Sessions of 1886-7. 1887

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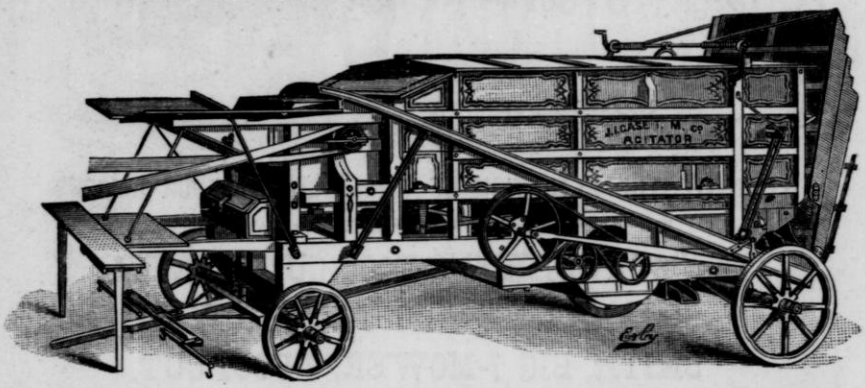

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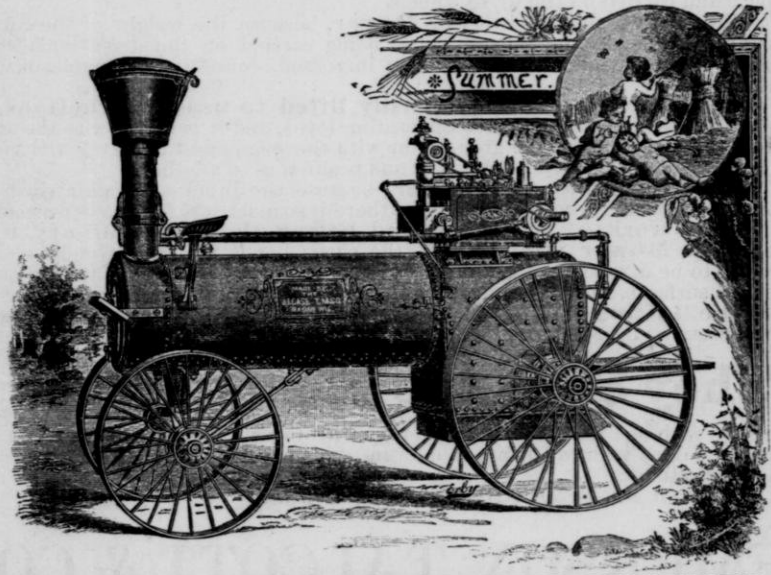

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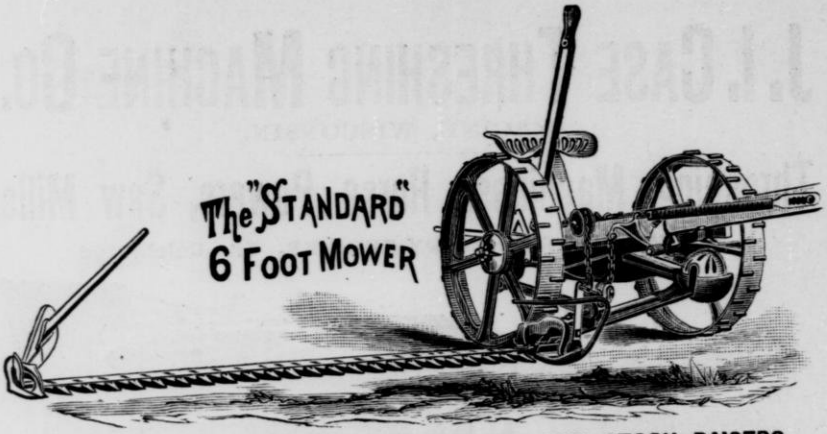

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WISCONSIN

FARMERS' INSTITUTES.

SESSIONS OF 1886—7.

EDITED BY

W. H. MORRISON, Superintendent.
JOHN GOULD, Asst. Superintendent.

FOR

THE WEEKLY WISCONSIN.

MILWAUKEE:
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1887.

CONTENTS.

PREFACE.

An act providing for Agricultural Institutes was introduced by Hon. C. E. Estabrook, of Manitowoc, at the session of 1884–5, appropriating five thousand dollars, and putting the same into the hands of the Board of Regents of our State University, in accordance with this law.

Thirty Institutes were held in different parts of the State during the winter of 1885–6, and were well received by farmers generally, making an advance in the agricultural heart and brain, stimulating animal husbandry, and improved methods in the various departments of farming.

The tendency of these Institutes has been to awaken inquiry, to promote comparisons of methods, to pool their experience, and create a desire for a more extended intelligence, that in the end will exalt farming to a profession. When this is accomplished farming becomes a pursuit, a science that will attract the progressive thinkers of the day. Intelligence, system, business principles and well-defined purpose will bring as great success on the farm as in any other business pursuit.

The following papers are selected from many hundred that were read and discussed at the Institutes, and teach the most approved methods in all departments of farm work.

The work of the editors has been one wholly of compiling, leaving the individual expression of the author to be its own interpreter, and as such we give it to the reader, as a compendium of Wisconsin's richest experience of agricultural literature.

W. H. MORRISON.
JOHN GOULD.

MADISON, WIS., Jan. 10, 1887.

FARMERS' INSTITUTES.

Bees and Their Management.

[By W. H. Putnam, of Fall River.]

It is much easier to give advice than to follow that same advice. We may all have many fine theories, but when we come to carry them out, partial or complete failure is often the result. Hence I will not pretend to say what Brother Jones or Brother Smith should do with his bees. But shall attempt to outline in a general way what I intend to do with my bees the coming season.

A swarm of bees is composed of one mother bee, called a queen, a large number of worker bees and a few male or drone bees. The queen lays all the eggs, the worker bees gather the honey, rear the young, guard their home, sting their enemies, and in short, do all the work that is done in their little home. They resemble the queen in shape, being a little smaller. Every worker bee is an undeveloped queen. The drones, the males, of the bee family perform none of the domestic work. They gather no honey, they have no stingers, they serve but one purpose. When the queen has filled all the combs with eggs and the young bees have hatched in such numbers that there is no more room for them to store honey or for the queen to lay eggs, then the bees build what are called queen cells, and place eggs in the queen cells and feed the young bees that are to become queens on what is called royal jelly, a food prepared by the bees for the queens, and nine days from the time the queen cell is started the young queen will be grown to full size, and the cell will be closed or sealed; and now the old queen and the old bees will fly out of the hive to form a new swarm. As swarming takes place in the middle of the day a great many bees will be out in the fields gathering honey. And they come back to the old hive. And in seven days the young queen hatches, and seven days after she takes her wedding flight. And having met a drone she returns to the hive and is soon laying eggs very fast. For most of the eggs laid by the old queen will by this time have hatched out, and the old swarm left weak by the departure of the old queen and bees, is in reality a new swarm having a new young queen and all young bees. But to return to the new swarm, as we call it—in reality the old swarm—because it has old bees and an old queen—comes rushing out of the hive. The air is full of bees flying in every direction for a few minutes. At last the queen lights on some tree fence, bush or whatever seems to please her, and the other bees cluster and hang in a large ball around her. I intend to have my hives ready before swarming time which begins the last of May and have them all placed just where they are to remain the rest of the season in the shade of some tree or bush; or if these are not to be had I shall make artificial shades. I shall have my hives face the east, and not less than seven feet apart. As soon as a swarm begins to cluster I shall thrust my swarming box up under the cluster and give the limb a gentle shake sufficient to tumble the bees into the swarming box, and the other bees will light on the swarming box crawl in and out of the holes; and soon all the bees will be in or on the box. Then take the swarm to the hive it is to occupy having first spread an oil cloth, a piece of carpet or having placed a board in front of the hive. Now shake the bees n front of the hive and with a wing start the bees toward the hive. As soon as the queen has gone in, all will be well, and if the hive stands in a cool place you need have no fear of the swarm leaving the hive. Surplus sections may be placed on the hive at once or after waiting a few days The former

is probably the better plan, because bees generally smarm about the time of the heavy honey flow, and if you force them into the sections as you can do by contracting the brood channel they will place the whitest and best honey in the sections and the dark honey that comes after can be stored below for the winter food of the bees. Hives may be contracted in two ways. You may hive a swarm in a half hive, as for example, by using one hidden brood case, or you can use less frames in the ordinary hive and shut the bees out of the rest of the hive by means of dummies or division boards. In any case, as soon as you see that the heavy flow of honey is over, the section should be taken off. And if the hidden hive is used, an empty case containing foundation should be placed under the case already in use. If the ordinary hives are used the dummies should be removed and empty frames with foundation should fill out the hive.

The next thing is to prepare for winter. As soon as the frosts have come, and there is nothing more for the bees to get, the beekeeper must examine his hives and be sure that each hive contains honey enough to last the bees until they can gather honey again the next spring. Each hive should contain at least twenty-five pounds of good sealed honey. If any hive should not contain that amount the beekeeper must, if he wishes to bring his swarm through, feed the bees until they have that amount. Caution *how* to *feed, when* to *feed.* As soon as the nights begin to be cool, I would remove the enameled cloth or wooden honey board, if I used it, anp place a blanket or chaff cushion in an empty surplus case on the hive. This chaff cushion will keep the bees warm through the chilly nights in fall and spring, and enable them to nestle and cluster in a ball as is their wont during the long winter. About the middle or last of November, the time varying according as winter sets in early or late, the bees must be removed in doors. A boe house is the proper place to put them. A bee house should be *dry and dark* with thick walls six to twelve inches sawdust so as not to be susceptable to sudden changes of temperature; and should have both upper and lower ventilation sufficient to keep the air pure and to keep the temperature from 40° to 45° Farenheit. The next best thing to a bee house is a perfectly dry and dark cellar with sufficient ventilation to keep the air pure; and this cellar should not contain any vegetables. A thermometer should hang in the center of each bee cellar, and the beekeeper should observe the temperature frequently and keep it from 40° to 45.° The essentials of successful cellar wintering are plenty of good food, a dry dark cellar with a temperature of from 40° to 45°; quiet and a change of air.

During the first week of last April, when the snow was nearly all gone the weather moderated, the thermometer rose to seventy degrees and a warm south wind continued for three days. On the first day, a little after noon, I set my bees out. They rushed out of the hives, flew about in the warm sunlight and immediately commenced gathering honey that stood in beds on the blossoms of the soft maple. While one never can tell what the weather is going to be, yet we can hit it sometimes; and as soon as the weather is fit, bees should be removed from the cellar to their summer stands.

Bees are wintered successfully on their summer stands in what are called chaff hives. My friend and neighbor, S. N. Chapman, is trying this plan. The chaff hives are double-walled with a layer of chaff about four inches thick beneath and on all sides, and a chaff cushion is placed on the brood nest.

As soon as the warm days in April come I shall examine every hive, taking out each frame and noting the following points: First, the quantity of bees; second, is there a live queen; third, is she laying; fourth, is there honey enough to last until new honey comes. If there are plenty of bees, all right; if not I shall proceed to put bees in such hives. Bees brought from any distance greater than one mile will remain in a hive, if they are kept queenless twenty-four hours. The way to put bees into a hive so as to avoid having them killed, is to remove the frames from the hives and shake the bees in front of the hives, mixing them by shaking some from the frames that belong in the hive. And then some of the bees you want to introduce; then some from the frames; and so on mixing them all up; and using plenty of smoke. If there is no queen, you must either get one or put the bees in a hive that has a queen, or give them a frame

of unsealed brood, and they will raise their own queen. If the queen is not laying I will find the reason and set her to work. If there is not honey enough in the hive I will feed extracted honey or syrup made from granulated sugar. In short, I shall strive to have all my colonies strong by the time the white clover begins to blossom. At that time I shall place sections on some hives and begin extracting from others, as I intend raising both extracted and comb honey next year.

We get most of our surplus honey here from white clover and basswood. Last year the basswood did not yield much honey on account of the July drouth, but the white clover honey which began about the 15th of May, was good, both in quality and quantity. We get some honey later on from corn, and then from buckweat; but buckwheat honey is dark colored; has a sharp taste, and does not sell as well as white clover or basswood honey.

I have here a sample of clover seed which claims to be Alsike clover seed, but from the description I should say it was *aff alfa* clover seed. At any rate, it produces well, makes splendid hay, and yields immense quantities of honey.

Thus far I have said nothing of bee stings. Pure Italian or pure black bees are the pleasantest to handle because they are not so cross as the common hybred bee, which is a mixine having the same nature as a mule, both being scroses between two species of the same general family.

Any person who attends to bees must learn to go quietly among his bees and handle his hives gently. There are two very useful helps in preventing stings; one is to wear a bee vail and the other is to use a smoker; both are inexpensive and of great value. One thing to be borne in mind, never, under any circumstances, expose honey or other sweets so that the bees can get at them; they will carry them home if there is no honey to be gathered, and when they have carried the exposed honey home they will begin prowling around other hives; and if a weak or queenless swarm is found it will be robbed, and when robbing begins it is hard to tell where it will stop.

Some folks are so foolish as to place combs partly filled with honey in front of weak swarms, thereby intending to feed them. The result invariably is that all the bees in the neighborhood rush to the exposed honey and when it is gone they go into the hives near by and rob them.

Selecting a Breed.

[By McLean Smith, of Dayton, O.]

Improved stock, more especially neat stock, may be defined with tolerable accuracy as stock which responds to good care and feed. There is no poorer investment, and none which is likely to prove more unsatisfactory than a purchase of finely bred stock, which is afterward neglected and allowed to shift for itself. Our native scrubs are what generations of neglect and periodical short rations have made them. If it is intended the cows shall pick a living in summer along the roadside, and in winter about the straw stack, there is probably no breed will do better, or yield a better return, than these same scrubs. They are bred up to that sort of living, and, as nearly as any animal can be, they are accustomed to scant fare and no favor.

The objection to the scrub cow is that, with the best of care and feed, she does little better than when picking a living along the road, with an occasional raid on some corn-field, you often hear a remark like this: "Yes, those cows look well, and give a fine mess of milk, or make fine beef; but if you would give a lot of scrubs the same care and feed they would do just as well." This is a mistake. The finely bred cows would do no better, perhaps not so well as the scrubs, on scant fare and no attention; but good care and full rations are largely thrown away on poor stock, they do *not* respond, as better bred animals do to high keep.

What breed is best will depend on the circumstances of each case — the purpose in view, the soil, climate, food, etc. But whether any unproved breed will pay depends chiefly on the *man*. If they are to shift for themselves, depending on luck, or the character of the season, whether they are full fed or half starved, and on the state of the weather for their physical comfort, then, decidedly, improved stock will *not* pay. On the other hand, if the cows are full fed, and properly cared for in inclement weather, then every day you keep a scrub, under such circumstances, you are loosing money. Your feed and care are largely thrown away. She can not

respond to such treatment as a better bred animal would do.

It is true that by generations of such keep, with proper selection, the scrub is gradually modified to suit her changed conditions, and becomes, in fact, an improved breed. But why waste so many years in what is of necessity a tedious and costly process, when the work has already been done to your hand, and you can select from the many improved breeds now in existence just what you want, and at a hundreth part of the expense it would entail to form a breed, even if you were sure of success. But you are not sure. Undoubtedly it can be done. With sufficient time, good keep, and proper mating, I believe our so called native cattle could be bred up to a high standard. But it requires genius for such work. Not many men possess the requisite ability to see so far ahead, and predict the result of different combinations, while any one of common sense can preserve a breed once formed.

But it is asked, would you then advise every one to discard his native cows and substitute full-bloods of some improved breed?. Assuredly not, that is certainly the quicker way to attain your object; but for practical purposes it is unnecessarily expensive. A three-quarter-blood, or seven-eighths grade, of any improved breed, if *properly* bred and cared for, ought to be, for practical purposes, as good as a full-blood. If not, the breed itself is lacking in power, it is lacking in one essential element of a thorough-bred animal —prepotency.

Of course all animals are liable at times to breed back, and a grade may breed back to a scrub; but, if mated to a full-blood, the chances are a hundred to one that the mongrel blood will not show itself in the offspring. Indeed, for practical purposes, a high-grade, developed on your own place from your old native stock and choice full-blood sires, is often *better* than a full-blood, because more perfectly adapted to the circumstances surrounding it. But grades, except in rare cases, where it is desired to preserve some peculiar trait, should not be bred together. A full-blood of inferior individual merit is a more desirable sire than any grade, because all its good qualities are more thoroughly in-bred, and are therefore more decidedly hereditary.

Having decided that you can and will give the requisite care to your stock, and proper feed to develop its good qualities, the first point will be to select a breed adapted to the particular conditions which will surround it. I do not mean by this the adaptation of the breed to our purpose—milk, or beef, or butter production, or a combination of all,—but its adaptation to the soil, climate and general conditions which will surround it. This will largely determine your success or failure; but it is not, I think, so often considered as it should be. Usually we are struck with the fine quality of some breed as it appears in the show ring, or in the herd of some successful breeder, and we conclude that is what we want. Perhaps it is. But, perhaps, if we knew all the care and feed employed to produce that fine appearance, we might conclude that something not quite so grand would suit us better.

Large size is not always desirable even in a beef animal. We should cut our coat according to the cloth. If our soil is rich and grass abundant, so that a large animal can obtain a full feed without much exertion, then, other things being equal, the larger animal is preferable. But on most of our farms grass is not over-abundant; and the slight advantage of the larger animal in saving room is more than compensated by the greater activity of the smaller. It may be laid down as a general rule, that on farms of moderate fertility, or where abundant rations are not always provided, a medium-sized animal is more profitable even for beef.

But the question arises, whether we shall choose a breed for one purpose merely—milk, or butter, or beef—or whether it is best to choose a general purpose breed; not, perhaps, the *best* for any one thing, but fairly good for all. My own opinion is that in a system of mixed husbandry, where grain-growing is the leading business, and stock is kept as an incident to this—to keep up the fertility of the farm and convert the rough feed into money—a general purpose breed—one that will grow a good steer, and the same time yield a paying quantity of milk and butter—will prove most desirable.

I know it is the habit of many breeders to sneer at the general purpose cow as a jack at all trades and master in none. And it is doubtless true that the

general purpose animal is not likely to attain the highest degree of excellence in any department. But it is also true that the work of the world is mostly done by animals which do not attain supreme excellence. You are not likely to find a horse with the speed of a thoroughbred and the strength of a Percheron; and yet a horse, which is inferior to both in their specialties, may be far more useful than either on the farm. So it is equally true that in many cases, perhaps in most cases where mixed husbandry is pursued, a general purpose cow would be found the most profitable.

Where it is desired to raise a few steers each year, and at the same time possess a breed of cows that will furnish the milk to raise the calves, and make butter to pay the grocery bill, a breed fairly good for every purpose must be employed. If one could purchase good steer calves as needed, at a fair price, it might pay to keep a milk or butter breed, without reference to beef, and knock the male calves in the head. But everyone knows this will not be done. If a farmer undertakes to raise a few steers for beef, they will be of his own breeding, if he has them, whatever they are. It is essential, therefore, if he would get any pay for his care and feed, that the cows should be able to transmit good beef qualities.

For the large farmer and stock-grower, or the farmer who is engaged in some special pursuit, there are particular breeds which, for special purposes, claim preeminence. For beef, the Short-horn, Hereford, and Polled Angus in the latitude of Ohio; in the south, the Devon, and in the extreme northwest, the Galloway.

I am a great admirer of the Short-horn. When properly fitted for the show-ring they are, in my opinion, the grandest breed of all; and, under favorable conditions, they will make beef of high quality as economically as any. The objections to them are that they are a little delicate. They do not bear exposure well, and they must have full rations without much effort. They do not forage as well as some other breeds.

Another serious objection to Short-horns, considered merely as a beef breed, is that breeders have not yet succeeded in completely overcoming the original tendency to milk heavily. They have pretty well spoiled them for the dairy by inducing a habit of drying up for five or six months after calving; but occasionally a cow at first will give much more milk than her calf can take. Where beef is the sole object, good milking qualities are a nuisance. It is a waste of energy on the part of the cow, in producing more milk than her calf requires, and it imposes considerable additional labor in looking after the herd.

If I wished a cow merely to raise a calf for beef, I should choose, for the latitude of Ohio, a Hereford or a Polled Angus. Both are good beef breeds, and neither, I think, is liable to give more milk than her calf can take. My own preference would be for the Angus, on account of the greater convenience in handling from the absence of horns. But the color is objectionable to many. They are not so grand looking beasts, and they do not so completely captivate the fancy.

The Hereford is claimed especially to excel as a grazing animal; and it is doubtless superior in this respect to the Short-horn, except under very favorable conditions to the latter. But I can see no reason why it should be better than the Angus. The latter is equally hardy, it produces beef equal in quality, and will make it as cheaply, pound for pound. As between the two breeds it is largely a matter of personal preference, taste, or prejudice, as you may choose to call it. But with me the hornless trait of the Angus would outweigh even greater merits than Hereford breeders claim. This trait, however, is of more importance in the close quarters to which our cattle are confined in Ohio, than on the boundless prairies of the West.

For a cold climate and a thin soil, where feed is not always abundant, and the stock must be much exposed, the Galloway claims the preference. They are, perhaps, not quite so large as the Angus, and are somewhat slower in attaining maturity. But they make beef of the best quality, and they will thrive where some other breeds would starve.

In England a still rougher breed—the West Highlander—is a great favorite with the butcher. They are small and of slow growth, a lot of yearlings, at a short distance, more resembling goats than cattle. But when fully matured and properly fattened they top the market in price, their meat commanding one or two cents a pound more

than any other breed. They do not thrive, however, in any but a cold climate; and even in a Scotch winter, I am told, they cannot endure confinement in a stable. They have never been imported to any extent into this country, and it is doubtful if they would be profitable here, except in limited areas in the roughest parts of the Northwest. For all ordinary locations, even in the coldest parts of this country, the Galloway is sufficiently robust, and would be much more profitable.

For Texas, and the extreme South generally, as also for the thin and rough lands of the Middle States, the Devon, I believe, has no competitor in beef production. Indeed, unless the Angus shows a greater range of adaptation than seems at all likely, the Devon is the only one of the improved beef breeds which thrives in a semi-tropical climate. In Texas the Short Horn is useless and the Hereford not much better, while the Devon is as much at home as in the Middle States.

The only valid objection to Devons for the production of beef, aside from their formidable horns, is that, like the Short-horns, they may milk too well. The serious loss and inconvenience this imposes will scarcely be realized without some thought. But conceive yourself in charge of a hundred cows and heifers coming fresh that had never been handled, and you may imagine what trouble good milking qualities would impose. Trust the calf to do the milking and you would probable have a ruined udder and possibly, for breeding purposes, a ruined cow. In selecting Short-horns and Devons, therefore, to build up a herd of beef producers, where the calves must do the milking, avoid as you would some hereditary disease, large milking qualities.

If butter is your sole abject, and you are prepared to give close personal attention, and the best possible care to your herd, the Jersey probable is what you want. But if you decide on Jerseys, keep them for what they are—*butter cows*—and do not fool away your time and money trying to grow beef. If a few steers are necessary, or would be profitable, better far sell your Jersey calves, or give them away if necessary, and buy something that will feed satisfactorily. A Jersey steer is a delusion and a snare, not on account of their small size—that is not necessarily an objection—a sheep may be more profitable to feed than a steer—but on account of the total lack of beef qualities. A Jersey cow is esteemed for the slight development of her muscular system; but a highly developed muscular system is essential to a good beef animal. A Jersey, when fat, is simply fat, and skin, and bones. There is no rich, juicy lean meat.

The objections to the breed, aside from beef, are lack of hardiness, and lack of docility, especially in the bulls. The breed seems especially liable to abortion, milk fever, and other troubles incident to calving. (I never had a case of abortion in my herd, until I introduced Jersey blood; and I have never had a case since I got rid of it. This may be a coincidence, but I do not think it is.) The Jersey is of a high-bred and delicate organization. The cows are very fawn-like and pretty; but they are in fact very ill-tempered with each other, and when closely confined, it is not surprising that accidents should occur.

If milk production is the specialty either for sale in the city or to the factory, the Holstein and the Ayrshire claim attention. Neither breed has any great merit from an æsthetic stand point, but both are large producers of milk of medium quality, and where milk is sold by weight or measure, the lower the grade, provided it passes inspection, the more profit in its production. You cannot make something out of nothing. The richer the milk the more food is required to produce it. If the patrons generally supply milk to the factory which grades No. 2. You cannot well compete with them and furnish at the same price, milk which grades No. 1. The Holstein is not an attractive cow. Indeed, I think she is excessively ugly; and judging from her form and make up, she must be an enormous feeder and a hard keeper; but that she gives much milk, and keeps up the flow well through the year, is beyond question. She is a specialist; but in her specialty she certainly excells.

The Ayrshire is much smaller in size, and much better adapted to thin or rough land than the Holstein; but, like the latter, is a large producer of a medium grade of milk—milk which is better adapted for cheese than butter. She is insignificant in appearance; of no decided or distinguishing color, and has

the least indication of high breeding of any British cow. Indeed, if a dozen well-bred Ayrshire cows were put in a lot with an equal number of common scrubs, it would require a trained eye to pick out the Ayrshires, except from the indications of superior milking qualities. But her insignificant appearance is the worst part of her. As a matter of fact the Ayrshire is an excellent milk cow, and will probably give as good returns, in proportion to feed, as any breed in existence. She is particularly adapted to rough or thin lands, where the production of milk for making cheese, or table use is a specialty. To return to the general purpose cow: to be profitable she must combine good dairy qualities, with a good form for beef, and capacity to lay on flesh of high quality, these are essential. The desirable traits, if they can be added, or combined with these, are good looks, hardiness, docility, and, as a personal preference, the absence of horns.

No man, it seems to me, can take much pleasure in breeding an animal which does not satisfy the taste, or appeal to our pride; an animal must be beautiful, or must do something wonderful, to excite enthusiasm, and without enthusiasm, there is no pleasure in breeding. As it is not expected that the general purpose cow will do anything wonderful—anything to eclipse the specialits in the way of milk, butter, or beef production—it is important that she should be herself attractive, in order to secure proper attention.

The importance of hardiness in our domestic animals—ability to withstand the ordinary vicissitudes of life and resist disease—will not be questioned; but docility is not so often thought of as a factor in breeding. Yet docility, if we consider the extra labor and annoyance its absence imposes, is a very important quality, and it is one which may become as thoroughly inbred as form or color. A vicious temper, or a wild, untramling spirit is a serious objection to a cow, and it requires generations of careful handling and kind usage to completely overcome it. It can be done; but it is better, where it is possible, to breed from stock which does not require it.

The breeds which claim special attention as general purpose animals are the Short-horns, Devons, Holsteins and Red Polls, or Polled-Norfolks. Short-horn breeders claim to have the great general purpose cow; and, in some respects, the claim is well founded. In my own opinion, when properly fitted for the show-ring, Short-horns are the grandest cattle in existence; and, originally, there is no doubt they were fine dairy cattle also. Indeed, they are in England to-day the leading dairy breed, and probably have no superior in the quantity and quality of yield, in proportion to food consumed. But in this country they have not been bred and cared for, generally, with a view to preserve their milking qualities. In fact, the effort has been, apparently, to breed out this trait. Almost universally the calf is allowed to suck the cow, and the latter dried as soon as the calf is old enough to wean. This, if persisted in, will ruin any breed of milkers; and it has very nearly ruined the Short horns. While milking too well to grade as beef cattle, pure and simple—that is, too well to trust the calf to do the milking—they do not milk well enough, or rather, they do not milk continuously enough, to be profitable for the dairy.

During a recent visit to England, however, I attended the London Dairy Show, and I saw some Short-horns that would rank as dairy cattle, and, so far as appearances can determine, they were dairy cattle of a high order. They were very large, of the characteristic Short-horn form, and carried an immense amount of flesh—much more than I should have thought safe, or, indeed, profitable, in a cow giving much milk. They were all recently fresh, or about due to calve, so that they showed to the best advantage. But, if they possessed fairly good *staying* qualities, they were certainly fine dairy cattle; and, I think, under favorable conditions for their proper development, with their evident capacity to lay on flesh, they were the *best* general purpose cattle I ever saw.

The original tendency of the Short-horns to milk well quickly revives when crossed with a good dairy breed. For this purpose, therefore, or for grading up good milking natives, Short-horns are entitled to rank as a general purpose breed, and, with suitable surroundings, they rank high. The objections to them are, that they require rich pasture, where they can fill themselves without much effort, and comfortable quarters in winter. But, where

all the conditions are favorable, a Shorthorn cross will prove satisfactory, and will yield as good returns for the food consumed as any.

The Devons, originally, were more noted for the production of work oxen, and beef of high quality, than for milk, but of late, since working oxen are little used, more attention has been paid to the milking qualities; and many Devon cows have made creditable records as dairy animals. The habit of breeders, of showing at the fairs, almost exclusively, either dry cows, or heifers not yet in milk, does not speak well for their own estimate of the dairy qualities; but there are, I know, many Devon cows that milk exceedingly well; and it would not be at all difficult to collect a herd which would compare favorably with any breed in profit at the dairy. They do not milk so largely as some others; neither do they eat so much. Indeed, in my judgment, the Devon is, or could easily be made, almost the ideal farm cow, if it were not for her formidable horns. They have, otherwise, almost every desirable quality. They are handsome; they are hardy; they are high spirited, and sometimes wild, but seldom vicious; they are very easily kept in good flesh, and make beef of high grade; and they are, or could easily be made very good milkers in proportion to the food consumed. But their horns ruin all. They are sharp, strong, and have just the proper curve to rip open an adversary. No man is a safe companion who habitually carries a loaded revolver, and I would not trust any cow in my barnyard with a pair of Devon horns on her.

The Holstein is claimed as a general purpose animal; but the claim is based, I think, altogether, on her size and milking qualities. As a beef animal she possesses almost every undesirable trait. She is long in the leg, big boned, loose jointed, coarse haired, and a hard handler. If she is not a big eater and a coarse fleshed animal she belies every indication in her make up.

Of the Red Polls, or Polled Norfolks, I speak with some diffidence, as it is the breed I have selected for myself, and any praise I bestow may be thought interested. But I have none for sale; so I should be acquitted. I think, if I speak favorably, of trying to bull the market. And favorably I must speak if I speak at all. Indeed, this is I think, for many situations, the most desirable farm cow. She has almost every good quality, except size; and that may be attained, by those who prefer a very large animal, without going outside the breed, but at some sacrifice of what I consider much more important—form and quality. There was recently imported a registered bull of the breed weighing twenty-seven hundred pounds. Another, from the same herd in England, had a recorded live weight of over three thousand pounds. If this is not large enough I would suggest an importation of Elephants.

It is too large for me, and it is too large, I think, for the average farmer to breed with profit. But it is much above the average of the breed. A live weight of two thousand pounds would be considered a large Red Polled bull, and sixteen hundred would be a large cow. The average is perhaps two or three hundred less.

As milkers the cows do very well, as well, I think, in proportion to feed, as any I know. Few records have been kept as yet in this country. Gen. Ross, of Iowa, reports a cow giving eight gallons a day and a higher, twenty-six months old, thirty-eight pounds a day. Mr. Jamison, of Kentucky, reports a higher, twenty-six months old, as giving thirty-seven pounds a day on grass alone. In England, cows of the breed have given ten gallons in twenty-four hours, and five gallons a day, I am informed is not an uncommon yield several months after calving. Their great merit as milkers, however, is in their great staying quality.

I have a two-year old heifer, officially tested at the West Virginia State Fair last fall, seven months after calving, and nearly six months in calf. She gave a little over twenty pounds of milk a day, which tested fourteen per cent. cream. This, after she had been for several weeks on exhibition at different fairs without a bite of suculent food of any sort, and a long railroad ride from Columbus, Ohio, a few days before.

The Red Polls have not yet been tested in this country for beef, but in England it is claimed they are equal to Devons, while the size is somewhat larger, and they mature, I think a little sooner. Indeed, in all the desirable qualities of a general farm cow they rank high. They are hardy, docile, easily kept, and last but not least, they are hornless.

Political Influences.

[By Mrs. S. E. Coolidge, of Augusta.]

MR. CHAIRMAN, LADIES AND GENTLEMEN: I understand that the prime object of this Institute is for the mutual interest of the farmers; that, in thus coming together, they may discuss different ways and methods, whereby they may benefit each other by exchange of thoughts on the different methods of farming in all its various branches. And, also, how they may best have their rights protected in our legislatures. Now, this last, I think, is a question of vital importance as to the best way of obtaining those rights.

You farmers annually assist by your votes to send a class of men to our legislative and congressional halls, who have but very little, if any, interest in the farmer, except it be to obtain about three times each day such amount of the farm product as to sustain his stomach, while he uses the strength he derives therefrom to protect the oleomargarine and whisky traffic, with many other various bills detrimental to the farmer's interest.

As a general rule the choosing of our public men is a mere farce enacted in a political ring, where money has more to do with their election than their true ability to fill the place, or of honest principle. They will club together for any nefarious scheme, saying, "now, you vote for me this year, and I will vote for you next year," or *vica versa*, as may best suit the object in view; and during the intervening time between nomination and election they manifest a great interest in the farmers, never failing to take them by the hand and give them a warm and friendly greeting wherever they may meet them. And, I am sorry to say it, yet it is true, that the farmers are too often duped by their oily tongues and seeming friendliness. And thus it goes on, year after year, until it has become the exception, and not the rule, when a straight honest man can not get even a nomination, much less be elected, to any high office. If by chance such a man does get a nomination for any high office his good name must be dragged through all the filthy ditches of slander; and not only his name, but that of all his ancestors must be blackened and degraded until the man is disgusted, and wishes he had never allowed his name to have been used as a candidate for office.

Now to me this seems to be all wrong; and you farmers can, if *you will*, do much towards making these things better. It has been said that he who stands afar off and watches the battle can tell much better how it is going than the soldier can, who stands in the ranks and does the fighting. And so it seems to me that we ladies, who stand outside of the ring and watch this political farce enacted year after year, can and do see whence it is drifting just as as well, if not better, than you gentlemen who do the voting.

But, perhaps, some gentleman present is thinking what would you do in this matter if you did the voting? Well, I do not vote; neither do I feel competent to give advice. Yet I think I will tell you what seems to me might in time help you to have some voice in the shaping of our laws, and in a measure control this giant evil. That is, to educate yourselves and your boys; use your brains as well as your hands.

Farmers, as a class, have no lack of natural intelligence. I think nature has endowed them with quite as good natural gifts as she has the average politician. The great difference lies in this fact, that one gives all his time and thought to the tilling of his land and greatly neglects his mental culture, while the other devotes his mind and strength to see how he can make money on the least payable amount of manual labor, regardless of the means he employs to gain his point. Now, if this could be equalized, if the farmers would study more and till less acres, look closer into the true principle of the men he is voting for to send to our legislature, to Congress or to fill the executive chair, and in the mean time not neglect to have his own boys educated so that in time they might be fitted to fill any one of these positions with honor, I hardly think there would be so much cause to complain of bad laws—at least not after a few years. There are some farmers now who might fill these places with honor; but they are the few who have tried to cultivate their brains as well as their lands.

I do not think it comes from lack of natural ability; but the average farmer has never thought it necessary for him to take any particular pains to keep himself posted in regard to public matters. He has taken it for granted if he was a farmer he could not be a law-maker;

and now, having neglected these things for so many years, they find the laws in some instances rather oppressive and they are wholly unprepared to help themselves. For, should they be sent to Congress or the legislature in their present unlettered state, what could your average farmer do among those kid-gloved, oily-tongue, office-seekers? Why, in my opinion, he would be but a little better than a dummy. If they could not silence him with ridicule, they would try bluff and perhaps bribery; although I have too much respect for the farmers' principle to think many of them could be bought, yet there is great power in the mighty dollar. How many do you suppose could, like Mr. Price, stand up for a principle against that mighty throng?

If we desire to have a voice in making the laws of our country, and to preserve it as it was first designed, that it should be a free and independent country, where all can have equal rights, I would repeat that our farmers' boys should be educated to fill these places of high trust as well as to hold the plow or dig potatoes. It is absolutely necessary that this should be, and that, too, very soon; or we shall in a short time be like the serfs and tenants of foreign countries. Our lands will be owned by monopolists, and we shall be compelled to till the soil, not for what we could make it yield, but for just the price our landlords might choose to pay us.

Just stop and think for one moment how many of our farmers are now paying a heavy school tax to maintain a district school for eight or ten months in a year, and yet many of those same farmers, under one pretext or another, deprive their own boys of the benefits of that same school, if not wholly, in part, by keeping them at home two or three days in a week, on some trifling excuse, when by some forethought the boys could have been kept in school every day.

Again, we often hear them say, it is no use to send them to school; they learn more mischief than books. Well, how can they learn their books; for just as they begin to get interested in their studies they are required to stay at home to cultivate corn, hoe in the garden, or some other work, and as a matter of course, they cannot learn much. They very soon lose all interest in their books—and it is a wonder if those boys ever get even a business education.

I am glad there is some wakeing up to this great need of cultivating our boys. Not many years ago it was not thought necessary that the farmer's boy should know much about books. If he knew how to write his own name and could repeat the multiplication table, it was sufficient for all his needs. Too much work and no time for recreation and pleasure makes the farm life irksome, our boys become restless, seek for pleasure in places that often leads them into serious vices. Then many times all the blame is laid upon the boy; he is accused of being wild and reckless; whereas, had he been properly understood, and had the fun-loving side of his nature been gratified in innocent amusements at home he might have become a good and useful man. Did you ever think of it, that it is our boys with the best intellect that have the greatest desire for pleasure and feel the yoke of constant labor the most. It is these we need to give chances for sport and pleasure in their own homes, and surround them with good society, or they will drift away from us, and we shall not be guiltless of their down-fall.

Then let us all strive to make our homes attractive, have good books and papers for them to read; and read with them so they may the better understand and be profited by what they do read.

Do not confine them wholly to works of theology or agriculture, but give them a variety of good, useful books wherein is mixed history and science. Should you find one reading a novel do not tell him he has committed a great crime; but rather help him to select such books as would be most instructive as well as amusing. Have innocent amusements at home, and a variety of them, so that to them their home may be the most attractive of all places.

It is very sad for a boy to feel that to have a good time he must go from home. To such a boy there is danger ahead. Boys should be encouraged to look forward to higher attainments as prizes to be won by actual worth and they can be won by farmers' boys as well as city boys. Among our most eminent men have been those who worked on the farm or in the shop all day, and got their education by the aid of a pine knot at night.

I fear that farmers and their families, as a class, lack confidence in their own ability and are inclined to think because they live in the country on a farm that they cannot associate with the people living in town. This is a very wrong impression, and ought not to be indulged in. My own experience teaches me that the ladies living in town would be glad to associote more intimately with farmers wives and daughters if they would not hold themselves aloof. Do not shun the town people, we are all made of similar clay, and if in some cases they can wear better clothes then our means will allow us to wear, that should make no difference with us. It is the mind and the principle within the man or woman that should be respected, and not the clothes they wear. Many a ragged coat has covered an honest man; and many a silk hat has crowned a knave.

We owe it to ourselves, we owe it to our children, we owe it to society, to try and make the most of ourselves. Children should be allowed to mingle in good society, they should not be required to stay out of doors and out of sight, while we entertain callers. Let them come in that they may form habits of feeling at ease with strangers and cultivated people. Habits formed when young are always retained; hence we should see to it that our children form habits of seeking after the good and true while we have them with us.

In these days when there are so many void of principle, watching, ready to lead our boy's and girls into the paths of wrong doing, we should be more careful in sowing the seed of a good principle which lays the foundation for a good and useful life.

Again, I repeat, let us educate our boys (as far as our means will permit) to fill any responsible position in life. They will be just as good farmers and far better than if they could neither read or write. For they can farm more intelligently and not so much at hap-hazard as many now do. Let us educate our daughters that they may be as well fitted to grace a parlor or fill any responsible position in life as to skim the milk or wash dishes. Among the numerous other things they need be taught let us not neglect to teach them most emphatically to shun the would-be beau who visits the saloon or trifles with intoxicating drinks. Let them be taught the true principles of womanhood.

> For great statesmen govern nations,
> Kings mold a people's fate;
> But the unseen hand of velvet,
> These giants regulate
> The iron arm of fortune
> With woman's charm is purled,
> For the hand that rocks the cradle
> Is the hand that rules the world.

So let us all aim for a higher and more useful life, with good principle to guide us that we may be better fitted to teach by practice as well as theory. Let us elevate our calling, remembering it is just as honorable to be farmers or farmer's wives, if we only fill our place with honor, as it would be to be lawyers, doctors or ministers.

The sooner we learn to honor our calling ourselves, that much sooner shall we be honored by all nations. For what would this or any other nation be if it were not for the farmers? All nations are supported by its farmers, hence the farmer should be respected as well as his productions.

And we can command respect as our just due if we will only try to improve ourselves in the same proportion as we do our lands and stock.

Let us then sow the good seed of truth and virtue, plant a firm and honest principle in our boys and girls, and work faithfully to keep them as well cultivated as we would a field of corn or a garden of choice plants, and most asuredly we shall have an abundant harvest.

> Be proud of the sphere of life you fill,
> And honor it all you can;
> But never fo get more noble yet
> It is to be called a man.

Farming and Mercantile Business—Their Relation to Each Other.

[By Elmer Bradford, Augusta.]

