, 331, 338, 341, 398; first raw cotton from, 355; early voyages to, 55, 64, 261, 262.
Easton, Massachusetts, 486, 487, 496; Pennsylvania, 558, 559.
Edge tools, 28, 476, 486, 489, 494, 570, 627.
Edwards, Col. William, 442, 453, 454.
Eliot, Rev. John, 154, 157, 160; Rev. Jared, on silk, 361; makes iron and steel from magnetic sand, 514, 515.
Elizabethtown, New Jersey, 197, 253, 442, 443, 453, 456, 540.
Emigration checked, 38, 296–298, 431.
Engineers and machinists, early, 100, 470, 476, 504, 534, 547, 568, 576, 577, 581, 594, 595.
Engravers, early, 172, 397, 492, 519; calico, 377, 396, 404.
Evans, Oliver, 76, 115, 130, 145, 147, 149, 388, 568, 576, 578, 595.
Exeter, New Hampshire, 58, 130, 420.
Export of ships, 44, 46, 47, 49, 56, 58, 63, 70, 89, 91, 341, 455; of lumber, &c., 26, 56, 68, 108, 109, 111, 113, 115, 147, 341; of flour, bread stuffs, &c., 123, 133, 134, 137, 138, 143, 145, 148, 149; of beer, 250, 258, 260, 261, 262; of bricks, 231; of hemp and flaxseed, 335, 337, 346, 378; of wool, woolens, and hats, 327, 340, 342, 343, 371; of indigo, 348, 349; of cotton, 349, 351, 354; of raw silk, 337, 357, 358, 359; of leather, shoes, &c., 434, 435, 449, 450, 452, 458, 460, 462; of deer skins, 447, 449; of iron and its manufactures, 491, 527, 535, 549, 550, 569, 571, 584, 589, 599, 625, 628; total, 344; duties on, 60, 109, 590; of machinery from England prohibited, 378, 396, 409, 630; from Pennsylvania, 579.

Fairs established, 258, 315.
Federal procession in Pennsylvania, 74, 262, 422, 462, 574.
File cutting, 551.
Fire arms, manufacture of, in Massachusetts, 414, 486, 492, 494, 498; in Rhode Island, 504; in Connecticut, 516; in New York, 537, in Pennsylvania, 568, 572, 573; in Maryland, 591–594; in Virginia, 607; in Carolina, 616; prices of, 572, 573, 592, 593; description of, 573, 592; premiums for, 516, 592;—*engines* first in America, 478, 500, 501, 576; not to be imported, 372; rivets for hose invented, 492.
Fisheries early commenced, 37, 41, 38, 43, 44, 45, 47, 51, 69; first deep sea, 278, 279.
Fish hooks, 27, 374, 498.
Fitch, John, builds first steamboat in America, 76, 77, 84, 595; first working steam engine, 577; bred a watchmaker, 521.
Flax and hemp culture in Virginia, 26, 33, 34, 35, 319, 321, 326, 336, 337, 383; in New England, 300, 314, 331, 345, 346, 378, 382; in New York, 367, 368; in New Jersey, 314, 362, 390; in Pennsylvania, 335, 336, 406; in Delaware, 346; premiums and bounties for, 335, 362, 367, 368, 406; seed exported, 335, 337, 346, 378; price of, 415; dressing and spinning machinery, 335, 346, 369, 376, 383.
Flour and grain, exports of, 40, 133, 137, 138, 143, 145, 148, 149.
Fly shuttle first used, 333, 401, 410, 413.
Forges, iron smelting, early British, 467, 480; first in New England, 472; bloomary, first, 479, 480, 489; first in Rhode Island, 501; destroyed by Indians, 29, 469, 483, 502, 552;—*plating* prohibited, 491, 558, 625;—*refining*, 489, 493, 512, 531, 533; number of at different dates in Massachusetts, 483, 489, 492; in Connecticut, 513; in Vermont, 524; in New Jersey, 541; in Pennsylvania, 556.
France in 17th century, 15; opposition to cotton machinery in, 376.
Franklin, Benjamin, suggests improvements in shipbuilding, 73; arrives in Philadelphia, 172 his services, 184; anecdotes of, 185, 186; publishes first literary journal, 186; a bookseller

192; promotes paper manufacture, 201; erects a type foundry, 213; recommends a silk filature, 363; encourages spinning, 378; his electrical discoveries ridiculed, 500; organizes a fire company, 576.
Frederick County, Maryland, 243, 415, 584, 588, 589, 592, 593, 594, 608.
Fredericksburg, Virginia, 596, 597.
Frigates, national, built, 42, 43, 52, 57, 63, 72, 74, 80, 83; *America*, description of, 57.
Fuller's earth, 306, 328, 329.
Fulling mills, first in America, 303; early one in England, 305; in Massachusetts, 303, 312, 313, 420; in Connecticut, 313; in New Hampshire, 414; in New York, 366; in New Jersey, 315, 414; in Pennsylvania, 317, 377, 392, 414, 415; in Virginia, 321, 383; in Carolina, 417; premium for, 381; and dressing of cloth, price of, 420.
Fulling stocks for hides invented, 442.
Fulton, Robert, 67, 75.
Furnaces, iron, in England, 21, 467, 479, 512; first in New England, 472, 473, 489; description of federal, 490; in Canada, 526; number of charcoal at different dates in Massachusetts, 483, 489, 492; in Vermont, 524; in Pennsylvania, 556; in Maryland, 589; in Virginia, 596; in Kentucky, 602; first regular, 596; cost of erecting, 597; first anthracite, 562, 563; steel prohibited, 491, 625 (see STEEL); copper smelting, 508, 509, 548.
Fustians, dimities, &c., 308, 309.

Gas from coal first used in England, 20; in America, 595.
Gee, Joshua, 89, 328, 359.
GEORGIA, shipbuilding in, 84, 85, 91; mills in, 114, 148; printing in, 178; beer, 264; wine culture, 275; indigo manufacture, 349; cotton culture in, 351–353, 355, 356; silk culture, 356–359, 364; non-intercourse policy of, 374; imports of, 374; encourages manufactures, 383; tanning in, 449, 450; iron mines and works, 622; branch mint in, 611, 623; exports of, 349, 357, 358, 359, 449, 457.
Germantown, Pa., 141, 181, 187, 188, 190, 212, 316, 555.
Gig mills, 333.
Glass in France, 15, 234; in Italy, 17, 232; in England, 19, 23, 26, 81, 232, 234; made in Virginia, 25, 26, 30, 232, 233, 242; in Massachusetts, 233, 239, 241; scarcity of, 234, 239; made in New York, 235, 240, 241; in Carolina, none, 236; in New Jersey, 236, 239; in Pennsylvania, 235–237, 239, 243, 371, 406, 574; in Connecticut, 242; in Maryland, 242; duty on, 237, 243; Lord Sheffield's remarks on, 239; cost of, 242.
Glover, Rev. J., 153.
Gloves, disused at funerals, 366, 380; premiums for, 368; manufactures of, 405, 414, 434, 445, 458.
Godfrey, Thomas, 73, 576, 580; Thomas Jr., 193.
Gold, antiquity of, 465; early search for, 468, 470, 524, 525, 550, 556, 564; found in Virginia, 471, 599; in Carolina, 610, 611, 618; in Georgia, 622, 623.
Gold and silversmiths, early, 519, 538, 551, 568, 573, 574, 575; petition for an assay office, 575.
Grain crop, first in New England, 123; first blight in, and theory of its cause, 126; distillation of prohibited, 140, 256.
Granite, first used, 221.
Green, Samuel, prints first Bible, 157, 160, 190; his descendants in same business, 162, 164, 175, 176, 178, 183.
Griffin, the, 65.
Grindstones, 383.
Gun barrels and locks, 498, 516, 591, 592, 593; prices of, 573, 592, 593; stocks, 537, 538.
Guns (see CANNON and FIRE ARMS).
Gunpowder, 109, 382, 383, 494, 592, 616.