We understand the occupation of farming to mean the cultivation of the soil and in connection with this is the raising of live stock and the manufacture of dairy products. And we understand mercantile business to be the buying and selling of different commodities, or the exchange of one commodity for another. There is scarcely an occupation which offers such unqualified independence and such opportunity for physical development as farming does. Away from the tainted atmosphere and alluring temptations of the crowded city one has reason to expect to find a purity of morals, and a conscientiousness, that is difficult to be found in the

crowded streets. Pure air and wholesome food have much to do with our moral as well as physical health. Were your opportunities not wasted, you as a class might reach the highest degree of physical, intelectual and moral development. The intelligent farmer does much mind work, studying and planing how to better his condition, save manual labor, thereby developing his mental as well as physical being. There is no more unpleasantness, no more annoyances, no more drugery in your occupation than in any other by the pursuit of which men earn their bread by the sweat of their brow. We concede that nearly every vocation offers to its followers some special and prominent inducement over others. Yet objectionable features appear in all. In mercantile business you would find a routine of duties to perform into which there is woven so much disagreeableness that it would astonish the initiated. Of all the occupations which men engage in I can think of none that offers to its followers so little freedom and independence as mercantile business does. From early dawn until late at night the merchant is busily engaged handling his goods, waiting on customers and attending to such other duties of his vocation as are necessary for its success. The relation these occupations bear to each other in agricultural districts should be understood and recognized by all, whether engaged in either or not. One cannot exist and prosper without the other, and the followers of each should have deep feelings of solicitude for the other's welfare. Instead of antagonizing and opposing each other, there ought to be a unity of friendly feeling and harmony of action, thereby encouraging and benefiting one another. Yet in some locations anything but harmony exists. The merchant understands fully well that in farming communities the success of his business depends largely upon the patronage of the farmer. If he is an honest man, and deals fairly with you, he surely deserves your liberal support, for by this he is encouraged in his enterprise, and also enabled to carry a larger and more complete stock of merchandise. Now the merchant that buys in large quantities, and is able to discount his bills, can well afford to sell his goods cheaper than he who can only make small purchases, and often fails to pay at maturity. Too often there exists a feeling of enmity against the tradesman, arising from different causes; perhaps it is the house he lives in, or the carriage he drives, or you may think he enjoys more of the comforts of life than you do. Such people should remember that if the party against whom they entertain this feeling has obtained his money honestly, that he has just the same right to invest it in adorning his grounds with a beautiful house, or buying an elegant carriage, as they have in spending their money in the purchase of land, or of any article which they desire.

There is a wide difference in the tastes of people, and it is right that there should be, that which one would put thousands of dollars into, another would hardly place a dollar in. If, by dint of hard labor and square dealing, a man has accumulated property, we should rejoice rather than envy him his prosperity. Through the short sightedness of some the merchant is looked upon as a person who, if you purchase his goods, makes you pay a certain toll on each article sufficient to support and secure to himself a competency in a few years, instead of being a benefactor he is considered by such people a sponge upon the community absorbing all he comes in contact with. There is no good reason why he should suffer their injustice of feeling. His business is one of the most honorable, and when properly conducted of great banefit to all other industries. Some toil on, year after year, yet through mismanagement or misfortune they do not accumulate anything; but because they have not been successful in the mighty struggle for wealth they have no reason for blaming others more prosperous, who have done them no injury. If your farm is located within a reasonable distance of some mercantile center, you are materially benefited by being thus situated. It enhances the value of your property. Where you find merchants, you will find a market for your surplus products. And it should be their duty and one that they cannot attend to too carefully to furnish you with a good market, paying for such of your commodities as they can consistently handle the best price possible. You being their patrons they are certainly directly interested in your welfare. The merchant has no reason to find fault with you for selling

your commodities at those places where you can obtain the highest price. In these days when bountiful harvests are uncertain and prices low, the farmer, if he expects to accumulate anything, must necessarily exercise good judgment in disposing of his produce.

In large places where competition is sharp, there is often paid a better price for farm produce than in smaller towns. Yet, does it always pay to draw a load of grain fifteen or twenty miles for the few extra pennies you receive per bushel? You should be interested in home enterprises, and, when possible, patronize those in whose prosperity the community are interested. It is true, that the promotion of the exchange among men of desirable things for others more desired by them, is the great incentive of commercial enterprise. Remove this motive and mercantile business would be almost entirely deserted. They are now the agents through which the great exchange of products pass. And they should realize the fact that the greatest material prosperity is best secured by large distribution and interchange of products at the least cost possible to every article. By exchange we mean the voluntary transfer of one article for another, which are deemed equivelent in value. It may be commodity for commodity as when one gives butter for tea, or it may be the sale of some article for its equivelent in money. Through all systems of exchange there is one central figure which is value. It regulates all mercantile transactions in which goods are bought or sold. Now the value of an article is determined by the demand for it. And the supply of it and the great arena of exchange where this demand and supply are ascertained is the market. Between these two factors, demand and supply, competition works continual changes, as supply increases value decreases, and as demand increases value is enhanced. But the value of all articles are quickly brought to an equilibrium by competition between the buyers and sellers. As farmers you occupy one of the noblest vocations in life that men can fill. You supply the bread and meat which are the two staples of humanity for the nation. Your occupation is the very foundation on which all other human industries must build. Nature has furnished spontaneously all matter necessary for the profitable pursuit of your business, and if you but carefully study and investigate your vocation you will surely receive and merit your reward—*Success.*

Farm Life.

[By Mrs. R. E. Wands, of Bloomer.]

When I was invited by the Committee to take part in the exercise of this Institute I refused to do so for the very good reason I know there would be present those that could talk so much better than I could. I preferred to be a listener, but was informed by the Committee that it was the duty of every farmer and his wife to do all they could to make the Institute a success. I wish to say at the beginning that speaking in public is not my fort, however, I will do the best I can, and that is all any of us can do.

The subject I have chosen to speak upon is, "Why do the Boys and Girls leave the Farm and Home." This subject should be of very great interest to every father and mother, who have built up a home in the country.

It is not the influence or education of the farm that implants evil, but rather habit of industry, frugality and economy. It is after our boys and girls leave the old farm and go to the town, and are exposed to all sorts of temptation, that they go astray. It is our duty as parents to teach our children to love the farm, and do all in our power to make our home pleasant. I do not mean that we should go beyond our means, or that we should fill our homes with fine furniture, that we cannot afford, for the majority of our farms are not all paid for, and I claim that it is a duty we owe our children to secure a home for them and ourselves. A pleasant home does not always mean elegant furniture and fine appointments.

If father is handy with carpenter tools, and mother both tasty and handy at upholstering many very needful and really pretty pieces of furniture can be made. If you have little folks in the house, let mother teach them also, they will soon catch the fever, for let me tell you fancy-work fever is contagious, and many pretty things can be made, and at so little expense, it costs but little now-a-days to make a room look cozy and inviting.

I speak from experience. In my own home you will find the greater part of our things made by ourselves. When

we came here three years ago we only brought the necessary things, and together we have tried to do the rest with very good success. at least we think so.

By all means do not refuse the little girls and boys if they want to help you; it will make them love home more, and, I believe, make better men and women. It does not cost much for a little canvas and some bright yarn for them to begin with. Mothers, we will never regret the time thus spent with our little ones. How many mothers say, "Oh, I had rather do it myself than bother with them;" but is that justice to your child? Teach the child to love the farm and home. The only way to do this, I believe, is to begin when the children are young. As soon as a child is old enough to understand, and help work, give that child something he can call his own, if it is only a hen and a setting of eggs; go with the little one and set the hen, in a place where she will not be disturbed; give him to understand, now you have set the hen, he must take care of her and see that she is watered and fed every day. Then when biddy comes off with her little family, show him how to make a coop; then explain to him how to feed and water the chicks. Tell him every chicken that lives you will take to market for him, and he shall have the money for his own: see how earnestly that child will work. When the time arrives to take the fowls to market, don't forget the child's fowls, and keep the money separate for the child; don't spend it for anything; give it to the child, and see with what pride his first earnings are exhibited. Now is the time for father's and mother's advice to come in. Tell him how nice it would be to buy a sheep or a lamb with that money; see how quick the child will take the advice. Let father get the sheep, and when the wool is sold don't forget the fleece that belongs to your child, and if there has been an increase don't let that slip your mind. If your child is a boy, as he gets older and stronger, give him a piece of ground to work; give him some early seed potatoes to plant; help him prepare the ground; when ready, market them for him; perhaps he will have money enough to buy some young stock. Fathers and mothers, get the confidence of your children while they are young, and try to retain it as they grow older. At night, as the children return from school, let each have his own task to perform, so there may be no wrangling or disputing. Teach them to respect you; also one another. If you have a musical instrument in the house, after the day's work is done have the children sing, or have one read aloud for the entertainment of the others. Take a kindly interest in their progress at school, and you will find the evenings pass all to soon; and our children are soon grown, then comes the danger of their becoming discontented on the farm, and they will want to go out in the world for themselves. Let the young people see that you have not forgotten you were once young; don't prohibit amusements in the family; even if they want to dance, let them. Perhaps, at some of the little neighborhood parties they play cards; now, don't forbid them to touch a card; remember forbidden things have a charm about them. The boys, no doubt, will learn to play; then, perhaps, would come the first deceit with the parent. Let them play at home, then they will not go to a neighbor's barn, or perhaps, behind the school-house, or church, on Sunday night, while father and mother are inside praying.

You may be surprised some day when coming unexpectedly upon your son sitting behind the woodshed smoking a pipe, now don't rise up in wrath and knock the pipe out of his mouth, try not to let him think you are surprised, but invite him into the sitting room, give him an easy chair, get the cuspador for him, nine cases out of ten that boy will be so ashamed for himself that he will not touch a pipe again. The boy does not see the harm for father smokes, almost every father does now days so don't blame the boy too much.

Perhaps some may think I am to liberal, in my views on the subject, we are here to express our views, each one has a right to his own opinion. I should like to hear others speak on the subject. I have spent the greater part of my life in town, and for some years lived where there was a large Academy where many of the farmers boys and girls attend school, most invariably those that were brought up in the strictest families, were the first to fall.

I remember two brothers in particular, whose parents were very strict Metho-

dists and very particular with their boys. The boys came to town to attend school. The billiard room was their pitfall. The father, a well to do farmer, gave the boys plenty of money to spend, the consequence was the boys spent every moment out of school playing pool, they spent their money, neglected their stuties. The principal was obliged to send for their father, he came, the boys promised to do better; but the temptation was too strong, they still squandered all the money their father gave them, then they stooped to rob a poor boy of $25 that he had earned to pay his board. The father was again summoned by the principal, he settled the affair, hushed it up as best he could, took the boys home with him, but they told their school fellows that they would not be tied to the old man and woman's apron strings. Those who witnessed the grief of the father said it was awful to see him walk the floor and wring his hands, and take the blame upon himself for his childrens' downfall. Fathers, when the boys ask for the horses and a little money don't refuse, remember they have helped you pay for the farm, and perhaps take more care of the horses than you do, let them take the team, perhaps they want to take their sister or some other boy's sister to a concert or lecture, let him go. It will help brake the monotony of farm life, for life on the form gets to be monotonous, especially to the young, that is why so many leave the farm, they want a change.

Make your home so pleasant that your girls will marry farmers, so that you can keep them near you. I think I have said enough on this subject, some of you may think too much. So I will close by thanking you for your kind attention, while I have been speaking.

How I Make Butter.

[By F. C. Curtiss, of Rocky Run.]

My method for making butter for which I receive the highest market price is to have for a dairy a breed of grade Jersey cows which have the run of the cornfield, etc., during the day and stabled at night in a clean, warm, second-story stable, so the liquid droppings drain through the floor and is absorbed by dry material on the lower story. They are fed on ensilage, night and morning, as recommended by Mr. Gould last winter, with a liberal allowance of wheat and bran; and I shall soon add corn, ground cob and all. The cows are watered from the well and in such a manner as not to be colder than 49°.

The milk is strained into tin cans 8½x20 inches, within about three inches of being full, and lowered into a cistern with a rope—and not too full, but so it will float, as the water raises by the windmill pumping from a well 100 feet deep, and as it is lowered by pumping out for the stock. This is all done without bringing the milk into the house. The milk is allowed to remain there twelve hours, and then brought in the house and kept twelve hours longer in a proper place, or can be skimmed at once; or it may remain longer in the cistern. The cream rises mainly within twelve hours. The water in the cistern never gets warmer in summer than 55° or colder in winter than 39°.

Ice and more expensive arrangements can possibly better this plan, but this is within the reach of all—was advocated for that reason by me years ago, and so poohooed by those interested in the sale of more expensive implements that I have clung to the plan partly to prove the correctness of my position, and partly for its simple intrinsic value adapted to and within the reach of the most humble.

The cream is kept in a moderate warm place until a slight acidity is noticed, and churned at 62° temperature, in a rectangular churn, to granulation; the butter milk drawn off; about a pint of good dairy salt to fifteen pounds of butter thrown in the churn; a pail of well water added; the cover put on; a few revolutions of the churn is made when the milky brine is drawn off, and another pail of water added, which washes out the remaining traces of buttermilk. Salt is added, to taste, which is about one ounce to the pound, and being added while the butter is in a granular state it is evenly incorporated through the butter as the butter is worked into a mass by the revolution of the churn. The butter is packed at once into the tub with a common butter ladle, without any other working than that given by the faithful packing and pressing with said ladle.

Small Fruit Culture.

[Mr. Fisk, of Bloomer.]

I will give my experience and luck in growing the apple tree. Eight or nine years ago, in spring, I bought a lot of of trees of A. G. Tuttle, selected from his catalogue—the most hardy kinds named therein—such as, Trancendents, Hylsops, Briers Sweet, Sylvan Sweet, (Whitney No. 20), Duchess, Wealthy, Walbridge, Tetofski, and others. The most of these trees were sold in small orders toparties. They were set out in different localities, and in all kinds of soil—some in sand. Some were set in clay soil. The trees mostly grew well the first season, The following winter the trees came out all right, but the next winter killed most of these out of not only my own trees, but others I had sold to. That winter was very changeable; there was not much snow, but the whole country was covered with ice most of the time; and where the ice came in contact with the trees the bark became loosened and peeled off. But I was not discouraged with this first trial. I ordered about 1,200 more trees from the Richland County Nursery, of saleable size, and 6,000 or 8,000 root grafts, fifteen or twenty different varieties in all. I sold most of my 1,200 large trees, and they were first-class trees, sound and healthy, and suppcsed to be all of the hardiest varieties for this latitude, but like all other apple trees (in this country), have gone to rest long ago, winter killed of course. The root grafts I managed to save till they were three or four years old, then they mostly went "up the spout." There were a lot of Russian trees among the grafts, but with all the great howl about Russian apples they were the first trees to kill out with me. I then bought 1,500 more grafts, such as Sweet Russets, Orion, Lake Winter, Lookers Winter, Winter Pear, Crab, Richland Sweet, President Hayes, etc. Most of these grafts did well and grew into good trees. I have quite a lot of them on hand now, as any one can see, at my garden in Bloomer. I have mostly given up trying to grow apples in this country. I don't believe that apples will ever be grown in Chippewa county, Dunn or Barron counties with any success. The winters are too cold. But still where a man has a favorable locality he could set a few hardy crab trees and some Duchess; they might live long enough to bear a few crops. And when they begin to fail plant out a few more trees, in that way might have apples of these kinds for his family use. I believe this boasted Russian apple is a humbug. Thousands of these trees have been sold and set out in this county, and were killed out about as fast as they were set out. I have yet to see the Russian apple that was grown in Chippewa county, except Tetofski and Duchess. This remarkable Russian mulberry is another humbug and swindle tree, good for nothing here. It winter-kills down every winter to the snow line. I have given it a thorough trial and would advise everybody to let the Russian mulberry alone. But there are other kinds of fruit we can grow in abundance: the currant, gooseberry, dwarf June berry, blackberry and three or four kinds of red raspberrys, as many kinds of black raspberrys, all varieties of strawberries, early varieties of grapes, such as Janesville, Perkins, Worden, Champion, Clinton and other varieties. We can grow the Desoto Plum. The tree is very hardy and will grow and do well in most any soil. The fruit fine, large, and good for shade trees. We can grow the ash, leaf maple, Lombardy poplar, mountain ash, all kinds of elms, laurel-leaf willow, cut-leaf maples, cut-leaf birches, larches, all kinds of evergreens, Norway spruce, balsams, arbor vitæ, hemlock, etc. We can grow fine roses, snow balls, hydrangeas, tree-honeysuckles, and many other fine flowering shrubs. With little trouble and care when first set out we can make our homes very pleasant, if we only try to make them so by setting out trees and shrubery, flowers and plants, etc.

The Education for Farmer's Daughters.

[By Miss Clapp, of New Richmond.]

How to educate our girls to be farmers' wives ? is a question which the courtesy of your committee has entrusted to me for a few thoughts this afternoon. It is a good omen, and one which I hail with joy to see upon the programme for a Farmers' Institute topics relating to the best interests of the boys and girls. I would that my thoughts might be inspired by the spirt of truth, my lips touched with living coals, and my words chosen from

Heaven's choicest vocabulary, so grand and sacred is the theme.

How to educate our girls to be farmers' wives? Don't educate them at all to be farmers' wives. Some of them will be doctors' wives, some ministers' wives, lawyers' wives, and, alas! some will be old maids. They don't believe it, but the world always has had some unmarried women, and always will; and some of us are vain enough to believe that there is room for a few, and that girls need not be taught to shun them so assiduously as to run their heads into inextricable difficulties. Don't educate the girls for any specific position exclusively, but educate them first to be girls, frank, generous and true; then to be women, intelligent, self-reliant and efficient, and they are ready to take up life's work whereever they may find it.

The question then is how shall we educate our girls. Teach them first and last and always the nobility of work, the disgrace of idleness; that no necessary work cheerfully done is a drudgery. We only make it such when we do it with a drudge's spirit. Mothers, farmers' wives, do not teach your girls that you have all the hardships of life; that you want them to go to school and get an education so they will not be obliged to work as you have done. Schools have been accused of teaching children that the prime object of an education was to save them from drudgery. But it is not the schools, it is parents, actuated by a false affection, who seek to instill the thought that educated people live more easily. Teach them that every position has its lights and shadows. Let your own cheerful attractive home be an object lesson on the lights of the farmer's life. Education begins much earlier than we are apt to think, and if we allow it to run wild too long it is very likely to get beyond our control. The first necessity for education is in the home, the early home, and if neglected there, can never be made complete. Shall we say it? that too often more care is given to the rearing of calves and colts than to the boys and girls. Not for want of love and tenderness and proud aspirations for their future welfare, but because we expect the children to grow of themselves and straightway develop into prodigies of smartness without regard to conditions.

In these days of progress the farmer has his agricultural journal and his dairy paper to which he gives full faith and credence. He studies the best food and conditions for fattening hogs, and the best fertilizer for his crops. But he don't believe much in the new fangled notions about wholesome food for his children or the most profitable books for them to read. He forgets, he doesn't think, perhaps he doesn't know that the air they breath, the food they eat, the sounds they hear and the sights they see, all affect their present and future welfare. He is simply oblivious to their natures and needs. He hasn't time to think about them; he has entered upon the business of acquiring property, probably for his children, that he may be able to place them in good circumstances bye-and-bye, when they ought to be able to place themselves there. To acquire property is well when it is sought as a means, not as an end. The first grand, supreme business of the parent, that which all plans should subserve is the education, the bringing up of the child; the proper and well balanced development of his three-fold nature. A business in comparison with which the accumulation of money as an end, sinks into nothingness.

But how often is it the case that the whole vigorous, pushing, manly nature of the father is thrown into the one purpose of making and saving money, the energies of the mother all consumed and literally licked up in the attempt to do her part of this great life work. Both deny themselves every luxury and even necessary comforts (and the children come in for their full share of the denial), with the laudable purpose of saving for their families, perhaps with the very worthy purpose of giving them an education and desirable advantages in the future. All plausible; but meanwhile those little scraggy, knotty natures are getting pinched, shriveled and twisted beyond all future redemption. Better give them something now. While the bud is opening give it the soil of love and tenderness, the air of freedom and Christian charity, and water with your prayers, your counsels and your companionship. Carefully watch the present growth during the age of helplessness and entire dependence.

Many a woman has received by the last will and testament of her father, money to be squandered by a dissipated husband, money of which she was

robbed in her childhood, and which, if it had been judicously used then in her education and proper training, would have put her beyond present need.

Nothing can take the place of early home culture. I once heard a lady excuse the ill-manners of her boys by saying that the teachers did not teach manners at all now-a-days. A manifest neglect; but did that excuse the mother who had a thousand and one avenues to the child's heart, never open to the teacher? Nay verily.

I am not pleading for extravagance or indulgence, but I am pleading that the home, the institution ordained of God for the rearing of the human family, be cared for, not only with an interest that will compare favorably with that given to the pigs and calves, but with an interest commensurate with the high possibilities and grand destinies of the immortal charge. Then I say again let the home be made attractive and comfortable in all possible ways, let the parents live more in the present and less in the future; more for the present, and the future will care for itself. Give the child's early years sufficient freedom from drudgery and stinginess that the bud may unfold in freedom; then give him sufficient to do that he may be kept from evil thoughts. Teach him self-reliance and self-support, with a clear understanding of his obligations to God and humanity, and you have done a work that will yield a better interest than any bank dividend.

Having thus a fair foundation laid, don't let the girl jump from childhood into long dresses, the company of young gentlemen and late evenings, with the whirl and excitement of the rink or dance till she loses her head. Give her a fair and honorable girlhood in which to mature physically, mentally and morally, a girlhood in which to be a companion, friend and help to her mother, a sharer in the joys and sorrows of the family, where she may learn to do, by doing, the many little things, as well as great, that go to make up a well ordered household. Give her broad culture, all the school advantages that the means of the parents can secure, and all that she can help to secure. She will be much better prepared for a farmer's wife with a broad literary culture as she will for a lawyer's wife or a minister's wife. Narrowness is not a requirement for a farmer's wife, by any means.

People in the city can find plenty of entertainments and opportunities for growth and advancement, but farmers must make their own entertainments, from good reading and from society that may come to them; hence the necessity that the wife and mother be a lady of some literary taste and culture who can entertain and instruct, who can keep pace with the children in their school life, even with the young people in their college life, that instead of being a drudge for them she may be a companion and claim their respect. So that the experience of the mother and the fresh vigor of the college graduate may hold sweet converse.

I do not mean to say that there are not multitudes of noble wives and mothers, self-made women of high type without a liberal education. But if I am asked to say what shall be done for the girls, I shall say give them the best possible school advantages. In pursuing the higher course of instruction, the girl gets more than book knowledge. She comes in contact with minds superior to her own; she lives in an atmosphere of broad experience, of high and noble purpose. Thus, during her formative years her mind is pre-occupied with themes worthy of contemplation; her aspirations are lifted above petty jealousies; grace and ease are acquired, that are as acceptable in the farmer's home as any where. The mental discipline acquired by the study of and grappling with difficult objects will give mental muscle thatwill fortify and energize the mind for the battles of life and ability to resist the petty trials of farm life, if there are more there than elsewhere.

Somebody will say that a girl who can speak German and read Latin, follow the intricacies of mathematics, paint a picture and play the piano will be quite out of place in a farmer's kitchen. Nay, it is not so. I heard of a man once who said he had found out that girls brought up ladies, milliners and school-teachers were just as good housekeepers as anybody. A wonderful discovery; but no doubt it has been made by many another man.

Possibly these girls for farmers' wives may call for a new class of boys for farmers. They may strike for clean mouths and clean hearts; but the law

of demand and supply will hold good. Educate the girls, and the boys will soon be there. So long as girls are willing to associate with tobacco and whisky, with low aspirations and evil practices, so long the boys will gravitate to that level.

But when the girls demand fewer cigarettes and more brains, when they ask honor for honor, purity for purity, when they will have the steady nerve and strong muscle of total abstinence, the boys will soon see light in their light and begin to climb to a higher plane. Hence for the sake of the boys as well as the girls, I plead for the higher education of the girls. Being educated they will be ready to assume responsibilities in any place. The greatest of greatness is shown in the ability to adapt one's self to any and all conditions. Give a girl an opportunity to develop broadly the powers and possibilities that God has given her, and she will be ready to serve or be served, to lead or to be led.

I quote from another. "The woman who understands chemistry well enough to know why bread rises will be a more successful breadmaker, than if she did not; the woman who is acquainted with botany sufficiently to know the medicinal qualities of plants, will make a better nurse for it; the woman who is proficient in mathematics is more likely to keep her household expenses on the sunny side of profit and loss. She who is thoroughly versed in physiology and hygiene will make a better mother; in short, he who has an educated wife has a priceless treasure.

Sheep.

[Hon. Wm. Miller, of Rusk.]

I commenced keeping sheep about twelve years ago. My reasons for going into the raising of sheep were: In the first place, to get fresh meat in the summer season; in the second place, to raise wool enough for our own clothing; and in the last place, to improve the fertility of the soil. Having moved onto a farm that was of excellent soil, but which had been let out on shares for a number of years and had had large crops raised on it and become exhausted through general pioneer farming, I purchased thirty-two sheep from a neighbor who had got tired of keeping sheep, for the small sum of $55.00. I had had no experience in sheep-keeping, excepting the big stories I had heard told of them, and what I read in agricultural papers. I purchased a Cotswold buck for $10 from my neighbor, M. H. Wilson, who was at that time raising a few full-blooded Cotswold sheep. I hear a good deal said about the first cross of animals being successful. I can truly say that I was successful in this cross. I raised the next spring forty-four of the finest lambs I ever raised. Although I have crossed with other Cotswold, Leicester and Oxford Down dams, I don't think I have ever beat the first cross.

In regard to improving the fertility of the soil: I know they have accomplished that. Although I have kept all other kinds of domestic animals, and believe it is as necessary to have a variety of the different manures as it is to have a rotation of crops, still I think my sheep have done more to improve the fertility of my soil than any other one kind of stock.

In regard to wool: I have not raised as large fleeces as I sometimes hear of, but I generally raise a few fleeces as high as 12½ pounds of unwashed wool, and generally average from 7 to 8 pounds per fleece.

As I carry on a fair-sized farm, and consequently have to keep a number of hired men, and as they are generally anxious about what we call in this country "good grub," I find, that a piece of lamb well-cooked is a great success as a peacemaker; besides, salt meats, even if well cured, becomes unpalatable, and is not healthy.

But there are also two sides, profit and loss, in this question. About three years ago a disease broke out in our lambs at birth that caused the loss of a few lambs. Two years ago it was still worse, and last spring some flocks lost almost all their lambs. Although they look strong at birth in an hour or so hey begin to drop, have a swelling on each side of the throat; and it is very rare that you can get them to suck. I don't know the cause or the cure of this disease. Some of our farmers have become discouraged in sheep raising on account of this disease. If our veterinary surgeons or any others can give us the cure for this disease, or what will prevent it, it will be gratefully received.

In conclusion I will say that with this drawback, which may not occur again, and with the low price of

wool and meat, I believe sheep are necessary to the general farmer in keeping up the fertility of the soil, furnishing meat for his own family and woolen clothing for our cold climate. I would say that I think sheep raising is profitable with good sheep in Wisconsin.

Renovation of Exhausted Soils.

[Hon. Chas. V. Guy, of River Falls.]

The first inquiry pertinent to this subject is, What elements of fertility has the soil lost, or what does it need? This can best be learned by knowing what crops have been raised.

As far as the purposes of this discussion are concerned, we will assume the raising of wheat, year after year, is chiefly the cause of exhaustion. For exhausted soils, barnyard manure is a specific. It contains in proper proportions very nearly all the elements of fertility required. Where manure is available the problem is very simple. Spread the manure on the field, cover it up, leaving it as near the surface as the nature of the manure will admit. If it is well rotted the harrow will cover it deep enough; if green and strawy, plow it under. In heavy soils it acts in two ways beneficially. First, mechanically, by making the soil porous, giving freer admission to light, air, water, etc., thus preventing what is known as baking in dry weather. Second, chemically, by supplying in proper proportion the elements which enter into the grossest grains.

There are very few farmers who do not haul all the manure made in the yards and around the barn and spread it where it will do the most good. Whether manure hauled in winter should be spread on the snow and ice above the frozen ground is still a question. In practice each farmer can judge for himself. I prefer, when I haul from town, to pile it up, leaving it hollowing on top to hold the water, throw a little earth on it to absorb the escaping ammonia, and leaving it to ferment till the foul seeds have lost their vitality, and then spread it where wanted when convenient. But the difficulty is, the supply is short when the manure is gone, but a small part of land needing it has received it. This brings up the question of burning straw and the debris of the fields and garden.

If a farmer, who has not tried it, should make a compost heap of all decaying vegetable matter, with the chips and leaves raked up about the buildings and roadside, and to this add all soapy water from the sink and washroom, or other house slops, the size and value of the pile would surprise him, unless he had attained that state of doubtful certainty where nothing surprises.

The practice of burning straw, as well as burning the prairies, is nearly done away with. Still, if one has no stock to work it up, it is better to spread it as thin as may be over the field at time of threshing, and burn immediately. A piece of, say four acres, on which the straw grown on forty acres has been evenly spread and burned, will show a marked increase in crops for several years. While one can scarcely expect to make manure enough from a given field to furnish a coating every year, or even every third year, yet keeping stock, saving and hauling the entire product of the farm, except the pasture, using it as an absorbent for the stables and barnyard when wet, spreading so as to absorb the liquid elements in the yard, a much larger amount can be made than usually is made. Every acre of small grain or hay should produce at least a cord of manure when as well rotted as barnyard manure usually is when hauled out; every acre of corn, if a paying crop, will produce twice as much. In case of a deficiency from the compact heap and barnyard, and none to be obtained within a reasonable distance by hauling, then green crops must be depended on for a supply.

Summer following, necessitates the loss of one season's rental for the land, and requires nearly as much labor, except harvesting, as is required to raise a paying crop. The rest the land gets repays in part for this loss. Our lands when first broken up contained an abundance of plant food, the accumulation of ages of vegetable products. Made still richer by alkaline salts, the result of many burnings of prairie and forests. This supply is very far from being exhausted, even in lands longest under cultivation.

By a judicious system of rotation, with the aid of a dressing of such manure as the barnyard affords, once in each rotation of four or five years, with an added coat of land plaster of from

one to two hundred pounds per acre, sown as often as a crop of grass is raised, will, I think, insure a paying crop, and improve, or at least prevent deterioration for an indefinite length of time.

The era of exclusive wheat raising in this part of the St. Croix valley is past. Most of the farmers have sold the fertile elements of the soil with their wheat. Nature and self-interest have each called a halt; one from exhaustion and the other from over-production. When more is produced than the market demands the price falls below cost of production; allows no adequate rental for the investment, and the farmer suffers, as at the present time. The remedy is, a change of crops.

Appearances now point to stock raising and dairying as the most ready solution of the difficulty. The farm must be changed to produce food for stock. Wheat fields must make way for meadows. This change must take at least a year's time or more to accomplish. Whatever is sold must be in the most concentrated form, as beef, pork, flour, wood, etc. Whatever is bought should be in the coarser forms, as bran and oil meal. These fed on the farm will bring back most of the elements of fertility sold off. By feeding these coarse products to stock we get pay for them in animal growth, and have nearly the entire value for manure left. With the keeping of stock a rotation of crops is a necessity and success a probability. That I may be better understood, let me suggest a system I think feasible on almost any farm where the elements of fertility are not wholly exhausted. If the coarse products of the soil are worked up in the barnyard and compost heap, as has been suggested, there will be manure sufficient for, say one-fifth the land under the plow. The pasture will be fertilized by the stock consuming the crop, so we can dismiss that item from the discussion. Sufficient manure can probably be made annually to fertilize this one-fifth, if not, manure what you can, and summer-follow the rest for a year or two, and after that one can count on an increase of crops sufficient to insure enough manure. This one-fifth put to corn. Corn is a gross feeder and will utilize a good part of the ammonia and phosphates, leaving a fair supply of plant food for a crop of wheat; this may be followed by a crop of some small grain not so exhaustive as wheat, with this small grain sow about a peck of clover seed per acre. On this piece, soon after seeding, I would put from one to two hunderd pounds of land-plaster as before suggested, at a cost of 30 to 40 cents per acre. Clover is a biennial, though not a perfect one, and ordinarily forms its seed the second year and dies, the second crop the second year bearing the seed in this country, though in some other places the first crop is saved for seed.

Clover will usually be in blosom in June, and should then be cut, and when properly cured, makes the best feed for beef or mutton of any of the grasses we raise. This clover sod should be plowed the latter part of July or before the middle of August, and the land harrowed so no weeds or grass can grow on it.

This land will be clean, fertile, and every way adapted for a crop of wheat or any grain one wishes to raise, and this completes five year's rotation. I have purposely omitted roots from the system, though in many places, especially in the British Isles, they constitute a much valued crop of the series, because they consume more of the alkaline elements of the soils than the grains mentioned. With bran at less than $8 per ton we cannot afford to raise and feed roots. Any system of rotation must be founded on the law that different kinds of crops absorb different elements from the soil and in different proportions, and also, although in a less marked degree, from the air. Clover extracts a large proportion of carbon from the air to be expended in heat-producing material, as starch and sugar. These properties are drawn from the air and we gain rather than loose by their use. This raising of clover with us is yet in its infancy, but in the older States and the British Isles after many crops have been taken off, the land becomes clover-sick, as it is termed. The seed fails to germinate and can be used less often in the rotation; but in this part of Wisconsin it can be used for many years to come. Crops differ largely in the growth of their roots. The small grains, with corn, spread their roots on all sides, keeping near the surface. Clover, on the other hand, is a subsoiler. It draws nourishment from deep in the soil or subsoil, and flourishes in times of drought when other grasses dry up.

The decomposition of these long roots tends to enrich as well as to lighten the soil as deep as they penetrate. In these times of low prices and sharp competition, with a soil somewhat exhausted by continuous cropings with wheat, it is not easy for the farmer to decide what crops to plant. Insect enemies in the wheat and corn; cholera among the swine, and pleura-pneumonia among cattle, and glanders among horses. To arrest these scourges of our agricultural interest, the man of science has combined with the law-maker; the first to discover a remedy, the last to enforce it.

Let us as intelligent men and women avail ourselves of these better ways. Better breeds of stock, better understanding of the laws of natural increase. Better ways of curing and saving feed; better ways of manufacturing dairy products, and become a wiser, better and nobler race of men.

Young Sheep the Most Profitable.

[From Good Farming.]

It has been alleged that a sheep aged two years yields a greater or heavier quantity of flesh than a sheep one year old. But this is fallacy. It is now ascertained that a sheep from its birth till it is one year old makes as much flesh as one double that age, provided the young sheep be fed plentifully, carefully and methodically; that is to say that there be no starvation or short common stoppages in the rations. Now it is a law of physiological growth that the time lost by insufficient feeding or the absence of sanitary care in the developement of animals can never be recovered. In the first year of its growth, the assimilation of food is thus lost in the system; all is supplied to build up, nothing is demanded in repairs. At one year old the period of developement in a measure terminates, and henceforward the animal has not only to feed to keep up life, but to repair the daily waste of tissues. Thus more food is necessary to produce a pound of flesh when, after one year old the tissues have to be repaired, than before and up to that period, when all vitality is not repairing waste, but developing growth. It has been demonstrated that the quantity of meat produced by sheep delivered to the butcher at the precocious age of from nine to fifteen months cost exactly half the expense of those fed to double that age. By bringing the animals early to the block, we reduce risks, and labor, and time, which in this, as in everything else, means money. The great fight amongst the mutton breeds of sheep hereafter must hinge on the matter of early maturity more than on any thing else.

Keeping Horses Shod.

[From the American Cultivator.]

Horses kept in use either on the farm or road need to be well shod, and never more than during winter. Frozen roads are all the worse on horses' hoofs from the fact that the latter are more apt to be brittle than during warmer weather. The hoof does not grow so rapidly in winter; but with some horses it grows unevenly, requiring frequent resetting to avoid sprains. Teams at work will well pay for good shoeing in increased efficiency, besides preventing danger from accidents. Horses kept on hard, frozen and icy roads should be kept sharp shod. Any other policy is cruel as well as dangerous.

Who is the Successful Farmer?

[By J. A. Curtis, of Patch Grove.]

"Our success is what we make it;
Joy waits for those who take it.
Patience, energy, smiles and pluck
Mine and coin and stamp success."

That is what are the principles and practices to which successful farmers owe their success. The successful farmers of to-day, as a class, keep up with the progress of the times, and admit science and intellect into the fields and the barnyard, and give employment to the brains as well as the hands. They see that only in the light of science can labor, such as the farm requires, be made attractive and elevating. Changes, innovation, improvements, are going on everywhere in the fields and household of the successful farmer. When thought, and order, and scientific rules, and *good, practical* sense regulate and direct the farm, the owner is sure to be a successful man. Thought is necessary to make work honorable. Thought makes the farmer a skillful tiller of the soil, and it adds dignity to labor. Hence it is the great educator of the intellectual and moral development of man.

Many men who have accumulated a competency by farming, when the land was new, are far from being successful farmers in the true sense of the word.

I knew a man who owned land by the thousands of acres, and yet he was a very poor specimen of farmer. His land has been rented and constantly cropped, until it has been nearly exhausted of its fertility. The less we have of such farming the better for the community, as well as for posterity. Every man owes something to posterity, and millions are living and dying with debt unpaid. It is only when men have paid the debt they owe to man, to society, to government, and to the world, that they can claim to be free, or claim to be successful in any line of business. A life wasted as the miser wastes it, as he who never sends a thrill of pleasure through any human heart, is a bankrupt life. "None liveth to himself alone." If we could all realize this solemn fact, this old world of ours would be better and brighter and grander. "A man isn't a man unless he is in close and intimate relation to other human beings." The miser leaves the heart barren, without a flower of kindness, without a blossom of pity. There is no sense, there is no profit in such a life. It is not *living*.

To be a successful farmer in this age of thrift and enterprise requires a high degree of intelligence. To keep anywhere near the front rank he must keep himself well-posted in the markets of the world, and the supply and demand of various farm products. There is no broader field of science, no more demand for thought and general mental activity, than in the work of a well-conducted farm. Labor is dignified and honorable when guided by enlightened intellect. The farmer should be an educated man, if for nothing else, that he may enjoy his business and ennoble his profession.

The successful farmer does things on time and with dispatch. He has good stock, well-made fences, flourishing crops, clean fields, and other evidence of thrift. To him farming is honorable and profitable, and life is easy. The poor farmer does things in a shiftless fashion and fails. To him farming is a poor business, he lives hard, and cannot see why any one ever wants to farm for a living. On habits of thoroughness and quickness, or lack of them depends success or failure in any line of business. The successful farmer is on time with all his work, doing everything just when it ought to be done to give the best results. The unsuccessful farmer is somewhat careless and behind hand, doing just as much work as his successful neighbor during the season, but not doing it on time, according to the best light of the present day. The first may be able to improve his farm and buildings, and surround his family with comforts and luxuries, while the latter will generally do well if he holds his own without any attempts at improvement.

Farmers have you thought of this? Let me illustrate in the simple matter of plowing and preparing land for crops. The successful farmer begins in good season, so that he has plenty of time to do it thoroughly. He never plows when it is too wet; if it be dry weather he harrows or rolls the fresh plowed land each day, when it is in perfect condition to work down with little labor. The unsuccessful farmer is behind in starting, and then is in such a hurry that he does not half do the plowing. He neglects to harrow until he is all through plowing, and then if a rain does not come at the time he wants it, he wears out horses and tools, and his own patience in almost vain endeavor to make a good seed-bed out of dried-up clods. The harrow simply moves the lumps around a little, breaking a few of them, but not doing one-quarter the real good that it would if it had been used at just the right time. So when cultivating corn or potatoes or any other crop. The first farmer is on time and stirs the earth as soon as it is dry enough after a shower, thus preventing a crust from forming and checking evaporation, and letting in the air and saving all the moisture possible for the crop. The second is behind. He does just as much work; that is, cultivates just as many times, but he isn't on time. He does not do it when it will do the most good, and the result is a light crop. The successful farmer not only raises large crops, but raises those that produce the most money and keep up the fertility of the soil. He uses the most improved methods in planting, cultivation, harvesting and fertilization. He does not use an expensive fertilization of the land, when a cheap fertilization will do as well or better. New ways, new methods and more skill will bring greater rewards than the old fogies ever dreamed of. We should not use two acres to raise what we can produce upon one.

Living on a farm does not prepare one to become a successful farmer. Fitting one's self for any business is an important element of success. The way is for each to study his own circumstances and make the most of them. The successful farmer is industrious, saving, persevering and prudent, in order to accomplish his object. Success is often determined by surrounding circumstances and our individual sagacity of making use of them. The successful farmer works to improve the farm, its fertility, the crops and the stock; doing all the work necessary in a thorough manner so that only the best results will be received. He knows that the fertility of the soil is his capital; on this depends largely his success or failure, and his great anxiety is how to keep it up to the highest point at the least expense. It is a well-known fact that it is much easier to keep it up as we go along than after it has been allowed to run down. It does not pay to raise small crops of any kind; medium crops may just pay expenses, while that part of a large crop in access of a medium may be nearly all profit. No farmer can afford to raise corn, oats and hay to sell. He should sell horses, not oats; sheep, cattle and hogs, not corn. He should make every profit possible out of what he produces. So long as farmers sell corn and oats they will be poor. When we cease paying tribute to others we will be prosperous. The successful farmer takes care of what he has and what he produces. As an element of success the farmer must give his best thought and time to his business; he must make it more than a recreation, more than a pastime. "It must be the study of a lifetime." The great element of success in all employments is the power to concentrate the mind upon the task before it until it is mastered. It is the iron will and an unconquerable determination given to the work till it is done, that *is* the secret of success. The power of concentration stimulates the whole body, as well as the powers of the mind, to the accomplishment of the task. The more of mind we carry into toil the better. Without a habit of thought a man works more like a brute or a machine than like a man. With thought his soul is kept alive amidst his toil. Labor becomes a new thing when thought is thrown into it, when the mind keeps pace with the hands. The successful man enjoys more and is happier than the unsuccessful man.

Young man, whatever you undertake master it in all its details and determine to stand at the head; this is a great essential to success, and it shows that you have abilities for your work. One may have a taste for a special line of business, like raising fine cattle, fine horses, fine hogs, or fine sheep, and if he makes it profitable he is a successful farmer. The truly successful farmer will try to make farming so attractive and labor so respectable and healthy that farming will receive a luster, making it beautiful and desirable in the eyes of the world.

Domestic Help, and How the Problem May Be Solved.

[By Miss Sue Bidwell, of Lancaster.]

"Domestic Help, and How the Problem May be Solved," was given me as a topic for to-day, and the time limited to twenty minutes for the work; let me tell you plainly friends, no such time will answer to solve a question of so much importance that it is being discussed in hundreds of thousands of homes all over our broad land, and away beyond the seas in foreign lands. It will take generations to eliminate the x or unknown quantity, so complicated has one of the simplest of questions become; the given time will hardly permit even a clear statement of the condition or causes, leaving it to each woman possessing, or contemplating the possession of a home, to assist in the solution of the problem; in early life necessity compelled me to solve it on the principle of self-reliance; to be my own help under all possible circumstances, but my rule wont apply in all cases and at all times.

The statement of the question before us shall be confined to life in our country homes, in the farmer's family, for the women who had the demands of society over those of their own families; for the women of fashion who toil not, nor spin, yet are of themselves in attire more gorgeous than that of Solomon in all his glory, for the women who require nurses for their children, to give them leisure to pet their favorite poodles, there are no words of comfort to-day, but rather condemnation; they are largely to blame for the existing condition of social life; they have imported

foreign aristocratic ideas and customs, and are trying to graft them upon society born and trained under democratic principles, but the two don't flourish together. Instead of ennobling labor, they have degraded it to servitude; they have created caste in society and graded a girl or woman by her occupation or employment, as though the kind of work could add quality, attribute, or character to the worker.

I here assert and expect to demonstrate clearly that the principal causes that have led to our difficulties about domestic help are *injustice* and wrong education; injustice in the requirements or demands, in the treatment and in the compensation. Time will not admit of remarks to any extent upon the education or adoption of wrong ideas by society, and how they affect the question. There is scarcely a paper or periodical, weekly or otherwise, comes to hand, but in their columns these two questions confront us: "What avenues are open for the employment of girls?" "How are women to be remuneratively employed?" And on the next column or page: "Where are we to obtain domestic help?" To the first inquiry our answer is, all places and avenues are opening to them occupations, if they fit themselves for the work. To the second, we must obtain our help at home, and from our neighbor's families, and they must fit themselves for their duties.

Woman finds herself at the head of the home department with all its duties and responsibilities under her charge. She is there because custom and a very long line of great-great-grandmothers marked the path for her to tread; these ancestors accepted, perhaps, for the sake of peace in the family, and bequeathed to their daughters the situation of chief-cook, washer-woman, seamstress, dairymaid, and not many years back spinner, weaver, physician, nurse and wife, all for board and clothes; and if a woman dragged through it all, which many really did, and survived a husband, she had the privilege of being called his relic, and cherished a hope of remuneration in a land of *perpetual rest hereafter*. The labors of home-life, with a few exceptions, are certainly most fitted to woman's strength and achievement, while man has installed himself provider, and in most cases taken the harder and unpleasant tasks upon himself; but he has failed in justice to woman, by considering his own labor as the only factor in the production of wealth, and has not divided the earnings of the firm equitably. The daughters of to-day are on a strike; they don't like the conditions imposed upon them by their ancestors, and besides, they have learned to worship—yes, worship at the shrine where the most heartfelt devotion is given—at the altar of the "almighty dollar." They are claiming equitable remuneration for their work, and don't propose to work on the credit system either, of rewards in a future for duties performed here and now. They are searching for employments that pay better than housework and where the requirements are less numerous. The declaration is made repeatedly that this kind of work can be done without any preparation; in fact, it is believed by very many, hence we have the results in such incapable, inefficient help, that no wonder the cry goes up all over our country, "where shall we get our domestic help?" and echo answers, where the two great difficulties are scarcity and incapability, let us search for the causes of this scarcity and incompetency.

Now there is no position public or private that does not require a prepartion for its duties; skill to labor is considered of so great importance that the crowned heads of Europe are obliged to acquire it in the way of mechanical trades; it is of no disadvantage to us under any circumstances, for, if able to hire, it require knowledge in the employer to get proper work done, and the wheel of fortune sometimes turns so swiftly, the rich of this year may be the poor of next, the employer of this may be the employe of next. No mother performs her whole duty to her family, who does not insist on the daughters having at least as thorough a knowledge of work as herself. This part of a girl's education may commence when she attempts her first mud pie, or a dress for her dolly.

Mothers should teach their daughters that labor is honorable, and the source of all the wealth this world holds, and they owe it to themselves never to become a burden upon others till brought to it by sickness or age; that the poorest girls in the world are those who have never been taught to work; the most forlorn, lost and miserable women belong to this class. It belongs to moth-

ers to protect their daughters from this deplorable condition, and they do a great wrong when they neglect it. Slavery in name at least has perished from our country; a new kind in the form of Chinese labor will not be allowed to fasten itself upon us; the helps we have been receiving from Germany, Norway, Ireland and other European countries being of a peasant class, unused to anything except the simplest life, where home comforts in many cases do not exceed those of our beasts, are excellent in cases where strength is required, but miserable failures in the kitchen of the average American farmer, and it takes perhaps years of patience and instruction to fit them for the requisite duties, a very evident proof that thorough training is necessary to fit one for housework. These girls are usually very willing and docile, but the supply don't begin to fill the demand.

This brings us now to our home supply of help, and we find, as said before, the rapid changes of fortune leave no permanency of class, at least none from which we can depend to draw for servants, or menials, as many are pleased to term the willing workers. Heredity settles class destinctions in the old countries, and servants are found there in the same families for generations; they have been well trained in the precept of "Servants be obedient unto your masters." Now, the high-spirited, independent Yankee girl has trained under another and different precept: "Call no man your master;" and, although not unwilling or afraid to work, refuses to be termed a menial or treated as one of a lower class than her employer. All honor to her for it, too. She seeks employment in shop, store, school, factory, anywhere, anything rather than take domestic work. The chief reason is, she loses caste in society by being called a hired girl.

Since the common schools have given equal facilities to both sexes for an education, the demand for teachers has helped to create the scarcity of domestic help; the main reason being the higher wages paid for school work. Another reason, the very wrong idea educated into us, that it is more *respectable* work. It is hired work in both cases, and we believe really that the extra dollars have created the fancied dignity. Girls having an eye to business have crowded to fill the ranks of teachers, some families supplying from one to four. It is not possible that all are fitted for the vocation by nature or education. Then just think of the hosts of excellent cooks, laundresses, dairymaids, etc., that have been spoiled in the attempt to make teachers. Our homes have been robbed of help, and our schools often failures, instead of the grand results expected from the millions of money expended on them. Permit me a moment to remark here, aside from my subject, too many are opposing the education of their children from the mistaken idea that it unfits them for the practical duties of life—spoils them for work, they say. No amount of scientific knowledge ever yet hurt any one; we suffer most from the lack of it. But too often the incentive is urged by educators, that mental attainments are to be rewarded in future by distinction in society, respectability and easy, remunerative employments. Reward for doing right is not a proper motive in the instruction of the young. But, to return to my proper subject. Those having the management of our educational interests, knowing that throngs have filled the ranks of school-teachers, having no ability as such, tried to obviate the difficulty by shutting out the incompetent by raising the percentage of standing requisite for a certificate and adding, year by year, new studies. With all this they have demanded increased wages, and the energetic girls have kept the ranks filled. They have stuffed and crammed pages, chapters and volumes of science, till they are amazed at the amount one head can hold. One remarked to me lately: "Why, I really feel my brain growing and expanding with the knowledge acquired from physiology."

Now, of all that host of teachers probably not one of them but intends at some future time, far or near, to be one of the joint proprietors of a home of her own; but how and when has she fitted herself for its cares, duties, labors or responsibilities? having left these all to mother and the hired girl, married life finds her incompetent for its tasks; a hungry, tired husband cares little for the analysis of sentences, if the bread is sour; nothing for the demonstration of a proposition if the coffee is a puddle of grounds; wouldn't give a fig for her best Kensington work if the meat is

raw, and would feel strongly inclined to say some very harsh words if the shirts are unwashed, or the socks undarned; 'tis said an appeal to a man's purse gives a sure measure of his conscience, but a truer saying is that the shortest way to his heart is through his stomach; we have long since observed he always keeps a loving corner in his heart for the woman who looks well to his comfort.

After our schools are all supplied with teachers from your homes many mothers find they have to apply to a neighbor for her daughter to assist in the housework; and what are the exactions on the farm? Hours from five, and often earlier, until twelve, without recess; the hours vary some in the afternoon according to the season of the year; six days and sometimes seven per week. The average price for services, a dollar and a half a week. The help compares her work and wages with that of your teacher daughter, who gives six hours for a day, and five days for a week, with numerous holidays thrown in, through each term, and receives at least a dollar a day compensation, and a higher grade in society; and with the Scotch plowman Burns, she thinks:

It's hardly in a body's power
To keep at times frae getting sour,
To see how things are shared.

Do you blame the hired girl if she makes up her mind to attend school and become a teacher next spring? Must words still be multiplied in this case, does it require anything farther to show that it is injustice to the worker that has brought about the present condition of no help, while there is an abundance of material for workers in almost every home? Time will permit but a very few remarks or suggestions of a way out of the difficulty; there was no promise of a solution, only a promise for a correct statement of this problem. Could there not be industrial schools or rather departments in connection with our schools, to prepare our young folks for practical life, where various trades, professions, arts, etc., might be taught; apply a part of the means raised for educational purposes to training for other employments as well as teachers, if the home education is incomplete, and let us have skilled workers everywhere; and then each seek the kind for which she had a taste or talent, would give us proper help in all situations.

A man may have other ambitions, but the one *great* purpose of his life is to have a home; within its cherished walls is to be included his little world; by his fire-side is the true happiness of life; and there is no other institution of our civilization can compare with a well-ordered home to cultivate and foster the virtues of our race. Home is the Mecca to which every wanderer's thoughts turn in all the vicissitudes of life. The help engaged for our homes should be required to have correct habits, good reputation, the best of morals and we should never engage as help in the house any whom we cannot trust with the same respect and consideration as the members of the family. For the consideration of bakeries and laundries, resident hotels, associated homes, or familists after the plan of Mons. Gordin, of Guise, France, of whom doubtless many of you have heard, and some methods of co-operative work, we must take another time as my twenty minutes have expired.

What Can the Farm Do for the Girl?

[By Miss E. F. Jones, of River Falls.]

In ancient times, the conquerors of the aboriginal tribes imposed upon the vanquished the task of cultivating the soil while they themselves were occupied with what they regarded nobler pursuits. The occupation of farming and those engaged in it were thus contemptuously looked upon by the ruling race. Through the centuries following, the unjust taxations and usurpations of the ruling class, kept the farmer so poor that life to him became a struggle for existence and intellectual growth an impossibility. It is only in the latter part of this splendid 19th century, that good government, broad acres, and the inventive genius of the American have changed these conditions. Given the steam plow, self-binder, the mower, the hay-loader and all the other great labor-saving machines, and the occupation of the farmer, to-day, becomes an enviable one of independence and comfort.

In the olden time, again we see, in the family, man the strong one, becomes the master; woman the weak one, the slave. Feudalism for the higher classes lifts her from this condition into one scarcely more enviable, the petted plaything of man, the sharer only of his idle moments and most trivial thoughts. Through centuries of struggle, woman

is now emerging from both these humiliating conditions and is trained to do, as Wendell Phillips says, "What God made woman able to do and therefore intended she should do." She is neither the slave nor the plaything of his idle moments, but the willing, glad helper of man.

I shall take for granted, then, in the discussion of the question assigned to me, that this intelligent people accedes in theory at least to each of the following propositions :

That the baby girl in the country belongs to the same species as the baby girl any where else and is capable of like development.

That the baby girl is to be trained in directions which will increase her happiness as a woman.

That happiness for woman as well as for man, lies in the direction of greatest helpfulness, not in the path of greatest helplessness.

That greatest helpfulness results from fullest development of the physical, mental, and moral nature of the individual.

Emerson in his essay on compensation says: "Every excess causes a defect. Every defect an excess. Every sweet has its sour, every evil its good. Every faculty which is a receiver of pleasure has an equal penalty in its abuse. For everything you have missed you have gained something else, and for everything you gain you lose something." If Emerson's doctrine is a true one, and I believe it is, what are the compensations which a home on a farm renders to the growing girl? Can this home build up, round out and complete the character which will result in a happy womanhood? Let us first see what she loses from her environments when compared with her more fortunate city sister. She loses the stir, the impulse to step faster because of the throng which presses all around one, the education which comes with scarcely an effort through the channel of the eye and the ear, from the busy, crowded streets, the familiarity with men and things.

"Something to see by Bacchus, something to hear at least,
There the whole day long, one's life is a perfect feast. * *
The city, oh the city, the square with the houses, why
They are stone-faced, white as a curd,
There's something to take your eye!
Houses in four straight lines, not a single front awry!
You watch who crosses and gossips,
Who saunters, who hurries by:
Green blinds as a matter of course when the sun gets high;
And the shops with fanciful signs which are painted properly.
* * * * * * * *
Ere opening your eyes in the city
The blessed church bells begin;
You get the pick of the news and it costs you never a pin.
By and by there's the traveling doctor, gives pills, lets blood, draws teeth;
Or the Pulcinello trumpet breaks up the market beneath!
At the postoffice such a scene picture—
The new play piping hot!
And a notice, how only this morning three liberal thieves were shot!
Above it, behold the archbishop's most fatherly rebukes,
And beneath, with his crown and his lion, some little new law of the Duke's!
* * Noon strikes, here sweeps the procession, our Lady borne smiling and smart,
With a pink gauze gown all spangles,
And seven swor 's stu k in her heart!
Bang, whang, whang, goes the drum, tootle-te-tootle the fife;
There's no keeping one's haunches still.
'Tis the greatest pleasure in life.

Choice of companions, co-operative study and work, ripe thoughts from the living lips of wise men, inspiring music, the master-play, the art gallery; yes, all these and many things more does our country girl miss which tell in the growth of her city sister. And yet, for all that, I do not regret that the first sixteen years of my life were spent on the farm, far from all these educational means. For all that, I count it a loss which cannot be made good if a few weeks of each summer's vacation are not mine at the old homestead, and for all the delight the city has for me. I expect to spend, if anywhere, a peaceful and contented old age where I spent my youth.

In place of the city sights and sounds, with its bustle and endless change, the country girl has the blue sky, the fleecy cloud, the glowing sunset, the majestic storm, the miracle of budding leaf and flower, the mystery of the burning bush of autumn, the ice and snow crystals of winter, the hum of insects and the sweet carol of birds.

She may not have the delightful companionship of chosen friends of her own age, but the possibility of hurtful companionship is made less, and tender home ties may nowhere else be so closely bound. To me at the old home, nothing could compensate as I see it, for the constant companionship of my mother, made possible by her freedom from the demands of society. The walks with her in meadow and wood, the fairy love of a distant land that she

then taught me; her descriptions of the picturesque scenery of her native home beyond the sea; its castles and its cottages; its peat beds and its fairs, so interwoven with stories of her own home-life there, were all so vivid to me, that sometimes now, it seems to me, I must have once breathed the mountain air of Wales, though I was born in the forest wilds of Wisconsin, and have never crossed the briny sea.

No evening service in a finely equipped church could awaken more true devotion than the Sunday evening circle in our early home, when seated around the large table with father and mother as teachers, and brother and sisters as classmates, I learned to read in the language of the distant fatherland the entertaining Bible. I needed no better incentive than my father's hand on my head and his "Well done, my girl," from his lips. A compensation for the concert we missed came afterward in the dear old Welsh hymns which our father and mother sang for us, the notes of which recalled now in our vacation days, will bring tears to the eyes of any one of the old circle.

"How dear to my heart are the scenes of my childhood,
When fond recollection presents them to view,
The orchard, the meadow, the deep tangled wildwood.
And every loved spot my infancy knew."

The strength which one receives from an anchorage in one's youth to one place, to a few familiar haunts, is frequently dwelt upon by George Eliot, whose early home was in the country. We need but to read the table of contents in a collection of Whittier's poems, or those of the Cary sisters, to recall how these simple sights and experiences of country life inspired their pure thought and noble song. If you would find a beautiful ideal of a country life, buy E P. Roe's Nature's Serial Story, give to your sons and daughters for a Christmas gift, and read aloud with them in the winter evenings. If I mistake not, the book will delight you, and teach a better appreciation and appropriation of your country privileges.

Incomparable are the advantages of the country girl for physical development. Pure air, fresh, unadulterated food, out-door work and pastimes, better conditions for sleep, should make her superior to her city sister in the great essentials of a sound body.

I turn with reluctance from the consideration of the possible to that of the actual. I fear that to-day, in many even well-to-do farmers' homes in Wisconsin, the girl of the family has not passed the drudge and doll conditions of earlier times. On the one hand, we see her awkward, stolid, uninteresting, plodding. On the other, in a still more deplorable condition of selfish ease and dependence, satisfied and vain because of her few shallow accomplishments. Is it not true that many of our country girls are round-shouldered, narrow-chested, weak-lunged, pale and nerveless? Is it not true that many whose services are needed at home are dissatisfied with their conditions, anxious to go out to domestic service, teach school, clerk, do anything simply to get away from the farm? Is it true that many a country girl prefers to marry a "dude," who spends his meager earnings in buying gaudy neckties, and keeps his boots blacked, to the honest young farmer, who can offer her a home on broad, well-tilled acres of his own? It is said that insanity is more prevalent among farmers' wives than among individuals of any other class. It is true that many a sad-faced farmer's wife does say, "My daughter shall never marry a farmer if her mother can help it."

If these charges are wholly or partly true, there must be causes for them, and there must be remedies for them, too. The work of producing by your labor and skill, in conjunction with the great forces of nature—that which nourishes and clothes the world—has, in itself, nothing that is not ennobling and satisfying. The fault, then, must be with the workers, and not with the work.

Let us try to find some of the causes which probably lead to these unsatisfactory results. In the country, as well as in the city, too little attention is paid to health. In selecting building sites, too often, the question of convenience sets aside the more important one of good drainage. The well is dug where it will be most "handy" to water the stock, not where the purest water for the children can be found. While due care is taken to warmly house the hog that is to be fattened, the noble horse and the cow, the delicate daughter, who already has a warning cough is allowed to sleep in a small, unwarmed room, whose walls may be dripping with mois-

ture. Her careful mother takes pains to exclude the sunlight in order to preserve the colors in the carpet, while she ignorantly sacrifices the color in the bright cheek of her daughter. The winter storm may be "too bad to take the horses out," but the daughter is allowed to walk a mile to school and sit the day through in wet skirts, in a poorly ventilated, poorly warmed school-room. Many girls are not sufficiently clad for this rigorous climate. Good flannel is costly, but doctors bills, sickness and death cost more. The girl's food is not selected and cooked with that care, which is necessary to make her first of all thoroughly strong and healthy. 'Tis well that farmers discuss earnestly the best food for producing fat hogs, largest amount of butter and cheese, at least expense, but thought shall also be given to the questions. "What shall we feed our children that they may have sound teeth, good digestion, healthy skin?" What food is best to supply the fat, which our thin, hollow-eyed child with a consumptive tendency, lacks? The girl is not encouraged to climb trees, ride horseback, saddle and harness a horse and do many other things that help to make her brother strong of body.

In a sound body, I plead that the farmer's daughter and his son, too, be given a cultivated mind. So often, it is said, "Of what use is an education to a farmer's son, much less to a farmer's daughter who is to be nothing *but* a farmer's wife by-and-by?" Of what use? To whom is it of greater use? Of what use to be surrounded by the glories and beauties of nature, if the eyes have never been opened to see, and the ears have never been opened to hear the lessons which they teach? Is it consistent to think that the noble sciences of botany, zoology, chemistry, astronomy and geology are of more value to the embryo banker, book-keeper, and lawyer and their future wives, than to the men and women who have the conditions to make them a life-long delight as well as a source of practical value in their business. "The learned eye is still the loving one" and blank fields, weedy roadside, the hollows in the wood, the be-clouded sky will be full of suggestions for thought and not lonely when "God is seen God in the star, in the stone, in the flesh, in the soul, in the clod." Where is more needed than in the farmer's home, isolated as it necessarily is, the diversion which comes from a well-selected library and the ability to use it? I believe that for the failure on the part of parents to recognize this need of mental training many girls as well as boys leave the farm. "But," you say, "If we send our sons and daughters to the school and university, they are dissatisfied with the condition of things at home when they return." 'Tis well. 'Tis very well, I think. Say to the sons and daughters who thus feel, "We are glad you have found out better ways and have higher ideas than when you went away. Now, we will join hands with you in an effort to make our home more to your liking." Do you realize what a joy it would be to your children to be thus taken into partnership, laboring with you and for you? To poor health and lack of opportunity for mental training, I would add the unattractive home as a fruitful cause of unhappiness at least to the farmer's daughter. One summer a philanthropic gentleman, who had always lived in the great cities, was invited to spend a week with a friend at this friend's boyhood home on a farm in Wisconsin. The invited guest had never spent a week in the country since he had visited an aunt in the near vicinity of Boston when he was a boy. Freely he went in and out in the various homes of the neighborhood and it was amusing to see how kindly curious he was concerning this new phase of life. "Why," he said one day, "do all farmers have a bit of a parlor as these do, with pictures on its walls, and some sort of a music box in its corner upon which their daughters are taught to play?" "I repeat to you, may not the farmer's home be made as neat, tasteful and attractive as possible to those who must needs spend so much time in it. Why should there not be pictures on the wall, a piano or an organ, a pretty carpet on the floor, cheering blossoms in the windows and order everywhere? Why not a neat fence about the house, a green lawn and a flower-garden, if the inmates of the home hunger for it? It pays in the long run to make investments of this sort for they bring hope and comfort to the hearts that dwell there, and a new courage and energy to do the most possible in sharing the burdens they impose. I never could understand why a father should frown up-

on his pretty daughter who wishes to be as neatly and tastily dressed as her city cousins who come to visit her. Harmonious colors, neatly fitting garments, made in prevailing modes, cost no more than gaudy, incongruous ones, and make a vast difference in the self-respect felt by the wearer of them, and her consequent happiness or misery. The father and brother coming in from their day's labor will smile more readily upon the ladies of the household if fresh gowns and clean collars have replaced those soiled in the morning's tasks. Would not the mother and daughters respond more heartily to their greeting if father and brothers exchange the necessarily muddy boots for the comfortable slippers, and brush the hair and coat before they spend the evening together?

Another remedy for the dissatisfaction of the farmer's daughter and his wife too, would be found if each could herself be in some way a producer of money and could have entire control of it. It is such a comfort to have one's own pocket book. More than one wife has said to me, not always a farmer's wife either, "I envy you in one respect and that is that you earn money and can do what you please with it. I have the best husband in the world, but I do hate to ask him for every little thing I want." May it not be possible in the varied resources of the farm to find some light, yet remunerative, work which may be chiefly done, wholly managed by the daughter, the proceeds to be entirely at her disposal. Washing dishes, baking bread, ironing, sweeping, the care of children are very essential in the home, but they do become monotonous, and the change of occupation would in itself bring relief. Butter-making on a small scale, poultry-raising, bee culture, the raising and canning of berries might be profitably engaged in. The sum total of the proceeds of the farm would be increased, and the father, when once he had become accustomed to a division of money, as well as of labor, would be spared much annoyance. The daughter would have a business faculty trained, would learn the value of money, as she can in no other way, and a healthful, helpful occupation and diversion would be furnished her.

Not all the correctives I have tried to hint at are enough to prevent occasional unrest and weariness. The preacher, the merchant, the lawyer and teacher would grow rusty and crusty if they never took a vacation. The necessity which comes to all workful lives for occasional periods of rest and change of scene is less recognized by farmers than it should be. The woman's sphere in the home is necessarily most narrow and confining, and she, it is, who needs most an occasional relief from its monotony. She, it is, who from lack of it grows cross, hopeless, morbid, insane. That a woman's home and work are on a farm is no reason that the city and its attractions should be a blank to her. Here comes in the beautiful law of reciprocity. Her country home is a haven of comfort, rest and enjoyment to her city friend and the city home of her friend becomes a compliment of her own, supplying the change and recreation which she needs.

A healthy body, habits of industry, a business tact, a strong attachment to home, a cultured mind, a helpful spirit, a loving, reverent soul, these all may the farm bring to the girl.

Need I suggest what the girl thus developed may bring to the farm? You have a loving daughter that is the light and life of your home, know what she does bring to the farm with all her frailties, now. You who have a patient, faithful wife, a tender self-sacrificing mother, know what she will bring to the farm home of the future when one worthy of her shall ask her to share and bless it.

On Beautifying Farmer's Houses.

[By Mrs. J. M. Smith, of Mineral Point.]

It has been said by travelers that they could distinguish a pure-minded and more intelligent family from the appearance of the house, and grounds immediately surrounding the house. We all know and appreciate the difference between the farm house or rather *home* of the more intelligent—surrounded with flowers and a few vines twined with care and taste over the dwelling, or the different spectacle of weeds and briars holding their dominion. The one is a rest and refreshment to the farmer, returning from his toiling and laboring, in the "sweat of his brow;" while the other represents to him only "bed and board," and often of an inferior quality to that he has provided for his well-housed cattle.

Little need be said of the dignity of farming as an occupation. It has engaged the attention of the most distinguished men in all ages of the world. Adam was the first farmer, and the Creator assigned a *garden* planted by himself for his home, and we know that all manner of trees, fruits and *flowers* were there. Of what *use* may some say is the cultivation of flowers; it neither gives us meat, drink or clothing? Well, supposing it does not. Are we not capable of another thought besides the keeping of body and soul together by the production of corn and potatoes, and the making of butter and cheese? We have a mind to be fed and refreshed, and our children to be educated in morals and culture. Because we live on a *farm*, isolated from our friends, is the greater reason that our surroundings should be *beautiful*; as largely as time and circumstances will allow of. Why may not every farmer's house have its plat of ground surrounding the dwelling, fenced from intrusion of cattle and hogs, and devoted to the cultivation of trees, shrubs and flowers, the cultivation of which is the tribute an enlightened mind pays to nature. The planting and tending of these, may be one source of happiness to wife and children, and no farmer, who is the head of a household, will be so churlish as to refuse to his family, this means of amusement and recreation. He should endeavor to make home attractive and lovely, in doors and out—a paridise, if possible. In the bleak New England States, no farm house is without its perennial flowers, shrubs and sweet herbs. In our own lovely corner of Wisconsin, flowers and vines grow almost spontaneously.

The outside of a house is usually an index to the inside. Some room other than the room of all work, can be made bright and cheerful, where, after the days labor, the farmer and family may assemble to make the fireside home, for home is not only a shelter and feeding place, but the assembled family, for the interchange of thought and experience, where comforts may be secured, and domestic pleasures enjoyed. Woman is the born decoration of the home. So much depends upon the woman that we might very nearly say, that the happiness or unhappiness of the home is woman's work. Decorations should not be despised because they are cheap, the paper on the wall, the rugs or carpets on the floor, the bright chintz on lounge and and chairs, the cheese cloth for the window curtins, may all be cheap and home-made, but nevertheless decorative and beautifying, a few nice pictures on on the walls—for a room does not seem furnished without pictures—the works of great artists are now distributed in prints and engravings, so that every one can afford them. Some shelves filled with good books, not the goody goody kind, but reliable books of adventure, history, fiction, of standard authors, some literary journal for family reading, besides the farmer's *Stock Journal*, a news paper, to keep you in communication with the "rest of the world," not forgetting the Family Bible and a good cookbook? All these combine the important art, of living happily. If the houses and homes of farmers are made attractive, farmers' sons will not long for the time to come when they may leave the farm home and drudgery for city attractions and temptations, but follow in their fathers' furrows, loving the tilling of the home acres, for no occupation is as independent and manly. Socrates, has called the cultivation of the earth, "an excellent employment most worthy the occupation of man, the most ancient, and the most suitable to his nature; it is the common nurse of all persons, in every age and condition of life; it is the source of health, strength, plenty and riches, and of a thousand sober delights and honest pleasures; it is the mistress and school of sobriety, temperance, justice, religion; and in short, of all the virtues, civil and military.

Fish Culture on the Farm.

[By O. M. Richards, of Elmo.]

I do not propose that every farmer will or can be a fish culturist, for the simple reason on some farms there are neither springs, running streams or ponds. But we do say that in a country like this, where so large a proportion of the farms have running streams of water on them, that the owners of such farms can be—and that too with comparative little labor or expense—a successful fish culturist. Persons unacquainted with the subject are apt to think that to be a successful fish culturist one must not only have the practical knowledge, but he must possess

vast scientific knowledge. Nothing can be farther from the facts in the case. About all that it is absolutely necessary to know is how to locate and construct a pond, and then, what kind of fish to stock it with. A pond properly located and constructed will give but little trouble. Stocked with the right kind of fish it will be a source of pleasure as well as profit.

Right here we imagine we hear the inquiry made if we expect fish culture to pay on the farm. We unhesitatingly answer that it will pay, and that too, in more ways than one, and the farmer, above all others, should be the fish culturist. The fish pond will furnish more food, of better quality and at less cost to the producer, than the same amount of land put to any other purpose that we know of. It will furnish the farmer's table, fresh and pure, with a luxury that is often difficult to procure. We hold that the farmer and his family are entitled to the very best of anything that can be produced on the farm. The pleasure and intelligent recreation that it will afford to every member of the farmer's family will pay for its cost many times over. The fish will multiply faster than candidates for county offices, and grow at a rate that will astonish any one unacquainted with their habits. You will not have to work all summer to raise food to keep them alive during the winter. The cyclone and the hail does not affect them. They are undisturbed by the summer's heat or the winter's cold, and each succeeding year the pond will support a larger number of fish and support them better.

Many who have suitable locations for constructing fish ponds, seem to be deterred on account of the vast amount of labor that the undertaking seems to imply. Here we wish to say that with suitable location and there are thousands of them in this part of the country, it would cost but little more to construct a fish-pond than it would cost to cultivate the same amount of land in corn one year. This may seem wide of the mark, but as we have had considerable experience in that direction, we think we know whereof we speak.

The idea of an artificial fish-pond suggests to most persons one of two operations, neither of which are practical. One is damming a stream, and the other is excavating. Damming a stream is impracticable, for the reason that the first flood will likely carry away a large part of your fish. Excavating is not to be thought of, for it involves vastly too much labor for fish culture on the farm. There are many springs throughout the county where artificial ponds could be made by simply raising a bank around below them, but as a rule, the pond should be constructed on dry ground.

Select a site on the margin of some stream where there is sufficient width of bottom land for your pond, and at the same time, have sufficient room in between the bank of your proposed pond and the hillside opposite to draw all of the water in time of floods without endangering the overflowing your pond. You will conduct such part of the water out of the stream as you may want for your pond, taking it out high enough so that you can conduct it in a ditch that will be about upon a level with the upper end of your proposed pond. If the pond is to be of any considerable length the natural decent of the ground will give you deep water enough at the lower end for your fish to winter, while the upper end will be shallow, and there in warm weather you will always find the fish, particularly the young ones, for it is in the shallow warm water that their food is produced in the greatest abundance. Now construct a good solid embankment from the hillside above to the hillside below, around your proposed pond, thus making a reservoir. Conduct the water under the bank at the upper end of the pond and through a box spout that will only admit of a certain amount of water. At one end of the spout should be a gate so that the water may be shut out altogether if necessary. The inner end of the inlet spout should be protected by a wire screen fine enough to keep the young fish from escaping. For an outlet dig well into the hill around the end of the bank at the lower end of the pond; have this also protected with a wire screen. If the location is such that the ponds must necessarily be narrow, there can be a succession of ponds and no two of them on the same level. By conducting the water from one pond to the other through a box spout that has an elbow at the outer end, that will raise the water up to the level of the water in the pond above. The dimensions of

the embankment should be as follows: Whatever its height it should be four times as wide at the base as it is high, and the width at the top should be equal to its height. To construct the bank take a good three-horse plow and backfurrow a land fifty feet wide; then take a dish-harrow and thoroughly pulverize the land plowed. Then commence in the middle of the land and back-furrow it again, and keep on alternately back-furrowing and harrowing as long as you can. Then finish up the top of the bank with a scraper, scraping from both sides. This will give you a bank with the dirt well pulverized and well packed, that should hold water as tight as a jug and should stand indefinitely. You will also have plenty of deep water on the inner side of the bank. There is a good deal of dirt to handle in a bank of this description, but the way we have handled it. it has not cost much. In June, 1884, we raised a bank sixty rods long from four to eight feet high of the dimensions indicated above, and three men and two teams completed the job in seven days, allowing $3 for man and team, and $1 50 per day for the third man, making that pond cost us $52 50. The bank includes about 800 rods of ground.

As to the kind of fish that we would stock the pond with, from our own experience, we would say the black bass. One of our reasons for our preference for the black bass is, that he is strong and vigorous, asserting himself whereever placed. As to our other reasons we can do no better than to read from a paper that we wrote for one of the public prints a short time ago.

"It seems strange that Pisciculturists have never found out that the black bass are the best fish for pond culture that are to be found in American waters. We suppose that the reason for this is, that their efforts have always been in the direction of artificial propagation. All attempts to artificially hatch the black bess have been, and are always likely to prove a failure. The reason for this is that when the black bass deposit their spawn they glue them to the bottom of their nests, and there they remain until they are hatched, or are destroyed by sediment settling upon them, which can only happen in consequence of the stream, that they may be in, being muddy from freshets, or some fisher capturing the mother fish, then they are sure to perish. We have repeatedly thrown dirt into the nest of the black bass when they are protecting their spawn. It makes them almost frantic, and their efforts are unceasing until the last particle of dirt is removed. They will swim around in a circle on the inside of the nest and that, too, so rapidly, that the eye can carcely follow them. After the dirt is thoroughly stirred up, they then assume an upright position and brush the last vestige of the dirt out with their tails. If the spawn is deposited in streams that run through an agricultural country they are very liable to be muddy at just the time to destroy all of the eggs of the black bass. But in the clear, still water ponds that are protected from the wash from the fields, and that have a coating of moss growing over their bottoms that keeps the waters pure and sweet, the black bass prepares her nest and deposits her spawn. Then all of the concern she has is to keep away intruders until her young brood hatch, and a brood it is in good earnest. When we come to know that a female black bass will deposit an amount of spawn equal to one-fourth of her entire weight, and then when we take into consideration that there are few fish eggs smaller than those of the black bass, then when we further consider that in clear, still water a large portion, if not all, of the eggs hatch, we will be prepared to make several figures to represent the number of the young fry that may be found in one school. After the young fish are hatched, the yolk sack, which is small in the black bass, is rapidly absorbed, and in a few days they are ready to leave the nest. At this stage they are from three-eights to a half of an inch long. They are almost transparent, with the exception of a distinct black stripe running lengthwise about mid-side. The young fish move slowly at first, and keep near the surface, and are always accompanied by the mother fish, who endeavors to keep away all intruders. While the young fish remain in schools, which they do until they are about an inch and a half long, large numbers of them can be captured by using a fine dip net. After they separate we have never succeeded in capturing a young bass with a dip-net unless we got him in some corner where he could not get away. The black bass is a rapid grower, and consequently a voracious feeder, and as he

will turn up his aristocratic nose at chopped liver and butcher's offal—for he is a clean feeder, taking his food alive, and prefers it on the wing—the food supply is a question that persons unacquainted with the subject fail to understand. They fail to see how a fish that, with favorable surroundings will multiply so rapidly and then grow so fast, are going to get enough to eat.

Right here we will make a general remark, and then explain it afterwards. The food supply in the pond will keep pace with the increase in number, and growth of the fish. Secondly the older the pond the greater the food supply. The first great feast that the black bass has is on the tadpoles and a feast of fat things he makes of it. As soon and even before the ice is all out it seems that all of the frogs and toads in all of the adjoining counties are in the fish pond. In a few days, or as soon as the water gets a little warm, it is swarming with tadpoles. Then the bass have a happy time, and refuse to take a minnow unless it is offered to them early in the morning before they begin to move about. The tadpoles furnish the larger part of food for the bass until the tadpoles get their legs, which is along about the middle of July. Then his frogship gets out of the pond as soon as he can, well knowing what will be after him. About this time the young chubs, dace and stickle-backs, which breed in immense numbers in shallow places in the pond, will be from one to two inches long, and they will furnish the bass his principal supply of food until about the first of October. About this time the soft shelled water snails that have bred in the soft dirt in the bottom of the pond, begin to come up, and in a few days every blade of grass, or piece of board will be covered with them, and in many places large masses of them collect together in the water. Upon the snails the bass feeds to repletion. He is now laying in a store of fat preparatory to going into winter quarters. At this time he cares but little about the minnow. Upon the approach of cold weather he seeks the deepest water, and there under a bunch of moss, or under the side of a stone or an old root, he enjoys a season of perfect repose. He neither eats, or grows, and comes out in the spring an older, and a much thinner fish than he was in the fall. As an edible fish the black bass has few equals, and it is doubtful if he is surpassed by any. W. H. Herbert (Frank Forrester) says the 'black bass is one of the finest of fresh-water fish, and is surpassed by very few in excellence upon the board.' Parker Gilmore says that the black bass is superior to the trout. As a game fish the black bass stands pre-eminent. A. J. Henshall, who is an authority on the subject, says of the black bass, he is plucky, game, brave and unyielding to the last when hooked. He has the arrowy rush and vigor of the trout, the untiring strength and bold leap of the salmon, while he has a system of fighting tactics peculiarly his own.' He further says that he considers him 'inch for inch and pound for pound the gamest fish that swims, and that the royal salmon, and the lordly trout must yield the palm to a black bass of equal weight.' Whoever has hooked the 'monarch' of the pool or has seen the swirl upon its surface, or listened to the music of the singing of the line, or watched the noble game as curving it reaches back and forth, he darts in conscious strength, describing arcs and segments in the shadows of the ruffled pool, will be willing to admit that he is game. Whoever has seen him leap from the water when hooked shaking himself like a lion shaking his shaggy mane, making a gallant fight in air or water all the same, will be willing to admit that the black bass is the gamest of game fish."

The Merits of the Hereford Cattle.

[By N. W. Van Metre, of Mineral Point.]

The position that you have assigned me is one which I fear that I am inadequate to fill, being a novice in the breeding of Herefords. However, I have selected, from information which has come within my knowledge, a few facts and statements that may be of benefit to you and help you to better appreciate my favorite breed of cattle.

The proper aim of Institutes, agricultural societies and farm journals is "to encourage the best breeds, the best methods and practices, and to bring these facts before the public. A breeder is not entitled to encouragement unless his efforts tend to produce the best butcher's beast, whether it be a sheep, a hog, or an ox, and the societies whose efforts do not tend to this end are open to criticism, and should not be encouraged. There is one breeder of fine

stock for breeding purposes, where there are one thousand for the butcher." From these breeders of fine stock the *many* purchase animals for the improvement of their herds. If stock journals and agricultural societies connive together to keep before the public breeds and strains of blood that are not the equal of others in vigor of constitution and quality of carcass, then they are assisting in defrauding the public, and ought to be discouraged. I, as a breeder of White-faces, believe that "economy of production and value of product" ought to be the standard of merit.

Until last March, as far as I know, there were none of these cattle in Southwestern Wisconsin. So little was known of them by many farmers that, on seeing them at our fair, they did not know what kind of cattle they were.

"About 120 years ago Mr. Benj. Tomkins of Herefordshire, Eng., then a young man just starting life, commenced a herd with two cows. He was the founder of the breed, and has the credit and honor of this position. Others followed and worked with him, until the work that he commenced was recognized as a success, and the highest price that was ever obtained for animals belonged to this herd in the early part of the century. Careful experiments were made by the Duke of Bedford, fifty years ago, and they resulted in the establishment of the breed on his estate at Woburn. Fifty years ago the records of the Smithfield Club showed that the Herefords had taken more than double the premiums when contrasted with all the other breeds combined. A history purporting to be "A History of British Cattle," was written fifty years ago, but it did not note the name of the Tomkins' herd in 1816, nor did it notice the sales of Mr. Westcar, of Hereford cattle from 1800 to 1820, at prices unprecedented in the history of cattle, or the experiments of the Duke of Bedford, or the record of the Smithfield Club, or of the Smithfield show, in which more premiums were given to the Herefords than to all other breeds combined; yet the work to which we refer has been received as authority. During the last 100 years Herefords cattle has been selling in the London market at a penny a pound more than the Short-horns, and from grass more than any other breed, while they would make beef at twenty-five per cent less cost. These were facts acknowledged by those persons who were familiar with the subject."

The Herefords are a kindly and hardy race of cattle, feed speedily and at an early age, and may be driven to market at 2-years old. They may be described as follows: Countenance pleasant; head small; chest deep; bosom broad; projecting forward; shoulder-bone thin and flat; shoulder full and mellow in flesh; chest full; loin broad; quarters long and wide; tail slender and neatly haired; the carcass throughout deep and well-spread; round bones, small and snug, and not prominent; legs upright and short; flesh, everywhere mellow, soft, and yielding pleasantly to the touch, especially on the back, shoulders and ribs; coat neatly haired, bright and silky; color most generally a middle red, with a white face, which latter is characteristic of the Herefordshire breed. And Youatt says, in writing of the Sussex, "The Hereford bears his flesh on the ribs and sirloin; the Sussex on the flank and inside. There may be some truth in this. Yet it cannot be denied that the Herefords carry theirs in the best places. And it is on this account that the prize is so often adjudged to them at the cattle shows, and particularly at Smithfield."

Pure breeding for a long period is one of the merits of the White-face, and it enables the sire to stamp his own good qualities indelibly on his offspring. Out of a herd of 52 grade calves, bred in one season from the same sire, 50 were red with white faces, and all were so built as to show unmistakably their Hereford parentage.

At the New York State Fair of 1882 two Hereford steers, which took first and second prizes, were dressed. The beef in the carcass of one was 63 per cent. of live weight, and of the other 69 per cent. With hide and tallow the former turned out 80 per cent. and the latter 87 per cent. The lean was finely streaked with fat, and was of rich texture. Not only the small per cent. of offal, but the fine quality of the meat are other merits of our breed. And my own experience in regard to economy of feeding is that I can keep four of them on the same amount of feed, and in the same condition that I can three Short-horns, and I know whereof I speak.