Halifax, Nova Scotia, first newspaper at, 187.
Hamilton, Alexander, 194, 208, 241, 423.
Hamilton laid out for a manufacturing town, 240.
Hargreave's spinning Jenny patented, 376; opposed, 376, 384; superceded 397.
Hartford, shipbuilding at, 49, 50; mills near, 103; printing at, 175, 187, 205; paper mills, 205; glass factory, 242; imports cotton, 300; cotton machinery made at, 410; woolen factory at, 418; duck factory at, 419; order made at, respecting leather, 438; guns and clocks made at, 516, 520.
Hats, premiums for, 321, 342, 346; manufacture complained of, 340; manufacture of, 340, 342, 343, 371, 405, 415, 421, 455, 461, 609; exportation of, 340, 342, 343, 371; prohibited, 342.
Haverhill, Mass., 43, 156, 420, 453.
Heels, wooden, use of, in early times, 331, 444, 447.
Hemp, first raised in New England, 303; bounties of parliament for, 328, 336, 337, 368, 371; first exported, 337; a substitute for flax, 390; wild, used in manufactures, 26, 302, 303, 315.
Hemp mills, 383, 410, 415.
Hides and Skins, not to be exported, 428, 429, 433, 436, 438, 442; enumerated, 450; laws and ordinances respecting, 432, 436, 438, 456; prices of, 428, 438, 442, 444, 449, 455, 456; imported, 455; first from South America, 455; exports of, 449, 450, 455, 461.
Hide, fulling-stocks invented, 442.
Hollow ware and Castings, 372; first in Massachusetts, 476, 482, 484, 485, 488, 489, 490, 492, 493; in Rhode Island, 504; in Connecticut, 511, 516; in New York, 531, 532, 533, 544; in New Jersey, 549, 550; in Pennsylvania, 568, 571; in Delaware, 583; in Maryland, 587, 588, 589, 594; in Virginia, 598; prices of, 525, 571, 598; scarcity of, 471, 488; first in sand, 484.
Homespun, becomes fashionable, 368, 371; quantity and quality of, 314, 329, 330, 331, 343, 372, 375, 386, 399, 411–416.
Hops, cultivation of, 246, 263, 416; duty on, 260.
Horn smiths, 382.
Horse mills, 116, 119, 121, 122, 135, 136, 138.
Hosiery made by the Dutch, 314, and Germans, 316, 317, 405; worsted, 314, 333, 418; knit woolen, 317, 367, 394, 412, 413, 414, 418, 457; woven, 368, 415, 418; silk, 360, 361; manufacture of, to be encouraged, 382, 383; premiums for, 368, 369, 382, 418; scarcity of, 457.
Household manufactures, character and extent of, 265, 314, 329, 330, 331, 346, 375, 386, 390, 396, 411–416, 608, 617, 621; of nails, 413, 491, 499; estimated value of in 1790, 416, 423.
Huguenots, expulsion of, 15, 16, 305; sent to America, 271, 322, 356; cultivate the vine, 272, 277, 316; and silk, 322, 346, 359; naturalized, 271, 273.
Humphreys, Joshua, naval architect, 74.
Huntingdon, Penn., 564, 565.

ILLINOIS, first printing in, 179; wine in, 277; salt in, 294.
Importations, effects of large, 422, 452; of British goods, 89, 184, 281, 331, 344, 369, 374, 389, 394, 406, 411, 414, 455, 460, 462; of iron, 629; from Russia, 411, 412, 496; of wine and liquors, 261, 269, 274; decrease of, 202, 369, 374, 414.
INDIANA, first printing in, 179.
Indians, lay waste early improvements, 29, 42, 98, 101, 272, 469, 481, 483, 502, 552; large canoes of, 38; brickmaking by, 216; brewing, 247; first learn the use of ardent spirits, 248; use of salt among, 279; teach the use of wild hemp, 302; use of cotton among, 307; use of iron unknown among, 29, 465; tools and weapons of, 466.
Indigo, indigenous to America, 308; cultivation of, attempted in New York, 314, 348; in Carolina, 322, 326, 348; in Louisiana, 348; boun-

ties and premiums for improved manufacture of, 549; an enumerated article, 325; exports of, 348, 349; displaced by cotton, 350, 356; yellow, made, 350.
Instruments, mathematical and philosophical, 73, 100, 492, 501, 521, 538, 576, 580.
Inventions, early European, 13, 14, 93, 211, 212, 506, 521; early American, nautical, 52, 53, 62, 73, 74, 75, 76, 107, 492, 538, 559, 577, 578, 579, 580; in mill and hydraulic machinery, 96, 100, 113, 115, 139, 142, 145, 147, 149, 150, 151, 492, 501, 521, 576, 579, 580, 595; in paper, types, and presses, 206, 207, 210, 212, 213, 214, 215, 492; in brickmaking, 231; in saltmaking, 295; in textile machinery and processes, 346, 351, 352, 353, 355, 388, 389, 398, 403, 497, 498, 518, 579; in leather making, 442, 454, 458, 464; in the metallic branches, 388, 476, 477, 488, 492, 497, 498, 501, 504, 510, 514, 515, 517, 518, 519, 539, 560, 562, 571, 577, 578, 580, 581, 594; in steam apparatus, 571, 577, 580, 581, 594; miscellaneous, 230, 418, 492, 500, 501, 515, 520, 521, 556, 562, 576, 578, 579, 580, 581, 595.
Iowa, first printing in, 180.
Ipswich, 40, 123, 126, 158, 362, 414, 475.
Iron, unknown to the Indians, 29, 465; antiquity of, 29, 465, 466; in England, 21, 29, 467, 468, 479, 623, 629; first mention of, in America, 27, 28, 33, 468, 609, 610; mines and works in Massachusetts, 470-501; in Rhode Island, 501-504; in Connecticut, 504-521; in New Hampshire, 521-523; in Vermont, 523-524; in New York, 524-539; in New Jersey, 539-550; in Pennsylvania, 550-582; in Delaware, 583; in Maryland, 584-595; in Virginia, 27, 28, 595-609; in Kentucky, 602-604; in North Carolina, 609-617; in Tennessee, 613-615; in South Carolina, 617-622; in Georgia, 622; general observations on, 623-631; official reports concerning, 482, 483, 489, 522, 529, 530, 558, 589, 623; jealousy of colonial, 485, 623, 626; acts of parliament respecting, 330, 396, 585, 623, 624, 626, 627, 628, 630; *Bar*, prices of, at different times, 473, 526, 535, 559, 564, 571, 584, 590, 597; Pig, prices of, 512, 535, 554, 563, 571, 590, 597; exports of bar and pig, 491, 527, 535, 549, 550, 569, 571, 584, 589, 599, 625; tables of, 626, 628; imports of bar and pig, 491; tables of, 629; duties on, parliamentary, 597, 624; domestic, 499, 500, 584, 590, 631.

Japanned leather, first, 443.
Jeans, first, 396, 398, 399, 403; cost and price of, 400, 403, 407, 408.
Jefferson, opinions of, respecting manufactures, 413; notes on Virginia, 413, 609, 610; letters of, 76, 151, 413, 607; household manufactures of, 413, 582, 608.
Jenks, Joseph, patents a saw mill, 96, 476; makes first brass and iron castings, scythes, and edge tools, in New England, 476; first dies for mint, 477; first fire engine, 478; proposes wire drawing, 478; Mr., 494, 523; Joseph, Jr., erects first house and forge in Rhode Island, 502, Stephen, 504.
Jennies, spinning, first in America, 383, 387, 398, 401, 579; cost of, 400, 402, 407, 408.
Juniata iron, 566.