Although in a few instances importations had been made into the United States by different persons, extending over a long period of time, there had been no general movement to introduce them to the notice of the farmers of this country until twelve or fourteen years ago. T. L. Miller, of Beecher, Ill., and others having had them brought to their notice, investigated their merits and decided that they were superior to any other rare of cattle. Tney went into the business of breeding them and determined to make it a success if it was possible for merit to succeed. The record of their achievemenls is familiar to most of you who have read impartial newspaper reports. They have made a record in the past six years of which any admirer may feel proud. They have fought their way against wealth and prejudice, and followed up the successes they have met with during the past century on the other side of the Atlantic, by the highest honors to be obtained on the continent of America. All tne White-face asks at your hands is fair play and no favors. I need not burden you with statements of the winnings of prizes at the fairs and shows this fall. They have been all that could be desired. But we can not refrain from giving a clipping or two from the Breeders Gazette, of the 2d and 9th. In summing up the successes of the Early Dawn Herd it says: "At the Inter-State Exposition at St. Joseph, Bean Real beat a field of twenty-two competitors (followed by four others). It is questionable whether a stronger ring of bulls was seen at any fair this fall, Short-horns, Herefords and Angus being represented by 'crack' specimens of the breeds."

The last issue says: "Just as we go to press we are informed, by wire, that a cablegram just received by C. B. Stuart, of Lafayette, Ind., announces that the championship of the Smithfield Club's Fat Stock Show, just concluded in London, Eng., has been awarded to a Hereford steer. In view of the fact that a bullock of this same breed gained the grand sweepstakes prize at the great American show recently held in this city, our informant's enthusiasm is perhaps pardonable, when he concludes his dispatch by saying, 'Blood will tell. White-faces will not down. Every dog has his day.' But the Herefords have made a grand record during the past three months, and no one will be disposed to rob them of their laurels."

In conclusion, let me say, whenever a bullock is found of a heavy, blocky build, on short legs, whatever name he may be known by as to breed, he is pronounced a good one, and the breed that produces such, of the greatest uniformity, is the best. The Hereford is uniform in this particular, and this class of bullock is the exception in the Shorthorn breed; hence the value of the Hereford.

Mixed Farming.

[By W. A. Chamberlain, L. L. D., President of the Iowa Agricultural College.]

Mixed farming is coming to have a bad name in many quarters. The word mixed seems to suggest the idea of contusion, lack of system, frittering away the energies on a multitude of small details. This kind of "mixed farming" I do not believe in, at least for these times. The mixed farming I do believe in I will describe further on. The kind I don't believe in is a kind of outgrowth of old times and conditions—a failure to adopt the style of farming to the changed conditions. When transportation was practically impossible, no railroads but "corduroy," and no markets except for barter or store pay, the farmer must raise and make about all he and his family ate, drank, wore and lived in; i. e., food, clothing, shelter. But, now, with our immense advance in machinery, our matchless facilities of transportation and exchange, the tendency is strongly towards division of labor, and concentration of effort upon specialties. And it is wisest and best that it should be so. It sometimes cramps and narrows the individual worker intellectually, especially under our manufacturing systems. Unquestionably the division of labor and the specialization of employments in manufacturies and commerce greatly increase the production of material benefits to the race. In agriculture, however, Nature has set up barriers against carrying specialties too far or in too narrow lines. Some of those barriers I will describe further on. But to a certain limit specialty farming, concentration of intelligence and effort upon fewer crops and kinds of stock, is wise.

I have said that the objection to a

certain kind of "mixed farming" is well founded. I have in mind a typical "mixed farmer" of the sort I don't believe in. No matter when and where I knew him, nor how many there are of him in Ohio, Iowa or Wisconsin. He is always mixed and so is his business. He has "more than he can carry," or at least, like the tipsy man, he "might better have gone twice for it." Three large farms he has and keeps buying and renting more land. He doesn't "want all his eggs in one basket," and so has so many baskets he can watch neither eggs nor baskets. He has all sorts of crops, stock and industries, and seems to need them all to make the "two ends meet," or rather the forty ends. He has three maple sugar camps, and you can smell burnt syrup in some one of the three pretty much all the time, when the hired help get careless or asleep. He has two summer dairies and one winter one and is on the anxious seat half of the time about their feed. He keeps sheep, too, and raises lambs and pigs and colts. A good colt amused himself by chasing the sheep; the father of the flock turned on him, played Roman battering ram and broke the colt's front leg. He whirled and with the three legs left kicked the breath out of the hundred dollar buck, and then had to hill himself. It was a fair fight and a draw game as between buck and colt, but it cost the mixed farmer $200. He raises all the crops in the catalogue. His sugar making and bucket washing run into oat sowing two weeks, and that into potato planting as much, and that into corn planting, and that into the next thing and so on. He is two weeks behind, all the time, and winter sets in with potatoes undug, corn unhusked, and half an acre of piles of cider apples frozen around his big cider mill. He goes into every new thing that promises to make him rich, and his 200 bushels of Bohemian oats that he is waiting to have the "company" take off of his hands at $10 per bushel. He has a brick yard and gravel bank, and threshing machine and portable saw-mill and a number of other strictly agricultural interests. He and his family work early and late, but with little system, or on the same system on which the man drove his oxen. "Gee, haw! Buck and Berry, go just where ye durn please; the hull field's got to be plowed." He's always behind hand with his work as I have said, and never gains on it any.

Now you will readily understand that I do not believe in that sort of mixed farming. Still I do believe thoroughly in the right kind of mixed farming as against narrow specialty farming; and I would lay down these four guiding principles:

1st. Successful farming must combine or "mix" crop raising with animal industry in order to keep up the soil's fertility.

2d. Rotation of crops and order of work should be so arranged as to furnish the farm force steady and remunerative work nearly or quite the whole year around.

3d. The farming should not be so mixed as to multiply fields, fences, and the kinds of machinery necessary for profitable work, or so as to waste the time in changing from this to that, or in puttering with small non-paying jobs.

4th. The farmer should make his money on his farm, in legitimate farming, and not in outside work or speculation.

First, then, successful farming must be mixed so far as to combine crop raising with some form of animal industry. Our domestic animals are the heaven appointed means of keeping up the soil's fertility. I do not believe it can long be kept up without them. I have tried to explain this in my lecture on manures. These animals, if good individuals of good breeds, have the power of taking from our grass and grain crops their feed value or money value for our pockets, and leaving in their voidings almost their entire manure value for our fields. Specialty farming without a fair proportion of live stock kept and their manure wisely saved has, after a time, invariably exhausted the soil or brought disaster of some kind. Witness the cotton fields of the South, the peach lands of Michigan, the potato lands of Lake County, Ohio, and the wheat lands of the Genessee Valley, N. Y., where the farmers that trusted the clover alone without much live stock were driven out of their specialties by diminishing returns.

One of the most successful potato growers in the country manured heavily up to three years ago, *i. e.*, the immediate effects continued till then. In 1881,

1882, and 1883 he had 47½ acres of potatoes which yielded about 10,704 bushels of potatoes or 225 bushels per acre. In 1884–5–6 he raised a few more acres, but kept almost no live stock and trusted mainly to clover for manure, and his average yield per acre for these three years has shrunk nearly half. But the weather was on the whole and on the average as favorable for potatoes the last three years as the first three, as shown by the fact that the average yield for his own State was 4 1 10ths bushels larger and in his own county was but five bushels less the last three years than the first three.

I can see no possible explanation except the almost entire discontinuance of the use of manure the last three years under continual cropping of over one-half his arable land in potatoes. While he manured heavily he had big crops. When he stopped manuring his yields fell off nearly one-half. I have never known a case where potatoes (of all crops) were successfully raised repeatedly on the same land even with occasional rests of a year or two with wheat and clover, unless large quantities of stable or yard manure were applied, either furnished by live stock kept on the place, or drawn from neighboring city or village. In the lecture on the "Value and Management of Manures" I have given other striking illustrations of the great value of regular old-fashioned barnyard manure. I repeat then my first proposition that we must "mix" stock keeping with crop raising in order to maintain the fertility of our soil.

Second; rotation of crops and order of work should be so arranged as to furnish the farm force with steady and remunerative work nearly or quite the year round. This seems impossible with any mere crop specialty, even where it includes two or three crops but no live stock. The Dakota specialty, wheat farming, gives employment only about six or seven months in the year, and potatoes, wheat and clover as a specialty without live stock will give employment for only seven or eight months. But the farmer must find employment the year 'round on his farm, and it can be done where live stock are kept. For example, my own farm of 126 acres has a good maple-sugar camp of 1,500 trees, including one-half rented trees, 15 acres of orchard just come to good bearing condition, and about 65 acres of land nearly all tile drained and suitable for rotation of crops, and the rest rather rough pasture land, including the sugar grove. If I were farming it now myself with one or two sons my plan would be as follows, which is in the main my plan now, working it as I do, absent from it most of the time, through a hired foreman: From November 1 to April 1, much of the time would be given in the warm-bank barn to care of winter dairy, selling milk or butter, or cream in the neighboring city, feeding well and high, saving all manure, solid and liquid, with great care, and drawing it upon the snow or frozen ground to the field to be all ready to be ploughed under for spring crops. Wisconsin practice might need to be different, owing to inability to raise winter wheat, and the common custom of fall plowing for spring crops. From February 15 or March 1 to April 15, devoted chiefly to making and shipping to first-class customers strictly first-class maple syrup in sealed packages, with brand of maker on each package. This is an exceedingly profitable branch of my farming, yielding over $850 one year, and often over $500, with little real out-go, and no manure required, or feed, except to the teams and men. After April 15th, the pruning of the orchard and the planting of ten acres or so of early potatoes, and ten acres of Hungarian grass late in May, and of three or four acres of sowed corn for dairy. Potatoes planted with Aspinwall planter and dug with McCallum digger. Care of potatoes and sowed corn would occupy the time until the cutting of the twenty acres of clover and timothy hay, about July 1; then the cutting of twenty acres of wheat, threshing wheat, digging and marketing potatoes, cutting Hungarian grass for hay, preparing wheat ground and sowing twenty acres of wheat to be seeded in spring to clover and timothy mixed. Wheat sowed about September 10; then finish marketing potatoes, if not finished, and pick, pack and market winter apples. Then fall work—building, fencing and repairing old sheds, etc., marketing wheat, if prices suit, and general fall work, and beginning care of winter dairy.

The specialties would be (beginning in the spring) maple sugar for sale,

clover and timothy and Hungarian hay and corn fodder all for winter dairy and teams, wheat and potatoes and apples and products of winter dairy for sale. The dairy would be dry four months of the busiest time in summer and would take little care, being out at pasture. This in brief would furnish regular remunerative work for a force of two or three men and four horses the year round. It would bring a good income. Sell only condensed and chiefly carbonaceous products that do not much exhaust the soil and make a royal lot of richest manure from some 24 cows, four horses and a few heifer calves each year to replenish the dairy. This is my idea of one way of combining specialty farming with mixed farming so as to combine the excellencies of both. Only one kind of stock besides work teams, and a few pigs and chickens to pick up the waste of the dairy. Only a few crops or products for sale and those of the best possible quality. Large fields, few fences, pasture if possible all in one field, except calf lot. Land for rotation all in one field if possible and hoof of horse or cow never allowed on that field. Horses kept up most of the year and their manure carefully saved. Tillage thorough; clover freely used as an aid but not as a dependence. All necessary tools and machinery for the best handling and marketing of the few crops and products raised, which would be impossible if very many different kinds of crops and products were grown for market and various kinds of stock kept. That would also necessitate many small fields with increased expense of working and of fencing and for proper machinery for handling. This really covers my third point, viz.:

Third, the farming should not be so mixed as to multiply fields, fences and the kinds of machinery necessary for profitable work, or so as to waste time in changing from this to that or in puttering with small non-paying jobs. This point scarcely needs further remark.

Fourth, the farmer should make his money on his farm and not in outside work or speculation. Mixed farming properly managed will enable him to do this. He should not mix his farming too much, as I have said; that is, he should concentrate his best thought, study and work upon a few things and excel in these, rather than divide his energies too much, or scatter fire like my father's old flint-lock musket that would "scatter" the fellow that fired it all over the barnyard. Some farmers make their farms simply a basis of their trading operations. Trade everything they can lay hands on; act as agents for all farm implements, fertilizers and supplies; join stock companies for this and for that; trade horses in particular, and come home with a new one at least once a week, or even trade with the professional gypsy trader that comes along. You hardly know how universal this spirit of dicker and trade is among the farmers in sections.

The point I am trying to make is this, that the farmer should make his money on his farm, and by legitimate farming, and not by outside work or speculation, and that "mixed farming" of the general kind I have described, *i. e.*, a combination of animal industry with cropping is the only kind of farming that can furnish steady employment, remunerative the yeur round and keep up the farm's fertility. Of course, a successful farmer may be legitimately called away from his farming wholly or in part. My effort in all my writings and lectures is to keep this fact sharply in mind, and to recommend to the actual farmer such things and such only as I practiced when I was actually and only a farmer, and as I hope to practice it I return to my farm in partnership with one of my sons when this harder, more anxious and exacting work I am now doing, shall have worn me out once more as it did over twenty years ago.

Summer and Winter Feeding Compared.

[By A. O. Fox, of Oregon, Dane Co.]

The nature of my subject is such that it can hardly be treated under the title of "Summer and Winter Feeding," because of its scope, its great diversity and its varied bearing upon the different branches of farming. I will therefore speak upon "The Problem of Cattle Feeding in Southern Wisconsin."

To the general farmer the cattle business of Southern Wisconsin is divided into two branches, that of dairying, and feeding for beef. I will speak only of the latter. Leaving the technical subject of breeds undiscussed, there comes the vital propositions: What class of cattle are best adapted to our needs for making beef? How can we produce

them the cheapest and feed them with the greatest economy? At what age had we best sell, and at what time or times of the year shall we sell? In determing these questions we are at once presented with the prime economical factors of the demand, supply and cost of production. From about the first of September to the end of each year, may be seen train load after train load of Western grass cattle, amounting to thousands daily, sold upon the Chicago market. The net return to their growers is found by only deducting from their selling price the commissions, cost of labor, transportation, and interest on capital. Now, add to this the interest on the money invested in our farms, and the exorbitant real estate taxes which we have to pay, and we have approximated the price which we would have to get from the same cattle. It is plain to see the folly of our attempting to raise and sell this class of cattle, or compete against them. We must produce a class of cattle which they cannot, and place them upon the market at such times of the year as are impracticable for them to get there with theirs. We need only spend a day in the Chicago stock yards to learn which class of cattle are the most sought, the hardest got and fetching the highest price. Our question was, "what class of cattle are the most sought, and fetching the highest price?" Here is a copy of the Chicago Drover's Journal. I guess every stockman in Wisconsin knows that paper. In its review of the cattle market it says, "Values were strong for choice qualities, while inferior cattle sold slowly. There were some rough cattle that were extremely hard to sell." This paragraph has a great weight of meaning in it, and affords us a splendid lesson if we will only learn it.

Among their sales they quote as folfows. In order to make comparisons of their qualities I have selected two sales from each sort as near an average as possible and cattle whose weights are nearly the same. There were 37 shipping steers averaging 1,190 sold for 4.15 while 39 dressed beef steers averaging 1,185 (only 5 lbs less) sold for 3.50, a difference of 65c per hundred. Another lot of shipping cattle averaging 1,520 sold for 4 62½ while a lot of dressed beef cattle averaging 1,521 (1 lb heavier) sold for 4.25 a difference of 37½c per hundred. Again those choice grade yearlings averaging 1,537 sold for 5 50 while a lot of dressed beef steers averaging 1,375 (18 lbs heavier) sold for $3 90, a difference of 60c per hundred. These sales serve to show us that the price is not governed wholly by the weight. It is the finish, the quality and ripeness, the ability to dress the most net meat which makes it valuable. Another fact, those heaviest steers are 3 or 4 years old and the last years gain is exceedingly small in proportion to the enormous amount of food consumed. So that if sold at the same, or even a higher price than the medium weight steers—which are a year younger—they do not net near so much money. This I know from my own experience, and I believe I am backed by the better authority of the most successful farmers in the States, among whom are Mr. Gillett, of Illinois, who has made the statement that a steer must not be kept longer than 24 to 30 months old if he is to secure the greatest net value to his feeder.

If we would reap the high prices, our steers must be of the fine-boned, blocky, short-legged sort, with a deep, well-filled heart and shoulder, a straight back, well-ribbed up and straight line underneath, a smooth, deep hip, not too wide, with heavy flanks carried well down to the hocks, their heads should be set well up on a short, well crested neck, there should be a ruddy, lusty look about their faces with bright pleasant eyes, they must be soft handlers in the skin which should be covered with a fine, thick, mossy coat of hair. I think Mr. Randall in his book "American Sheep Husbandry," quotes some one as giving the three great requisites of a good sheep in these words: 1st. Constitution. 2d. Constitution. 3d. Constitution. We may make a like comparison with our cattle, and require, 1st. Substance. 2d. Substance. 3d. Substance.

Now I want to describe our scrub cattle, to make the distinction clear as noonday, and to do so, I will quote the language of one of the most successful breeders and feeders of cattle in Europe, Mr. Wm. McCombie, of Tillyfowe, Aberdeenshire, Scotland. Chiefly to whose energy, foresight and grand judgment, coupled with that of Mr. Hugh Watson, we have to-day the spendid Polled Angus

breed of cattle. In an essay of his upon the subject of Cattle and Cattle news, delivered before the Chamber of Agriculture he was describing the difference then existing between the native Galloways and the Aberdeen and Angus cattle. In speaking of the Galloways he said: "They have too much thickness of skin and too much timber in their legs. They are too thick in their tails, too deep in their necks and too sunken in the eye for being the very best feeders. It is difficult to make them ripe. You can bring them three-fourths fat, and then they stick. You can't fatten a fanning-mill by pouring oats through it. Neither can you fatten a beast if he has not power of assimilation." Again he says: "Thick legs, thick tails, sunken eyes and deep necks, with thick skins and bristly hair, always point to sluggish breeders."

The next proposition is, "how can we produce and mature our cattle with the greatest economy of time and feed, with the smallest possible amount of capital." This brings us to the various systems of feeding, all of which probably have their especially good features, varied by peculiar location. I have never had any experience in a high system of stall feeding. I presume nearly all cattlemen in this State are like myself, more vitally interested in the plan of feeding in the straw yards with sheds, and of summer feeding and grazing. I will speak more particularly of these latter systems. I will discuss only such systems as you can all follow without a dollar's outlay, and give facts and figures that you can take home and use in your own barnyard. The out-door system commends itself especially to men of small capital who have no large barns nor expensive appliances and are not able to build any. There is also great economy of help; two men cared for 200 cattle for me. They must, of necessity, keep all their money in their stock.

Having settled the question that we must all grow the best class of stock, we must now market it so as to meet the least competition. We know that the great drive of all the Western stock, and the poorest stock in our own country, is marketed in the fall months of September, October, November, and some in December. Now, if nearly everybody is trying to get rid of their surplus at that time, why had not we better try to sell at some other time? Earlier than they can get ready, or later than they can hold? That gives us the benefit of the summer market—from June 1st to the middle of August; and again, the winter market—from Christmas to the middle of March. I say the middle of March, because there is sometimes a very bad market from the middle of March till the middle of May, on account of a great many corn-fed cattle being sent forward to get them out of the way before spring work. By this plan we can generally manage to have a few good cattle ready for the winter market, and others following that will be ready to sell in summer. But the cattle that are intended to go onto grass should be wintered with special care, to avoid loss of weight in the spring. I was early taught to believe that a beast intended to go onto grass in the spring should not be crowded with high feeding in the winter. My own experience has demonstrated the truth of this.

If he has been fed to high there will be a dead loss for at least thirty days, and frequently longer; especially if the season is wet and the pasture composed of new seeding of timothy and clover. If, however, it is old timothy sod or blue grass sod, they will not fall away so much, and when they once begin to gain it will be very rapid.

To illustrate I will give you my scale weights, made upon three different bunches, last spring and summer. It will bring out one statement for which I expect to be closely criticised, but my scales have demonstrated for the past eight years, and I am now fully convinced that, although clover is one of our most valuable grasses, it will not put on the pounds and ounces of thick butchers' meat, nearly so well as our old June grass sod; or old timothy and June grass mixed. We will go back to our weights again, to show the gains and losses met with upon turning cattle out in the spring.

Last spring, on May 5th, I turned to pasture twenty-five head of steers that had been fed pretty full rations, although not at all forced. The pasture was composed of timothy and as like about four years old. The cattle were from 20 to 26 months old, or what would commonly be called two-year-olds in the spring. The twenty-five weighed, when turned out, 28,920 pounds, aver-

age 1,156 pounds. We stopped feeding them shock corn, but gave them a noon feed of crushed corn on the cob for about twenty days. On June 1st they were weighed again. Just twenty-six days from the previous weighing. The twenty-five weighed 30,560 pounds, gain 1,640 pounds, average 1,222 pounds; equal to a gain of just 2½ pounds per day per steer.

This is fully better than an average gain (immediately following turning out) for steers that have been pretty heavy fed before going out. But the noon feed of crushed corn was of great assistance to prevent their shrinking. We have had meal-fed cattle not gain a pound on grass at first, even with their rations kept up. We also put twenty-five other steers out on an old blue grass pasture, and five others into a clover field. This bunch of thirty steers had been wintered on moderate rations of shock corn and oat straw; they were what might be called good thrifty stockers. The bunch of twenty-five put on blue grass weighed, when turned out, 24,390 pounds, average 975 3 5. Their rations were taken entirely off. At the end of 26 days they weighed 27,040 pounds, averaging 1081 3 5 pounds.

This shows a gain of 2,650 pounds or 106 pounds to the steer in 26 days; equal to 4 1-13 pounds gain per day to each steer. The five that were put into the clover field weighed when put in, 5,300 pounds. They were taken out at the end of 14 days and weighed 5,240 pounds, showing a loss of 60 pounds to the steer, in 14 days 12 pounds to the steer, or over 8-10 of a pound less per day per steer. Our experience in turning into clover in the spring or early summer has nearly always been on a par with this. We do not always get such large gains on old blue grass, as with the above twenty-five head, that gained 4 1-13 pounds per day each, but we have always found it could be relied upon to make steady rapid gains, running from 2½ to 3½ pounds per day and to develop thick meaty cattle that always sold well and butchered well.

Now let us go back to our scales again. These weights serve to illustrate that if we intend to turn to grass in the spring and not market till midsummer, our cattle will do much better not to be forced in the winter feeding. They must of course be kept gaining. Such cattle generally make from 2½ to 3½ pounds gain per day from the middle of May till the middle of August without any rations. The question of feeding grain in troughs in the field in summer, depends so largely upon the condition of the pasture and of the cattle, also on the price of grain in the locality, that it hardly admits of treatment here, only to say, that from our own experience I think that moderate rations of grain fed in pasture to first-class cattle is always money safely invested, and that rather than resort to heavy force feeding in the cold winter months, we are safer to keep part of the grain for summer use. By this course I have had cattle net me, free of all expense, $5 per month per steer for fifty days. Computing their cost, their selling price, feed and interest, it figured up at the rate of just 150 per cent. per year, but having made such rapid gains early in the season it would have been ruinous to hold them in anticipation of their keeping it up.

Having given you some facts and figures on summer feeding I will now speak of

WINTER FEEDING.

For winter feeding I am very partial to the shock corn system, with hogs as an auxiliary. I believe it is the cheapest feed we can produce, and there are several strong economical advantages connected with its use. In the first place, we need little or no hay; without it we must have hay. Ear corn without hay is not a suitable ration with which to feed for any length of time. Even with good straw the cattle soon tire of it. They will not fatten well without greater and better variety of feed. The fodder of the corn when properly cut is nearly equal to the best tame hay in nutriment. This fact has been developed by the best feeders and is backed by analysis of our best chemists; from those researches we can learn a great deal of value to us, concerning the proper mixing of the various foods, their relative digestibility and nutritive qualities. If you husk your corn it is done late in the fall when the days are short and usually so late that the ground can't be plowed until spring. If your help is careless or the weather bad and corn down under the snow, as is often the case, a portion of it never gets into the wagon. In Wisconsin it takes a good average husker to husk an acre a

day—few will do more. An acre of corn husked the old way, leaving the stocks and fodder in the field to make manure, is worth from $12 to $14 at the crib. The stalks left in the field generally make manure by flying to pieces, and scattering all over your neighbor's land.

It will take a good acre of hay with the acre of corn to winter one steer. The hay is worth $12. The corn and hay together are worth about $25, and have required about two acres of your good land to produce them.

Suppose you cut and shock your corn. If you cut it the land can be fall-plowed. The men can start cutting across, and the plow can start behind. The work is done in early fall, when the days are long, bright and cool. A good average hand will cut and shock an acre and a half a day. (I have men who have averaged two acres a day), but any good fair hand will average an acre and a half a day, at $1 a day, by which one operation you not only secure your corn (every ear of it, too), but you also gather your hay crop in the shock, getting both done for one-third less cost than you used to pay for just your husking alone.

Now, I am going to demonstrate to you that one acre of good shock corn will fatten your steer in fine shape; so that your acre of corn is doing the work which took the other two acres to perform, leaving you half as much more land for pasture or other uses. The ear of shock corn being enveloped in the husk, is much easier chewed by the steers, and is more toothsome to them; they are less liable to get off their feed, and will gain, during the six months of winter feeding, an average of two pounds a day, besides keeping one shoat, which follows each steer.

I will now give you a few figures: Last year I had a yard of thirty yearlings that averaged better than two pounds a day a part of the time. During the clear steady weather many made gains up to three pounds a day but the fearfully cold and stormy weather of January made the gains very small for that period. They averaged. when yarded, 982 pounds. They were sold in 140 days averaging 1,266 pounds equal to a gain of 285 pounds to the the steer, or just five pounds over two pounds gain per day per steer. It took fourteen shocks o corn to the steer to produce this gain of 285 pounds.

There are twenty shocks to the acre the way we cut them, so that 14 20 or 7-10 of an acre, put on 285 pounds in 140 days, and the sale of the cattle brought me just $22.00 per acre for the corn, besides the keeping for me of the shoats, and a nice lot of manure left in the yard, sufficient to manure six acres heavily. (With the manure we make we are able to broadcast thickly thirty acres er qr.) We find it takes the excrement of about five head of cattle to manure one acre.

We find we cannot put on such certain nor as good gains in winter as on grass in the summer, without very heavy feeding; but the light gain of the steer is made up in a great measure by the carrying of the hogs, and the grand body of manure left after the winter feeding is over.

We therefore follow both systems of summer and winter feeding, for the two combine nicely, and serve to give us better opportunities to reap the benefit of the best markets at both seasons of the year.

I regard our stock growing as a vast, diversified and, when managed like business, a very lucrative business. Cattle feeding is one of its most important branches, and I hope the time is near when I and all my fellow stockmen will have become so well up in it, that we shall no longer tremble at the competition which now is driving us hard, but that we shall understand every avenue of our business and will know to a certainty how cheapest to produce the greatest substance and the best quality of that which commands the highest prices, and how to do it in the shortest possible time. We must work less with our hands and more with our heads. We must mix brains with our business, mix brains with our corn, mix brains with the culture of everything that grows if we would succeed. When these changes shall have been accomplished, then may we hope that the generation of sons who next succeed us, will not come home from college with their minds stuffed with the "vulgar errors of the wise."

Practical Hints on Poultry Culture.

[By L. A. Bishop. M. D., Fond du Lac.]

It has been truly said that we are a nation of egg eaters. We consume on an average 50,000,000 of eggs daily, of a

cash value of $800,000, aggregating $292,000,000 annually. Of poultry we consume a little over $300,000,000. Making a total of about $600,000,000 consumed annually of eggs and poultry in the United States alone; a product twice as large as the dairy product of this country and worth over $100,000,000 more than the wheat crop. From its magnitude, it deserves much consideration from the farmer as to the best breeds for profit, and the best and most economical management. The amount of poultry and eggs consumed in our largest cities is simply enormous. I see by the Maine Farmer that New York city consumes annually $25,000,000 of poultry and $10,000,000 of eggs, making a total of $35,000,000 for that city alone.

Right here in our own state the number of eggs handled annually is surprising. A firm at Waupacca pickles 60,000 dozen of eggs annually; another at Johnson's Creek about 40,000 dozen; marketing them in the winter season at about 100 per cent. profit. Our own city is not to be ignored. Bartlett & Casstens one day last week shipped 35,000 pounds of poultry. This was but the shipment of one firm for one day. The above figures do not include poultry and eggs shipped for breeding purposes, but for consumption alone. It outranks any other single article raised and sold in this country.

From the above figures you would naturally conclude that the poultry business is overdone. Far from it. Of the many products of husbandry this is almost the only one we do not export. For the year ending June 30, 1884, Canada alone sent us 11,384,856 dozen eggs, for which we paid her $1,950,561. Thirty-six million dozen eggs more than she produced was required the last year to supply the United States; at least that is the number sent us by foreign countries. These were principally supplied from France, Holland, Belgium, England and Canada. Far-off China sent us 1,000,000 dozen. The major part was shipped from Antwerp, the great egg mart of the world, at an average expense for pickeling, handling and freight of three-quarter of a cent each.

I wish to ask you farmers one more question: Does your poultry pay? I imagine I hear many of you say, "no," and I know you are correct. I again ask you, "why don't it pay?" I will tell you, and then I will tell you how to make it pay from 100 to 400 per cent. profit on the original investment. Does anything you are engaged in pay you any such returns? Each of you can promptly answer, "no, it does not." If it did your pocket books would always be flush. The reason your poultry does not pay is either from lack of knowledge or from negligence. You do not give it that care and study you do the other departments of the farm. You allow the fowls to hunt their own living; to lay where it best suits their convenience—in weeds and fence corners—with an old, broken-down stinking shed or a tree to roost in; no water to drink but what they can procure from some cesspool. Almost any fowl will lay in summer when eggs are cheap. It is the egg laid in winter that chiefly determines the balance sheet. Eggs in winter mean profit; the want of them means loss, and profit and loss does not depend upon chance, but are the consequences of wise or unwise methods of proceedure. Most of you allow your poultry to shift for themselves, and if your stock degenerates or decimates by dint of sheer neglect; if they cease to lay and become unprofitable through the loose, slipshod and ill-chosen conditions of your own making, you never ought to say (as it would be stupendously rediculous) that "there is no money in hens."

A farmer said to me the other day, "I do not see why you get so many eggs. I do not get ten in all winter." Now I will wager a breeding pen of A No. 1 fowles that his flock of hens is make up of dunghills of all colors and sizes and allowed to shift for themselves the year round. He breeds poultry at a loss. It would be cheaper for him to kill all his hens and buy eggs and fowls for consumption. You may as well expect to make hens profitable without proper care and management as to think of making a 3-year-old steer weigh 1,800 pounds by wintering him at a straw stack with a snow bank for his bed and the cutting winds of winter for his stall. Shake off the old foggy idea that dunghill fowls are better layers than our improved varieties. All you need is one good trial in the proper manner and you will be convinced beyond a doubt. You may as well think of comparing a common native cow with an improved

Jersey for butter, or a common native steer with a Short Horn or a Hereford for beef, as to attempt to prove that a common fowl is as profitable to the farmer as the improved varieties. Fowls, like all domestic animals, will degenerate if left to shift for themselves and breed haphazard. It does not make any difference how well-bred your stock may be, if not well cared for, well fed, well sheltered and mated with wisdom and experience, it will degenerate and run out. It is a law of nature, and it is a wise breeder that heeds this law and profits by it. There is just as much difference in the different strains of the same variety of fowls as there is in the different strains of any one breed of stock. To keep up your stock, select large, well-developed, early hatched pullets—March, April or May; yearling hens, hatched during same season of the year; they will lay early and all winter long. It is an old adage among poultry men, and a true one: "Early chickens, early eggs; early eggs, early chickens." If you find any that are particularly good layers, note it, and save eggs from such for hatching. Save medium-sized, perfect shells, perfect-formed eggs, from your best layers. Observe the same care in selecting eggs for hatching as you do in selecting your seed corn; then change your male birds at least every two years. Add fresh blood to your flock. Observe the same rules in selecting cockerels as you do in selecting any male animal to breed from. Sell off the old hens in June, when they bring a good price, and so make room for the young flock. If you find a hen that is often broody and difficult to get to laying again, cut her head off. You can better afford to replace her with one that will do better. In this way you will cultivate your flock and make them more profitable year by year.

If properly managed, you will find the poultry-yard the most profitable part of the farm for the money invested. Many reckon in this way, if 50 fowls are profitable, 500 will be ten times as profitable. This is an instance in which figures do not tell the truth. As soon as the number of fowls are doubled, troubles are quadrubled. A range and houses that will keep 50 in perfect health, will be over-crowded with 100, and all the trouble due to dense population will follow. You have all learned from experience that the larger the number of animals you keep together, the more you crowd them, the less they thrive. You all know that a flock of 10 sheep on the same feed will do better than a flock of 100. The same rule applies with equal force to fowls. Any of you can make a flock of from 50 to 100 fowls pay well, but it requires an especially suitable locality and adaptability of talent to make a flock of 1,000 pay. Not one man in a hundred can do it.

One of the most important items in poultry breeding is a suitable poultry house. This can be constructed at very little expense, any farm-yard is not properly equipped without one. Select a dry well-drained spot. If not thoroughly drained, drain it. For a flock of fifty hens erect a building thirty feet long by twelve feet wide, eight feet high in front and five feet high in the rear, with a southern or south-eastern exposure, double boarded and filled with anything to make it warm. Bank up well to keep out the wind and frost. Put on double doors with space between and all the double windows you can get in. On the south side to let in abundance of light and solar heat. Do not fail to ventilate well. This is very important. Have your ventilating shafts run from the ground up through the roof. In this way you will rid your house of the noxious vapors in reach of the fowles and at the same time retain the heat that raises to the top of the house, making many degrees difference. Whether you ventilate from the bottom or top, do not allow any drafts of cold air. A crack is more dangerous than an open door. Put in a few loads of gravel and fine dirt for your fowls to tick and wallow in. The dust bath is the fowls toilet-set, *dont forget it.* Make a single perch three inches wide, rounded on the top, the whole length of the rear of the house, twenty inches to two feet from a plank floor, three feet wide, also running the whole length of the back of the house. Six or eight inches under the perch place a platform two feet wide, and under this laying boxes, closed in front so the hen has to reach them from the rear. These are called dark nests. By using them your hens will not be disturbed by those not wishing to lay, and will not acquire the pernicious habit of egg-eating. Put in some boxes at the sides

filled with broken bones, crushed cyster shells, charcoal and broken glass. These articles will aid digestion, keep the digestive organs healthy, and furnish material for bone and shells. The cost for the material for such a house need not exceed $30 or $40, and any of you are sufficiently handy with tools to construct it. This may be embelished upon to any extent, but you cannot improve upon the principle, or construct one that will serve the purpose better. Make your poultry house warm enough to prevent the hens' combs and wattles from freezing. A hen with a frozen comb will no more think of laying an egg than a man will think of working with a frozen foot.

I do not advise artificial heat. I think they will be healthier without it.

Keep your hen house clean from vermine, exercise as much care in cleaning your hens' house as you do in your cows' house, sprinkling the platform under the perch daily with road dust or what is better land-plaster, and cleaning it off thoroughly from once to twice a week. Put the manure away in boxes or barrels to be used as a fertilizer, which you will find equal in value to the best compounds fertilizers which would cost you from $40 to $60 per ton. A flock of fifty hens will furnish from three-fourths to a ton of this guano in one winter. This item alone will pay for the poultry house in one season. Try it on your vines and corn and you will be surprised at the growth it will produce. Nothing in the market is equal to it as a fertilizer. Do not use either bleeched or unbleeched ashes; these disolve the dropping, thereby liberating the ammonia and will render the manure of very little value.

To keep your fowls free from vermin, give them all the oportunity they desire to dust themselves in dry earth. If you detect any lice sprinkle them with Persian insect powder—a very cheap article to be found in any drug store. Wash the perches and nests occasionally with kerosene and smudge the house three or four times a year with burning sulphur or pine tar. In winter give a warm feed in the morning of wet meal with a little bone-meal in it. This will keep them from bowel troubles. Scraps from the table and bits of meat, change the diet often. Rotate it the same as you should rotate your crops. Give whole grain at night. Corn is best as this takes much time to digest and keeps up the animal heat through the long nights in winter. Buckwheat is one of the best grains to make your hens lay. Do not over-feed or give much fat-producing foods, but more egg-producing, those that contain the elements necessary for the construction of the egg and its shell. Do not keep a hen fat, if you do she will lay soft-shelled eggs if she lays at all, and be subject to apoplexy and congestion of the egg tract. Some day you will find her dead on the nest and the verdict must be over-feeding killed her.

Give your fowls plenty of green feed. Onions are the best, next cabbage, beets and turnips. Do not fail to give them plenty of fresh water. Every day bury the grain you give them in the earth, or throw in a forkful of straw or dry leaves and through the grain in these. This will give them exercise and keep them out of mischief, so preventing any bad habits. You remember the old adage that "Satin always finds some mischief still for idle hands to do."

A hen will lay from 100 to 150 eggs a year, and if you crowd her to laying in the winter by duplicating the natural food of summer, together with warmth she will lay her eggs when they are of the greatest value, and be ready to raise a brood of chicks early in the spring, thus enabling you to place this progeny on the market when it will bring the highest price. A chick weighing two pounds in May will be worth as much, or more, than a six pound chicken in November, and thus save you the expense of growing the extra four pounds of meat. One bushel of corn will make from nine to eleven pounds of either poultry or pork, and the poultry is worth from one and a half to two times as much money as the pork, and is much better as a diet. A hen will consume from one bushel to one bushel and two quarts of corn, or its equivalent, a year, according to the size and variety, with a cash value of from fifty to seventy-five cents a year. At the latter figure, a flock of fifty hens will cost $37.50 to keep them one year. These will lay, if taken care of properly, and of an improved variety, twelve dozen eggs each a year. This, at an average price of 15 cents a dozen, will amount to $1.80 for each hen, or $90 for the flock. Then, deducting the expense of keeping, $37.50, you have

left a clear profit of $52.50 on eggs alone, say nothing about the young chickens.

Remove the sick fowls from the healthy ones. By allowing them to remain, they will vitiate the air of your poultry house with the germs of disease. You may as well think of keeping your flock healthy by permitting the sick to mingle with the healthy, as to think of improving your own health by continually remaining in the sick room. A laying hen has a bright red comb and wattles. A hen that does not lay has a pale comb. If you find any such in your flock, keep watch of them. Try to determine the reason why. You will find that there is one of three things, either she is sick, over-fat, or naturally a poor layer. In either event it will not in all probability pay you to keep her.

As the breeding season approaches, separate your flock into pens of from ten to twenty-five according to the variety—of the large varieties, ten to twelve, and of the smaller varities, fifteen to twenty-five. As these are the numbers, you can rely upon for one male to fertilize, all the eggs, for a non-fertilized egg is set at a loss, both in losing the eggs and the loss of the hen's time as a setter and brooder. In each of these pens put a strong, vigorous male bird, an early cockerel or a yearling cock. When you set your hens, make it a point to set two or more at the same time, as many times a hen can care for more chicks than she will hatch out. If you do not wish to raise chickens, keep the male birds away from the hens, as a non-fertilized egg will keep much better and longer than one that has been fertilized.

Economy of the Barnyard.

[By Barney Sheridan, Byron.]

The title of this paper is "The Economy of the Barnyard." The four important factors that are esential about this are, first, proper stabling; second, good and suitable fodder for the different kinds of stock you keep; third, plenty of good water conveyed to the barnyard, if you can possibly do it, by adopting the method of piping it from wells or springs. For no farmer can afford, in my opinion, to let his stock of any description run over his land without that freedom being detrimental to both stock and land.

When a man forms an opinion that his cattle, sheep or horses can subsist on frozen grass, he makes, if I am right, a great mistake. They may keep up an outside appearance; but the tallow that they have been putting on all summer is rapidly decreasing.

The time of year that some farmers neglect their stock is in the latter part of the fall. Stock should not be allowed to remain out during cold rains, they should be taken up, stabled, and a little feed given to them.

Dairying is one of the most esential points for the prosperity of the farmer, if properly managed. The farmer should not rely on old meadows of long standing for summer pasture, and timothy for winter feed. I do not think there is much money in that. In order to make dairying a success in these days (and I would especially speak of our clay-ground farmers) we must change our pastures as often as possible; not let them stand over three years at most. For I believe one acre of new seeding to clover and timothy will produce more feed than two acres of meadow of long standing. Plant plenty of corn and fodder, for these are better substitutes for feed than any hay. No farmer is liable to get overstocked with corn fodder, if it is of good quality. In order to have it this way do not stack your fodder when it is in such a condition that it will heat in the barn or stack. The result in such cases is, the fodder is spoiled and injurious to any animal that is obliged to eat it. I recommend, if there is any doubt of fodder being dry enough, stack it out in small stacks. I cut the fodder for my horses and cattle and feed it whole to my sheep. I find that to be the best way of feeding it.

There are a great many farmers who say there is no money in raising so much corn, but I find no trouble in raising a good crop. But my experience is that the first thing to be done is to put the ground in proper shape. Some farmers will plow their sod, harrow it a few times, and call it good; but I believe it should be pulverized thoroughly with a good pulverizer. I use the disk harrow, and I can recommend it to be one of the best implements on my farm. It leaves the ground in such a condition that it is easy to keep clear of weeds. I cultivate my corn as often as possible, especially in dry weather, as it helps

to hold the moisture in the ground. Some farmers think they must not stir their ground in dry weather—that it will injure the crop; but we have had a good chance to experiment on that the past season. I notice those who were afraid to stir their ground had but little corn among the weeds, and their ground is in poor condition for a crop next year. Therefore, taking all in consideration, I believe corn as profitable a crop as the dairyman can raise.

What I mean by the dairyman is the man who sends his milk to the cheese factory; for, if I keep cows, I want to send away all the milk every day that I can. I do not want to make a pound of butter when I can have it manufactured into cheese with less trouble, and, I believe, more profit.

Some men form the opinion that they cannot raise calves nor pigs if they send their milk to the factory; but I believe at the end of the year my calves are about as good as my neighbor's scim-milk calves. But in order to have them so, I find it necessary to have my calves come about the middle of March, and then they are old enough to wean when I get ready to send my milk to the factory.

When my calves first come, I tie them up in small stalls and feed them in individual troughs. I have a small box of middlings in a convenient place and drop a little in the milk at first, and in a short time they will eat all they should have. Then, at the time of weaning, you will have no trouble teaching them to drink. At that time I get some white middlings or export flour, which can be bought for $7 per 100 pounds. I mix it with equal quantity of bran and mix all with water. And give no whey to your calves, give it to your pigs, as it is a very good substitute for souring swill.

In the fall when the feed begins to get short, I feed my calves a small quantity of oats, and continne so until spring, and by so doing I raise about as good calves as my neighbors who do not send their milk to the factory.

When I enclose my stock in yards I have a separate yard for my calves, for I think they do better. I make my yards as small as possible, leaving room enough for the cattle to get out of each others way. The smaller the better for manure, which is a very important point for the farmer to look to. I do not believe in using a five or ten acre lot for a yard, as some men do; I believe the yard should be small and as near level as possible, in order to get the full benefit. If it is convenient I think it better to mix the horse and cattle manure together, as it will not freeze so hard, and you will be enabled to draw it out in the winter or early spring before the substance is all soaked out, which would be much better on the land than run off in strains.

As we have said so much to the dairymen, why not say a word to wool growers. This is a point worthy of notice. There was a time when Wisconsin butter and cheese laid down in Eastern markets was marked inferior or low grade. To-day they grade equal, if not superior, to any made in the United States. It has taken no small amount of labor to bring it to this point. Similar steps should be taken to advance the quality of wool, not only to equality, but to a point of superiority over any in the United States. A man cannot keep his wool in good condition when letting his sheep run to the straw stack and pitching straw down on top of them, or keep them in straw-covered sheds where the water will leach through The result is that your wool is chaffy and stained, and becomes clotted, and you get a reduced price. You should arrange your sheep yards and stables so as to feed them out of racks, and not waste feed by throwing it on the ground. Racks should not be filled at any time. Little and often is a better way to feed sheep. You should be cautious this year as the straw is full of chaff. My racks in the stable are picket racks, and I find by feeding straw in them that some of the sheep will stand along side of the rack and others eating over their backs will cause chaff to work in the wool. To prevent this I find it necessary to nail a board ten or twelve inches wide along the bottom of the racks, so as to form a part of a trough which will catch the chaff; and prevent sheep from getting close to the rack. I divide my sheep so as not to have more than ninety in each flock, and water them every second day and salt them often. I feed my sheep corn fodder, except in warm weather, then I feed them clover hay; and I find it in no way difficult to bring them through in good condition. I keep my sheep in the yard from the time I take them up in the fall until the grass is fit to eat in the spring.

Should it be Clyde, Percheron, English Shire, or Suffolk Punch.

[By Prof. Brown, Ontario Agricultural College.]

No one but the tyro expects to find perfection in any breed, or even in any individual member of a breed of horses. So that those who are most conversant with horse flesh are content to define a good horse, as one possesing a number of good points, and few bad ones.

Before taking up the specialties of any of the heavy breeds, let us advert to some of the more important points, irrespective of either, as without such an enquiry it is simply impossible to understand what we want.

First, and of most consequence, perhaps, we have the nervous system, the central position of which is the brain and spinal cord, and it also may be termed the fountain from which flow streams of nervous force to the various parts of the body, and on which all portions are dependent not only for their life but also for their power to perform their respective functions. So, of course, the manner in which this nervous force is supplied has an important influence upon the physical ability of a horse. Although their nerve power may be abundantly supplied, it depends upon the intelligence of the individual as to whether it is economized or dissipated, hence if plenty power of this kind is possessed it is of little advantage, if not under proper control. Horsemen are wont to observe the dimensions of the forehead as an index to proper brain development, and although this is valuable, it cannot be considered an unvarying guide as to the amount of intelligence or nerve power. Courage, tractibility and good temper can only be determined upon with certainty by making a practical trial of the animal. In order that this nervous power can be generated adequately, the brain, etc., must receive a blood supply of proper quantity and quality. The digestive and respiratory organs co-operate in furnishing this; the former in providing nutriment, and the latter, in a great measure, are accountable for its purity. The volume of the chest is an index of the capacity of the lungs, and it is very important that it should have a full proportionate development. The lighter breeds get this capacity by depth of chest rather than by breadth, for excessive breadth is opposed to the free and rapid action of the blade bones, and consequently speed would be impaired from such a formation. In the heavier breeds, a chest roomy in all directions is desirable, and in addition to depth of chest, the ribs should be well sprung, thus affording breadth and giving roundness to the barrel—a point so often spoken of and admired. A horse so formed is pretty sure to have good wind; but well sprung ribs in addition to decided length of the back ribs has another signification, pointing to the likelihood of well-developed digestive organs being possessed, and consequently of ability to consume and convert nutritious matter into healthy blood.

These points are among the most important, for it is on their perfectness that the thrift, vigor and staying power of a horse largely depends, but unfortunately we too often find them coming very far short of what is desirable, so that poor feeding, easily fatigued, unthrifty horses are by no means rare.

We have thus far concluded that a sufficiency of nerve force, properly economized, and regularly supplied by a nervous system that receives adequate material to work with, is essential to an animal machine. In order that this power may be used to the best advantage, the machine upon which it acts should be made up of parts of sufficient strength to endure severe taxing, and that these parts may be so put together, and related to one another as to enable them to take advantage of all motive power.

In looking critically at the points of an animated machine, from a structural standpoint, it is only rational to look first at the framework, and secondly, whether the material of which the bones are composed is good. Texture of bone is of more importance, insofar as durability is concerned, than mere size, for we know that the comparatively small bone of the thoroughbred will stand concussive shocks with impunity, that the comparatively spongy bone of the heavy draught would succumb under. It is therefore desirable, in addition to a sufficiency of weight, that the texture be good in order to form a substantial framework. The external evidence of proper quality of texture is afforded by flatness of the *canon* bones, so that the nearer these bones approach flatness, the closer approximation there is to perfection. In

addition to flatness and good size of the *canons*, it is very essential that they shall be short, for this improves the animal's harmony of parts to each other, as the muscular force is economized. Good bone development is further evidenced by prominence of such parts as the point of the elbow, hock and hip, in addition to giving leverage to the muscles acting upon them.

The organs of motion and locomotion called the muscles, are not secondary in importance to the framework, and it is very essential to the judge of horse flesh in the selection of an animal with power to move heavy weights, and to proceed with agility or speed to be able to detect indications of such ability, and to discriminate between muscle and fat. There are several situations to be observed for such indications, as for example, in the forearm, by noticing whether there is a swelling-out or prominence of that organ, for in such a situation we don't find fat accumulating to any extent, so that what we do find there can be relied upon as muscle.

By glancing between the quarters, defective muscular development can be detected by the existence of a space in that region—commonly described by saying that such an animal is slit-up, and such a formation is regarded as a sure accompaniment of a lack of staying power.

Narrowness of the loin is sure to be associated with a sparse clothing of muscles, which deficiency is well marked when compared with a well-furnished loin, where the muscles are broad, prominent and well defined.

Horses with bull necks are generally hardy ones, and this thickness is due to bulky muscles, but the seeming excess of volume is rather the result of shortness of the organ, a formation which certainly does not add to a horse's appearance and cannot be compared in this respect with one of moderate length, but clean cut and with a feeling of firmness.

There is another factor in the locomotory apparatus which is by no means to be ignored, if full benefit is to be derived from proper bone and muscle, and that is the joints. If an animal is to possess freedom and elasticity of motion, with plenty of surface for the attachment of muscles, the joints should be large, which does not necessitate roughness, the usual accompaniment of large, round, spongy bones.

We have so far discussed some of the more important elements in forming horse perfection, but there are, of course, many minor ones which it is not necessary to handle at present. You will allow me to touch upon one of these, however, as it bears strongly upon the subject of my paper. I refer to hair on the legs.

I ask of what benefit is a superabundant growth of hair on the lower parts of the legs? In answer, I can only quote the reason assigned for desiring it by the most ardent admirers, that it adds to the appearance. If this can be called a good and sufficient reason for the cultivation of this feature in breeding, it can hardly be held to counterbalance the disadvantages its presence entails: a profusion of hair pre-supposes a coarse skin, and a coarse skin means a corresponding decrease in vitality, and consequently a greater tendency to diseases, such as grease, thick legs, and cracked heals. Bushy hair is also a splendid harborer of dirt, and being very retentive of moisture it leads to excessive irritation and itching. It is doubtful, however, where horses are bred for *weight at any expense*, whether such a feature could be bred-out, for the whole tendency is to grossness of constitution, but, where 1500-pound horses are required—and they are surely heavy enough for general purposes—it is quite possible to breed without long coarse hair. It seems strange that hairy legs should be looked upon as a point of beauty in heavy draughts and its absence equally pleasing to the eye in the thoroughbreds.

The heavy breeds to which the attention of the farmer is most given in this country are the Clyde, English Cart or Shire, and Suffolk Punch and Percheron. We have no authentic date with regard to the origin of any of these breeds, which is evidence that they all had an existence at a somewhat remote period. The Suffolk has perhaps retained his characteristics since the earliest recorded accounts, with fewer modifications, than any of the other breeds. He has always been described as the "the chestnut," and the chestnut he still remains, although there are half a dozen shades of that color. Other characteristics he has retained with equal tenacity, showing that he belongs

to a source of some purity. The reason for this uniformity of the breed is attributable in a great measure to one district only producing them, where no variety of soil exists, and where their breeders have never brought in any outside blood.

The Suffolk is remarkable for endurance and long life, which is no doubt due to their middle piece, as it shows strong evidence of plenty of breathing capacity as well as developed digestive organs. Their contour is more calculated to impress one favorably with hardihood and utility than with symmetry and stylishness. They belong more to the agricultural class than the heavy draught, but during twenty-three years when Clydes, Shires and all comers were shown in one class at the Royal of England, fourteen first prizes were carried off by this breed. They are frequently found fault with for not showing enough bone, but it is evident that what they do possess is of pretty good quality, for they are unusually sound bred and very free from bone diseases. There is a marked absence of the long hair on the limbs which is so prominent a feature in the English Cart horse and Clyde, and a proportionate freedom from skin diseases of the extremities. The Suffolk is a remarkably unexcitable horse, but with plenty of pluck, and there is no honester drawing animal in the world.

In the English Cart and Clyde we have specimens of, perhaps, the best draught horses known, as they possess the great weight and consequent ability to move heavy loads that entitles them to be put in the first rank. Neither breed taken as a whole can boast of great purity of blood, for there is not that uniformity of color and other features that would allay all suspicions of the introduction of some other blood at no very remote period, and that inter-breeding between the Shire and Clyde had been indulged in from time to time. I think it would puzzle some of the best judges to say to to which stud book some registered animals belong—by appearances. The Clyde certainly posses greater regularity of features, there being a large number of them of the same bay color, and although some modification is noticeable in different localities, as for example the Galloway and Kintyre breed, yet there is nothing like the variety seen in England, for nearly every country has its own style of the same class. Of the two breeds, the English horse is on the whole the heavier, and consequently less active; he possesses a very upright shoulder, which gives him greater power in the collar, but less freedom of action than the Clyde.

Both breeds have a large quantity of bone, but I am inclined to the opinion that that of the Clyde is in the majority of cases flatter, of better texture, and associated with a finer quality of hair, although it would seem that those who have endeavored by careful breeding to increase the quantity of bone, to meet the never ceasing cry for bone, have succeeded too well, and have produced it to an extent not proportionate to the other parts of the animal. Dark bays or browns are much desired by breeders of Clyde now-a-days, and it will certainly be to the advantage and credit of the breed when they become more common, and take the place of the light bay, so common at present. This light color is certainly anything but pleasing, and it is held by many to be indicative of a want of hardiness. Greys are not favored, but are not objected to so much by producers of the Shire—blacks, browns, or dark bays and greys being the recognized and encouraged colors among them.

Both breeds as a rule show well developed and muscular hind and fore quarters—points so much to be desired—and yet they show prominently the defects of the middle piece, and slender, conspicuous long backs, shallow flat-sided chests, short back ribs and narrow loins. In comparing the two breeds I think the last named imperfections are more frequently seen in the Clyde than in the Cart horse, so that in considering the relative constitutional strength of these two breeds it is to the advantage of the latter.

It is only within the last ten years that our acquintance with the Percheron has become at all intimate, and during that time they have made a good many friends. It certainly seems to be a breed of some purity, for they present a very uniform conformation, and a very large proportion of them are grey, and a very good grey at that. Their popularity are to some extent owing, no doubt, to the flashiness of their color, but they possess merit of more sterling worth

than mere color, and indeed some think the color their worst point.

They are even lighter than the Suffolks, consequently can lay no claim to be called heavy draught, and are more correctly classed as agricultural, not inappropriately styled "general purpose," being as a rule oblique in the shoulder, most of them are pretty good travellers; they are, however, of rather a dull temperament, which disposition seems intensified in the progeny of a cross with our common mares, endowed with a want of style, ambition, and animation. They are well typed horses but show a marked want of length of neck, which suspends a head of rather an uninteresting character. Although they have very little long hair on their legs the skin is inclined to be thick, and the common bone has a tendency to roundness, with a lack of tender development.

Nine out of ten of our Canadian farmers say that the Clyde horses are not so much for general farm purposes, but have brought lots of money in the American market, and as this demand has fallen off very considerably we are thinking more of what is best for our own use. There is no doubt, whatever, that the Clyde wants stamina and is awkward and clumsy when taken from the plough and driven eight miles an hour to market.

As the record most common in Ontario, I have to tell you that the Percheron has declined in popularity because of a less foreign demand, want of style, too dull, and the half breeds are poor travellers when wanted for such a purpose on the farm; they want range, are poor movers, and in our experience are less sure at service; the half-breed does not fetch within $40 of others.

You will see then that in Ontario we are in a sort of transition stage between the recent good market on this side for heavy draughts by Clyde and Shire, and what we are looking for as best for farming purposes, or the general purpose horse.

You will not be surprised, therefore, when I tell you that a good many of our cautious, practical men are looking to the Suffolk Punch as the best source of this. There are several crosses of this with the ordinary light mares of the district I come from, and we have them on the experimental farm also. They are active, good walkers. short-legged, plenty pluck, easily kept, and with excellent constitutions. They are a more compact horse, and come nearer the "Roadster" than any of the others we have been discussing.

As we are here to some extent as suggestors, I ask the privilege of inviting discussion on the subject of types of Clyde horses, and what, as Americans and Canadians, we should aim at in breeding them. The subject is not a new one, certainly, but the voice of this meeting may do much good in the present uncertainty among farmers in several districts.

There are in Scotland a larger, and smaller class of Clyde; are these simply irregular variations in general breeding, or are they of particular families, characteristic it may be of districts?

But, having such distinctions from whatever cause, would it not be desirable to advise the owners of unpedigreed American and Canadian mares to patronize the horse of corresponding stamp that common sense, if nothing else, tells us does give less trouble in foaling, and at the same time tend the better to keep up the types referred to.

Then again, if the Clyde advocates claim a share in the production of a general purpose horse, it is obvious that more success would be attained in this line by such a choice in mating, than is possible by the present indiscriminate practice.

Not only so, but systematic work of this kind would save our status as breeders for any market, and corresponding advantages would accrue. Here comes in the value of pedigree and of your place as guardians thereof, for no maintenance of types could safely be entrusted to anything but *the true blood*, and as the matured size of a two and three-year-old colt is not easily gauged even by the most experienced, those who desire to use such a colt to their mares would have to rely on pedigree as the best evidence of a large or of a small type.

A Blind Boy's Thoughts of Home.

[By J. W. McGalloway, Forest, Wis.]

There is no theme that so stirs one's emotions as this of home. Poets have sung of it in strains most rapturous; orators have given it unequalled eloquence; and there is no form of genius but has deemed it worthy of its most

exalted efforts. Yes, our whole literature is brilliant with gems of tribute to this vestal shrine. At the mere mention of home our memories recur with peculiar pleasure to the

"Sweet scenes of our youth,
Seat of friendship and truth,
Where love chased each fast-fleeting year."

It matters not if we are carried back in thought to a log cabin whose low-sagging beams threatened our fathers' heads, and whose unmatched, wide-seamed floors were crossed by rows of shining nail heads; or to the palatial dwelling whose interior seemed the very abode of luxury and ease, with its tufted floors and marble-manteled halls. In either place there was something inexpressibly charming, a fascination peculiar only to home. And what was the cause of this fascination? Was it the quaint old cabin, with its rural surroundings? Or was it the elegant mansion, with its artificial lawns and playing fountains? No, it was the presence of those whose memory we cherish, and in whose hands we were but plastic clay, and who made such indelible impressions on our minds that time itself cannot efface them.

If in the homes of our childhood there was a force sufficiently strong, not only to influence our youth, but to assert itself throughout our lives, is there not a force equally potent in our homes now which shall be as lasting with the rising generation. There certainly is, and it should be taken advantage of and used to direct the childish thought.

"For great statesmen govern nations,
Kings mold a people's fate;
But the unseen hand of velvet
These giants regulate.

The iron arm of fortune
With woman's charm is purled;
For the hand that rocks the cradle
Is the hand that rules the world."

With a world's destiny at stake there should be no neglect of parental duty. Too frequently the spirit of avarice is paramount to any obligation due the family. The home is scantily furnished in cases where opulence would permit elegance. The child is not allowed to mingle in society, much less to invite young friends to his home. Thus the child's nature is dwarfed, and instead of enjoying the innocent sports and pastimes of other children and giving spontaneous vent to the fun within him, he must silently listen perchance to words of contention and discord. So the pernicious seed of a morbid disposition is sown, and he remains at home to grow into an illy-balanced manhood. I have all sympathy of and respect for that spirit which prompts a lad to burst from the stifled atmosphere of such a home and seek congenial scenes among strangers.

Much attention is given at present to the subject of trade-schools for young men and boys. The question merits careful consideration. The apprenticeship system is practically done away with, and the issue now is, what shall take its place? This can be answered with considerable certainty at the farmer's home if he will but provide a few ordinary tools for the free use of his sons. If there is a natural fitness for any special mechanical pursuit, it will appear in Henry's or John's individual work. Then when he is sent to a trade-school he knows what trade he wishes to learn, and thus settles the question as to whether a four years' course in which to select and master a trade, should be given, or a very much shorter time in which to learn a trade previously chosen. It is a false economy that balances dull tools, and a few feet of wasted lumber, against the discovering and fostering of genius.

Home is the place to detect and nurture talent. If a child evinces a passion for music, gratify it even though that indulgence means months of listening, on your part, to torturing practice. Better the bang of piano than the click of billiard balls; better the moan of an organ than the groan of a drunken son; better the scrape of a violin than the creak of a prison door.

Too early nor too much attention can be given to the intellectual training of a child. The skilled mechanic requires it, it is indispensable to the thorough musician, and one's social standing is measured by the breadth of his culture. Unfortunately his paramount duty to the child, and through him to the future, is too frequently reserved for the school teacher. The proper place to deal with it is at home and through the library. This does not mean a taxing of youthful strength with an array of ponderous volumes full of abstruse thought. It is not the quantity, but the quality that signifies. In reviewing the lives of eminent men how frequently we find less than a score of books on their

father's shelves, yet those few volumes were the foundation of broad and varied culture. Abraham Lincoln's boyhood knew only six authors; but these were read with that diligence and earnestness that charactarized the man. Let perseverance be the youthful "open sesame" inquest of thought among well-chosen books, and a wealth of intelligence will result; but if a child enters an indifferently selected library and reads aimlessly, he neither acquires knowledge, nor forms correct habits of reading. Parents, therefore, should be specially solicitous on two points, what their children read and how they read it. In these days when books multiply as by magic, it is not easy to suggest a list of authors for a library, but a good general rule to observe is to buy none but those that have stemmed the tide of time and criticism.

With such works on your shelves, teach your children the advantage of following Daniel Webster's rule for reading, which was that for fifteen minutes with a book merited thirty minutes reflection. No home should be without at least one of the standard literary magazines. They are all replete with valuable information; their topics are as varied as thought itself; they are faithful mirrors of our literary activity in all its phases, and therefore should be welcome guests to every household.

Another matter that should not be neglected is the adornment of home. What is more desolate than four white unrelieved walls in a dwelling. One sees even his own Silhouette with a sense of gratitude in such a room. It is not necessary to lavish wealth on costly paintings and tapestry in order to make a room cheerfull and inviting. A half dozen carefully selected and tastily arranged pictures will break the monotony of plain walls, and suggest comfort. These pictures serve the double purpose of ornaments and teachers. They please and they instruct. As a single illustration is frequently worth pages of logic, so a single picture may reveal at a glance truths and beauties beyond the power of pen to express. If the artists theme be worthy, and rendered with merit, it is not of vital importance whether your rooms are adorned with oil paintings, steel engravings, or three-pounds-of-tea chromos.

It is true that many parents knew none of these luxuries. Pioneer life was not likely to afford social advantages, mechanical training, or musical education for the young. The urgent demands of practical duties did not permit leisure for reading or ornamentation. But the conditions of pioneer times should not gauge the needs of today. We have been advancing and encountering new difficulties and new conditions, and therefore a broader education is required. The field of brawn and muscle is fast being annexed to the arena of intellects, wherein farmers must do combat against the principles which agtagonize their interests; therefore, we should concern ourselves generously about the future.

What may the future expect of us? It should demand a nation of men and women strong in character, keen in intellect, and of exalted integrity; a people to whom home should be at once a family shrine, and the nation's bulwark.

Bee-Keeping.

[By A. A. Winslow, Appleton, Wis.]

What is honey worth? What is extracted honey worth? What is a swarm of bees worth? How many swarms have you? How do you winter them? etc., etc., are questions that the bee-keeper has to answer many times. Well, we try to answer all such questions so that it will be satisfactory; and if the person asking questions wants to learn anything about the business we always try to help them all we can. We do not have any secrets in the bee business, at our place. Any one can come and see us work and ask as many questions as they like; and we do the best we can to answer.

Now I want to ask the farmers here, to-day, why is it that there are so few bees kept by the farmers? Do you not know that all your farms are almost dripping with honey some parts of the year. Do you not know that it only needs a few swarms of bees to gather all the honey you would need in your own families, and that it would not take half the time to do all the work needed in caring for the bees that it does to raise that one-half acre or more of sugar cane. Now I do not expect you will all keep as many bees as I do; but I do think it would be better if there were more bees in the county; perhaps not better for me, personally, but better for the community.

Now, let us see a little in the way of

figures. There must be about 600 square miles in this county. I do not think it a high estimate to say there would be a ton of honey gathered on every square mile; but to put it low enough call it 1,000 pounds per square mile. That would give us 300 tons of honey. Do you think the estimate is high? I have raised three tons this year, and is there not room in the county for 100 more to do the same as I have done this year? Sure there is, and I believe it could be doubled. Three hundred tons of honey at the low price of eight cents per pound would bring the bee keepers the snug little stake of $48,000. It all goes to waste now. Is it not worth saving? Have you all got your pocket books so full that you do not want any more? I am not grinding any axes to-day; I have no bees to sell. I would rather buy than sell. But think of this, you who would like to have honey on your tables, and see if there is not some one of the family that can get up the courage to get a swarm of bees and learn something about them, and get more, as you can make it pay. I do not think there is a man in the house that is any more afraid of bees than I was when I commenced eleven years ago, and I am here yet. Do they sting me? Why, of course they do; they would as soon sting me as you. It makes no difference to them when they are in the sting. But, perhaps, you will like it after you get used to it. Try it.

There is one thing I wish to tell you, to-day, and that is, you will have to work at the business a long time before you learn all there is to know about it, and it is a very interesting study. How many of us can tell how much the busy little workers do for mankind in the way of fertilization of the flowers of all our crops, and more especially in the fruits and the clover? Do you suppose we would have any clover seed if there were no bees; would we have the same amount of fruit that we now do, and would it be as nice? I have no doubt but I had hundreds of quarts more strawberries than I should have had were it not for my bees; and I know the bees gathered hundreds of pounds off from the raspberries and strawberries. So you see it is a good thing to have the bees, and yet how little we know about them. How many are there that would know a queen bee if they should see one away from the hive? How many have ever learned enough of the bee-hive and its happy family, to know what the work is for each of three kinds of its inhabitants?

But now let us get to the practical part of the business. I am keeping about 100 swarms of bees, mostly Italian, and as full blooded as I can keep them, with black bees all around me. I do not breed my bees for color of the stripes on the body as much as I do for size of the body and bee. Let me say there is as much difference in the size of bees as there is in the size of cows or any other stock. Large bees can carry more honey than small ones, and besides they are not apt to be as cross as the small ones. We have for the last few years practiced letting the bees swarm in the natural way, and like that better than dividing. Think we get better results. We raise both comb and extracted honey. Think there is more profit in the extracted honey; but there is a demand for comb honey in the market and those that want it will take no other. We are sure to raise it to suit our customers.

We commenced this spring with 80 swarms, and have increased to 108, and taken 4,000 pounds of extracted honey and 2,000 pounds of comb honey. We winter our bees in the cellar under the house. Think I should winter some of them packed in chaff on the summer stands, if I had the chaff; but we do not raise grain, so do not have it. We have used comb foundation largely in our business, and would not do without it; it helps the bees, and that helps us to get more honey. It pays to keep bees.

How to Improve the Soil.

[By Joseph Nuttall, of Juneau.]

How to Improve the Fertility of the Soil. First, by good plowing and well manuring, and keeping the farm clean of weeds. Second, a good way to fertilize land is by sowing clover and plowing the second crop under. The next best way is to sow buckwheat early. When it is in bloom plow it under and sow the same land again with buckwheat. Plow that under; then sow with either wheat or rye. Then your land is beginning to fertilize. By repeating the same process

the land will become rich, and will grow any crop you may choose to put on. Third, a good way to fertilize land is to get peat out of the marshes and slues; mix with barn-yard manure and let it rot; then turn it over and let remain a month; then haul it on the land and plow under. I have seen excellent results from the use of guano on a clay farm that was so entirely run out that it would not grow anything but weeds, and few of them. The guano was put on in the spring. In June following the grass was so thick on the ground that I compared it as if I was standing on a feather pillow. The grass was so thick the result was that the farmer had to treble his stock to keep the grass down. The same results would happen with us if we would use the same means. An old farmer used to say, "Behave well to your land and it will behave well to you."

Fruit-Growing in Wisconsin.

[By A. C. Barry, of Lodi.]

As in its settlement, so in its fruit-growing. Wisconsin has had its pioneers. Almost the common thought of the earliest comers was—if thought it may be called—that fruit could not be grown here, save at great cost and at infinite pains; and even then only an inferior quality and an inadequate supply could be produced. Orchard planting was therefore neglected, and wheat growing, to the neglect of almost everything else, was the absorbing interest. There were a few, however, who right away began to test soil and climate as to whether they were friendly or unfriendly to fruit production. Where the crab and wild plum flourished, these cultivated fruits could not fail to find conditions congenial to their growth. So they began their experiment, in a primitive way, by planting the seeds of the apple, peach, plum and pear; although here and there one procured trees of the various fruits from eastern nurseries as a beginning. In 1843, I found considerable orchards in Racine, Walworth and Rock counties, and many of them have already come into bearing. Peaches in certain localities were abundant, and of excellent quality. Apples, also, of seeding sorts, from early plantings, were very fine; while those produced by eastern grown trees were of unsurpassed excellence. Considerable nurseries had been established —one in Racine county, by Norton & Mosher, one on Gardiner's Prairie, Walworth Co., by J. Bell & Co., one in Delavan, by F. K. Phoenix, the veteran nurseryman of Wisconsin, and one in Milwaukee by Parker. Very likely there were others of which I had no knowledge. To such a result in fruit growing did the experiment work itself out, and there were none to doubt or question, that it was possible to have orchards here as in the states east of the the great lakes. Every farm had its orchard, large or small, and in the gardens, both of county and village. the plum, the peach, the cherry, the pear were growing, besides the usual variety of small fruits.

As late as 1855, or fifteen years after the settlement of Wisconsin began, the growing of the common kinds of fruit seemed to be moderately successful, at least, and there was a prevailing impression that our orchards and gardens would in time be as productive as those of Ohio and New York. There were disastrous seasons, to be sure, and often we were reminded, as Eastern farmers and horticulturists were, that "eternal vigilence is the price" of fruit growing as well as "of liberty." The "blight" would attack the pear trees, the "yellows" invade the peach rows, and the canker worm, curculio and bark louse make sad havoc in our promising orchards. Now and then a sub-Artic winter, or a wave of polar cold would smite all with terrible severity, to be followed by barrenness and perhaps decay. Already, among those first planted, were seen wrecks of once thrifty and productive orchards, only here and there a living tree remaining, whether apple, pear, cherry, peach, or plum. A few years later it almost seemed, because of changed climate conditions, and the operation of various causes, as though what had been said of Wisconsin in relation to fruit growing was likely to prove true, that both soil and climate were in the way of its successful culture.

In the year 1856 a small farm, back from the lake shore ten miles, came into my possession by purchase. Its original owner, Elder Field, of the M. E. Church, as early as 1837 had planted on an eastern and south-eastern slope, amply protected on three sides, and with sufficient drainage, a considerable orchard of the apple, plum, pear and

peach. For several years after it came into bearing, it ranked, because of the variety, quality and yield of its fruit of the several kinds, among the best orchards in the country. The autumn previous to my becoming the owner there were of peaches alone 100 bushels. Plums, pears and apples were in large supply and of the finest sorts. When I took possession in the late spring the peach trees, with two or three exceptions, were dead; the pear trees showed great loss of vitality, and several of the plum trees were in a half-dying condition. The apple trees, also, showed hard usage, and already afflicted with the bark louse, which the intense cold could not kill, years of careful treatment and generous culture were required for their restoration to health and productiveness. If this orchard, sheltered as it was, and in near proximity to a large body of water, which exerted a softening influence upon the winter's severity, suffered as described, you can judge how other orchards with less protection, or none at all, and in districts having a rigorous local climate, must have suffered. Of course, the peach trees were all killed, and to this day, I believe, few or no attempts have been made to grow peaches in Wisconsin.

Two and three years ago the experience of '56 was more than duplicated, when our orchards that had withstood for twenty-five and thirty years the asperities of our winters, and the burning heat of our summers; the ravages of insects, and the neglect and ill-usage of man, succumbed largely, if not entirely, save in favored localities, or when composed of exceptional varieties, to intense and long-continued polar cold. A few trees, in instances, escaped seemingly unharmed, and those not always reckoned as hardy, but, on the contrary, listed as tender. In my orchard, out of twenty or more varieties, I have left, in very fair condition, the Red Astrachan, Dutchess, Perry Russet, Plumb's Cider, Honey Sweet, Blue Pippin, White Cluster, Bailey Sweet, Seek-no-Further, English Russet, Tallman Sweet, and two or three inferior and undescribed varieties.

The question now is, in all portions of the state, save on or near the lake shore, not whether we can grow peaches, pears and plums, but can we grow apples?—that is, can we have permanent orchards, or orchards made up of trees so hardy, so robust of constitution, as that the vicissitudes of our changeful climate, local or otherwise, shall not seriously affect them? That we can, is in part demonstrated by the present "survival of the fittest," and more largely by the fact that we have orchardists among us who have been able to place on exhibition for two years past, as a result of their true grit, intelligence and enterprise, from fifty to more than one hundred varieties of the apple, many of them new, and so hardy as well to be termed "iron-clad." Our question is, therefore, fully answered; and, with well-chosen locations, carefully prepared soil, painstaking in planting, judicious culture, and faithful oversight, we may have permanent orchards everywhere in Wisconsin, and an abundance of excellent fruit in season. While along the borders of Lake Michigan, fifteen or twenty miles inland, may be grown—have been grown for forty years, and are now grown—nearly all the old standard varieties grown in the East, such as the Rhode Island Greening, Baldwin, Porter, Rambo, Northern Spy, None Such, Newtown Pippin, Swaar, Spitzenburg, Yellow Bellflower, Strawberry, Fall and Winter Pearmain, etc., we must choose as most reliable for our orchards, in addition to the varieties that survived the wreck of two years ago, such hardy varieties as these: Telofsky, Myer's Nonpareil, Grimes' Golden Pippin, Wealthy, Yellow Transparent, Kremer's Green, Breskovka, and Blushed Colville. This list may be increased from among the Russian sorts to any desirable extent.

But let it be borne in mind, that if we would succeed with even the hardiest varieties, several important matters are to be taken into account, having reference to climate, and therefore to location, transplanting and cultivation. Climate, as we know, is governed by many causes, among which may be included elevation, or geological features, and especially the presence of lakes, which have the effect to diminish the range of the thermometer in its markings of winter's cold and summer's heat. This gives us to see, in part, why a northern district may not be so cold in winter, nor so warm in summer, as one several degrees farther south; in other words, why Green Bay experiences none of the extremely low temperatures, long continued in winter, and the

extreme heat in summer, common to Lodi and a large extent of surroundihg country. Our climate is what is known as rigorous or continental. And this is to be taken into account, not only in the selection of trees, but in the choice of location, preparation of soil, planting and after-treatment.

As to the selection of sites and soils very little definite instruction can be given. It is the opinion of many Western pomologists that the orchard should be planted on a swell or slope, rather than on low, flat land, mainly because better fitted to produce hardier, thriftier and more productive trees. A northeast or southeast exposure is to be preferred, and if protection can be had on opposite sides, all the better. For this purpose nothing can be better than a close hedge or Norway spruce.

The location chosen, be sure that a right beginning is made. Break and prepare the ground in a most thorough manner, and if the condition of the soil requires it, under-drain. Then drive over to Brother Tuttle's in Baraboo and select your trees; or send your order to Brother Kellogg of Janesville, or to Wisconsin's pioneer nurseryman, Brother Phoenix of Delavan, or to some other well-known and honest dealer, and secure good trees, true to name, and that will grow right along if properly planted. And remember that the number of sorts is not so much an object as that you plant largely of a variety known to succeed in your particular neighborhood, or will prove hardy and productive in your soil and climate.

In planting you will avoid copying the bad practice of the man in the old rhyme:

"I rams 'em in,
Now thick, now thin,
For what cares I
Whether they live or die."

You do care, and therefore should go about the business in an intelligent way. This done, and abundant mulching supplied, you may rest from you labors for at least a year; only you must stand guard over your young orchard, and shield it from the depredations of rabbits, mice, worms and every sort of invading enemy.

In my own mind I have been debating the question, whether if we had given attention to under-draining and subsoil plowing of our orchards, to supplying proper nutrition, and to mulching they would not have gone through the terrbly hard winters of 1884 and 1885 with far less of loss. Nutrition would have supplied vitality, and the other processes would not only have prevented the deluging of roots with water, or from being burned by drought and heat during the summer; but prevented their being enshrouded in thick ice, and therefore subjected to a lower temperature than they could withstand during the winter. Be this as it may, it is safe to say, that by the processes named the vigor and hardiness of the trees would have been promoted, and therefore a preparation secured for withstanding the extreme cold to which they were subjected.

Says a recent writer on the subject of fruit planting: "There are many waste corners about the farm and door-yard where there is room for a fruit tree of some kind, or for a row of currant, gooseberry, raspberry, or blackberry bushes. There is no better place for these than along the fence in the back yard. Plant quince trees around the wood-pile. They will screen the pile from view, and the rotten wood, chips, etc., make just the soil they delight in. Plant plums in the hog lot and chicken yard—it is just the place they want; but the young trees in the lot must be protected from the swinish snout. Plant a cherry tree or two to shade the kitchen from the hot sun in summer, and some more to shade the yard about the stables. Plant pear trees in the fence corners—they flourish best in a sod." These suggestions, I am sure, can be followed with profit. They show us how, that with only a small outlay of money, we may furnish ourselves with an abundance of fresh fruit in variety, throughout a considerable portion of the year. On many farms, as he tells us, there are enough idle corners or plats near the house and outbuildings, which, if utilized as suggested, would supply the family with fruit of many kinds. That a farmer should allow the idle corners, the back yard, the hog lot, the stable grounds, the road-side to be occupied by burdocks, thistles and every sort of vile weed instead of fruit-bearing trees, vines and shrubs, is a severe reflection upon his taste, his refinement, his good sense, and I had a mind to say, his moral sense also.

Considering the small room they require, and the comparatively trifling cost of planting and cultivation, there

is scarcely anything grown upon the farm or in the garden so remunerative in yield, or that make so satisfactory returns as small fruits, even if only the supply of the family table be taken into account. A few square feet of ground and a little time employed in cultivation will give to the farmer all the strawberries, raspberries, currants, gooseberries, and even grapes he will need for his own use, and may be a few to spare to the neighbor who grows burdocks.

First on the list, as it is first in its season and deliciousness, is the strawberry. If we cannot grow the large fruits we can grow that, and with little risk of failure if certain conditions are fulfilled. As showing its wonderful productiveness I may here state that on a bit of ground, considerably less than a square rod, I grew three years ago, of four varieties, 100 quarts of as fine berries as I ever saw.

The strawberry is indifferent to the kind of soil in which it is planted. If it has any preference, it is for a clay loam. Do not understand that it takes kindly to a *poor* soil, nor that it will laugh right out in great clusters of rich fruit when neglected or badly treated. Nothing so quick to respond substantially to kindness. I quite agree with an old fruit grower of Wisconsin when he says: Plant a strawberry bed on poor soil, selecting a poor variety, or using old plants begged of a neighbor whose bed has run out; plant late after all the other spring work is done, and think it is hardly worth while to mulch the plants, they look so poor; in June scratch around a little with the hoe, then leave the weeds to take possession; the drouth to do its work, and when winter comes furnish no protection because there is nothing worth protecting; begin and proceed after this fashion, and the following season you can very easily go without berries, and be ready to say to all that it is almost impossible to raise fruit of any kind in Wisconsin.

The practical directions as to how to grow the strawberry in abundance and perfection are few and simple, as I have said, a clay loam would seem to be essential for such a growing. This should be thoroughly manured, if not already sufficiently fertile, and worked to a depth of two feet or more. Pulverize with the rake, and set the plants in rows two feet apart, and from ten to eighteen inches apart in the rows, as the vigor of the variety may determine. The setting should be done in May or the latter part of August, and the plants protected, not only the first but every winter, by a covering of leaves, litter from the garden or marsh hay. I have I have found oak bushes,retaining their leaves, to answer the purpose.

"The points of culture are, to keep the ground loose and free from weeds, and the plants free from runners. When runners are required for new beds, they can only be grown at the expense of fruit, and it is better that they be produced apart. When large space is occupied, the culture will of course be easiest accomplished by horse power with suitable harrows. In garden culture, nothing is superior to a good steel rake.

After the plants are set, mulch every inch of ground they do not occupy with forest moulds, or well-rotted manure. The succeeding spring, not removing the covering too early, loosen the ground with the hoe or rake, and work in the manure as thoroughly as possible; then top-dress about the hills with a compost of night-soil, ashes and muck, or of poultry-droppings, lime and scrapings from the forest. After this use as a mulch so much of the winter covering as may be necessary. Two small beds in my garden treated with these composts, produced last season, notwithstanding the severe and long-continued drouth, and without additional mulching, all the berries needed for family use, while other beds not thus treated were barren of fruit.

What I have desired to get before you is, that with the proper soil, planting, enriching, cultivation and protection, you can grow strawberries on a small plat of ground in an astonishing abundance.

You may desire to know which varieties, of a large number, are best for planting in our climate. My own experience is too limited to be of much use to you here. I have in cultivation only the Wilson, Downing, Crescent, Sharpless and Vick. The last named has fallen into disrepute with many growers, but I had gone without berries last season but for the Vick and Cresent—the Vick excelling. It is possible that their fruiting was due, in large part, to the treatment they received. There are other highly recommended varie-

ties—the Countess, Piper's Seedling, Manchester, Longfellow and Cumberland. A new Wisconsin seedling, named Jessie, is accorded high merit by the leading horticulturists of the state. Kellogg says it is the best flavored large strawberry he has ever tasted. Phœnix mentions it with pride. J. M. Smith extols it as very productive and the most promising of all the new berries. The Belmont is reputed of great excellence; the Jewel also.

Next in order is the raspberry, the earliest fruitings of which appear upon our tables before the latest strawberries have disappeared. The soil best suited to this plant is a loose, friable loam, or a loamy clay, moderately rich, but sufficiently dry. We find the eatable wild raspberries growing in moist lands, and also upon rocky and stony hills, but generally in the richest soils of the country, where they abound. Nearly all of the cultivated kinds do best, so far as my experience goes, in a moist and rather shaded location, as for instance, on the north side of a fence. If large fruit and fine crops are desired, the soil should be deeply trenched and well manured. I refer now especially to garden culture. The stools should be in rows at least four feet apart, and two feet in the rows. If of the black-cap varieties, I should say the rows should be six feet apart and the stools four feet apart in the rows. My practice is to mulch heavily after planting. On the approach of cold weather the improved and tender varieties are laid down and covered with earth. The black varieties, with the exception of the Gregg, need not be laid down. Early in the spring the old, dead shoots, together with the weaker new ones, should be removed, and those that remain headed back to two or three feet in height, and in some way supported. For the black caps I dispense with supports. They are trained low and branching by pinching back the young canes when two to three feet in height. By doing this the fruit is increased in size and quantity.

The best approved varieties are of the Red, the Turner, Brandywine, Cutlebert, Hansel, Carolina, Superb and Marlboro; and of the Black; Gregg Souhegan, Tyler and Onandaga.

In this connectisn I want to tell you that I am cultivating alongside the Gregg and Doolittle a native black-cap, that in point of hardiness, productiveness, and size and quality of fruit, is scarcely surpassed by either of the varieties I have mentioned. I found it growing wild on my little farm, and struck with the largness of its fruit and its bearing qualities, I at once began its cultivation, and have continued it with entirely satisfactory results.