Kaolin, 524.
Kansas, first printing in, 180.
Keith, Sir W., opposes immigration, 316; his scheme of government for colonies, 337; his iron works, 552.
Kentucky, first printing in, 179; salt in, 294; tanning in, 462; iron works and mines in, 602.
Kingston, 484, 488, 489, 496.

Labor, freedom of, 21; price of, 2., £2, 30, 106, 109, 220, 339, 346, 444, 474, 527, 597; servile effects of, 428.
Lace, fringe, &c., importation of, 344, 372; made, 362, 414, 419.
Lancaster, Penn., mills in, 111, 112, 143, 415, printing in, 190, 406; paper mills, 199; breweries, 262; glass house, 237; fulling mills, 377, manufacturers, 415, 421; leather and saddlery, 445, 457, 461; iron and copper mines and works, 552-557; guns, 572, 573.
Laws, sumptuary, 318, 435.
Lead, in Massachusetts, 493; in Connecticut, 513-518; in New York, 524, 527, 532, 533; in Pennsylvania, 550, 564, 565; in Maryland, 588, 592; in Virginia, 29, 471, 603, 604; in North Carolina, 610; in Tennessee, 614; in South Carolina, 610, 620; in Missouri, 604; scarcity of, 533.
Leather and its manufactures, 424-464; extent and importance of, 424; antiquity of, 425; among the Indians, 425, 426; the Japanese 426; laws and ordinances respecting, 433, 436 437, 438, 439, 445, 458, 463; in Virginia, 3 427, 428, 462; in Massachusetts, 431, 432, 43 435, 451, 453, 459; in Connecticut, 435, 436, 43 438, 451; in Rhode Island, 439; in New York 439-442, 455, 461, 462; in New Jersey, 442 443; in Pennsylvania and Delaware, 443-448 457, 461, 462; in Maryland, 448, 462; in South Carolina, 448, 449, 450, 461; in North Carolina 449; in Georgia, 449; exports of, 434, 435, 449, 450, 452, 458, 460, 462; prohibited, 428, 429, 435, 438, 442, 445; prices of, 439, 444, 446, 449; improvements in, 442, 453, 463, 464; fancy and morocco, 443, 458, 459, 463; apparel of, in early times, 317, 367, 381, 2.., 429, 432, 444, 446, 451; duties on, 463. (See Shoes and Tanning.)
Lee, 128, 205.
Lenox, iron ore and works, 495, 496.
Leonards, the, 47., 479-482, 491, 496, 540.
Leslie, R., inventions of, 580, 581.
Lightning rod first, 500.
Lime, first manufacture of, 218, 219, 470.
Linen, manufacture of, in England, 81, 337, 344; in New England, first household, 298, 299, 303, 314, 330; improvement in, 331, 332; factories, first, 333, 334, 335, 373, 376; made in New York, 314, 367, 369, 371; in New Jersey, 314; in Pennsylvania, 315, 316, 317, 330, 371, 385, 405, 407, 408, 412, 415, 592; in Delaware and Maryland, 319, 336; in Virginia, 314, 320, 343, 412; general use of, in early times, 330, 391; premiums for, 316, 334, 335, 336, 344, 346, 367, 368, 381, 382, 620; importation of, 3 7, 338, 339, 344, 389, 411—(see Duck and Sail Cloth) —*foot wheel* introduced, 331, 332.
Linsey-woolsey, 330, 371.
Liquors, first excise on, 251; consumption of, 261, 264, 265, 269, 270, 274, 276.
Livingston, lead and iron mines and works, 511, 526, 527, 530, 533;—*Chancellor*, 67, 417, 539; Robt. R., 210.
Louisiana, first printing in, 179; vine culture in, 277; indigo in, 348, 356; cotton in, 351, 352; first sugar mill and cotton gin in, 351; silk in, 356.
Lumber, meaning of the term, 104; cost of sawing, 97, 106, 108, 111; exports of, from New England, 36, 44, 56, 58, 95, 96, 99, 101, 341; from New York, 107, 108; from New Jersey prohibited, 68, 109; from Pennsylvania, 111; from Maryland and Virginia, 113, 147; total from United States, 115.
Lynn, mills at, 123; sheep and cattle at, 304, 431; first New England tannery at, 431; first shoemaker at, 432; shoe business of, 367, 414, 435, 451, 452, 453, 460, 463; first improved shoe manufacture at, 451, 452; first New England iron works at, 471-477.

Machinery, invention and manufacture of papermaking and printing, 210, 214; brickmaking, 231; textile, efforts to obtain, 335, 336, 377, 390, 579; premiums for, 346, 369, 376, 579; opposi