Blackberries are grown in much the same manner as raspberries. They require more room on account of their greater vigor and larger growth. Not more than two young shoots should be allowed to grow in a stool, and these stopped when four to six feet high, but allowed to branch freely. The bearing wood is cut off soon after the fruit is gathered, or any time before freezing weather sets in. By covering the spaces between the rows with decomposed manure in autumn, and incorporating it with the soil, continued fertility for five or six years will be insured.

The varieties preferred by Wisconsin growers, are Stone's Hardy, a native of this state, and the Ancient Britan.

In concluding this paper on fruit-growing in Wisconsin, I would like to write it upon your minds so as never to be wiped out, that you cannot grow fruit of any kind right along, prime in quality and in abundant supply, without feeding for it, any more than you can grow corn or wheat, hogs or cattle, of which you shall not be ashamed, without abundant nutrition. Do not thiink that the soil unhelped is to do everything and you are to do nothing. The soil will do all it can but it is deficient in some, perhaps in many, of the elements which combine in the production of fruit. Study, therefore, to know what your fruit trees, vines and bushes require, then feed them with food convenient for them, and in steady supply. As was said by a French priest of a field he was called upon to make productive by his blessing, so may it be said of many an orchard and garden in Wisconsin: "Prayers are of no use here—this needs manure."

Swine Husbandry.

[Geo. Wyle, Leeds, Wis.]

With the experience of the past year no one but a dyed-in-the-wool enthusiast on swine matters could possibly face an audience on such a subject. But notwithstanding the ravages of dis-

ease, the manipulation of the market by speculators or the strikes of "pig-stickers" *our hog is still there*, and for obvious reasons will always hold a front rank and be a conspicuous figure of the in the great corn-growing belt of the West. Corn being, one year with another, one of our safest and surest crops, and a good breed of hogs the best machine for concentrating the bulk of that crop for shipment, and whether the transformation from corn into pork is made at a profit or a loss depends largely (like the success of Institutes) on the man who runs the machine. Although there may be subjects more "taking" for a paper than the hog but few are of more importance to the farmer, viewed from the standpoint of quick returns for money invested, none of our domestic animals give larger returns for a little judicious management and good care, yet none are so systematically neglected and allowed to shift for themselves on the "*root-hog-or-die*" principle. Perhaps the universal neglect with which the hog is treated may be accounted for in part by the fact that mankind in general do not like to see too strong a reflection of themselves, for deny it as we will, there are many traits in the hog that very closely resemble prominent traits in some of their human owners. But after all the abuse he has received at our hands, he has in days gone by rooted the mortgage off many a farm when every thing else failed, and has succeeded in placing himself very near the top in our list of foreign exports. And I must not omit to mention his last achievement, looking toward supplying the million with gilt-edged creamery butter, a movement that has shook the dairy world from center to circumference.

While the profits of the past year have not been remarkable, viewed from a swine-breeder's standpoint, we have plenty of consolation in a talk with our neighbor the cattle feeder, the grain grower, or the aristocrat of a short time ago, the "Tobacco Man."

Although the past year's crop of pork was sold at prices that left little or no profit. Farmers should bear in mind that the world must be fed, and that a staple article like pork cannot long remain below the cost of production. They should also bear in mind that corn and pork are about the only things that American farmers have left of which they can say they have a monopoly. Russia, India and Australia, with their wheat are crowding us in the European markets, but corn still holds its own, and we can supply the world with pork laid down at their doors cheaper than they can raise the feed to make it.

Notwithstanding the low ebb of the swine industry at the present time farmers may, if they will, turn it to good account. There never was a better opportunity offered for the general improvement of the swine throughout the country. First-class animals of any of the improved breeds can be bought now cheaper than ever before, and there is no excuse for anyone keeping poor hogs when good ones can be bought at almost pork prices. And here let me say that the generality of farmers are slow to take advantage of their opportunities. And many of them do not farm as well as they know how. This is true both as regards live stock and all other operations on the farm. They will admit that good stock pays, but while making that admission make no effort to obtain it. Or if they do make an investment in a pure-bred pig or other animal. They appear to think that they have done their whole duty and that their stock must now stand in the front rank forever. Yet these same men can talk political economy by the hour with as much earnestness as if their bread and butter depended on that, instead of on the stock aforesaid.

If you ever make an investment in pure-bred stock of any kind you must keep at it. Don't think that when you have got your hogs towards perfection that they will stay there of themselves. There is but one safe course for you to pursue in seeking to maintain the improved condition of your swine, that is to adhere closely to the same means to which you resorted to bring about the improvement in the first instance. It should be borne in mind that there is no kind of stock that can be so rapidly improved by judicious selection and crossing as swine; also that there is nothing that will degenerate so rapidly under neglect. Even the best breeds we have will degenerate into worthless scrubs in a few years if care is not exercised in the selection of stock and the infusion of fresh blood each year. Breeding in and in tells with fearful effect on a herd, and the lack of care in the way of food and

shelter will help their downward course. One way to meet low prices for our products is to keep only swine that will give the largest possible returns for the feed consumed. With high prices we may with very indifferent stock make a fair profit, but the past season nothing but the very best would pay. Our aim should not be *more hogs*, but better ones, and never to keep more than we can keep and keep well. Too many hogs without proper care and feed is the cause of nearly all the ills that hog flesh is heir to. The lee side of a straw stack where hogs pile up and become overheated and then expose their steaming bodies to cold winds is sure to produce disease of some kind. Corn and all corn for feed one generation after another produces the bone and muscular system, and undermines the constitution of the animal, making it an easy prey to disease. Another fruitful cause of disease is, that practiced by fully two-thirds of our farmers of breeding from young half-grown pigs. Where this course is followed, an inferior, dwarfed projeny is sure to result. While on this subject, a few words in regard to selection in swine breeding may not be amiss. In the first place, the most promising pig for show purposes will not, as a general thing, be the best to set apart for a breeder. A natural tendency to fatness is necesssry in the show-pig, but pretty much all of our popular breeds as shown in these days have as strong a tendency to lay on flesh, as it is safe to encourage in breeding animals. The best show pig may come from the smallest sow in the herd; but it is not safe, as a rule, to select breeders from that class. We want the most size in the shortest time, and we can safely forego a little of the fattening tendency, provided we secure in the prospective breeder rangeyness and a tendency to growth. The practice of most farmers in discarding a sow after she has raised one litter is not to be commended, unless the pigs show more merit than their dam. Always keep a good brood sow until you have something as good or better to take her place. Our experience is that fully matured sows raise the largest pigs at a given age; and it does not cost as much to keep a good brood sow over a year as it will to raise one from a pig to a yearling. While the mature brood sow is suckling she will be able to profitably nourish her litter, without reducing her strength to a point of danger, as is done in the case of the young sow. Although we want our breeding stock rangey, we do not want them of the coarse-boned, slab-sided, hard-feeding sort, that never get fat. There is not so much danger, however, in getting them too coarse as there is in breeding them too fine. The very fine-boned, fancy kind, with constitution and vigor all bred out of them, are not a profitable kind to raise; yet many of our farmers and professional breeders, too, are sacrificing constitution and substance to a gilt-edged pedigree or a fine-tipped ear; or, perhaps, the sire or dam took a first-prize at some recent state or county fair, and for that reason the stock *must* be good. Here is where the custom of giving prizes to the fattest animals, as is usually done at fairs, work a positive injury. A first-class breeding animal once fatted and finished up for show, with the assimilating powers taxed to the utmost, is never so reliable for breeding afterwards. No prize ever awarded ever added anything to the merits of the animal. I would rather have the opinion of one fair-minded expert, who understands his business, than the average scrambled-up, fair-ground committee of three, who frequently don't know one breed from another. In the hands of some men the best hogs of the best breed in the world will degenerate into worthless scrubs in a few years. While others with rather indifferent stock for a foundation, will, by selection and judgment in breeding, in a few years have a herd that for all practical purposes will equal the best. Swine increase so rapidly and reach maturity so quickly that the intelligent breeder can rectify mistakes and breed out faults several times with several generations of hogs, while the horse or cattle breeder is waiting through years of patience to see the result of a single cross, this being the case, swine breeders, having the practical results of certain crosses so frequently brought to their notice, ought to be "Masters" of their profession. And we are not sure but some of them could tell the horse or cattle breeder, the best cross to make in certain cases without consulting the pedigrees. For no one knows better than he that a limited amount of feed and plenty of exer-

cise will develope "the trotting instinct."

While swine raising can profitably be made a *leading* feature on nearly all of our farms the man who undertakes to make it a specialty to the exclusion of everything else will find in time that he is impoverishing his farm in the operation. The reason for this is plain. The hog assimulates more of the food consumed than almost any other animal. And the manure made is so little that it practically cuts no figure in keeping up the land necessary to raise crops for their consumption. In conclusion I have no iron-clad rules to offer in regard to swine breeding, but the man who keeps his herd up to the standard by the use of the best breeding stock obtainable, who uses judgment and common sense in the management and care of them, need have no fears but they will repay him one year with another better than any living thing on the farm.

What Shall We Do With The Boy?

[By Pres. W. I. Chamberlain, Iowa Agrl. College, Ames.]

This is not a new lecture. This audience is perfectly safe. Last winter I tried it on forty different Ohio audiences and it didn't kill off a single one, a single audience I mean, it may have finished an individual here and there. Still further, the lecture was sixty minutes long then, but here under the imperious mandate of Supt. Morrison, it has been squeezed down to twenty. If you can't stand twenty minutes when they stood sixty, it proves that the Ohio audiences are three times as tough as those in Wisconsin, unless, perhaps, lectures are like lemons, when squeezed to one-third the size they lose all their juice.

Seriously, the noblest crop or product of our farmers and homes is the crop of boys and girls; worth more than all the rest; for which all other crops are raised. As a farmer I have, therefore, always resented the common remark that "farmers think more of their corn and calves and colts than of their sons; and of their wives, more of their pickles, preserves and tidy houses than of their daughter's training."

This serious charge is not true of any parent worthy of the name. Less true is it of farmers, I believe, than of parents in most other callings. The companionship between father and son, mother and daughter is closer in farming than in almost any other calling, and this companionship increases the confidence and love and strong desire to promote the childrens' welfare. These parents here before me know that more than all things else on earth you desire the truest and best growth of your children, physically, mentally and morally. How than shall we train them, whether in city or country. How shall we best supply their needs, and guard them from the evils that surround them in both places.

Of the two, the average country boy, in my opinion, has a better chance than the average city boy to become a pure and strong and self-reliant man; and the statistics show an immense preponderence of fact to sustain this opinion. There are three reasons for the opinion and the fact, that country boys, as a rule, make stronger, purer, better men.

First, they form on the farm, from necessity, habits of promptness, efficiency, steady industry for steadily earned reward. They learn the cost and value of money. They know just how much sweat and back-ache there is in a dollar bill.

Second, they acquire quickness of eye, dexterity and knack of hand and body, learn the use of tools, learn how to adapt means to ends, how to extricate one's self from difficulty, and this gives them self-reliance, originality, independence and gumption.

Third, in the bright sunshine and air of the country he develops a clean heart and a robust constitution, than which there is no better foundation for, or greater aid to, mental or to moral greatness.

The country boy learns habits of steady industry. Sometimes it is too steady. Do you know anything steadier than riding horse to plow corn all day long? Such a slow, poky horse. Such a mean, little, thin, sweaty blanket. Such a sharp backbone. No wonder country boys have longer legs than city boys. Such long rows; such a dreadfully long day, relieved only by watching the woodchuck in the clover lot near the pond, and laying plans to get a "stint" at hoeing and "drownd him aout." Didn't the boys do it too. He and his big brother,—plug up one end of the hole, and lug about forty barrels of water, while they were rest-

ing, and "sick" old Bose on, as the amphibious rodent emerged from his watery hole, and stand and watch which of the two would "lick." Supreme and inexplicable human longing to see a "fair fight."

I said above, the country boy acquires dexterity. A dozen old-time farm processes take more dexterity and knack than the whole trade of the modern city mechanic. He learns to milk cows, teach calves to drink (try it once), harness horses, spread hay, mow, cradle, rake and bind, husk, plow, yoke oxen, what not of skill, knack and patience. He can mend harness or whiffletrees with halter strap or wool twine, three pounds in each pocket, load sawlogs that weigh two tons and not lift a pound, mend a log chain with a toggle, rivet a cutter-bar section with a monkey wrench on the drive wheel of the mower, before a city boy could ask a policeman the way to the blacksmith shop. He traps rabbits in winter, spears suckers at night in the spring, shoots squirrels and quail whenever he can get a chance in spite of game laws.

He has a shop over the woodshed, where he makes his box-traps, puts handles to his fish spears and woods to his skates, and a regular electrical machine from old bottles and odds and ends. He is in twenty places where he must use energy, ingenuity and self reliance to extricate himself from difficulties.

Time fails to tell of the night skatings on the mill pond, the all-night sap-boiling in sugar camps, the huskings and apple-parings of old times, when you find red ears of corn, or whirl the apple parrings over your head and go home with the girl you "don't care much for any way," and dream about her all night long. Of the sheep-washing and shearing in later spring, the apple-picking in fall, the city marketing when the boy cuts his eye-tooth. This was the boy life on the farm forty and even twenty years ago. Don't you know that such life develops hosts and multitudes of pure and strong and self-reliant men?

Now the average city boy lacks such and such like stimulants. He has many compensating advantages in the way of better schools and more polite culture, and the polish and sharpness that come from contract and attrition, but his advantages are not naturally in the direction of energy, ingenuity, self-reliance, strength, vigor and push.

For example he has no steady work, vacations or before and after school—not even home chores. Everything is done for you in the city and you must foot the bills. Pavements, water, gas, sewerage sanitary matters, all cared for by boards, city council and contractors.

The boy is left out in the cold, so far as money-earning work is concerned. No wood to cut and haul and split and bring in; you have your car-load of coal dumped in your cellar, and foot the bill. No kindlings to prepare; you telephone for patent kindlings, or to the planing-mill for refuse bits of pine —$2.00 for the winter's supply. No water to bring from well or spring; a huge engine, three miles away, pumps it to your faucets in kitchen, or bath-room stand, ready to deliver it to you hot or cold. There is no cow to feed and care for and milk; daily, at your door, at seven cents a quart, you buy your chalk and water. No horse to tend, feed and harness; only the rich have horses in the city; you foot it, or ride on the car that passes your door every five minutes, and that develops no skill or foresight; you just go out and "hop on" and pay your nickel.

Instead of becoming industrious, dextrous and self-reliant and independent, the city boy is in danger of becoming the most dependent of beings, dependent not on providence and his own patient, skillful efforts, but on other people. Your bread, cake, pies, fruit, meat and groceries are delivered daily at your door, if you choose. Whatever you need you can telephone for from the corner grocery—canned, preserved, desiccated, pickled, dressed, boned, minced, spiced, seasoned, cooked, ready for the table. All the labor left undone is that of eating, and, for aught I know, the very next invention will be that of a "patent masticator," worked by treadle, crank or pocket engine.

No, there seems absolutely nothing that you cannot get at the corner grocery—except religion. You cannot get that there, nor self-reliance, nor habits of industry, but quite the reverse, and and that is just the trouble. The whole atmosphere of the city, and of the most of the city schools and colleges, cast reproach on physical exertion, even upon skilled manual labor. Only

negroes and foreigners do hand and back work in sight in our cities, and such work with pick and hoe and shovel and hod, on streets and sewers and buildings, is not intelligent and dextrous like the handiwork upon the farm. Inside the shops, or on the rising buildings, a more intelligent class than the first named work in some narrow groove, perhaps at skilled labor, but they are out of sight of the well-dressed throng of life that surges on the streets and pavements. We cannot deny that physical labor is shunned in our cities. The clerk in the store, shop or law-office, or the insurance office, with $400 or $500 per year, ranks socially above the skilled mason, carpenter or plumber, that earns in an occupation that takes quite as much brain work.

All physical work seems to be regarded as menial, whether it requires intelligence and skill or not. I know men that would deem it a disgrace to be seen carrying home a pound of crackers or a yard of cloth. The grocer's wagon stops before their doors and delivers a pint of pickles or a half pound of tea, and we all help pay the free delivery. I know men and women that will stand on the street corner ten minutes, with the thermometer ten degrees below zero, and their toes ten degrees below that, waiting for a car to take them four squares, because, forsooth, they "don't have to walk." They could walk or run in half the time, and have warm feet and ruddy face and better appetite besides. Feet and hands are so little used by well-to-do people in the city that I sometimes wonder that the Lord wastes feet and hands upon city people any more.

City people use the physical powers so reluctantly and so little, that they lose their snap, vigor, energy; they get sallow, dyspeptic, lazy. The only way I myself kept up country health and vigor for six years of confining city office work, was by four walks of a mile each every day, or, rather, I usually ran part of the way, down a back alley, of course, so as not to horrify the whole town (hoo) by seeing a white man run. Your true city man never runs. Bless your heart, no!—except for office—and then they sometimes get badly left on the home-stretch, their legs are so out of practice.

Now the influence of all this upon the city boy is not hard to see. No work to do but go to school and learn dry books. Nobody works either that is well dressed or of any account. No chance to play in a way to get rollicking physical exertion. The streets seem the only place where there is life, and so the small boys steal rides on the conductorless (bob tailed) cars to make the drivers mad and the big boys, unless they have a taste for books or music or drawing, gather on the corners in front of saloons and stare at and criticise the ladies that pass, or steel rides on the freight trains switching at the station. I knew one such boy, some 40 years ago, bright and beautiful and daring. It was a perfect delight for him to leap upon or from a train in rapid motion. There could be no danger for him, so fleet and agile. One day he missed his footing and was brought home a mangled, lifeless mass. And his father cried in agony, "O God in Heaven what can be more cruel than such a death of innocence and beauty."

Some 30 years more of town life, with its idleness and saloons, had done its work for a younger son of the same man. Dilirium tremens again and again; manhood gone,—honor, decency, self-respect, all gone; beautiful wife driven to divorce, bright children worse than fatherless; tortured by demons even in this life he died; and now his anguish stricken father cried, "Would God he had died in childhood's innocence like his brother." I tell you my friends the wise and wealthy men and women of our cities must, with man's strength and woman's love, wrestle with the problem of healthy, invigorating amusement and skilled physical employment for our city youth.

It is a mighty and an awful problem of our civilization, which I cannot even touch here. Free gymnasiums, ball grounds, tennis lawns, parks, care for healthful athletic sports on the one hand, and on the other the industrial feature introduced into our city schools, with special manual training and trade schools and technological schools of higher rank, are some of the hints to a solution. They will help destroy the false idea that it is degrading to use the muscles, bend the back and soil the hands; the false idea that unproductive idleness is more genteel and more respectable than intelligent productive industry, that the kid-gloved

dress-up-and-sit-down occupations are more manly than the creative works of ingenuity and toil.

Under this false idea, as things now are, our American boys, both in city and in country, are drifting away from the callings that require physical with mental skill—the trained mind and hand and eye together to produce best results. They are leaving the farms and shops and trades that create and fashion things for human use, and going into the department of transportation and exchange; becoming newsboys, brakemen, conductors and the like on our railways, where there is much sitting and riding and seeing the world, and little physical or even intellectual skill required; or they are becoming traveling salesmen—a vast army leading a dog's life, though one of excitement and stir; or they are becoming clerks, bookkeepers, copyists, operators, or crowding for the countless riches that trade and transportation offer where boys and men may stand or sit and get a living without creative work that soils the hands or bends the back.

I am not decrying or belittling these callings. They are honorable and respectable; but they are not the only honorable ones, nor necessarily the most honorable. Which is most a man, the one that copies words for a lawyer, retails goods for a merchant, foots up long columns for the banker, or the one that with trained mind and hand and eye, builds our houses, railways, bridges, invents and constructs our engines and machines, or improves our fruit and grain and live stock? What callings move the world, those of commerce and trade and speculation or those of agriculture and manufacture? True, the three should go together, but especially is commerce impossible apart from intelligent agriculture and skilled manufacture. Rome began to die when she gave over her agriculture to slaves or foreign conquered tribes, and her manufactures to unskilled men, and sent her best blood into the army, politics and commerce.

Our country cannot afford to let our young men drift away from these productive industries, agriculture, manufactures and the trades.

How shall we, as farmers, best interest our sons in farming, and thus check and stem this too strong tide towards the high-toned callings? I can only throw out a few brief hints for your discussion. In general I should say we should, as far as possible, counteract the disadvantages of farm life. I have clearly, perhaps too strongly, set forth its advantages. Its disadvantages grow mainly out of its isolation, and are chiefly of three kinds, (1) inferior school advantages, (2) inferior social advantages, (3) lack of contact with the world in a business way.

One. Our schools are poorer than in the cities and villages; partly from sparseness of population and consequent impossibility of concentrating pupils enough for proper grading. But they are poorer, more, I think, because we farmers will not vote so high a per cent. of tax for school purposes as they do in the cities. Can we afford to have it so? To have our sons and daughters grow up with inferior intellectual advantages? Then, too, our boys are "so handy" on the farm that we do not give them a chance to attend the entire time of school, or we keep them out a day or two now and then, a great wrong to them and to the school.

Two. Social Privileges.—The young must have them and the adult should. The church, the grange, the singing school, the friendly visit or party, the sleigh rides, pic-nics, excursions, visits to the city or the lake or the river or the summer resort, or distant model stock farm, or county, or state fair, all these and such like harmless, pleasant things are bright spots for the live farm-boy to look forward to, and they linger long and pleasantly in his memory.

Three. Business Contact.—Begin early to trust your sons in business matters, to ask their opinion and take their advice. Let the partnership idea be planted early in their life and nourished well. Let it be our farm, our orchard, our wheat and corn and oats, our blooded calves and colts, not my farm in which my boys have not even the hired man's interest, for he gets pay. Unrequited toil is the secret of many a farm boy's leaving home. Let us say to our sons, as the father in the parable of the prodigal son, said to his faithful elder son, "Son, thou art ever with me and all that I have is thine." Let us say this and mean it, and we shall have fewer prodigal sons. When a farmer gives a boy a colt to call his until it is a three-

year old and worth $200, and then sell it and pocket the money, I don't blame the boy for getting up and running away from the farm that night. Let us be honest, true, generous with the boys, not give them all the "mean" and monotonous work and none of the pleasant; not work them beyond their years, or too much cramp their boyishness. The best colts are not worked hard and continuously until they have got their growth.

"You never can put a man's head on a boy's shoulders." But you can teach him to be truthful and honest and trustworthy by like conduct towards him, and you can interest him in the farm by actually giving him an interest in it.

Industrial Education.

[By Pres. W. I. Chamberlain, Iowa Agricultural College, Ames.]

In my lecture entitled, "What Shall We Do With the Boy?" I pointed out among other things, the strong tendency of our American youths to drift away from the callings that require physical, along with mental skill and toil, that requre the trained hand and eye with the trained mind, to drift away, I say, into the callings that require little or no physical skill and exertion, indeed, but little if any more of the mental.

I noted the fact that the clerk in bank or law office or "store" with $500 a year seems to stand higher, socially, than the skilled mason, carpenter or other skilled mechanic that makes $800 or $1,000, and than the skilled young farmer who works both brain and hand.

I had not time, there, really to raise, certainly not to answer, the question why this is so. I raise that question now. Why do our youths shun the occupations that require physical activity joined to mental activity? Is it from a natural dislike of physical activity? That is the natural presumption. Why no. You laugh at the very suggestion.

All nature, animate or inanimate, is astir with physical activity. Activity is the law of the physical universe. Nothing is at rest, physically speaking. The sun and rain and frosts disintegrate the solid rock. Minute and busy forms of life build up the coral reefs and islands to the surface of the sea. Even what we call death and putrefaction, blight and decay, are but changes in the form of life. The very mold, that is the emblem of the past and dead, when seen under the miroscope, is but a new and beautiful form of life. And in the higher realm of animal life all is stir and motion. Lambs skip and dance and form in squads and companies, and race all panting across your forty-acre field. Children are instinct with life the nearest approach to the unsolved problem of perpetual motion.

Were you ever there when a city primary or grammar school "let out" or rather "broke loose" for recess? The little folks are made to march in rank and file and martial tread until they reach the outside of the play-yard door, and then they bound out, as if shot from a huge gun or catapult, pell-mell, hurly-burly, "slam-bang" across the yard to the high fence, and then recoil and surge back and mingle with the oncoming throng, like swarming bees, or the recoil of waves upon a rocky bluff. Do you observe any natural dislike of physical exertion here?

Were you ever a boy at the country "district school." Do you remember the "noon-spell" and the "recess" with "Gould" and "pullaway", and "prisoner," and "crack the whip," and base ball and "Dutch long," and "fox and geese" in the snow and the long slide on the ice, with forty boys and girls in a row or round, where you ran 200 feet and slid 20 or tumbled down with half the crowd tumbling over you, and where you "pegged off" the sole leather from your boots faster than half the cobblers in town could peg it on again. Didn't you slide down the long hill head first, on your stomach, and haul your sled up and at it again; and did you ever solve the problem why it was four times as far up the hill as down. Were you ever in the war of the snow-balls, or did you ever help hold the (snow) fort against the "Injuns," or storm one under Napoleon Bonaparte? Did you ever discover any dislike of physical employment, or sign or see a petition to have recess or nooning shortened so as to get an intellectual and clerical employment? Why, they want every minute, and don't hear the bell that calls them in, half the time.

They run, jump, slide, climb, race, turn somersets, wrestle, "rub" each with snow, fisticuff, tear their clothes

and "holler," especially the latter. Each urchin has throat of brass and lungs of ten-horse-hollering power. What wouldn't that amount of energy accomplish if utilized in running threshing machines. No wonder that when the early settlers built the first log schoolhouse in the woods, the wolves and bears and wild cats and catamounts got up and left. "Couldn't stand the racket," you see. Direct opposition to their line of business.

Well, to be serious once more, such facts as these as I have mildly overstated, seem to show that there is in the young no natural distaste for physical exertion. Our American young men do not shun the productive industries, so-called, from any inborn dislike for physical activity. How can we then account for the admitted facts. To be brief, I believe our schools and colleges themselves in the past, and even down to the present, are largely responsible for it. They have trained the mind and its activities to the almost total neglect, I had almost said contempt, of the body, its powers, faculties and activities.

Clerks and copyists ranked higher socially than skilled mechanics in old times, mainly, I think, because reading and writing were confined—purposely confined—to the learned few, regarded as wonderful achievements withheld from the common people. In the past the whole spirit and tendency of the schools has been away from the farms, the workshops and the trades of skill and art or high artizanship. Up to 1870 half the college students came from the farms and only one in fifty returned to the farm, and much the same was true of the per cent. in other industrial callings. In England and on the continent the colleges and schools in the past, and largely even yet, were for the aristocratic, privileged and professional classes, who were sent to them because they did not have to work physically, or in order that they might not have to work physically. Hence, physical work usually went with ignorance or servitude or both, and was deemed menial and disgraceful.

In this country the colleges mainly imitated those of the old world, and the tendency was to rear up a privileged and aristocratic class, an aristocracy of learning, and, on the whole, of morality indeed, the most worthy of aristocracies, but nevertheless one of industrial inactivity. The literary colleges trained men for the so-called learned professions, law, medicine, divinity and literature. The military schools trained men for the profession of war.

The commercial colleges trained for business and clerical employments, for commerce and trade. None of them trained men for the trades of manual skill. The high schools and academies have been taught mainly by college men, who have, of course, taught chiefly the things they themselves were taught in college. Until very lately we have had no schools that gave special, thorough, practical knowledge of the sciences that underlie agriculture and the mechanic arts, or the art trades, or that gave training in the applications of those sciences. In a word, the schools trained for law, medicine, theology, literature, war and commerce; for exchange and destruction, but not for production.

No schools taught the sciences and arts of productive industry in its strict sense. Farming was taught on the farm by rule of thumb; not as an art that fundamentally rests on many and difficult sciences.

The mechanic arts or trades were taught by rule of thumb too, to apprentices "indentured" or "bound out" for seven years, and more lately for four or five. The apprentice was, and still is, next to a slave, the servant of servants, kicked from pillar to post; working by compulsion, where and at what he can make most for his master, not where he can learn most for himself; sifting sand, mixing mortar, carrying hod for the mason; printers' devil and errand boy for the printer, and the like, absorbing slowly in seven years the knowledge and skill he could acquire in seven months, with proper instruction, in a good trade school, as has been demonstrated lately in New York City. The state taught all its children book-knowledge. In many states it even carried all who chose through the college and university courses. But until lately in America our state governments have taught skill of hand and eye only to the criminal and the unfortunate classes. Useful trades are taught in the penitentiary, the deaf and dumb asylums, the blind and imbecile asylums, the county infirmaries, the state reform schools and farms, and the city juvenile work houses.

If the state would teach useful trades more outside the penitentiary and reformateries, it would have fewer pupils to teach on the inside.

Even the name "Industrial School" is degraded and insulted by being applied to the city reform schools, where the boys, too dull or roguish to learn in the public schools, and too vicious to be governed by teachers or parents, are sent and taught a trade as a penalty. The overseers of the poor are now the only ones that bind any boys out to apprenticeship. In the past, physical exertion belonged to the ignorant and the inslaved classes. More lately the tendency has been to confine it to the criminal and the unfortunate classes, to pauper youths and to foreigners. Is there any wonder then that our American youths, especially in cities, are not going into the trades that require skill.

As I showed in what I said (before in the lecture on the boy), the city boy has no chance to acquire skill or knowledge of tools or how to use them, nothing to develop physical skill or activity. He has scarcely the power when he leaves school even to learn how to work at trades of skill. He stands in the labor market and wonders no one buys his labor, when really he has no labor to sell, much less any skilled labor. He says he is willing to do anything; there is nothing he knows how to do. And as I have just shown our whole past civilization really discredits physical labor. If the American boy learns a trade, too, his associates will be chiefly the intelectually ignorant or else they will be recent foreigners.

Now why are foreigners so almost exclusively filling our trades of skill? For the reasons already given and because they have been taught trades of skill, and our American youths have not. When the apprenticeships decayed in Europe, schools for technical instruction were established, both for general instruction, scientific and practical, in the mechanic arts in general; and for special training in practical trades. Some of these schools are on a magnificent scale. The expenses of the Imperial Technical School at Moscow are $140,000 per annum.

A single trade school in Crefield, Prussia (83,000 people) confined mainly to instruction in weaving and dyeing was established at a cost of $210,000 by the government, the city and private subscription, and was established because the municipal Chamber of Commerce reported that the silk industry of the city (the main industry) could not otherwise cope with French competition, rendered formidable by the superiority of the work done under the impulse of the excellent French training schools. And the town now exports annually $20,000,000 worth of silk products, most of which come to the United States and to England. At Chemnitz, Saxony, is a technical school (locomotives, hosiery, etc.) that costs $400,000, and there is not a manufacturer in town whose son, assistant or foreman has not attanded this school; and of the 3,000 employes in one great manufactory in the town all the boys between 14 and 16 are obliged to attend the technical school a part of the day, and their work hours are shortened for that purpose.

In Sweden there are about 300 schools where manual instruction in the use of tools for wood and iron work is given. All over Europe such schools have become numerous and excellent. The artizan is taught much of the scientific principles of his trade, and is trained in its manipulations and details. For example, in the decorative arts he learns how to make his own designs and drawings and fashion his own models. He therefore works on a new and beautiful design with the keen relish of the creator or inventor; the pleasure always felt when mind and hand and eye work intelligently together. He has both knowledge and skill.

A few schools are already established in this country, and it is far past high time for them to be, for the race of native skilled mechanics was dying out and we were training no new ones. Instead we were importing artizans and trained mechanics from Europe where they had these training schools or, still worse, we were exporting our gold to import the finer products of their manufacture, such as silk, tapestry, cut glass, ornamental pottery and the like, simply because we had no artist-artizans of a high order among our American youths. They were crowding into the three or four learned professions so-called, into clerical work and into trade and commerce, simply because the schools specially fitted them for no other employments, at least none

that required skill of hand or eye. The clerical, commercial and professional callings were therefore inevitably crowded to repletion. For our system of education in book knowledge, free intuition, compulsory in attendance, was increasing a hundred fold the number of persons fitted to do clerical, commercial and lower grades of professional work.

This oversupply inevitably degraded the pay of such work as compared with skilled mechanical work. Strange, indeed, is it that it has not also already lowered the comparative social standing of those engaged in clerical callings. I have already hinted at the reasons.

First, originally these callings were for the aristocracy and semi-aristocracy, the privileged classes who held the monopoly of the necessary knowledge.

Second, the schools were in the hands of these classes and therefore they cast the mantle of respectability over such callings.

Third, originally, too, for a like reason, the unintelligent labor was done by slaves, or at least by those who had little book knowledge. Hence, all hand work came to be regarded as servile, or as belonging to those who were low in the social scale.

Fourth, criminal and unfortunate classes alone educated to trades. What is the remedy? First, a clear insight into the facts; second, a change in our State school systems. A clear insight into the facts will show that physical labor is not degrading unless it is excessive, or of the monotonous and simple kind that requires and calls forth no mental effort. Physical labor, on the other hand, in itself is not ennobling but physical labor of some kinds is far more intellectual than some kinds of "intellectual work," called intellectual apparently simply because they are not physical.

For example, routine clerical work, copying, simple bookkeeping, retailing goods in a small way, and the like are far less intellectual, than skillful carpentering, brick laying, stone carving, bridge building and fine machinists work. The latter are already better paid than the former in this country. But they rank lower socially, girls say they won't marry greasy mechanics, etc. There is no sound reason for this.

"Man advances just in the proportion that he mingles his thoughts with his labors" or rather guides his hands by his brain. In the ultimate analysis employments should grade socially (equal morality being assumed) in the main, according to the degree of intelligence required in their performance. Minor considerations will be those of pleasantness or unpleasantness, risk incurred, healthiness and unhealthiness and the like, though these considerations enter rather into the question of compensation than of social standing.

The remedy then seems at hand, viz.: a radical change in our schools. They have cast the mantle of respectability around the clerical occupations by fitting our youths for them alone. Now let them cast the same mantle of repectability and in the same way around our trades of skill and knowledge, by fitting our young men and women for these callings. Let them give the necessary knowledge of the scientific principles involved, and at least start the youths on the road towards the necessary skill. Let the state give to the mass of youths in the country, the knowledge of the sciences that underlie agriculture, and in our cities the possibility of learning a trade of skill, or at least the essential things in all trades. As it is now (or until very lately) this is well nigh impossible. Trades unions opposed to letting new recruits into their ranks, because of the false theory accepted by them that they can limit the number of workers so as to increase or at least maintain the pay of those already in. Instead of seeing that work makes work; that busy masons make carpenters busy, and these in turn make busy tailors, shoemakers, grocers and the like, they seem to think there is a fixed amount of work and a fixed "wage fund" as some of our political economists call it, *i. e.*, just so much work to do; just so much money to pay in wages, and therefore if numbers can be kept down, pay can be kept up. It is sought to make each trade into a monopoly, an effort that can never be successful, in the United States at least, because of the flood of foreign-born and foreign-trained mechanics poured in upon us. But it is successful in connection with the other influences named, in keeping our American youths out of the trades of skill. And the question is, shall American youths or foreigners fill these trades of skill.

As I have said, the apprenticeships are dead. Plainly the workmen of the future must learn how to work before they seek employment. And the state must give them the means to learn, principles and practice; not how to swim before they go into the water, but by going into the water. As we have schools where boys learn to ride by riding, to dance by dancing, to swim by swiming, to row by rowing, to write by writing, to read by reading, and to cypher by cyphering, so must we have schools to teach to work by working, schools for manual instruction and trade instruction. When I say the workman must learn to work before he seeks work I announce no new truth. Professional and clerical workers do exactly this. We have scientific schools with drafting, field practice, etc., for engineer and architect, law schools with their moot courts for lawyers, medical colleges with their dissecting room, free clineque and hospital practice for the doctors, business colleges for clerks and bookkeepers, so it seems to me must we have technical and manual instruction and trade instruction for the future mechanic, foreman and inventor, and scientific, agricultural instruction for the future farmer. State cannot afford it? But it trains for law, etc., the over-crowded and aristocratic callings.

The demand is most pressing in our cities. Country boys, as I have shown, get dexterity and ingenuity in certain lines, adaptability, independence, energy and health. The city boy under average parents gets nothing but book knowledge and the sharpness and polish that comes from contract and attrition. He can scarcely saw off a board or drive a nail. In the city, therefore, the need of mannual instruction and trade schools is pressing. There are of two kinds.

(1.) Schools for mannual instruction which teach the lad how to handle tools, and develop his hands and arms and eyes, just as other schools develop their minds. These do not teach a trade, though they make it vastly easier for the boy to learn any trade. The training in these schools is meant to make the boy handy.

(2.) Trade schools which have a different end in view, namely, to make the boy fairly skillful in some practical art or trade by which he can intelligently earn a living. Maual instruction has already been made a part of the public school system in Boston, Baltimore, Philadelphia, and Toledo, and virtually in New York and St. Louis, while manual instruction and training schools have been established in Cleveland, Chicago and several other cities, partly on a private basis, with tuition enough to cover running expenses after the "plant" or equipment is provided. The testimony of teachers and superintendents in the public schools is uniform and decided that the brain work is really aided by this hand work.

The technological schools established in each state on the munificent land grant endowment of Congress, are many of them doing excellent practical and scientific work for agriculture and the mechanic arts, in training mind, hand and eye together to do the world's work of the more difficult and skilled sorts in engineering, mechanical invention and the higher agriculture.

Those who desire a thorough discussion of the city trade and manual instruction schools will find it in the admirable article by Richard T. Auchmuty in the November Century, an article all should read.

Those who desire a careful criticism of the old methods of instruction, a discussion of the wisdom of the new method of training mind, eye and hand together, will find it in my recent inaugural (mailed on application by mail to me at Ames, Iowa).

I have just this to say in conclusion. A good trade of skill is better than $30,000 to any young man. Foreigners are now monopolizing these trades in our country. In Europe now even the nobility learn some trade of skill. Our government owes it to its young men and women to make it possible for them to learn these trades somewhere besides in the asylums for idiots, or the deaf, dumb, and blind, or in the poor-houses, the reform farms and schools, the workhouses, or the penitentiary, or by long and menial servitude as an apprentice.

This stigma, this disgrace, should be removed from intelligent skilled labor. Brain work, with work of hand and eye, should stand as high socially and financially as the same grade of brain work, apart from hand work. It does stand higher financially now because it stands lower socially. Our schools

should help remove the causes that make it stand lower socially, for our schools are in part responsible for the existence of those causes.

The discouraging feature is that a new generation of teachers must be raised up, fitted to give this new scientific and industrial training. Nay, still more discouraging, a new generation of parents and of youths must rise up to demand it.

And yet I have the eye of faith to see that this better era is already dawning; the era that shall add to the mental or literary training of the past, the scientific and industrial training needed in the present. It will come because the world needs it and must have it.

It will come through all our common schools before the oncoming glory of the Twentieth century shall flood the skies with the golden light of knowledge joined to skill.

Recuperative Agriculture.

[By Prof. I. P. Roberts, Cornell University, N.Y.]

How to restore a sufficient portion of the original fertility of impoverished fields so that their occupancy and culture may be fairly remunerative while improving them, and how to keep lands fertile that have not been impoverished, are problems that require our most careful consideration. Through ignorance, carelessness and greed many once fertile acres have been so far impoverished as to preclude profitable culture now or hereafter if the same systems that rob them are persisted in. If this be so, changes of some sort become necessary if we preserve for cultivation the lands that have once been brought under subjection by the plow. It is not my purpose at the present time to speak of land which, under any management would prove unprofitable if kept under tillage, but of those which in time can be so far improved as to make their cultivation profitable, and also how to preserve the fertility of lands that produce bountifully from the stores of plant-food naturally in them.

A large amount of cultivated land, I believe fully one-half, is not producing under present management over ten bushels of wheat or its equivalent in other products per acre, and over an eighth, put it mildly, is not producing over half that much. Although my readers may not agree with my estimate they must agree that much of our land is growing slowly poorer in plant-food.

Why spend the equivalent of a dollar for the pleasure of receiving in return 95 cents?

A field well set in grass will improve rapidly in fertility if the manure the animals produce that consume the grass, and a reasonable amount of bran and other bi-products, be returned to it. Of all domestic animals sheep are the best suited to improve poor lands. They graze closely, which causes the grass to pillar and cover bare spots. They eat nearly all species of weeds and brambles. They pack and level the surface of the land without poaching it. They usually lie at night on the highland, thus leaving their droppings largely where most needed. They furnish the best and most convenient means of securing fresh, cheap and healthful meat at all seasons of the year.

A ton of bran, costing $14, furnishes in round numbers:

Nitrogen, -	44 pounds.
Potash, - -	28 pounds.
Phosphoric acid, -	54 pounds.

If fed to sheep not less than 80 per cent. of these valuable constituents would be found in the droppings, as follows:

Nitrogen, 35 lbs. at 16c,	$5 60
Potash, 22 lbs. at 4c,	88
Phosphoric acid, 43 lbs. at 8c, - - - -	3 44
Total, - -	$9 92

Why are we so slow to follow the common practice in England of feeding and folding sheep on grassland to improve its fertility?

There are vast and inexhaustible stores of plant-food in and upon the earth, which are either going to waste or are inert and valueless to the farmer in their present condition. It is the province of improved agriculture to seize upon crude and cheap material, and through the aid of plant and animal, transform it into merchantable food and clothing. The phosphoric acid found in the rock and bone, for which is paid 8 cents per pound will be found in the milk. A thousand pounds of which contains 1.5 pounds potash, 1.7 pounds phosphoric acid, 5.1 pounds nitrogen.

The total cost of the above in the form of fertilizers would be $1; in solution of milk they sell readily for from $10 to $40. Then why not purchase more liberally of the

crude, cheap products; mix them with brain and muscle and sell at these advanced prices?

If we take some other products, as cotton-seed meal, the showing will be still better. There is not the slighest doubt that the surest and cheapest way to profitably improve poor land is to seed it down even with weeds of the less harmful sort, if it will not grow grass at first, and then supplement the pasture with other food.