tion to, in Europe, 376, 384; manufacture of, 343, 383, 398, 410, 578, 579; cardmaking, 388, 420, 497, 518, 571; nailmaking, 488, 492, 498, 503, 519, 571, 594; iron and steel making, 490, 512, 553, 580, 596, 620; screw cutting, 504; gunmaking, 517, 553; wood and metal works, 517; lapidary and marble cutting, 519, 579; minting, 519; dredging, 521, 578, 595; horological, 501, 520, 521, 576, hydraulic and mill (see INVENTIONS); museum of, proposed, 581; exportation of, prohibited, 378, 396, 630; from America, 409, 579.
Madder and woad, 319, 350, 382, 416.
Magazines, first in England and America, 186.
Maine, shipbuilding in, 44–46; saw mills in, 96, 97–100; corn mills, 128, 129; bricks in, 221; printing in, 179; tanning in, 435, 462.
Malt (see BARLEY and MALT).
Mansfield, 360, 361, 362.
Manufacturers, proportion of, to population, 412, 415, 568.
Manufactures, first colonial, 25; acts for encouraging, 49, 114, 199, 235, 333, 334, 345, 357, 361, 408, 409, 417, 423, 505; causes of neglect of, 303, 323, 327, 328, 329, 411, 450; promoted by restraints on trade, 34, 204, 237, 324, 337, 428, 450, 451, 454, 482, 594; complaints of, 88, 90, 199, 326, 329, 338, 340, 623; alarming progress of, 88, 328, 329, 330, 369; right to confine asserted, 330, 370; domestic encouragement of, becomes general, 381–383; objections urged against, 405; advantages of, 406; character and extent of domestic household, 411–416; total estimated amount of, 416, 423;—*British* importations of, 89, 331, 344, 374, 389, 394, 406, 411, 414, 462, 544, 629; drawbacks allowed on, 327, 328; cost of, 328, 330.
Manufacturing town, proposed plan of, 410, 411; laid out, 240, 421.
MARYLAND, shipbuilding in, 78–82, 91; saw and corn mills in, 112, 146, 147, 594, 595; printing in, 175, 176, 187; papermaking in, 207; brickmaking in, 229; glassmaking in, 242, 243; beermaking in, 262, 263; textile arts and materials in, 336, 339, 346, 353, 381, 398, 415; leathermaking in, 448, 461, 462; iron mines and works in, 584–595; coal of, 590, 591, 595; early state of arts and trade in, 146, 319, 594; non-importation agreements in, 374; imports of, 262, 322, 374, 629; exports of, 83, 113, 146, 147, 322, 337, 448, 584, 589, 599, 626, 628.
MASSACHUSETTS, shipbuilding, in, 36–49, 58, 90, 91; saw mills in, 94–97, 101, 102; corn mills in, 117, 118, 122–128; printing in, 152–167, 183, 184, 186, 187; bookbinding and bookselling in, 190–192, 197; papermaking in, 197, 198, 199, 200, 204, 205, 207, 209, 340; type founding, &c., in, 212, 215; provincial stamp act in, 203, 206; brickmaking in, 219–222, 231; glassmaking in, 233, 239, 241; beermaking, 245–250; saltmaking in, 279, 280–284, 287, 288–290; textile arts in, 298–300, 302–314, 332–335, 339–342, 345, 346, 366, 367, 372, 373, 375, 381, 398, 399, 401, 414, 419, 420; leather and shoemaking in, 431–435, 451, 453, 459, 462; iron mines and works in, 470–501; household industry of, 298, 372, 414, 420, 499; non-importation agreements in, 202, 237, 367, 372, 373, 374, 375; imports of, 269, 374, 414, 629; exports of, 36, 76, 123, 231, 250, 342, 434, 435, 452, 495, 497, 626, 628.
Mast and raft ships, 58, 72; timber, 99, 104, 105.
Medford, 38, 43, 220, 221, 454.
MICHIGAN, first printing in, 179.
MILLS, sawing, 93–115; in Massachusetts, 94–97, 101, 102; in Maine and New Hampshire, 95–101; in Vermont, 102; in Rhode Island, 102, 103; in Connecticut, 103–105; in New York, 105–103; in New Jersey, 108, 109; in Pennsylvania and Delaware, 109–112; in Maryland and Virginia, 112–114; in Carolina and Georgia, 114, 115; in Canada first, 101; in Ohio first, 104; in United States, 112;—*wind*, 116–122;—*water*, *grist* and *flour*, 122–151; in Massachusetts, 122–128; in Maine, 128, 129; in New Hampshire, 129, 130; in Rhode Island, 130, 131; in Connecticut, 131, 132; in New York, 133–137; in New Jersey, 137–139; in Pennsylvania, 139–144; in Delaware, 144, 145; in Maryland, 146, 147, 594, 595; in Virginia, 147, 148; in Carolina and Georgia, 148, 149.
Millwrights, early, 27, 76, 100, 101, 103, 106, 136, 142.
Millstones, 149.
Milton, 197, 198, 200, 491.
Minnesota, first printing in, 180.
Mines and minerals, search for, 28, 468, 470, 505, 524, 525; grants of, 471, 493, 505, 524, 525, 526, 540, 610. (See COPPER, GOLD, IRON, LEAD, SILVER, &c.)
Mining companies, 494, 508, 511, 525, 527, 532, 548, 556, 557, 562, 574.
Mints, colonial, 78, 477, 478; United States, 478; branches in Carolina and Georgia, 611, 623.
MISSISSIPPI, printing in, 179.
MISSOURI, printing in, 179; mineral resources of, 615.
Monopolies injurious, 18; abolished in England, 306, 468; prohibited in Massachusetts, 96, 434; in New York, 223, 224.
Mourning apparel, disuse of, 345, 366, 367, 368, 370, 372, 380.
Muskets, first made in Massachusetts, 487, 516, 590; prices of, 573, 591, 592. (See FIRE ARMS.)
Mustard mills, 144, 578, 579.

NAILS, spikes, &c., manufacture of, in Massachusetts, 382, 414, 484, 491, 492, 494, 498, 499, 500; in Rhode Island, 503; in Connecticut, 513, 518, 519; in New Hampshire, 523; Vermont, 524; in New York, 538; in New Jersey, 550; in Pennsylvania and Delaware, 499, 551, 560, 564, 566, 567, 568, 570, 573, 575; in Maryland, 587, 594; in Carolina and Georgia, 617, 619; in United States, 630; in Canada, 536; foreign not to be used, 372; family manufactures of, 413, 491, 499; first cut, 388, 488–492, 498, 519; and nail rods, prices of, 525, 537, 538, 571; importations of, 523, 629; duty on debated and laid, 499, 500.
Nantes, edict of issued, 15; revocation of and its consequences, 16, 305, 322.
Nantucket, 43, 420.
Naval stores, production of, to be encouraged as a means of diverting from manufactures, 328, 338, 341; bounties on (see BOUNTIES and PREMIUMS).
Navigation laws, 81, 82, 87, 88, 285, 303, 325; American petitioned for, 81, 86.
Navy yards, 52, 83.
Needles, 504, 616.
Newark, N. J., 138, 258, 442, 443, 540.
Newbury, 42, 125, 126, 182, 187, 192, 215, 435, 492.
New England shipping, 90, 91; newspapers in, in 1788, 189; fisheries, commencement of, 278; United Colonies of, 174, 297; early pursuits of, 278, 298; first cloth manufacture in, 298, 339, 340, 341; household manufactures of, 413, 414; imports of, 374, 629; exports of, 457, 626, 628.
NEW HAMPSHIRE, shipbuilding in, 55–58, 90; saw mills in, 95, 96, 97–101; corn mills in, 95, 118, 129, 130; printing in, 178, 187, 215; papermaking in, 204; saltmaking and fishing in, 279; textile arts in, 331, 332, 339, 340, 414, 420; first neats cattle in, 431; tanneries in, 462; iron mines and works in, 521–523; imports of, 523; exports of, 56, 57, 58, 99, 101, 522.
New Haven, 37, 49, 50, 131, 174, 175, 187, 213; silk raising at, 360, 361; cotton factory at, 419; order respecting leather at, 436, 437; metallic manufactures, &c., 506, 510, 518, 519.
NEW JERSEY, shipbuilding in, 68, 69, 91; saw

mills in, 108, 109; corn mills, 137–139; printing in, 172, 174, 177; papermaking in, 197, 201, 209, 210; brickmaking in, 226; glassmaking in, 236, 239; beer and cider making, 257, 258; saltmaking in, 290, 291; scarcity of salt in, 291; textile arts and materials in, 314, 315, 411, 414; leather and shoes in, 442, 443, 453, 462; iron and copper mines and works in, 539–550; exports of, 109, 138, 545, 546, 547, 548, 550; prohibited, 109.
New London, Conn., 50, 51, 52, 103, 119, 131, 132, 175, 187, 313, 335, 421, 474, 505, 507.
Newport, R. I., 54, 55, 118, 130, 177, 221, 277, 334, 361, 373, 420.
Newspapers, origin of, 165; first in England, 165, 166; first in the Colonies, 163, 164; in Massachusetts, 163, 164; at Philadelphia, 171; at New York, 172, 174; in Carribee islands, 173; put in mourning for stamp act, 174; first Western, 179; in California, 180; first daily, 187; number of, in 1775, 187; in 1788, 189; small profits of early ones, 188; first at Halifax and Quebec, 187.
New York city, first grants and city magistracy in, 60; early shipbuilding, shipping, and trade of, 37, 59, 61, 63, 134; first china trade of, 63; early merchants of, 61, 62; mills in, 105, 117, 119, 133; bolting monopoly of, 60, 61, 133; first press in, 170; first newspaper and number of, in 1849, 172; first daily, 187; booksellers and binders, 190, 192; type foundry, 214; early houses and furniture in, 61, 209, 222, 224; first tavern, 222, 251; first brewers and distillers, 250, 252; first Sunday liquor law, 250, 251; anti-tariff spirit in, 251, 252; first native mayor of, 253; first poor-house in, 334; society of arts in, 367–371, 455, 532; linen factory, 371; cotton factory, 403; tanners and shoemakers in, 440–442; the "swamp," 254, 441; early smiths in, 525; air furnace, 534; first waterworks in, 534; first carriage factory, 538; metallic manufactures, 538, 539; non-importation resolutions in, 367–374, 375; imports of, 60, 61, 134, 222, 374, 452, 455, 626, 628; exports of, 60, 61, 63, 108, 134, 354, 378, 452, 535, 629.
New York, shipbuilding in, 37, 59–68, 91; saw mills in, 105–108; wind mills in, 117, 119, 120, 121, 122; water corn mills in, 133–137; printing in, 162, 169, 170, 171, 174, 175, 187; bookselling and binding in, 190, 192; papermaking, 200, 206, 209, 210; stamp act in, 203; scarcity of paper in, 206; paperhangings in, 209, 210, types and presses in, 212, 214, 215; brickmaking in, 222–226; glassmaking in, 235, 240, 241; beermaking in, 250–254, 257; saltmaking in, 223, 281, 284, 285, 293, 294; textile arts and materials in, 314, 328–330, 339, 340, 341, 362, 366–371, 377, 398, 403, 417; leathermaking in, 439–442, 455, 456, 461, 462; iron and copper mines and manufactures, 524–539, 626; non-importation associations in, 367, 374; imports of, 60, 61, 222, 224, 285, 374, 455, 629; exports of, 60, 61, 63, 107, 108, 133, 134, 137, 250, 354, 378, 455, 527, 535, 626.
Non-importation resolutions, effects of, 202, 366–370, 374; adopted by Congress, 379; articles excluded by, 366, 372, 374.
North Carolina, shipbuilding in, 83–86, 91; mills in, 114, 149; printing in, 178, 187; papermaking, 207; brickmaking, 230, 231; glassmaking in, 236; textile arts and materials in, 322, 328, 343, 351, 354, 382, 413, 616, 617; leathermaking in, 448–450; iron mines and works, &c., in, 609, 617, 626; imports of, 264, 374, 449, 450, 629; exports of, 354, 448, 449, 626.
Norwich, Conn., 103, 187, 200, 270, 418, 439, 518, 521.
Nova Scotia, newspaper in, 187; Scotch Irish settle in, 332, 333; first neats cattle in, 427; iron mines and works, 427.
Ohio, first printing in, 179; first saw mill in, 104; tanneries in 1810, 462; mineral resources of, 603.
Oils, expressed, premiums for, 30, 416.
Oil factories, sperm, 55.
Oil mills, 109, 121, 143, 382, 414, 415.
Onondago salt springs discovered, 284, 293.
Oregon, first printing in, 180.
Organ building, 580, 581.
Orreries, 501, 521, 576.
Orr, Hugh, 346, 398, 486, 487;—*Robert*, 487.
Oswego, mills at, 137.

Paint, limited use of, 208, 209.
Painters' colors, duty on, 202, 237, 372; premiums for, 407.
Palatines, German, settle in America, 142, 275, 316, 357, 375, 590.
Paper, manufacture of, in England, 81, 195; in Mexico and Peru, 195; first colonial, 196; in Pennsylvania, 195–197, 199, 201, 206, 207, 208, 209, 210; in Massachusetts, 197–199, 200, 204, 205, 207, 209, 340; in Rhode Island, 200, 204; in Connecticut, 200, 205, 207, 210; in New Hampshire, 204; in Vermont, 205; in New York, 200, 206, 209, 210; in New Jersey, 197, 201, 209, 210; in Delaware, 201, 207, 210; in Maryland, 207; in Carolina, 207, 208; in California, 205; duties on, 201, 202, 203, 206, 208; repealed by England and France, 202, 209; and rags, scarcity of, 198, 199, 205, 206; bleaching and blueing of, 204, 205, 206, 210.
Paper hangings, use and manufacture of, 208–211.
Parchment, 201.
Parliament, British, first act of relating to America, 278; admits colonial produce free, 303, 357; enacts the navigation laws, 87, 285, 324, 325, 326, 450; erects a Board of Trade and Plantations, 326; prohibits the exportation of wool and woolens from the colonies, 327; passes, the trespass acts, 57, 99, 100, 105; allows bounties on naval stores and raw materials, 328, &c., (see Bounties); encourages importation of raw iron, but declares against manufactures, 330, 624–628; calls for reports of manufactures, 338, 370, 625; prohibits exportation and limits the manufacture of hats, 342; prohibits slitting mills and steel furnaces, 491, 558, 625; prohibits paper money, 345, 365; its liberal appropriations, 99, 327, 356, 358, 362; lays first duty for revenue in America, 365; on stamps, 185, 201, 366; on glass, paper, &c., 185, 202, 372; prohibits exportation of tools, utensils, and artificers, 378, 396, 630.
Patent laws, origin of, 96; early American, 96, 114, 186.
Patterson, N. J., founded, 411.
Pawtucket, R. I., 97, 103, 400, 401, 403, 502, 503.
Peck, John, 47.
Penn, William, 69, 110, 141, 168, 169, 196, 228, 235, 236, 259, 272, 273, 315, 316, 443, 444, 551, 552, 562;—*John*, 243, 363, 371, 557;—*Thomas*, 556.
Pennsylvania, shipbuilding in, 69–77, 91; saw mills in, 109–112; corn mills, 139–144; printing in, 167–169, 170–174, 181, 182, 184, 186, 187, 188, 189, 190, 193; bookselling and binding in, 190, 192; papermaking in, 195–197, 199, 201, 206, 207, 208, 209, 210; type founding, 182, 212–214, 406; brickmaking in, 228; glassmaking in, 235–237, 239, 243, 371, 406, 574; beermaking, 258–262; vine culture, 272–275, 277; saltmaking, 292–295; the textile arts and materials in, 315–317, 335, 336, 339, 340, 346, 353, 362–364, 371, 377, 378, 383–388, 391, 392, 394, 398, 400, 404–410, 412, 414, 415; hatmaking, 421; leathermaking, 443–448, 457, 461, 462; iron mines and works, 550–582; coal discovered in, 561, 562, 564, 568; miscellaneous, manufacture of metal, 569–582 (see Copper, Lead, &c.) imports and exports (see Philadelphia).