The following rations were fed to cows averaging 1,192 pounds with the following results:

Dampen and mix—
Clover hay, 13 5 pounds.
Cut cornstalks, 4.5 pounds.
Cotton-seed meal, 5 0 pounds.
Corn meal, 4 6 pounds.
Malt sprouts, 4.6 pounds.

Each cow drank 83⅓ pounds of water and gave 31⅔ pounds of milk per day. It was found by feeding the above rations that each cow produced 89½ pounds of solid and liquid droppings per day. An analysis showed that this manure—computed at the manurial value of 1884—was worth 16 2 9 cents.

In conducting some experiments this winter to determine the effect of giving warm water to cows it was found that six cows in thirteen days produced 7,847 pounds of manure or an average of 100 pounds per cow and day. Computing this at $3.05 per ton the lowest value yet found in manure analyzed at our station we found that each cow produced manure to the value of 15 cents per day. Incidental it may be of interest to know that the cows which had warm water ate 14 per cent. less hay than those that had cold water. The manure from liberally fed cows or horses may be safely estimated as worth $15 per hundred. Numerous experiments conducted during the last three years on the University farm show conclusively that clover is one of the best fertilizing factors the farmer has. Our first investigation gave 3,295 pounds of second growth air-dried hay per acre and 4,893 pounds of air-dried roots per acre. An analysis showed that the nitrogen potash, phosphoric acid computed at 15, 4 and 6 cents respectively per pound, had a commercial value of $16.06 per acre. The same computation made the value of the roots as a fertilizer $18.83 per acre. This clover was but one year old and had produced a very heavy crop of hay in June. Some investigations by Mr. A. M. Breed in 1885 gave the following results:

Air dried tops, 5,417 lbs. per acre.
Air dried roots, 2,368 lbs. per acre.

The value of the nitrogen, etc., in the roots and tops gave on analysis a value of $30.10 per acre. I can see no reason why plant food produced from clover tops and roots should be of less value per pound than that furnished in commercial fertilizer. The nitrogen is certainly as soluable, though the phosphoric acid may not be. The last named experiment was conducted late in the fall and the clover was of two years' standing.

A few words as to what is best to sell from the farm and what is best to retain may not be out of place.

One thousand pounds of flour carries off in round numbers from the farm, $2.90 worth of nitrogen, 25 cents worth of phosphoric acid, 10 cents worth of potash. Total, $3.25.

One thousand pounds of bran carries off $3.60 worth of nitrogen, $2 18 worth of phosphoric acid, 90 cents potash. Total, $6.68.

One thousand pounds of straw carries off 78 cents worth of phosphoric acid, 17 cents worth of nitrogen and 30 cents worth of potash. Total, $1.25.

Total value of plant food carried off by bran and straw, $7.93.

Environments will always cause the details of improvement to be as varied as are the farms and their owners. We strike the key note when we feed the land liberally with cheap food products that the harvest of concentrated high-priced ones may be abundant.

Then true agriculture consists in taking from the soil such concentrated products as are suited to minister to our various wants, replacing them with crude, cheap and waste products so skillfully that no serious diminution of fertility shall occur. To do this to the best advantage requires a great amount of skill, training, knowledge and labor, and where either or all of these are notably deficient, the land suffers.

The Horse—His Early Training.

[By R. F. Parshall, of Tomah.]

Considering the elegance, style, ease of motion and profit, the horse is the most perfect animal God ever made.

His construction is of a remarkable character. He has existed from birth of all animal kind. Though his native country is not known, but was first brought under subjection to man in Central Asia and Northern Africa.

The disposition of the horse is naturally gentle and confiding, which qualities have made him a useful creature, both in the peaceful and waring conditions of nations. His capabilities of descerning objects at night, his acute sense of hearing and smelling, enhance his value to man.

There is a great diversity in the mental and moral qualities of the horse —some are bold, intelligent and good natured, others timid, stupid or cross— and by care or neglect each of these qualities become the characteristics of the animal, a quaint writer has well remarked that in this world there are three special objects of interest to man, women, money and the horse, and the man who does not love one or all of these is simply a fool. I invite your consideration to the last of these objects, and as the horse has become so inwoven with the comfort and profit of the race, and as his usefulness becomes identified with the interests of man just in proportion as he is taught to subserve the well-being of his owner, so his early training should become a subject of care to every one who would be profited by his speed or powers. No specific rule can be given applicable to the training of all horses. The nature and characteristic of each must be thoroughly studied and understood, and the kindest of treatment should always be maintained.

I am impressed that most men undervalue the intelligence and capabilities of the horse, consequently make no special effort for his education. The training should begin with the colt, it matters not how young, not in the way of getting so much, as in educating it to do what will be required of it in later periods. The child first learns his letters, then words, then sentences, and so on to completion. This often requires eight or ten years. Few people take time enough to educate or train the colt. He should be thoroughly trained and broken before harnessed and hitched to a wagon. The first exercise should be given with the halter. Farmers think anything is good enough to put on a colt, whereas, a nicely-fitting halter—one that cannot be broken —should first be put on him; he should learn to be led from pleasure, not from force; should never be hitched to anything that will not hold him. The horse that pulls at the halter, or balks, or kicks, has not been properly trained, and the man who allowed him to do either of these things first ought to have the sore head and receive all of the flogging. The colt should be so handled in the stable—head, limbs and feet—as to make him perfectly safe in future use. The second line of instruction should be with the bitting-harness, and that should be adjusted as not to give pain. The first lesson should not last over ten or fifteen minutes, never to give weariness. In this harness he should learn to yield to the rein, to back, to perform all the turns and phases which will be required of him in harness. Men who leave the colt untouched until he is three or five years old and then, without education, harness him to a wagon may expect to have a shy, kicking, run-away horse and no one to blame but himself. The horse can be taught to have a wagon come against him as well as the harness without fright. To have the tongue of the wagon come between his hind legs without kicking, as well as on the outside of them. The horse should be taught to do not only what may be required of him, but all he is capable of doing. The training upon any given line should be repeated until the habits of the horse are formed and the action become a part of his nature. The horse should be made to know that he is not a master or an equal, but a servant and that his best good is in obedience, submission to man must be demanded. And when chastisement as a last resort is inflicted it should never cease until entire submission is secured.

Some horses are never conquered, never broken, always go and do just as they choose and the reason is they know more than the man who has undertaken to train them. Some men have no business to undertake the breaking of a colt. They have no commanding power, no Psychology—no mesmeric force. Horses are very sensitive to the will power of their trainer.

But few horses are properly trained because the owner does not bestow thought and care upon them. At least

35 per cent. of the value of the horse turns upon his early training.

Some horses are extremely stubborn, and unless there is great caution they will be balky. What course should be taken with a young horse with this disposition? After he has been thoroughly bitted the harness should be put on him, the lines drawn through the thill straps to prevent his turning around, then a long strap attached to the traces and the draught on it just what the colt will endure without stopping. A horse inclined to kick should be treated with utmost care.

We should always address the intelligence or memory of the horse through the medium of pain or pleasure.

The profit to the farmer in raising colts and thoroughly training them is in advance of raising cattle. It costs but little more to raise a colt than a calf. The one a year old will bring $60, the other $10.

Mutton Breeds of Sheep.

[By J. W. Gaues, Lowell, Wis.]

For a common scrub farmer to write a paper upon any topic to be discussed at an Institute is like a rural member of the legislature. He goes to Madison, has a good time with the boys, votes generally on the wrong side of the question to suit his constituents, returns home after two years of weary toil to be cat-hauled around because he did not do anything becoming a statesman. So with me: at the close of this paper of eight pages of well-written matter, you will wonder why I did not say something about the "Mutton Breeds of Sheep." I was chosen by the committee on programme to write upon this subject, and if this article does not fill the bill, blame the committee not me. After being chosen I used all the spare trme I had for six evenings in writing upon the subject, and I had only completed two pages. On the morning of the seventh day I started for town with the determination of letting the job to some one else; but the boss committeeman said: "No, sir-ee. If farmers are not willing to do their part, how are we going to make this a success?" Failing in all other excuses I unfolded my "Mutton Breeds of Sheep," two pages, and began reading, feeling confident that after I had tortured him with that he would let me off. Instead, he says: "John, you have done remarkably well; although there is one thing you have forgotten to mention, and that is your topic, 'Mutton Breeds of Sheep.' Let me give you a little advice. You know I am one of the ablest and oldest writers of inland journalism in the Northwest. Go home and wait until the spell comes upon you; then write." After I had got straightened around, the next morning, the minister called in. (By the way, we are having a series of meetings.) "John," he says to me, "why have you not been out to the meetings of the last six evenings?" I says, '"Mutton Breeds of Sheep,' Beaver Dam, January 11 and 12. After that I am open for other engagements." My wife rushed in and said: "My husband is a Hypochondriac!" The minister went, and I went for a dictionary. "Hypochondria, a mental disorder in which melancholy and gloomy views torment the affected person." What to do I did not know. "Mutton Breeds of Sheep" must be ready by Tuesday next, and only two pages written.

After mature consideration I came to this conclusion, that there was but two known breeds of sheep—mutton breeds and no-mutton breeds. The no-mutton breeds will be described by my friend Jones; mutton breeds by me.

The most popular breeds of sheep in America are the Merinos, Cotswolds, Lincolns, Southdowns, and the various crosses. Where large flocks are kept for the production of wool no breed equals the Merinos, and many men prefer this breed to any other for all purposes combined, as they are very hardy and will stand neglect better than any other breed. Cotswold is a favorite breed when mutton and wool are both wanted. They are large, quite hardy, and more prolific than Merinos or the Lincolns. Their large size is one of their chief recommendations. Southdowns are especially desirable where early lambs are wanted. They produce wool in a fair quantity, and good in quality.

My idea is that almost any kind of sheep will pay if well managed, and I am sure there is less work about them than any other stock, and this is a big item.

Mutton-breeds of sheep are superior to the other kind, because we have three crops a year,

wool, muttton and increase. They two, wool and increase.

In my own experience I have never bred any Downs, but principally the long-wool varieties, Cotswolds, Leicesters and Lincolns. For the past six years I have bred Lincolns and Lincoln grades only. Have always found ready sales for my full blood buck lambs for breeding purposes, and a good many of the grades. The remaining buck lambs I sell to our home butchers at $2 to $3 each. This season I could have sold many more for breeding, had I had them; in fact they are the only stock that I have had any special demand for this fall.

In order to get the best prices for your butcher lambs they must come early, say March or February, if you have the place to take care of them; and if you have not got a suitable place where you can make it warm and comfortable with plenty of good succulent food, don't raise early lambs.

My calls, that is my old ewes, I sell for $3 to $4 each; while the no-mutton breeders cannot sell their calls at any price.

The halfblood Lincolns show good mutton points. They are square-built and heavy quartered, and are good shearers. In the season of 1885 I lost forty high grade Lincoln ewes that sheared 312 pounds of washed wool. Edwin Fan did the shearing. Wm. Haase weighed the fleeces. The wool I sold to C. Reinhard, of Reeseville, for $78, receiving the highest price per pound that he paid for any wool that season. Those ewes raised forty-four lambs, of which I sold ten to John Hensler, of Beaver Dam, for $25, eight of them for breeding purposes, for which I obtained $42 and three were killed and eaten at home, leaving me twenty-three ewes lambs, of which two were lost, one bitten and died, and the other drowned in the water-tank. That fall I sold the cull ewes for $28—nine of them—leaving me fifty-two ewes and ewe lambs.

If you please, I will call my flock of ewes, forty that I had in the spring of 1885, $200; that is $5 each. (I ask and sell them at that price to other farmers for breeding.) My wool clip, $78; ten lambs to butcher, $25; eight lambs for breeding, $42; three lambs that we killed, $5; fifty-two ewes and ewe lambs, $260, making a total of $410 for the season.

In some respect I cannot make as good a showing in 1886, because everything is lower; but I will say that I sold all my male lambs that I had for $10 each, the full bloods, and $5 each for the grades, and had lots of call and inquiries that I had to turn away; and in some instances they are booked for 1887.

There are quite a good many of my neighbors that are breeding about the same kind of sheep that I am, with about the same results. The main thing with sheep is plenty of suitable food and good care. They want a light, airy and comfortable place in winter. Sheep will not do well shut up in a dark, cold pen with no chance to get sun and stir about. They must be kept dry in winter, and have fresh water when ever they require it; and it does not make so much difference what they are fed. By this I mean I can take a flock of sheep and give them a dry, light sunny stable and yard with water as they want it, and no grain with clover hay, and they will come out in good order and do well. And the same flock kept in a wet, cold, dark stable and no yard to exercise in, fed all the grain they should eat, and hay, will come out poor in the spring, and the lambs will be weak and unprofitable.

I do not advise any one to breed mutton sheep; but if they do I think they will be much pleased if their success is as good as mine has been.

That Boy On The Farm.

[By Mrs. James Richmond, of West Point.]

It has been said that the handiest thing on a farm is a good smart boy. Considered in the light of a machine, and valued according to his activity, it is true. From the dawn of a new day, when his father's sonorous voice sounds up the chamber stairway at four o'clock in the morning, with the announcement of the hour, and the command to "get up," until he lays his weary head upon his pillow at night, the days are hardly long enough for him to answer the demands made upon him by others. He is at the beck and call of the entire family. Even the hired man does not disdain to call upon him to save his steps. Does anybody ever stop to think how many times a day he is required to "run now?" It is a good thing that the average farmer's boy does not always literally run, but when

out of sight of his father's watchful eye, loiters along the way, and watches the graceful flight of a bird, or the nimble antics of a squirrel.

When November winds begin to blow, and the year is rounding toward its completeness, then it is that the boy's heart turns yearningly toward school, for only in the winter months can he be spared from the labors of the farm, to master the "three R's." But if the corn-husking is belated, or the land must be plowed, he must put aside his ambition for "book learning," until a more "convenient season," and, to the shame of some fathers be it said, only when there comes a day that there is nothing driving on the farm, is that boy allowed to go to school.

An examination of the registers kept in the common schools of some farming communities would reveal the fact that if the law requiring a certain number of days attendance at school, within the year, was put in force, the treasury would be considerably replenished. Even the district officers themselves might be called upon to "step up to the captain's office and settle."

Our boys are the future men of the nation. History will but repeat itself if some of those boys are called upon to help rule our country, or become the law-makers of the land.

The great need of the farmers of the present time is a more adequate representation in our national councils. We believe the majority of our legislators, both State and national, are lawyers, and they generally do not have the interests of farmers very much at heart. How can farmers properly legislate for their own good, except they be fitted by education and a lively interest in the business of farming? There must be a thorough culture of mind, for it is through this that men are made leaders; and joined to this culture must there be an *honesty of purpose*; not from that low level of *policy* but because it is *right*.

Second, a genuine love for the farm, and a farmer's life and work. Said a farmer (father of several sons who had graduated from a common graded school), when asked why none of his boys remained on the farm, "I have educated them too well." Can this be true? Can it be possible that a common school education unfits a boy for a farmer's life? If so, how true it is that "a little learning is a dangerous thing."

Let us see if there is no need of a cultivated mind on a farm. It is not all hard hand labor that wins. There must be *brain* work. Much of success in farming depends on good management, and judicious planning of the work. The farmer works with nature. The sunshine, the rain, the dew, and the frost, are his allies. He must be watchful of the seasons, and bring his work in harmony with them. The successful farmer does not have to stop in harvest time to cut the wood with which his wife shall cook his dinner, neither does he husk corn in January. The farm work is not drudgery. The farmer has the most approved machinery at his command, and he or that boy must be somewhat of a machinest, with all his varied accomplishments. How different the condition of the farmer of the present day, from that of even twenty years ago! We did not have "Farmer's conventions" in the capital city, nor "Institutes" in the villages in those days. Verily, the farmer and his boy are getting to be somebody, now!

Now, that boy must understand something of the chemistry of soils, and be able to judge of the requirements of each. The fertilizer necessary for one field may not be at all suitable for another. He must also know something of the science of stock raising. "The survival of the fittest" is an excellent doctrine for the farmer to consider in the breeding and rearing of his farm animals. What a broad field is this! And is there no call for talent and education in it?

A very common but mistaken idea is the one that anybody can run a farm successfully. No other occupation calls for the exercise of good judgment as this. That boy must be taught to watch the markets of the world and buy and sell discreetly. He must make his expenses less than his income. But no other business will bear the strain of mismanagement so long as will farming. The merchant who directs his affairs as loosely as some farmers, would soon find himself in bankruptcy.

A very important question is agitating the minds of many fathers just now: Why don't that boy stay on the farm? What inducements have you held out, oh fathers? Have you given him a share of the profits of the farm, as well

as a share of its labors and cares? Have you taken him into partnership, after he has served his apprenticeship? Have you given him a word of commendation, now and then, or have you been very liberal with fault-finding? We are none of us too old to love the approval of a fellow creature. Deep down in the boy's heart is a desire for the word of praise, and appreciation. If both that and disapproval are withheld, he is left to infer that things are in a *tolerable condition*. Have you given him a young animal to rear for his own, and when he has by great caretaking, brought it to maturity, taken it for its "keep," and proved to him that though it was that boys' colt or calf, it was pa's horse or cow? In such a transaction as that (and there have been such) is that boy's keen sense of justice outraged, and faith in the father destroyed. Woe to that father, when, by dishonest dealings with his boy, that boy has lost confidence in him. Give him, at least, one animal he shall have full ownership of. Even if his liking for some particular kind of stock may not agree with your preferences, sacrifice your own feelings, and encourage him in his undertaking. If he succeeds in raising a superior animal, let him exhibit it at the fair. Not only *let* him, but *help* him, and show him that you have an interest in his succesful competition. Then advise him in his business transactions and counsel him in the expenditure of his money. Teach him that one hundred cents make a dollar. Make the farm house a pleasant home. If that boy has a taste for music, provide him with the means of gratifying it. Bring good reading to the home, Get the best books on farming. No professional man can be successful in his work, except he be fully equipped by a course of reading. What would be thought of the minister, the physician, or the lawyer who had no library? Why should not the farmer have one? He needs the help which the experience of others can give. Provide good newspapers, those great educators. The farmer who signs his name to a paper purporting to be an order for so many feet of lighting rod, and which turns up a promissory note, is *not* the man who reads the papers.

"Can't afford all this," you say? Let us perform a single example in arithmetic. If star or spear-head costs 50 cents a pound, and you chew 10 cents worth a week, in five weeks you have chewed up half a dollar. In one year you have used $5.20. If Adams' Standard costs 20 cents a pound, and you smoke half a pound a week, in one year you have used $5.20, and the wise man says this is a very moderate estimate—$10.40, in one year for that which is of no benefit, but rather an injury. What right have you to use this amount of money so unwisely for yourself, and then seek to find excuse in poverty, for failing to provide that boy with needed information? What are you toiling and striving for, anyway? Is it not for the boys who will take your place when you are gone? Why stint their lives now, in order to have some government bonds or money at interest, which may prove a snare to your soul, when the assessor makes his usual visit? Make that boy's farm home beautiful and attractive. Encourage him to plant trees and shrubs, that he may take a pride in his home. Let the mothers' see to it that the boy's room is just as comfortable in every respect as that of the girl's. In many farm houses the brightest, sunniest chamber is given to the daughters, and as anything is considered good enough for that boy, it usually follows that his room is not very attractive. We fancy some mothers would be rather reluctant to show their boys' rooms to visitors. Boys can appreciate articles of beauty as well as their sisters, and what more proper than that the mother, in arranging the household, should insist that her daughters should take just as much interest in their brother's surroundings as in their own. Then will that boy be not ashamed to invite companions to visit him in his own room. Bring flowers, those great beautifiers; cultivate in that boy a love for the sweet messengers of beauty, and when he bashfully asks for a rose for his button-hole, have it ready for him. Let in the sunshine, though the carpets fade. Have no "best room," in which that boy shall feel himself almost a stranger.

If you have given him a good education, and inspired in him a love for the farm, let us now see if there is not some work outside, which he can do for his fellow-farmers. There is a demand, at the present time, for men; men who cannot be bought and sold. Now, when great monopolies and corporations threaten to crush the life out

of farmers, do we need men who care more for character than for a railroad pass. Men who will be fearless in defense of the right. Men who will have enough moral courage to be honest, whatever the consequence to themselves. We need such men in our legislatures and in congress. We need legislation for farmers by farmers. Why should not that boy, if he has been well-fitted by education, and interest in the farm, and been carefully trained in strict integrity and honesty (and here, oh! parents, you cannot be a moral guide-board, forever pointing in the right direction, unless you go that way yourselves), be sent to represent his fellow farmers in the great assemblies which make our laws? How much farmers are needed in Congress is shown by the action of that body in relation to the oleomargarine bill. Passed by the lower house with a tax of 5 cents on a pound, and that reduced to 2 cents, and already this winter manufacturers of that delightful compound, in comparison with which the witch's cauldron is purity itself, are beseiging congress to repeal the tax altogether. We need that boy on the farm, now grown to manhood's estate, there. Let us educate him, train him in high moral principles, cultivate in him a love for, and an interest in farm life, and then send him to the capital to legislate for the farmers, and in their interests, to resist oppression by the great money powers of the land. "The American people are taxed to raise more than a hundred million dollars beyond the needs of the government." A large percentage of this tax is upon the farms of the country. "The farmer pays for all."

The public land, the rightful inheritance of the American people, has been shamefully wasted by grants to railroad companies well able to build and maintain their own roads. Surely, here is work for that boy to do for us. But let us pray that he may never become that caricature on true manhood, professional politician! Oh, we all know *him*. He comes to our farms and shakes hands with the "horney-handed son of toil;" talks about the dignity of labor, praises the good wife's bread, and admires the baby.

Let that boy do the work he is sent to do, and then go back to the farm to end his days, as so many of our great American statesmen have done. What a touching picture we have of Daniel Webster dying at Marshfield. One of his last requests was that his faithful oxen might be driven past his window, that he might see them for the last time.

Having given that boy on the farm all this training, you may think about what you shall leave him.

The very richest legacy a parent can leave a son is a good name, and the memory of a happy home on the farm, to which his loving thoughts shall turn in later years; for then shall he rise up and call you blessed, and so shall you have your reward.

Potato Culture.

[By B. B. Olds, Clinton, Wis.]

The assignment of this subject by Supt. Morrison to one of so limited scientific experience in the business, is not easy to account for only in one of two ways.

First on being asked what subject I would write upon, replying that I had none, only that of doing things in the right way and at the right time. He concludes, that principle applied to potato culture, is of the highest importance, or else second, because he may have heard that notwithstanding having had bugs, wet, drought and many other unfavorable conditions, I have succeeded in bringing out fine specimens of choice varieties, and am therefore able to tell others how to attain to like results.

Be this as it may be, I will simply give my method, and raise some questions, expecting to be questioned, thus opening discussion.

For the last season my field was a clover sod on a southern slope of rich prairie, broken in the fall, then during the winter and early spring a light dressing of manure was spread upon it. As soon as the soil was in fair condition to work, the first process was to mark the ground with a three foot marker running the same way of the plowing, then, having the seed ready, proceed by dropping a row in the marks across the field by stakes, so as to be a convenient start in cross plowing by narrow lands, which was done with a gang plow running very shallow to cover the first row dropped. Then droppers follow the plow, placing each hill in the land side of the furrow directly against the marks; these to be covered by the

succeeding round of furrows, being a little more than two feet for the width between rows, crosswise the marking. Thus the work went on till the field was plowed new and planted. The object of this plan was to fit the ground in the best manner, the quickest way possible and do the planting all at the same time.

I am satisfied, however, that this method can be improved, by dropping the seed about midway from the bottom of the furrow upon the mellow earth thrown out, thus giving the young roots and tubers a well pulverized bed in which to start, care being taken to keep the hills even with the marks. For I regard the rowing both ways of much importance in the cultivating; for with properly constructed cultivators the work can be well done without any hand-hoeing.

As soon as the plant begins to show itself I use the slanting tooth harrow which is a great help in destroying the first little weeds, running it till the potatoes are well up.

A narrow-wheel, two-horse cultivator, which should follow the harrow, is the best implement for the wide way, and a single-horse cultivator, or shovel-plow, for the narrow way, which should be kept running, so as to keep the weeds all in subjection and the soil well stirred.

The seed may be prepared some days before hand—medium to large preferred. If seed is plenty, first cut off a slice from the seed end, and throw away the little cluster of eyes; then split lengthwise once or twice, according to the number of eyes upon it, so that each piece may have at least two good eyes, answering for a hill. Immediately after cutting they can be improved by a sprinkling of a composition of lime, ashes and plaster which serves both as a healer to the wounds made, and a fertilizer to give vigor to the young plant.

The time or stage for a "lay off" in the cultivating I leave for a question.

The harvesting or digging I prefer to have done soon after the vines show signs of decay, using a common-sense digger worked by a slow and steady team, first taking every alternate row and picking them up before digging the remaining rows. Before this harvest work is commenced I prepare bushel crate boxes, enough at least to hold two loads, and take to the field upon a broad platform wagon and distribute where the work is to commence. When a load is early dug and picked up they are quickly loaded by driving along the line of work. By the use of these boxes a great saving of labor is gained, as no shoveling is necessary and consequently much cutting and bruising saved from the common way of handling—If the market is favorable it is the best economy to deliver them at once. If it seems necessary to store before selling I prefer a cool, dry cellar, well ventilated and kept dark, not having a depth of pile more than two and a half to three feet if it can be avoided.

Clover on Sandy Soil.

[By Prof. I. P. Roberts, Cornell University, Ithaca, N. Y.]

A field that had had a liberal application of manure, and had been under the plow and cropped for six successive years, was seeded to wheat in the fall of 1882. Two quarts per acre of timothy seed was sowed a few days after the wheat was put in. In March, 1883, six quarts of clover seed per acre was sowed on the wheat. In 1883, when the wheat was cut, the seeding appeared to be about seven-eights clover and one-eighth timothy. The yield of hay in 1884 was estimated to be between two and three tons per acre. An abundance of moisture being present, the second growth started quickly and grew luxuriantly.

Desiring to sow this field to wheat in the fall, and having plenty of hay, the question arose whether it was best to cut the second growth for hay and purchase fertilizers or plow it under. In order to throw some light upon this question the clover from an area of sixteen square feet of average growth was cut and dried and the roots of the same area were dug, washed and dried. The tops contained when analyzed 11.41 per cent., and roots 9 85 per cent. of water. Taking the yield of 16 square feet as the unit for computation it was found that there was a yield per acre of air-dried hay containing moisture as above, of 3,295 pounds, of air-dried roots containing moisture as above stated 4,893 pounds. The analysis showed that the roots had not been entirely cleansed of the sand although every effort was made to do so. Analysis of

the tops taken from the second growth, August, 1884, gave the following results:

Nitrogen,	2 31 per cent.
Potash,	2.74 " "
Phosphoric Acid,	.53 " "

Results given in pounds per acre.

Nitrogen, 76 11 lbs. at 15c,	$11.41
Potash, 90.28 lbs. at 4c,	3 61
Phosporic Acid, 17.46 lbs. at 6c,	1.04
Total,	$16.06

ROOTS.

Nitrogen,	2 24 per cent.
Potash,	.567 "
Phos. Acid,	.44 "

Results given in pounds per acre.

Nitrogen,	109 6 lbs.	at $.15	$16.44
Potash,	27.74 "	.04	1.10
Phos. Acid,	21.52 "	.06	1.29
			$18 83
Value of tops,			16.06
			$34 89

The question naturally arises if clover plowed under furnished such a large amount of plant food for the succeeding crop, why husband so carefully farm manures. Here we have in one year a large crop of hay and in the second growth of tops and the roots plant food equal to ten tons of well-preserved manure or three-fourths of a ton of high-grade ammoniated superphosphate.

We too often forget that the clover creates nothing. It simply utilizes the nitrogen, potash, etc., which it finds in the soil. That is, it brings it up from the sub-soil and deposits it near the surface.

I am permitted, through the kindness of A. N. Breed, a student of agriculture, to give the results of his investigations as to the manurial value of clover. The samples in this case were taken from clover two years from seeding, very late in October. The soil was a moderately fertile clay loam. Some timothy was mixed with this clover, all was very tall and rank and the clover quite brown and gray. The area cut and dried was 25 square feet.

Weight of air-dried tops per acre, 5,417 lbs.

Weight of air-dried roots, per acre, 2,068 lbs.

The tops were found to contain on analysis:

Nitrogen - - -	91.5 lbs.
Phosphoric acid -	40.35 lbs.
Potash - - - -	78. lbs.

The roots contained per acre:

Nitrogen - - -	47.36 lbs.
Phosphoric acid -	27. lbs.
Potash - - - -	31.96 lbs.

The value of nitrogen, etc., in the roots and tops of an acre computed at the same prices as above would be $30.10.

Some careful investigations conducted during the past season showed that in our soil tomato roots penetrated the ground to the depth of 12 5 inches

Pea - -	roots,	12½ inches
Potato - -	"	14¼ "
Oat - - -	"	16½ "
Carrot - - -	"	16½ "
Corn roots, good ground,		18¼ "
Corn roots, poor ground,		21 "
Clover - -	roots,	52 "
Orchard grass	"	16 "
Sweed turnip -	"	15¼ "
White sugar beet	"	12¾ "

This sample of clover was taken from a soil that was rather inclined to sand on the surface and was pure gravel and stone at a depth of three and a half feet where the sample was found. In no other case were we able to find so large a mass of roots at so great a depth.

Some investigations this fall as to the quantity and value of clover on newly seeded land are interesting as showing the vast amount of roots that grow in the soil in a limited period of time. The soil from which these roots were taken was a sandy loam. The ground was used for growing oats in 1885. In the fall it was plowed and treated to eight to ten loads of manure per acre on the surface and sowed to winter wheat Sept. 15. Two quarts of timothy seed per acre was sowed on the land about ten days afterwards. In March, 1886, about five quarts of medium clover seed per acre was sowed upon the wheat. A heavy crop of wheat was harvested from the ground this year. The roots of the clover were dug in the wheat stubble Nov. 16, 1886. From the time of sowing the clover seed to the time of digging the roots was eight months. Sixteen square feet of surface was dug over and the roots washed and preserved. The tops of the clover having been cut as close as possible with a sickle before the roots were dug, One-tenth of the roots were found to be timothy. They were thoroughly washed and dried in a hot room for about two weeks when a determination showed that they con-

tained 6 86 per cent. water. Using the unit of 16 square feet—the area dug—for computation, it was found that an acre contained 1,991 lbs. of air dried roots, containing 6.86 per cent. of water. Computed at the average amount of water found in air-dried hay—14 per cent.—the amount per acre would be 2,156 lbs.

Estimating the composition the same as that found in the former experiment it would show that the value of these young clover roots in the wheat stubble was $8.00 per acre. That is to say; the plant food they contained could not have been purchased on the market in the form of fertilizers for less money. The tops of this clover were not determined. It was estimated that they would produce a ton of hay per acre.

Raising Horses on Grain Farms.

[By Prof. I. P. Roberts, Cornell University, N. Y.]

In America horse-power is cheaper than steam power in cultivating the land. I judge nine-tenths of all the farmers who occupy the heavy wheat lands have either too few, too small or too unproductive horses. To make clear how I would remedy this we will take for example a farm which, according to present methods, requires four able, mature horses and upon which the farmer imagines he cannot afford to keep any more. To get started suppose we change these four work horses for four good, common or mixed blooded brood mares and two 3-year-old fillies, paying the difference by note or money. The mares should be bred so as to drop their colts in late fall or early winter. The team of 3-year-olds should be kept for driving and light work. In four years one span of horses will have been sold and if fairly successful and no other sales have been made, there will be on the farm, allowing for a loss of twenty-five per cent. of the increase, four brood mares, three four-year-olds, three three-year-olds, three two-year and three one-year-old colts, or the equivalent of these.

In some groups there may be four and in some but two in all twelve colts, three of which will be able to do nearly full work, and three more able to do fully half a mature horse's work. Now, when the rush of work comes, there are the equivalent of four good teams available, and this is just the time when the boss should lay off his coat and cuffs and follow the old mares, if he can't keep up with colts for every day's work added to the cultivation, and every day's work in the right time, instead of the wrong time, always means full pay, and frequently $10 to $20 per day for these few additional days' work. The half-blood steer unfattened, at three years, will weigh 1,100 pounds, and can be sold for $44. The half-blood French colt, at the same age, unbroken and ungrained, will weigh 1,000 pounds, and can be sold for $150. The steer, at four, after he has eaten from forty to fifty bushels of grain, will weigh 1,500 pounds, and will bring $82.50 at the farm. The colt will earn all he eats after he is three years old, and at four years will weigh 1,300 pounds, and sell for $250. From this deduct $20 for cost of service, and it will appear that while your cattle brought 4 cents your horse brought 13 cents per pound; fat cattle 5½ cents; 4-year-old horses with board bill paid 18 cents per pound.

These are no fancy figures, but those reached by us on the university farms. Our experience in the rearing of fall or winter colts proves that it is no more difficult, in fact less so, than to raise them in warm weather. If one has learned how to keep a cow warm and make her give milk in the winter, then he knows how to make colts grow in cold weather.

The utmost care should be taken in the selection of the brood mare. Now, large numbers of "dung-hill" mares, bred sometimes to good stallions, but more often to poor ones as the quality of the mares will not justify the owner for paying as much for the services of the horse as a poor colt will be worth at one year old. "Scrubs" or "weeds" of mixed or even pure bloods are more apt to tansmit their undesirable qualities than the best pure bloods are to transmit their desirable ones. The brood mare should be strictly feminine in appearance so much so that she can be distinguished at first glance from the geldings. She must be close to the ground if her off-spring are to do the world's work at the smallest cost. Short-legged horses almost invariably have broad, strong, well-made limbs and firm textured feed. The whole bony structure should appear firm and strong without being, in the least, coarse. The neck

should appear slim, viewed from above. From the side, it should appear small at the head and broad at the shoulders. It should not be set on the end of the body like a pig's, but well back on the withers. A slight crest adds beauty, if not so large as to give a masculine appearance and characteristics. A "ewe-necked" animal may sometimes be a good and a pleasant driver, but as a rule, better select those that have their necks set on right side up.

The hind quarter should be broad, long and rather sloping. If the rump is too straight the hind limbs are liable to be the same. Then follows the pounding motion that produces spavins and ring bones. If the rump is short the leverage of the hind parts is too short, the stride restricted and the walk and the trot must therefore be slow and labored. There should be great breadth of loin and hip in order to give power to the end of the horse that does all the pushing and also to give ample pelvis capacity. The shoulders should be rather oblique, blades thin, the reverse of meaty, the withers high and rather sharp, the shoulder points not prominent nor too far apart. Lung room should be secured in the schooner-shaped breast which can hardly be too prominent. Flat-breasted and flat-ribbed horses seldom have the ideal lung power. It is hardly necessary to say that the back should be short, the lower line long and the loines strong. While the animal should not be "too open," neither should she be ribbed up like a pony. A brood mare should never be pony shaped unless it is a pony brood mare. The abdomen should be ample, especially of the old brood mare. The ideal color is a strong bay with dark points. The head, eyes, etc., why describe them? They are never bad on the mares of the type I have described.

How can we get them? There are always a few really valuable brood mares of mixed or common brood in each county. If none of these can be procured their offspring certainly can. A moderately good, tried, brood mare may cost $175, the best $300.

The difference in the value of the colts of the two mares in a single year is quite likely to be more than the difference of the cost of the dams. It will take some little time to learn what one wants and how to get it. I judge the grain farmer does not want trotters nor pure draft horses, but business horses that will sell any day except Sundays. Business men who are willing to pay a round price for a round, sound horse, are not given to Sunday horse jockying. There are places for both extremes, the trotter and the heavy draft. The farmer would do well to chose the golden mean.

What shall the stallion be? First, masculine, strong and vigorous rather than stylish. Lofty, long, slim-necked, long-backed and long-legged, "showy" first premium horses are too often the sires of third premium colts. We have a few large stallions from the trotting strains with too much business in them for the race course, too compact and firm and good natured even for the 2:40 agricultural "horse trot." The heaviest, shortest legged French coacher might also be used. The get of either of the above, from dams of size and substance, would make the ideal farm horse, except upon the heaviest clay lands. The lighter and smaller ones would make roadsters and single and double carriage horses, good for ten years at light work, and if well used serviceable for six to ten more on the city delivery wagon or street car.

Good stallions are found among the draught breeds. The Norman Percheron furnishing the larger number for the kind of breeding I have designated. There is a good market in the cities for very large horses, provided they have good feet and limbs; but they are very difficult to breed, and when bred they are too heavy for American farm work, and too slow for the high-strung American farm boy. In selecting the stallion from draught breeds, there is great danger that a lofty crest and size will so captivate that the plainer and more valuable qualities will be lost sight of. There is one safe rule that will seldom lead, even the novice, astray in the purchase of a horse of any kind or style. Choose a little below the medium of the large breeds and a little above in the smaller breeds. Let the showmen deal in monstrocities and put quality always before style. Good quality seldom means really bad style. A lofty crest will hardly compensate for a curbed leg.

Well matured fillies should be bred at 2 or 2½ years old and they should not be put at hard work till after they are 4 years old. Difficulty is sometimes experienced in getting the mares to re-

ceive the males late in the fall or winter. To obviate this to some extent the mare should be kept on low diet till sometime in February; then if put in a warm stable or blanketed, or both liberally fed and well cleaned they will come in season whenever the weather remains warm for a few days. The duration of pregnancy in the mare is about eleven calander months, and as she conceives with very great certainty, on the ninth day after dropping her foal the time of the birth of the colt may be advanced, on an average, twenty days each year. With a little care the time of breeding may be changed in a few years to suit the conditions of the breeder. Mares in foal are better off for being worked moderately, but they should not be used on very soft ground or in deep mud; neither should they be put to excessive load or at work that requires quick motion.

Pregnant animals of all kinds are liable to be more or less constipated during the latter period of pregnancy, hence, bran mashes, roots and other light laxative foods should be used largely. Timothy hay, especially if over ripe should be fed, if at all, in limited quantities. Constipation and hard, unyielding muscles cause more trouble and loss at parturition than all other deleterious influences combined.

Milk in its natural state is composed largely of water (87 per cent.) so it stands to reason that the mare that gets but dry timothy and is watered at most twice daily cannot raise a good colt. Milk also contains a large proportion of nitrogen, and if the colt is to be properly nourished the dam should receive an abundance of roots, bran, oats and a little oil meal and bright clover hay. If properly fed and taught to eat in its own manger the colt will be ready to wean at three months old. The living colt will not only be the better but the one in *utero* also, and the mare will be more certain to breed regularly than if lugged down with a long and continuous nursing. When the dam is at work the foal should never be allowed to follow her, but should remain in a box stall.

Carried off the farm by a $200, 1,200-lb horse:

Nitrogen, 31.92 lbs, at 16 cts.,	$5.10
Potash, 1.7 lbs, at 5 cts., - -	.08
Phosphoric acid, 22.3 lbs, at 8 cts.,	1.78
Total - - - -	$6.96

By $200 worth of wheat, 1,800 lbs:

Nitrogen, 332.8 lbs at 16 cts,	$53.25
Potash, 84.8 lbs, at 5 cts.,	4.24
Phosphoric acid, 126.4 at 8 cts.,	10.11
Total, - - - - -	$67.60

The bran from $200 worth of wheat carries off:

(5,300 lbs. in 16,000 lbs. wheat.)

Nitrogen, 118.7 lbs. at 16 cts.,	$19.00
Potash, 75.79 lbs. at 5 cts., -	3.79
Phos. Acid, 144.69 lbs. at 8 cts.,	11.57
Total - - - - -	$34.36

If the bran is returned to the land then $200 worth of wheat would remove but $33.24 of plant food.

Butter, 800 lbs. at 25 cts., value $200, carries off the farm:

Nitrogen 5.68 lbs. at 16 cts., -	$ .91

Principles of Breeding.

[By J. McLain Smith, Dayton, Ohio.]

It was a prevalent opinion a few years ago, resulting doubtless from its political associations, that all men are created equal; equal, that is, not only in rights, but in natural aptitude and capacity. Of those who combined to organize the Republican party, a very large proportion sincerely believed that if you would take a hundred colored children and a hundred white children, and submit them all to the same training, and afford to all the same opportunities, the two races would arrive at substantially the same goal—that the colored children would make, on an average, as moral and intelligent men and women as the white children. Nothing can be more erroneous or more directly opposed to the uniform experience of mankind. Not only are there broad and marked race characteristics which no training can obliterate; but, even in the same race, there are family traits and personal peculiarities, disposition, apitudes, capacities, even tricks of manner, which are transmitted from generation to generation with almost equal certainty. To say that the accumulations of the race consist wholly in material things and not also in inherited apitudes and capacity, is to ignore alike the facts of existence and the teachings of religion.

Given a child, whose ancestors for many generations have been intelligent, cultivated, moral people, and you may educate him as you please, or neglect him as you please, he will almost certainly turn out an intelligent, upright

man. Many children, in fact, if not a majority, are born with a character and disposition so firmly fixed in its main outlines that no subsequent training can seriously affect it. Some, by their very nature, are constrained to walk in the paths of peace and virtue; others are predestined with equal certainty to go to the bad at the first opportunity.

This was well illustrated by Francis Galton, the author of "Hereditary Genius," in one of his inquiries, undertaken to determine the respective influence of education and inheritance in determining the character and disposition, he came into personal contact, or correspondence, with nearly all the twins of England. Twin children, as everyone knows, are often strikingly alike, not only in appearance, but in character and disposition. On the other hand they are often very unlike in every particular, assuring that, when they were raised together, they would enjoy the same advantages, and be subjected, as nearly as possible, to the same discipline, and the same surroundings, the question was whether this similar education and environment tendered perceptibly to modify the original differences. On the other hand, he found many twins, similar at birth, that were reared under very different conditions —one perhaps by the parents, the other by the grand-parents or some other relative. He sought to discover whether the original similarity was perceptibly modified by the subsequent training. This conclusion, after a careful and extended study, was that inherited traits in every case predominate, and that education and surroundings has so little influence in opposition to this, that it may be almost ignored in the final estimate; that where the twins were alike at birth, in character and disposition, they continued alike through all the vicissitudes of life, and that, where they were dissimilar at birth, a similar education and surroundings had no perceptible influence in changing their natural bent.