Pepperell Sir W., 45, 57, 98, 99.
Perkins, Jacob, inventions of, 492.
Petersburg, Va., 148, 599.
Pewterers and pewter ware, 372, 551, 575.
PHILADELPHIA, shipbuilding and shipping of, 69–77; tradesmen and manufacturers of, 70, 75, 333, 412, 445, 551, 569–582; first school and press in, 167, 168, 188, 201; first newspaper, 171, 187; booksellers and binders, 190, 192; paper mills, 201; type founders, 212, 214; early dwellings and plan of, 227, 228, 229, 236; glass-houses, 235, 236; breweries, 259, 262; vineyards, 273, 277; fairs, 315, 316; cotton gins and textile machinery made, 333, 353, 388, 410, 415, 579; silk filature, 363, 377; fulling mills, 377; first jenny, 383, 387, 579; textile manufactories, 385, 387, 392, 397, 398, 400, 404, 407–410; Continental Congress meets at, 379; United Company for promoting manufactures in, 385, 387, 404, 579; Pennsylvania Society of Arts in, 404–410, 459; Philosophical Society in, 186, 193; price of cotton in, 386, 408; first bank, 394; first chemical works, 407; proportion of manufacturers in, 412; hatters in, 421; wages at, 444; leathermaking, 445, 447, 458, 461; metallic manufactures in, 551, 555, 558, 560, 569–582; first fire engine and company in, 576; first steam engines, 576, 577; museum of models at, proposed, 581; imports of, 260, 261, 274, 374, 378, 406, 452, 629; exports of, 70, 73, 111, 143, 144, 260, 262, 315, 336, 340, 341, 354, 378, 444, 445, 446, 462, 569, 579.
Pianofortes, 580.
Pig Iron. (See IRON.)
Pins, first in England, 20, 478, 584; making of, in America, 478, 504, 518, 616.
Pittsburg, first press in, 179; early manufactures of, 243, 262, 415, 462, 567, 568.
Pittsfield, Mass., 102, 128, 205, 420, 421, 462, 495, 496.
Plymouth, Mass., 37, 39, 97, 123, 124, 283, 301, 302, 429, 483, 488, 492.
Pole boats, 76, 579.
Porter and ale, 250, 260, 261, 265. (see BEER).
Portland, Me., 46, 99, 129, 179, 435.
Portsmouth, N. H., 56, 58, 95, 118, 129, 178, 187, 279, 280, 431, 522.
Pot, pearl, and soap ashes, 25, 26, 30, 33, 99, 114, 125, 407, 414, 532, 619.
Pottery, 18, 27, 32, 220, 223, 226, 229, 230, 231, 236, 238, 406.
Premiums. (See BOUNTIES and PREMIUMS.)
Prices in 1621, 30, (see BEER, BRICKS, COTTON, IRON, LABOR, LEATHER, SALT, SHOES, &c.)
Printing, 152–194; first in the colonies, 153–154; second press sent, 156; Indian Bible, 157–159; first censorship, 160; first copyright act, 161; first printing in Boston, 162; prohibited in New York and Virginia, 162, 176; first newspaper sheet, 163; first successful, 164; necessity of the newspaper, 165; condition of the press in England, 166; first press in Philadelphia, 167, 168; in New York, 169; first newspapers, in those cities, 171; Benj. Franklin, 172, 184; first press in Connecticut, 175; in Maryland, Virginia, and South Carolina, 176, 187; in Rhode Island and New Jersey, 177, 187; in North Carolina, Delaware, Georgia, and Vermont, 178, 187; in Maine and Western States, 179, 180; Sower's German Bible, 181; first English Bible, 183; the stamp act, 185; J. Thomas, 186; first magazine, 186; first daily papers, 187; M. Carey and trade sales, 189; booksellers and binders, 190–193; literary character of the colonies, 193, 194.
Privateers, 47, 50, 61, 63, 69, 85, 86, 91.
PROVIDENCE, population and shipping of, 54, 55; mills in, 103, 130; printing in, 177, 187; manufacturers of, 200, 218, 221, 222, 333, 353, 389, 399, 401–404, 504; first cotton factory at, 401–404 410, 414; metallic manufactures, 501–504.
Pumps, 492, 501, 521, 576, 578.

Quadrant, the, 14; Godfrey's, 73, 538, 576.
Quartz mills, 605.
Quebec, 107, 187, 536.
Quercitron, first export of, 461.
Quern or hand mill, 19, 116; in America, 138, 146, 121.

Railroad proposed, 539; first in United States, 563; Baltimore and Ohio, 590.
Raynham, 476, 480, 482.
Revolution, first act of, 277; its influence upon industry, 380, 389, 394–396.
RHODE ISLAND, shipbuilding in, 54, 55, 58, 90; mills in, 102, 103, 130; printing in, 177, 187; papermaking, 200, 204; brick and lime making, 218, 221; beermaking and distilling, 250; textile arts and materials in, 333, 334, 339, 341, 345, 361, 388, 389, 399, 401–404, 410, 414, 420; first cotton mill in, 401–404; leather manufactures, 439; iron mines and works, 486, 501–504, 536; coal discovered in, 403; imports of, 54, 55, 250, 277, 374, 629; exports of, 102, 222 250, 439.
Ribbons made, 361, 414.
Richmond, Va., 83, 147, 595, 599, 605, 609.
Rittenhouse, Dr., 77, 316, 409, 521, 576.
Rochester, N. Y., 122, 137.
Rolling and slitting mills, first in England, 480; first in New England, 491; in Massachusetts, 483–484, 485, 488, 489, 491, 496, 625; in Rhode Island, 503; in Connecticut, 507, 513, 516, 625; in Vermont, 523; in New York, 536, 625; in New Jersey, 109, 541, 542, 545, 549, 625; in Pennsylvania, 556, 558, 566, 568, 569, 578; in Delaware, 583, 625; in Maryland, 585, 586, 587, 590, 592, 593, 625; in Virginia, 606, 609; in North Carolina, 615; prohibited, 491, 507, 624, 625; steam, 578.
Rowley, Mass., first fulling mill and cloth manufacture at, 303, 304, 305; iron works at, 483.
Rum, manufacture of, 55, 250, 270, (see DISTILLING).
Rumford, Count, 556.
Rumseian society, 77.
Rumsey, James, nautical inventions of, 75, 76, 77, 84; improved mill machinery, 113, 144, 147, 150; steam engines, 594, 595.
Russia goods, importations of, 337, 411, 412, 496, 627, 629.

Saco, Me., 98, 129.
Saddlery, 445, 462, 463, 609.
Sail Duck. (See DUCK.)
Saint Louis, 179.
Salem, 39, 40, 42, 117, 125, 126, 187, 192, 209, 233, 234, 282, 303, 420, 430, 431, 432, 470, 487.
Salem, N. J., 69, 108, 138, 226, 258, 314.
Salem, N. C., 207.
Salisbury, Conn., 495, 511, 531.
SALT, manufacture of, in England, 21, 282, 286, 287; first in America, 27, 28; little used by the natives, 279; right of making reserved, 281; works in New England, 279, 282, 283, 286, 288, 290; in New York, 284, 285, 286, 293; importation for the fisheries allowed, 285; works in New Jersey, 290, 291; in Pennsylvania, 292–295; in Virginia and Maryland, 27, 28, 33, 279, 286, 592; in Carolina, 287, 616, 620; in Western country, 292–294, 614; scarcity of, and price at different times, 281, 283, 285, 291, 292, 295; duty on, 295.
Salt Lake, first press at, 180.
Saltpetre, 114, 382, 383, 592, 606, 616, 619, 620.
Sand, first castings in, 484; magnetic, first iron and steel made from, 514.
Sans culottes, origin of the term, 393.
Savannah, 178, 187, 190, 275, 358.
Saw mills. (See MILLS.)
Saws, manufacture of, 105, 492, 496.

Scituate, Mass., 41, 97, 117, 484.
Scituate, R. I., 502.
Scotch Irish, 331, 332, 345.
Screws, 504, 566.
Scythes, early improvements in, 476, 477, 486, 487; manufacture of, 492, 493, 494, 496, 532, 568, 620; price of, 525.
Servants and laborers in 16th century, 19; dress of, in colonial times, 331, 413.
Sewing silk made, 356, 361, 362, 363, 414, 419.
Sewing machines opposed, 23.
Sheep, first in the colonies, 304; propagation of, encouraged, 310, 312, 313, 315, 321, 345, 379, 381, 383, 406, 417; merino breed introduced, 417.
Sheet iron, 492, 549, 571, 593; ware, 550, 575.
Sheetings and shirtings, 340, 412, 413; first cotton, 404, 413.
Shirts, scarcity of, 393, 395.
Shipbuilding, 36–92; first in the colonies, 37; in Massachusetts, 37–49, 58, 87, 90, 91; in Maine, 44–46; in Connecticut, 49–54, 90, 91; in Rhode Island, 54, 55, 58, 90, 91; in New Hampshire, 55–58, 90, 91; in New York, 37, 59–68, 91; in New Jersey, 68, 69, 91; in Pennsylvania, 69–77, 91; in Delaware, 77, 78; in Maryland, 78–82, 91; in Virginia, 27, 30, 82, 83, 91; in Carolina and Georgia, 84–86, 91; how regarded in England, 88, 89, 90; American innovations in, 47, 73, 74, 75, 91, 92.
Shipwrights sent to Virginia, 27, 30; to Plymouth, 37; incorporated, 39; prominent early ones, 40, 47, 50, 51, 67, 74; number of, in Massachusetts, 47; of Baltimore and Charleston, petition for navigation act, 81, 86.
Shoemakers, early ones, 32; in Virginia, 27, 412, 428, 462, 609; in Massachusetts, 432, 452; incorporated, 434; in Connecticut, 437; in New York, 440–442; in New Jersey and Pennsylvania, 415, 444, 461, 462; in Carolina and Georgia, 450; wages of, 444.
Shoe peg, invention of, 464.
Shoes and boots, manufacture of, silk and stuff, 414, 435, 455; imported, 460; of leather, 412, 413, 428, 434, 435, 437, 438, 452, 460; wooden heeled, 444, 447; pegged, 464; scarcity of, 456; prices of, 428, 432, 437, 438, 439, 443, 444, 446, 449, 450, 457, 460; importations of, 460; early exportation of, 434, 435, 452; duty on, 460.
Shovels, hoes, &c., 487, 492, 494, 502, 532, 608.
Shuttles made, 333; flying, first, 333, 401, 410, 413.
Silk, culture and manufacture, early notices of in Virginia, 27, 30, 33, 34, 319, 320, 321; profits of, compared with tobacco, 320; with linen, 361; in Carolina, 322, 323, 359, 360; in Louisiana, 357; in Georgia, 357–359, 364; in Connecticut, 360–361, 414; in Rhode Island, 361; in Massachusetts, 362; in Pennsylvania, New Jersey, and Delaware, 362–364; bounties and premiums for, 357, 358, 360, 361, 362, 363; exports of raw, 337, 357, 358, 359, 360; filatures, 357, 358, 360, 361, 363, 377; throwing mills and throwsters, 320, 357, 359, 362, 579; fabrics of domestic, 320, 357, 360, 361, 362, 363, 364, 414, 417, 418, 419; stockings, first, 360, 361; company incorporated, 361.
Silk grass, 26, 27, 33, 319; royal robe of, 33.
Silver, used before iron, 465; early notices of, in America, 466, 471, 475, 493, 494, 513, 532, 533, 550, 610, 611, 619; first coined in America, 477, 478.
Simsbury and Wallingford copper mines, 507–511.
Size stick, shoemakers, first used, 437.
Slater, Samuel, arrives in America, 402; erects the first cotton mill, 403, 407.
Smiths, honored by Anglo-Saxons, 467; early American, 476, 486, 500, 510, 525, 528, 551, 568, 573, 575, 584.
Snuff mills, 144, 579.
Society of Arts in London, effects of its rewards and premiums in England, 94, 376, 384, 458, 459; premiums for colonial productions, viz., vines, 276; indigo, 349; cochineal, 350; silk, 358, 360, 361, 362, 363; hemp, 368; sundry inventions, 492; sand-iron and drill plow, 515; cobalt, &c. &c., 619;—*in Pennsylvania*, instituted, 404; its premiums and efforts, 355, 406, 407, 409, 459, 460; —*in New York*, 367, 369, 371, 455, 532; to establish and promote manufactures recommended, 382, 383, 391; formed in Boston, 345; in Georgia, 383; in New Jersey, 411.
Society, American Philosophical, 76, 151, 186, 193, 201, 206, 276, 362, 363, 364, 576, 577, 578, 579, 580, 581;—*Royal*, the, 22, 50, 193, 247, 248, 286, 287, 429, 500, 514, 515.
Sole leather, 372, 455, 460, 461.
South Carolina, shipbuilding in, 84–86, 91, mills in, 114, 115, 148, 149; printing in, 176 187; brickmaking, 229; brewing and distilling, 264; vine growing, 271, 272, 275, 276, 277, saltmaking, 287, 616; textile arts and materials in, viz., silk, 322, 359, 360; indigo, cochineal, &c., 348–350; cotton, 351–356; first cotton gin, 353, 354, 417; household manufactures, 413; first Agricultural Society in, 416; medal for Merino sheep, 417; leathermaking in, 448, 449, 450, 461; iron mines and works in, 617–622; imports of, 374, 460, 629; exports of, 337, 348, 349, 351, 354, 356, 359, 449, 450, 461, 626, 628.
Sower, Christopher, 181, 182, 212, 316, 555.
Specie, scarcity of, 365, 474, 475.
Spinning encouraged and enforced, 299, 303, 311, 316, 320, 346, 368, 369, 378, 390; among the Hindoos and American Indians, 307; price of, 317, 392, 400; schools, 333, 334, 345, 375, 419; matches, 372, 414; machinery, early, 332; improved, 331, 375, 376, 383, 397–399, 401, 403; Arkwright's, 384, 397–399, 410.
Spinning wheel, origin of, 332; for linen first introduced into America, 331; manufacture of, 346, 375, 415, 568, 609.
Springfield, 207, 419, 487, 495.
Stamp act recommended, 338; passed, 185; provisions of, 203; effects of its repeal, 370.
Steamboats, first in United States, 75, 577; first Western, 568, 577;—*engines*, early ones, 499, 502, 510, 521, 534, 547, 568, 576, 577, 695; first built in America, 534, 576, 577; early factories of, 568, 578; various modifications of, 76, 492, 539, 547, 577, 594, 595.
Steel manufacture, antiquity of, 466; in India, 516; in France, 166; in England, 506; first in America, 506; in Massachusetts, 382, 492, 496, 498, 625; in Connecticut, 506, 510, 513, 514, 515, 625; in New York, 528, 532, 537; in New Jersey, 542, 546, 550, 625; in Pennsylvania, 558, 569, 570, 593, 625; in Maryland, 593; in Virginia, 383, 606; in North Carolina, 616; prohibited, 491, 625; method of hardening and softening, 492; imports of, 496, 523, 629; duties on, 570.
Stereotyping invented, 212; first in United States, 214.
Stevens, John, 67, 530, 595.
Stocking looms, 369, 402, 415, 418.
Stoves, 490, 497, 523, 529; jamb, 555; Franklin's, 556; air tight, 556; anthracite, 562, 564; with talc lights, 562.
Sugar colonies, complaints of, 345; act, the, 365, 367; canes, early mention of, 28, 610; mills first in Louisiana, 351; work for, 500, 579; refineries, 340, 574.
Sulphur refining, 383, 606, 616, 619.
Swedes, arts among, 77, 105, 110, 139, 144, 227, 258, 270, 315, 443, 550.
Swords, 502, 591.

Tacks, brads, &c., first cut, 388, 504; machinery 488, 498, 594.

Tanneries, first in New England, 431, 432, 435, 436, 454, 462; in New York, 439–442, 455, 462; in New Jersey, 442, 443, 456, 462; in Pennsylvania, 443, 445, 446, 461, 462; in Delaware, 461; in Maryland, 429, 448, 462; in Virginia, 427, 428, 462, 609; in Carolina, 448, 450; in Kentucky, 462; in Ohio, 462; business of, monopolized, 440; in United States, 1810 and 1850, 462; early laws respecting, 435, 438, 441, 443.
Tar, pitch, and turpentine, 25, 26, 99, 328, 330 (see Naval Stores and Bounties).
Taunton, 479, 481, 482, 496.
Taxation, early resistance to, 246, 326, 365, 370, 372; recommended, 338, 365; right of asserted, 370; of immigrants, 316.
Tea, first use of, 259; duty on, 375; use of abandoned, 379, 394.
Tea kettle, first cast iron, 488; copper and wrought iron, 488, 548.
Telescope, the, 17; first made in America, 576.
Tennessee, first printing in, 179; salt in, 294; iron and coal mines and works in, 613–615.
Texas, first printing in, 180.
Theodolite, the, 501.
Thread, 31, 346, 367, 369, 414, 419 (see Sewing Silk).
Threshing, early mode of, 32; machines, 501, 580.
Throwing mills and throwsters, 320, 357, 359, 362, 579.
Tilt hammers and plating forges, 491, 527, 558, 587.
Timber, definition of, 99; denominations of, 105.
Tin, in France, 16; England, 21, 81, 467; in America, 471, 522, 526; platemaking, 81, 382, 498, 575; ware factory, first, 516, 609.
Tobacco in Virginia, 26, 30, 31, 34, 83, 322, 324, 428, 599; in Pennsylvania, 70; in Maryland, 79, 322, 599; pipes, 220, 229, 502.
Tonnage of Massachusetts, 40, 47, 48, 49; of Maine, 46; of Connecticut, 51; of New Hampshire, 56, 58; of New York, 60, 63; of Pennsylvania, 71, 78; of Maryland, 80; of all the colonies in 1747, 90; in 1770, 81; of United States in 1792, 92; duties on, 41, 54, 62, 71, 72, 78, 92.
Tradesmen and mechanics encouraged, 314, 315, 323, 324, 378, 406, 429, 442.
Traveling in England formerly, 19, 20; in America, 104, 129, 292, 294, 541, 559, 566.
Trip hammers, first, 486, 487–492, 494.
Type founding, first in America, 182, 211–214.

Umbrellas, first in England, 20.
Union of colonies, first, 297;—*Federal*, proposed by Franklin, 174.
United company for promoting American manufactures, 385, 421, 579.

Vessel, first built in America, 37; in Massachusetts, 38; on Lake Erie, 65, 67; on Lake Ontario, 66, 67; in East Jersey, 68; submarine, 53.
Vine culture, 266–277; in Massachusetts, 268; 272; in New York, 270; in Pennsylvania, 272, 277; in Virginia, 31, 267; in Delaware and Maryland, 270; in Carolina, 271, 275; in Georgia, 275; in California, 270; encouraged by Society of Arts, 276; company incorporated, 277.
Virginia, shipbuilding in, 27, 30, 82, 83, 91; saw mills in, 112–114; corn mills, 147, 148; printing in, 176, 187; brickmaking in, 28, 220; glassmaking in, 25, 26, 30, 232–233, 242; beermaking, 27, 263; saltmaking, 27, 28, 33, 279, 286, 592; textile arts and materials, 319–322, 342, 343, 354, 382, 409, 412, 413, 415, 416; leathermaking in, 35, 427, 428, 462; iron mines and works in, 27, 28, 595–609; non-importation agreements in, 374, 379; imports of, 35, 322, 374, 427, 429, 460, 462, 607, 608, 629; exports of, 26, 30, 83, 113, 148, 279, 322, 324, 337, 354, 428, 599, 608, 626, 628.

Wampum, 477, 478.
Washington, President, 230, 187, 291, 354, 379, 391, 399, 407, 419, 420.
Waterbury, Conn., 313, 516, 519.
Water spinning first in United States, 401, 403, 410, 417; *works*, first, 534, 577.
Watertown, 117, 125, 312, 433, 435.
Weavers and weaving, first, 27, 304, 312, 317, 321, 415, 609; itinerant, 371; prices of, 317, 400, 408.
West India trade, 36, 41, 44, 49, 50, 51, 55, 56, 61, 70, 78, 87, 98, 101, 109, 129, 138, 154, 206, 231, 242, 268, 269, 270, 274, 288, 297, 365.
Wetherill, S., 392, 398, 404, 407.
Whaling, first, 43, 51, 69, 70, 365.
White lead, first made, 407.
Whitney, Eli, invents the saw gin, 355; early occupation of, 494; establishes gun factory, 516, 607.
Whittemore, Amos, 388, 389, 497, 498, 521.
Wilmington, Del., 77, 78, 111, 143, 144, 145, 178, 364, 461, 583.
Winchester, Va., 292, 415, 462, 608, 609.
Wine, domestic, 30, 31, 265, 267, 268, 270, 271, 273, 274, 346; imports of, 269, 274, 276, 285.
Windmills, 116–122.
Winthrop, John, 50, 247, 248, 283, 287, 471, 472, 474, 504.
Wire drawing in England, 81, 478, 548; in Massachusetts, 478, 492, 497; in Connecticut, 388, 518; in Rhode Island, 504; in Pennsylvania, 388, 562, 568, 571; in Virginia, 606; in North Carolina, 616.
Wisconsin, first printing in, 179; lead ore in, 604.
Wolves, bounties for killing, 311.
Women of the Revolution, 394, 395.
Wool combs and cards, 381, 382, 383, 388, 397, 478, 497, 606 (see Cards, Cotton and Wool).
Wool growing encouraged (see Sheep); exportation of prohibited, 305, 317, 321, 428; by parliament, 327; prices of, 392, 415; premiums for, 406, 417.
Woolen cloth, manufacture of in England, 81, 305, 397; in France and Holland, 15, 306; domestic and household, 304, 310, 329, 339, 340, 366, 371, 377, 381, 383, 385, 392, 404, 413, 414, 416, 417, 418, 420, 592; first noticed by parliament, 327; export of prohibited, 327; recommended by Congress, 380; worn undyed, 331, 333; machinery not to be exported, 378, 396, 409; factories, 392, 418, 420, 421; first incorporated, 421.
Worcester, 101, 127, 207, 221, 362, 396, 401, 420, 454, 493, 494.

Zaffre and smalt, premiums for, 619.
Zinc ores, 493, 522, 541, 545, 546, 588.

SUPPLEMENTARY INDEX

TO

VOL. I.

Alvord, C. A., New York, 651.

Bruce, George, New York, 152, 214, 633.
Boots and Shoes, 689, 690.
Bowles, Samuel, Springfield, 195, 653.
Bryan, Clark W., Springfield, 654.
Burt, Edwin C., New York, 462, 690.

Case, Newton, Hartford, 195, 656.
Clark, John C., Philadelphia, 152, 641.
Cochran, Gerry W., Boston, 462, 689.
Collins, T. K., Philadelphia, 195, 658.
Conner, James, New York, 152, 638.
Cummings, John, Woburn, 424, 675.

Envelopes, how manufactured, 666.

Fagan, John, Philadelphia, 152, 643.

Gordon, George P., New York, 174, 660.
German Books, 663.

Jewell, Pliny, Hartford, 424.
Jenkins, Edward O., New York, 174, 662.
Johnson, Lawrence, Philadelphia, 152, 643, 644.
Jones, Josiah M., Boston, 462, 687.

King, Robert P., Philadelphia, 195, 663

Leather, 424–464, 675–691.
Loring, Alfred S., Hingham, 462, 677.
Lovering, Willard, Vol. I., 348; Vol. II, 533.

Mudge, Alfred, Boston, 195, 665.
Musser, William, Philadelphia, 462, 677.

Nesbitt, George F., New York, 174, 666.

Printing Presses, 660.
Printing, 152–194, 633–675.
Poor, Henry, Boston, 424, 679.
Pratt, Zadoc, 680.
Pevear, George K., Lynn, 424, 686.

Ramage, Adam, 633, 642.

Stereotyping, 212, 214, 640, 643–4.
Shaw, Fayette, Boston, 424, 685.
Sherman, Conger, Philadelphia, 152, 647.
Smull, Thomas, New York, 462, 683.

Tanneries, 675–691.
Trow, John F., New York, 174, 668.
Thompson, Abijah, Woburn, 424, 676.

Webster's Dictionary, 657.
Wendell, Corenelius, Washington, 174, 672.
Wright, Albert J., Boston, 195, 670.