Some children, it is true, are of such a mixed lineage that they have no decided character. They are born in a state which chemists call a condition of unsalable equilibrium. A slight push this way or that determines their subsequent career. With *such*, education and environment are all important. But they are so because the breeding is defective. Indeed, you may say the value of the surroundings in modifying character varies inversely in proportion to the strength of the breeding. The stronger the natural bent, which is only another way of saying, the stronger the breeding, the less important the environment or surroundings, and *vice versa*.

How this comes about we do not, as yet, fully understand. There is little doubt, however, that inherited character and disposition are the same in *kind* as instinctive habits in the lower animals. The better opinion seems to be, that instincts are nothing more than the accumulated experience of the race which has become thoroughly ingrained in the organization. They are transformed uniformly in all the members of the race or family, and they exist uniformly because the same conditions apply to all, and the law of the survival of the fittest tends rapidly to exterminate those individuals who fall below the average in aptitude. There is every reason to believe, however, that if the conditions of existence should gradually change, so that the present instinctive habits in any species became useless or pernicious, they would be modified to suit the changed conditions. We do know that as they become less important they are less exact and less uniform in different members of the family. As intelligence increases, opportunity is afforded for greater divergence from the common type without serious inconvenience, or, perhaps, with advantage. In the highest animals uniformity ceases, and instinct is limited to a few automatic actions, chiefly in the very young. The accumulated experience is transmitted in capacity to learn rather than ability to do.

This, in some of its aspects, is a harsh and apparently an unjust law. But in it is founded all the power of a skillful breeder, and, I may add, all the rational trust of a moral, intelligent man in the outcome of his offspring. If it were not possible to build up a breed of animals, in which certain desirable traits are transmitted with almost absolute certainty, there would be little encouragement to spend time and thought, and money in their improvement; and if a vicious, ill-conditioned whelp of a man were as likely to get a high-minded, intelligent son as one who himself possessed those characteristics,

half the incentive to well-doing would be taken away.

But whether you approve the law or not, there is no doubt of its existence and of its absolute sway. There is no use kicking against the pricks. It is the part of a wise man to submit to the inevitable. If, in some of its aspects the law is harsh, from another standpoint it is the most glorious and beneficent. Individually we can do little to elevate our nature or extend the range of thought; but if men were bred with half the care we breed our sheep, that little would not be lost, but would become a permanent acquisition of the race. Indeed, on this law of inheritance is founded the only possibility of progress and improvement.

But we are concerned with the law to-day only as it affects the control of our domestic animals, and our influence in moulding them to suit our purpose. There is a common impression, I believe, that the power of a skillful breeder is practically unlimited; that by proper selection he can mould the form as readily as the potter moulds his clay, and realize his ideal more slowly, perhaps, but as surely as the painter or sculptor. This is a mistake. The power of the breeder is limited in reproducing in the offspring what already exists in one or the other of the parents. He can take a head from this, a back and well-sprung rib from another, a soft touch from a third, and, by skillful manipulation, he can combine them all in one individual. But when he has done this—when he has combined in one animal all the good points which, in a state of nature, are scattered through the breed, he has done all that mere breeding can do. It is just as impossible by *breeding* to produce some new quality, or to increase the development of some quality already existing, as it would be to breathe into a statute the breath of life. Improvement, in the sense of increased development of any desirable trait, is a spontaneous matter—it is nature's response to favorable *conditions* in the matter of care and food. Breeding proper can only assist indirectly by avoiding combinations which would tend to *diminish* the quality sought for.

Take the milking quality as an illustration. Suppose we have a breed of cows the best of which yield say ten pounds of butter a week. It is desired to produce a cow which will yield fifteen pounds. Mere breeding, the coupling together of the *best* for this purpose, other things remaining unchanged, would never accomplish the purpose, or not at least with any certainty, or within the lifetime of any breeder. You might, and in time undoubtedly would, secure a family all the members of which would prove equal to the best of the breed as it formerly existed. That is all you could reasonably expect. The fifteen-pound cow would be about as far from attainment as ever.

The rational way of proceeding in such a case, and the way in which all great improvements have been secured in our domestic animals, is, after selecting the best animals attainable for the purpose, to afford them facility to increase their yield through better care and more abundant food, of proper quality. Note those that respond most freely to the change, and discard the others. Keep this up generation after generation, affording at all times the most favorable conditions for growth in the direction desired, and breeding only from those animals which show a tendency to *grow* in this direction, and, if the goal is not beyond the innate capacity of the breed, you may well hope for success.

I say, if the goal is not beyond the innate capacity of the breed. You cannot make a silk purse out of a sow's ear. You cannot produce a fifteen-pound butter cow out of a breed which, from a defective organization, cannot digest food enough to make it. No matter how thoroughly a breed *tends* in the direction desired, to make any great results possible, this tendency must be backed by a proper physical organization.

The point I wish to enforce at present, however, is that success in breeding owes half its success in feeding. It is useless to attempt the improvement of our domestic animals by greater care in breeding unless at the same time we improve in every particular. It is folly to spend money for an animal of choice breeding, possessing in an eminent degree the qualities desired, unless we afford its offspring an opportunity to develop those qualities fully. If we aim to winter our calves at a straw stack and allow them to pick a living in summer along the roadside, it is not likely we can improve much on our native

cows. They are just what generations of such treatment has made them and are probably as well adapted to their conditions, and yield as good returns in milk and beef as any breed in existence *with this treatment.*

You often hear the remark that Mr. A. or B. has some fine stock which yields much milk and butter, or turns out fine beeves; but that any stock would do as well with the same care and feed. This is a mistake. As I have said, under a system of neglect and of periodical starvation our native scrubs will probably do as well and yield as good returns or lose as little money as any breed. But they do not respond, as better-bred animals would do, to improved keep. They do not inherit the capacity to utilize the abundant ration.

Nature's first care is to preserve life and propagate the species. If the food is not more than sufficient for this, the parts and organs not essential to life or procreation are gradually reduced in size. Large digestive capacity, or a fully developed vascular system, is not necessary to a cow which never has enough to eat, or a full supply of blood. So a broad, level back, and well sprung ribs, while indicative of capacity to lay on flesh of high quality, require rich blood for their proper development. If the blood is lacking, Nature reduces the parts to correspond. And this diminished capacity is transmitted from generation to generation, with an increasing tendency to economy in nutrition.

It is a mistake to suppose that good qualities are more decidedly hereditary than bad, or that a well-bred animal is especially prepotent. Nature's ways are often inscrutable, and occasionally we find what is apparently a useless variation from the normal type propagated with extreme persistence; but, as a rule, qualities which are useful to the animal, and qualities, whether useful or not, which have been transmitted through many generations unchanged, are the most decidedly prepotent. An illustration of this was afforded, many years ago, in the attempt to improve one of the old French breeds of sheep by the use of an English long-wool ram. The French sheep were small and ill-formed, but carried a good fleece. It was thought the English ram would increase the sizes and improve the quality of the flesh without impairing the wool. Much disappointment was felt when it was found that the lambs showed no trace of their English sire. In seeking an explanation of the marvel it was suggested that the French sheep, though greatly inferior, were, in fact, more strongly bred, in that their qualities, such as they were, had been transmitted through many generations, while the English ram was of a recent improved breed. Assuming this to be the case, it was argued that, if the prepotency of the French sheep could be broken down, by crossing two old but diverse strains, the produce would cross more favorably with the new breed. This was done, and the results fully justified the anticipations.

Leaving out of view, then, the exceptional cases, which are in reality inexplicable, we may say that the prepotency of an animal—the influence it will exert in determining the character of its offspring—depends on the fixity of its type; and the fixity of a type depends on its age—the number of generations it has endured unchanged.

If a red Short-horn cow produced a roan, or white calf, it might cause some disappointment, but would excite no surprise. But if a Devon cow produced a roan calf, scarcely any conceivable testimony would satisfy an intelligent breeder that it was of pure Devon blood. Why? Because the red color is characteristic in one blood and not in the other—not more so than roan or white. But again, we expect, with almost equal assurance, that the produce of a Polled-Angus bull and a native cow, of any color, will be a black calf; and the produce of a Devon bull and a native cow, a red calf. Why? Because in each case the color is a race or family trait in one parent, and not in the other.

This, it seems to me, is the bed-rock in breeding. It is the foundation principle on which we must build. To develop a breed—to combine in one animal all the good points which can be found in the breed—and to develop fully its latent capacities, requires decided genius—a sort of intuitive perception of the combinations which will nick, and give each trait full room for development. But to preserve a breed once firmly fixed, or to breed up a mongrel to a high standard, through the combination of improved blood, requires only care and good common

sense. It is only necessary to remember that full development of the most desirable qualities requires abundant nutrition; and that the parent which is likely to prove most prepotent is the one whose type is most firmly fixed. This is the advantage, and the only advantage, so far as breeding goes, in a recorded pedigree. It enables us to trace the lineage, and to know that the qualities we admire in the animal before us are race characteristics, or at least, family traits, and are, therefore, certain to prove strongly preponent in a union with an animal of mixed blood. For this reason also a pure-bred animal—and by pure-bred I mean an animal of unmixed blood of any fixed type—is a more desirable sire than a much better animal, individually, of mixed breeding, and a grade bull—the produce of a full-blood of any breed from a cow of mixed lineage—is likely to prove a better sire than a cross-bred animal—the produce of two pure bloods of different breeds—unless the two breeds closely resemble each other in desirable qualities. Our fat-stock shows have pretty clearly shown that, for every purpose except breeding, a three-quarters or seven-eights grade of any breed is as good an animal as a full-blood; and they are often practically better, because they are better adapted to their surroundings, and a cross-bred animal is often decidedly superior, in size, form and feeding qualities, to either of the pure breeds from which it springs. But for breeding purposes, except to couple with a full-blood, both should be rejected. For any of the ordinary purposes for which stock is kept—milk or beef in cattle, work in horses—the one-eighth or one-quarter of mixed blood is practically lost and obliterated by the three-quarters or seven-eighths of pure blood. But in breeding the case is reversed, and the slight trace of mixed blood reduces the prepotency of the animal much more than its proper proportion. A three-quarter blood bull of any breed is not usually one-half so prepotent a sire as a much commoner looking full-blood, and a cross-bred animal, for grading up inferior stock, is, in reality, little better than a scrub. The explanation in both cases is the same. There is a constant tendency on the part of all animals to breed back to the original type, which, in the case of all improved breeds, is a much inferior animal. In the case of well-bred animals this tendency is checked and controlled by the long series of generations through which the improved qualities have descended. But where this series is broken by the introduction of foreign blood, or blood possessing different characteristics, the tendency to revert is greatly augmented.

In breeding, therefore, each animal stands, not as an isolated individual, but as the representative of a long line of ancestors, each exerting some influence in generation. If these ancestors are all substantially alike in the qualities sought to be reproduced, or, better still, if the qualities show an increasing development from generation to generation, the animal will almost certainly prove very prepotent in transmitting these qualities. On the other hand, if the ancestry is a mixed lot, good, bad and indifferent—of diverse and inconsistent attributes—no matter how perfect the animal itself may be, it is, for breeding purposes, the veriest scrub.

A common illustration of this principle is found in the human family, where one parent comes of a black-eyed race, and the other is of mixed lineage—in this respect ancestors whose eyes were black, or brown, or blue, or gray indiscriminately—the children will almost certainly, at least ninety-nine times in a hundred, follow the parent of unmixed lineage; and what is true of this obvious feature is true of the entire individual; every quality of body and mind is just as hereditary, and controlled by just the same laws, as the color of the eyes or hair.

In breeding, then, the first requisite is to know precisely what you want—in cattle, whether milk or butter or beef; in horses, speed or style or strength—and to know the particular form and qualities which go along with that you seek. These select as your foundation stock, or, if it is proposed to breed up from native cows, or common mares, select as the head of your herd an animal in which the qualities you seek are race characteristics, or at least, strong family traits. Afford the offspring every opportunity for full development, and success is absolutely certain, or at least, as certain as that the combined action of certain parts in a machine will produce determinate results.

It ought to be as easy to predict, with accuracy, the quantity and quality of milk an unborn calf will yield, when it

becomes a cow, as to know the color it will have and the general form it will attain. That it is not possible to do so, is an evidence that our stock, even the best, is not bred up to its full capacity for milk, nor so well bred in this respect as for the more obvious traits of form, color and general appearance.

Breed, then, so that you will be able to predict the result; above all, do not be misled by mere individual excellence. Individual excellence is, of course, the end to be attained. But, let your breeding be such that you can repeat it at will, and not as a mere chance. In this view, remember that an animal represents its entire ancestry rolled or united into one. If that ancestry is of uniform, or increasing excellence in certain definite lines, the breeding qualities of the animal will, almost certainly, be true and satisfactory. If the ancestry is of heterogeneous and diverse character, no matter how pleasing the individual itself may be, it is, for breeding purposes, a scrub, and it will prove in the end a delusion and a snare.

What Farming Would Confer if Rightly Followed.

[By Prof. W. I. Chamberlain, Iowa Agricultural College, Ames.]

The condition, "if rightly followed," at once raises the question, "when and how is farming rightly followed?" "How should we farm?" "What general maxims and principles must we follow?" These questions I must answer briefly further on. Meantime I assert my firm belief that on the whole there is no better business known to man, at least in the United States, than farming is if rightly followed, and that if rightly begun and followed it will confer health, comfort, increased intelligence, refinement, aesthetic enjoyment, independence, individuality, increased fertility, competence, permanence for family, ownership of land, and hence a place among the future nobility of the land. These points I shall notice one by one presently.

But to secure these great and most desirable blessings, farming must be, as our text says "rightly followed," and by the right kind of a man. Good farming implies a good farmer. He should have health, intelligence and some capital. Too much have been expected of farming. All other kinds of business require some capital, or that you should work for some one that has capital; require intelligence, or that you work for some one that has intelligence; health or that you work for less than full pay. But farming seems to have been considered a kind of Botany Bay where all could be sent who were not fit for anything else. You know the saying "Any fool can be a farmer." You know that you yourselves sometimes pick out your brightest boy for college life, professional life or business life, and keep the duller, steadier, plodding one for a farmer. You know the story of the "coon dog." The would-be seller of the dog recommended him most highly in that capacity. How he knew he was good on coons was thus: "The Lord (he said) never made anything in vain, and as this dog wasn't good for any other earthly thing he must be a good coon-dog." Now I am bound to say that farming has stood this severe test as no other occupation could. In it sick men have found health, poor men have found competence, and uneducated men have been forced to read, think, study and become intelligent students. It is one of the chief glories of farming that it has been so. Some twenty-two years ago, two years confinement and severe application in teaching had made of your present speaker a kind of white-faced walking skeleton, with a big cough and a small appetite. The cough was bigger than the man. The cough was the kite, and the man was the tail, and it was only a slender cord that anchored the kite and tail to earth, and it seemed only a question of time when the cord would break letting both fall. People gave me six months to die in. Well, I went to farming, thinking I would turn the turf over once at least before they put me under it. A year or two later I had regained heath, and while visiting in a town ten miles away, an old gentleman asked me, "are you a relative of the young Mr. Chamberlain of Hudson, the teacher, who died there lately of quick consumption?" "Yes, sir," said I, "I'm the fellow himself." "Well, well," said the old gentleman, "I should call you a reasonably jolly, lively red-faced sort of a corpse, but I heard you were dead." Yes, farming often confers health where it is wanting. I have been there and tried it. So also has it often given education and always increased it if rightly followed. It has given competence from poverty, often, on new

and low-priced land. But, really, in order to be successful the farmer should have at the start, just as for other kinds of business, some capital, good health, and fair education, the more education the better, if it is of the right kind and does not make him feel above or divorce him from sympathy with the common people, and from country life and surroundings. How then shall such a man pursue farming in such a way as to gain the many blessings I have named.

First. He must have the right sort of a wife, snug, tidy, efficient, who believes in farming as an occupation, and in the farm home as the place to rear children to habits of industry, thrift, integrity, success. One who is interested in crops, stock and farm business and neighborhood life. One who is not ceaselessly pining for the more exciting life of city or village. One who will be his helpmate in all good work. Such a one he should make his business partner and adviser. She should know all his business matters. The property and ready cash should be as much and as truly hers as his, and he should no more spend money or make important purchases or contracts without her knowledge and consent, than she without his. They two should constitute the executive and finance committee, until their children are old enough to be admitted as advisory members.

He should be progressive; should live up to the times and adapt himself to the condition of things, changed amazingly as they are since his father was a farmer. Those changes are of many kinds, due mainly, however, to the increased use of steam, and the improvement of machinery and of farm crops and stock. As a child, forty or more years ago, I remember a neighbor in Ohio, on his 400 acre farm; a man of iron frame, mighty muscle and great power of endurance. He seemed to scorn the aid of labor-saving machinery, as an insult to his muscle, and of improved stock and kinds of crops, as innovations of a wicked world. He used the sickle, and laboriously reaped one half or three-quarters of an acre of wheat a day, long after the grain cradle had proved that it could cut four or five acres a day as well as with less backache; stuck to the scythe long after the mowing machine was invented, and to the cradle after the reaper came; kept a "penny royal" bull for his great dairy, and raised 10-cwt. steers at three years old, when a good Shorthorn sire would have added 300 or 400 to each; and so on.

Plainly, our progressive farmer must not imitate him. He must be quick to see and adopt real improvements suited to his needs and circumstances. Human muscle can never compete with the power of horses, wind, water and steam, and lightning when brain work has first harnessed them to do the work once done by human hands; and the pregressive farmer will put himself and his farm in shape to use these great powers of Nature as aids in his farming, so far as he can do so to advantage.

Steam and electricity and machinery have wholly changed and revolutionized manufactures, transportation and commerce, and tenfold increased their rapidity and power. They have had less effect, in proportion, upon agriculture chiefly, perhaps, because agriculture is spread out so wide and so little condensed that these agencies cannot be so well and successfully applied. You cannot so readily apply steam power to your work in agriculture as in manufactures, commerce and transportation, and water power hardly at all, save indirectly in the manufacture of agricultural implements and machinery. The spinning jenny, cotton-gin and locomotive engine will help one man to do the work of 100 or more in manufactures and transportation. The steam thresher, indeed, will do almost as much in agriculture, because you can bring the grain together to it. But the steam plow and the twine binder must be taken around to their work, and must therefore waste fully half their power in carrying themselves about, and hence have less net power left to utilize for agriculture. And agriculture, I judge, must always labor under this disadvantage as compared with manufactures and transportation. But all the more carefully should the progressive farmer utilize the powers of nature and the aids of mechanism wherever he can do so profitably.

Still he will be conservative. If he "proves all things" he will, at least, "hold fast that which is good." He will not rush into every new and marvelous thing that offers to make him immediately rich. On such things he will experiment through his neighbors,

as the monkey used the cat's paws to rake the chestnuts out of the fire.

He will pursue mixed farming, that is, grain growing combined with stock keeping of some kind, as the only and heaven appointed means of maintaining and increasing his soil's fertility. But he will not "mix" it too much, so as to fritter away his time in profitless details. He will recognize the one great fact of the age covered by the single word "mobilization" or the immensely diminished cost of transportation.

When a bushel of Dakota wheat (or the flour from it) can be carried to New York for 10 to 15 cents, and a pound of Iowa beef or pork for a cent, and Michigan apples and Delaware peaches can be laid down in Iowa and Dakota cheaper than they can be grown there, it looks as if Dakota and states similarly situated must largely raise the wheat and meat, and Delaware and Michigan and states specially adapted, the apples and peaches. I use these as mere illustrations of a vast array of facts covered by the word "mobilization" in the sense I have given it, and which seem to tend inevitably towards specialization in agriculture, as based upon the principle in political economy known as "division of labor." In old times when transportation was costly or impossible the progressive farmer raised or made almost everything he needed, because that was cheapest,—best economy. Under the changed conditions he raises some things and buys others, because that is best economy. He must specialize somewhat, so as to do things wholesale, and justify the purchase and use of best machinery. His specialties should be those best adapted to his tastes, talents, soil, climate, markets and circumstances. He must not specialize so much, however, or in such a way as to diminish the fertility of his soil or the activity of his mind.

It goes without the saying that the progressive farmer must be a thorough business man. He must study the circumstances, grow the things he can best market and then market them wisely. He must be systematic, snug and tidy in his work, a good breeder, feeder, handler and houser of his stock, a good manager of his machinery, keeping it well oiled, bright, repaired and adjusted when in use. His mind should work with his eye and hand, or rather both before and with them. He is his own foreman, engineer, salesman, purchasing agent and bookkeeper; whereas the great establishments and corporations have experts and geniuses in each of these departments, and men not necessarily of special intelligence under them. Evidently the progressive farmer must be a thinker.

On these points I cannot go more into detail, but must hasten on to notice more specifically what farming will confer if followed thus. (1.) Health. I have partly spoken of this. There is, I believe, no healthier occupation if rightly followed. But excessive physical exhaustion and weariness is neither healthy, necessary or wise. It is unnecessary, because machinery, utilizing the power of horses, wind and steam, enables him to do three times as much with half the physical or muscular effort. It is not wise, because the man physically exhausted every night is not fit to plan wisely for the morrow, or to read and study as his business requires or enjoy his family as he has a right to do. Nor is his health so good.

Comfort. Well if the farmer cannot be comfortable I don't know who can. Does he ever go hungry or ill clad or cold from necessity? Is not his house comfortable? Cannot he have books and papers and music and friendly chat when the day's work is done? I think I am entitled to speak on this point, since for over thirty years of my life I have been farmer or farmer's boy, and expect to be ti l I die.

Increased intelligence. The farmers' occupation compels him to read and to study. Intricate machines to study. Crops to grow and market both; "bugs," insects, mildew, rust, blight, drouth, flood, tornado, all to study or oppose, stock and crops to improve, market to watch. Why he must study. Necessity is upon him. It's like the story of the pig.

City boy says, "Ye see the dog was after him hot and would 'o knabbed him, sure, but just then the pig shinned up a tree." Country boy retorts, "Why, you blamed city greenhorn, don't you know a pig can't climb a tree?" "Yes but he had to, he had to! The dog was right on him." And so the progressive farmer must study and read. His occupation stimulates him to this as does almost no other unless it be the literary and scientific professions.

Refinement and enjoyment. The pro-

gressive farmer's surroundings promote refinement and aesthetic enjoyment. Fruits and flowers, red fields of clover and golden seas of waving grain tossing in the wind like waves upon the lake; calves well built and handsome, and colts finely moulded and fleet, the broad, bright glory of the sun hidden by smoke and lofty buildings from the denizens of cities, the broad, green meadows and fields of dark green corn, the gold and crimson of the forest leaves in—these things and things like these fill the very soul of the intelligent, educated farmer with keenest aesthetic delight. Then there is the milder, less aesthetic, perhaps more substantial enjoyment of watching the unfolding and developement of the various kinds of crops and stock; of making improvements in field, fences, drainage, buildings and seeing the good results thereof. Such things furnish pure and real and rational enjoyment.

Competence. Add to this the freedom from fear of want. The farmer does not grow vastly rich it is true, neither is he, on decent soil, often distressing poor. Business men in cities often grow rich, but over 90 per cent. of them fail, financially, sometime in their career unless I wrongly remember the statistics. Not 10 per cent. of the farmers ever fail in their business, nor do any of them "come upon the town." Over 5,000 persons in Columbus (population 51,000, census of 1880) winter before last, received aid from the city, county or state in the way of charity. Did you ever hear of a *bona fide*, wide awake farmer that came to township trustees or county commissioners or city council for charity, for food, clothing or fuel. That kind of people crowd the villages and cities. Isn't it a real feather in the plume of farming as a business or profession that if rightly followed it always confers a reasonable competence ?

Independence. Farming, rightly followed, confers or promotes independence. By this I do not mean wealth or financial independence, but individuality, independence from dictation by other men, the right to order ones own actions.

In another lecture I have shown the dependence of the manufacturing and mining and commercial classes. Ninety-five per cent. of them work for someone else. Many of them can hardly say their souls are their own. In resisting the tyranny of employers, companies, corporations, syndicates, they have joined trades unions and various secret labor organizations, often more despotic than any European or Asiatic Czar, Sultan, or King.

As I write these words the daily paper tells of 250 workmen in a shoe factory, perfectly friendly towards their employers, and satisfied with their pay, ordered out on a strike by some distant grand master or high official of their organization; and of a larger body of tanners and curriers, out all summer on a strike, supported by their organization till now, and then the strike declared off, the support withdrawn, their old places filled with new men, and they unable to find work anywhere, and all this right in the teeth of winter. Is it not worth something that farming gives exemption from such troubles; confers freedom, independence and individuality? Who dares claim a right to dictate to the farmer?

Best opportunities to rear a family. I have spoken of this in another lecture. It is one of the greatest benefits conferred by the occupation of the farmer. If the parents do their duty, the surroundings cannot but develope strength, purity, vigor, intelligence and manliness in boys and the best type of womanhood in the girls.

Permanence. We are a drifting, restless, roving people, we Americans. We need to be anchored to the soil in order to grow into permanence of family. Thus anchored, we or our children get the benefit of all improvemets made, in fertility, orchards, building, betterments, improvements in live stock, and in a solid business reputation for integrity.

I like the English idea of taking sons regularly into business partnership. Many farmers and especially breeders in Ohio have adopted the idea, as T. C. Jones & Son, C. Hills & Son, J. Dodge & Son, C. C. Dodge & Son, among the Shorthorn breeders; and many others in other branches of breeding and farming. I cannot but deplore the tendency of our American boys to undervalue such chances of business partnership and land owning, and to rush into trade in cities or business upon our railways as traveling salesmen or in our manufacturing concerns. Some rise to position and wealth, but as a rule they

live on wages all their lives, subject to caprice of employers or dictation of organizations which they join, seldom owning even a roof to cover their heads; renters all their lives when they might be land owners, landed aristocracy in 30 or 40 years. For by that time the real land-owning farmers will be the aristocracy, the nobility, here as in England and on the Continent, and the homeless and the landless and propertyless classes will be the dissatisfied and discontented ones.

These are some of the benefits farming will confer if rightly followed. They are many and substantial. Let the audience suggest others and discuss them.

Is It Worth While to be Honest?

[By Prof. W. I. Chamberlain, Iowa Agricultural College, Ames.]

It is at least worth while to meet the question fairly. Dishonesty, small and large, is all abroad in the land. New forms of stealing and robbing legally are multiplying. Corners in grain and in stocks, with the attendant gambling; substitutions and adulterations of foods and other merchandise, by which a great concern steals a small fraction of a cent and of health with each half pound package or pint can sold; schemes old and new and bunko games for getting money or value out of others with or without their consent, but without rendering a fair equivalent of value or of service; large fortunes of ill-gotten gains; haste to be rich; rich honesty if may be, dishonestly or doubtfully if must be. Such and such like things tend to raise the question whether it is not merely an old-fashioned proverb, that "honesty is the best policy."

Our answer to this question will depend much upon the meanings we give to the two words, "honesty" and "policy." If the first means strict pecuniary honesty and the latter means the way to make money fastest for a time, then the proverb is not true. Strict honesty does not always bring quickest wealth. Many a man during the war grew suddenly rich on shoddy clothing sold the government to its robbery and the suffering of our troops. Many an expert gamoler takes in a small fortune in a single night, of the money of his dupe; many a bank cashier has fled the country suddenly. Enriched at bitter cost of stockholders or depositors or both. Honesty does not always pay the larg est immediate cash returns. If it did there would be no bogus butter, cheese, sugar, coffee, spices, no railway and grain gambling with corners; no thieves, counterfeiters, forgers, gamblers, swindlers, defaulters, burglars or robbers.

But if our proverb means that honor, integrity and truthfulness are in the long run and in the large issue wisest for a rational and moral being, then I think the proverb is beyond all peradventure true. And this, I think, was the original meaning of this much abused proverb of poor *Richard*.

Follow with me a few illustrations that seem to show that in this sense the proverb is true.

First in agriculture it is true. The short-sighted often doubt it at first. Many a farmer, so-called, has thought to cheat his farm and crops or stock and succeed thereby; has sown poor seed or scant, only to find that "whatsoever a man soweth that shall he also reap." Or he has cheated or pinched in care or feed of cows, sheep, steer or pigs only to have his dishonesty thrown back into his face his butter or wool yield the weighers sales in Chicago. Or he has skimmed his soil by poor tillage, or skinned it by failing to restore the exhausted elements of fertility. For a few years in each new locality long-suffering nature has endured this dishonesty, this theft from the generations yet to come, and then she has rebelled and brought retribution. Whole regions of the Old World, stripped of their fertility by the vandalism of misnamed "agriculture," stand to this day unsightly monuments, with these words deep-cut for their inscriptions "In agricultural honesty is the best policy."

How is it in merchandise. Where do you buy your goods to-day? Where you were cheated yesterday, or where you yesterday got the exact goods in quality and quantity you paid for? Who are the merchant princes of our great cities, whose massive blocks tell of real success? They are the men that dug deep and laid the foundations of their massive blocks and of their vast business relations upon the bed-rock of fundamental honesty. Why the "firm name and good-will" of some such business houses is worth a million dollars in solid gold.

How is it in banking? Why our whole complicated modern system of

banking and exchange rests upon honesty and truthfulness and upon confidence therein. Suddenly break confidence in a bank, and you break the bank. Depositors rush and clamber over one another in eagar haste to draw out the money they do not want, from the place where it would be safe if they would leave it there, while it is in utmost peril if they all try at once to draw it out. Lack of confidence brings panic, and a run that no average sufficient margin of deposits can meet. What brings financial crisis and depression over the land? "Over production" some say. "Extravagance" say others. But this simply means over consumption and contradicts the "over production" theory. "Loss of confidence" say others still; and this perhaps most nearly accounts for admitted facts. But "lack of confidence" in what? In truth and honesty. How is confidence in these destroyed? By falsehood, dishonor, reckless speculation, perversion of trust funds, commercial dishonesty as in the case of Fred. Ward. How is business at last revived after stagnation? "Only by a restoration of confidence," you say. Confidence in what? In the honor and fidelity of men. Confidence, at least, that by the bitter ruin of stagnation men have learned for another term of years that "honesty is the best policy." And so the banks unlock their vaults and bring forth their vast resources, locked there from distrust in men's veracity and honor, and once more business revives and mighty enterprises are set on foot.

How is it in railroading? How is it when the snorting iron horse, the modern Centaur-Cyclops, with his single flaming eye, by night gathers in his train the goods and souls of you and me and half of the people in the land, and whirls them at a terrific speed into the awful darkness of the stormy night? How dare you trust your life to this wild and snorting monster? Simply because you trust the skill and honesty and truthfulness of all that rule and guide that monster, and of all that laid the narrow, glimmering, paralel lines on which his swiftly rolling footsteps thread. Civil engineer, trackmen, bridge-builders, switchmen, locomotive engineers, firemen, brakeman, all believe that in railroading at least honesty and truth are the best, nay, the only policy. Did not you believe they so believed and practiced, you would not for a moment dare to trust the tender mercies of that iron monster. How is it when any single railroad man abandons honesty and truth as his policy in the management of trains. Awful disaster may and often does result. We have scarcely done reading of the "Nickel Plate" disaster in Onio, where in the grim and biting sarcasm of Mrs. Partington an "excursion train" was indeed an "execution train." How did it all happen? In Cleveland sat the train despatcher; in his minds eye a distinct picture of every switch and siding and train in his whole division of the road. Oh, the faithfulness, the skill, nay, the genius of our train despatchers that send so many trains flying in opposite directions over a simple track, all freighted with human life and yet so few mistakes.—This train despatcher sat in Cleveland, I say, tapping his telegraphic key. Sixty miles away the operator read the clicking with his ear, wrote it out, and handed the order to the conductor of this excursion train. "Let train No. 11 pass freight train No. 42 at Station 96"—Station 96! Why this is station 96! No place to wait for a slow freight. Plenty of time to make the next station. Push on engineer!

And the engineer pushed on;— —too late sees the freight train rounding the curve through the deep cut— — —and as the mangled bodies mingle in the awful chasm below, and the souls ascend to the judgement seat of God, what is the accusation they will bring, the crime they will charge upon him who slew them. Disobedience to orders? Ah, no, that is the charge the railway company brought against him, and instantly discharged him from their service, and from the service of all railways for all time. Will it be manslaughter? No, that is the indictment of the human court. The awful accusation these murdered souls will bring is this. "He was dishonest with us. He lied to us. Tacitly he said, "My orders are to push on." Oh, if he had come to us like an honest man, and read to us his telegram. and said, "My orders, as you see, are to wait here for the freight train. But I am sure I can make the next station. You know the high bridge and the curve in the deep cut beyond, but I'm going to try to make it under high speed,"—if he had done this, he would at least have been honest with us, and we could have stampeded from the doomed train before it set forth on its

accursed way." And then from the full chorus of the souls that had left theirs mangled bodies in that wreck, methinks there would go this single cry, "Lord, God of truth and justice, judge thou whether eternity be not too short to expirate the guilt of such dishonesty."

Take another case from our own somewhat recent memory, that touches the point of financial honesty in railroading. One fearful night in blinding snow and wind and intense cold, the Lake Shore R. R. bridge at Ashtabula, Ohio, parted its iron, and the train crashed in awful ruin a hundred feet below. I will not sicken you by recalling the scenes of horror there enacted. — — —A few weeks (perhaps months) later Mr. Collins, the chief engineer of the road, committed suicide. Hints had been openly heard that he had been bribed by the contractors to accept inferior steel and iron and workmanship in that bridge; but there was no proof. His suicide of course added strength to the suspicion. Men called to mind the memorable words of Daniel Webster, "There is no refuge from confession but suicide, and suicide is confession." Whether the suspicion had any real foundation I do not know; but if it was well founded then what visions nightly, before the suicide, must have wakened that engineer in the cold sweat of horror.— —Here is the yawning chasm;—there he sees a hand thrust from the smoking mass, the hand freezing outside in the zero of the blizzard while the foot roasts inside in red hot coals of anthracite;—Siberian hell outside,—inside the hell of the tropics, consuming the agonized body of one man.— —Now in the hush of his new slumber he hears a dying woman's prayer, "God in his tender mercy pity my motherless little one at home, and their heart-broken father." Then he sleeps again and hears the harsh clank of the gold that bought his official silence when he inspected that fateful bridge and knew full well its "factor of safety" was to small. Through all the ages of eternity do you think that chief engineer or that "Nickel Plate" conductor will for a moment doubt whether honesty is the best policy. The wrath and curse of God and of man abide upon such dishonesty.

These of course are mere illustrations but they might be multiplied indefinitely, and give strong presumptive evidence that honesty and truthfulness are the best settled line of conduct; that they are best, nay, essential to permanent success in study, in scientific investigation, in agriculture, in merchandising, banking, railroading, in the whole realm of human activity.

But I meet two classes of men not convinced by such arguments. The first class say, "Yes for the bulk of mankind and for the welfare and existence of society, honesty and truth may be best and even necessary, but is not this one of the cases where the shrewd ones will do best to get out of the beaten ruts in which the bulk of mankind must and should go. Will not dishonesty pay best for the shrewd?" Ah, you, sir, that say this, what kind of a man do you thus declare yourself to be? A foe to society. One who wants all the rest of mankind restrained by law from being dishonest, that prosperity may reign, property may accumulate and you may thrive by dishonesty and deceit. Do you wish to live in society that you may profitably practice the thing that would wipe out property, destroy society and reduce it to anarchy and barbarism? Would you live at ease on the toils of others and thus at enemity with conscience, with society and with God when you might live at peace with them all? Is that the kind of a man you wish to be?

Then let me say to you that the "knowing ones" do not always escape detection. As a rule they end in exposure or in the penetentiary.

Let me give a few from very many similar examples that have come under my own notice, and which seem to show that men over-estimate the slowness and impropabilities of detection and punishment, and do well to consider the pitiful smallness of the rewards of dishonesty compared with the bitterness and disgrace of exposure.

A farmer in Ohio sold his clip of wool to the agent of an Eastern firm. He was to pack it at his own wool room and deliver it at their railway station to be weighed and paid for. The same parties bought thousands of tons of wool in Ohio. The fact that he, this Ohio farmer, packed a few pounds of small boulders in each sack could never be discovered. Then, too, it would come out of the rich manufacturers who were not paying him enough per pound for his wool at any rate. So he

argued with his conscience, trying to still its chidings, a task no man has ever yet fully accomplished. In a few weeks it was traced back to him, and he paid several hundred dollars as "hush money." But it never could be hushed. His neighbors whispered it and eyed him askance. He would have given his whole farm to blot out that mean act of dishonesty from existence and from the knowledge of his neighbors and of his own conscience.

I once had a pupil in a large High School I taught, to whom the boys, when angry at him, would shout "Codfish at $20 apiece." He would slink away from them, and once I saw him shedding bitter tears. It puzzled me at first but I finally learned the facts. This boy's father before the boy himself was born, had one evening in a grocery stolen a dry codfish and started for the door. The grocer saw its tail sticking below his coat, and beckoned him aside and said, "You should wear a longer coat or steal a shorter fish. I'll take just $20 for that one." He paid the $20, and then this grocer having levied the blackmail and taken the hush money had the meaness, not to hush, but whispered it abroad to vex for twenty years the man's children, then unborn. What would not that man have done to blot that small theft forever out of existence.

In the hurry of a state fair in Ohio, some three or four years ago, I paid some one of four clerks $5 too much, and discovered the fact within a few moments. Circumstances fixed it presumably upon one, and his hearing made me doubly sure it was he. I had asked them all. Well, he was $5 ahead and I was $5 short. The next year he was anxious to help again and the next, for it was good pay. I never needed him again. My successor did not need him, he never will need him, for I gave him the exact facts. The young man was $5 ahead the first year, and is already $50 behind. We had another state fair clerk, an expert with the pen; too expert. He was a regular clerk in another state house office, that of the state canals. With his expert pen he "raised" the figures in canal warrants to the overplus amount of some $20,000 and got that amount himself. But when he was sent to the penitentiary where he still is, he had not a dollar left to show for it all. It was all gone on wine, cards, fast horses and fast women as money thus gotten usually is. And his poor old father and mother and young wife (for he had one) were almost heartbroken.

But you say such men are sometimes successful in avoiding detection, or escaping punishment. Yes, and they are to be envied. I know one such, a bank cashier, the brother of an honored friend of mine, a successful defaulter, who got out of the country some twenty-five years ago with a hundred thousand dollars of our peoples' money. Did anybody envy him? No, the universal feeling was, what an utter fool. Worse than dead to his friends. His name never mentioned by them or to them to this day. Thus men regard even the successful defaulter.

And so I might go on to give large numbers of examples like these from my own observation in the last thirty-five years to show that as a rule dishonesty and falsehood do not pay even financially in the long run. Even if dishonesty is financially successful for a time it does not seem to endure, or to bring real happiness even while it lasts. Only the money and the reputation honestly got are of permanent value. Conscience, society and God on high seem to conspire against the dishonest man and mar his success and happiness.

I wish I might take the time to look into the reason for this, and to establish these two preparations by argument. 1. Great physical forces environ us in this world, and it is wisest for us to work with and by and through these great forces rather than without or against them. 2. This is also a moral world, with supernatual or if you please nonphysical forces, and it is also wisest for us to work with and not against these great nonphysical forces—the moral forces that environ us. I wish I might rehearse what seem to me unanswerable proofs that the same God that established the matchless order and created the mighty forces of the physical universe, established an order quite as matchless and forces quite as mighty in the moral universe; and that even as violation of physical law often brings awful consequences, as when a wrong signal wrecks railway trains, or a lantern broken in a shanty sweeps the great city of Chicago with flames as with the bosom of destruction, so in the moral world what may seem a small violation of law may bring awful consequences.

Consequence follows conduct less promptly in the moral world than in the physical world, but not less surely. "Though the mills of God grind slowly yet they grind exceedingly small."

One practical question and I am done. How can we best band together to stop the flood of dishonesty that seems sweeping over our land. I answer we must begin at the cradle and work all the way up.

As parents by precept and by example we should train our children to habits of absolute truthfulness and honesty. We should never threaten a punishment or promise a reward we do not give, or never let them see in us dishonesty or falsehood.

As teacher we should imitate the Persians who taught four things; to read, to write, to cipher (compute) and to speak the truth. To the "three r's," readin', 'ritin' and 'rithmatic, we should add the fourth, righteousness, or right conduct.

Our preachers should see that they do not divorce morality from religion. The foundation stones of Christ's gospel are love, purity, truth and honesty. The falsehood and mean hypocracy of Annias and Sapphira were followed by sudden death, and ever since the whole force of the church has been squarely against dishonesty. St. Paul says, "Lie not one to another" and, "Let him that stole steal no more, but rather let him labor, working with his hands the thing that is good." Would that our pulpits might ring out the gospel truths on dishonesty.

As citizens we should never cast our ballot for anyone who has amassed property by questionable means, for anyone whose integrity is not unquestioned, for anyone we could not trust with our pocket-book full of uncounted bank bills, for anyone whose word is not as good as his bond.

As business men and housekeepers we should never knowingly buy counterfeit or adulterated goods, or deal except from necessity with dishonest men. I do not in general believe in boycotting; but I do believe we have a right to boycott lying and stealing.

Mixed Farming.

[By Prof. W. I. Chamberlain, Iowa Agricultural College, Ames.]

Mixed farming is coming to have a bad name in many quarters. The word mixed seems to suggest the idea of confusion, lack of system, frittering away the energies on a multitude of small details. This kind of "mixed farming" I do not believe in, at least for these times. The mixed farming I do believe in I will describe further on. The kind I don't believe is a kind of outgrowth of old times and conditions; a failure to adapt the style of farming to the changed conditions.

When transportation was practically impossible, no railroads but "corduroy," and no market except for barter or store pay, the farmer must raise and make about all he and his family ate, drank, wore, and lived in; *i. e.* food, clothing, shelter. But now, with our immense advance in machinery, our matchless facilities of transportation and exchange, the tendency is strongly towards division of labor, and concentration of effort upon specialties. And it is wisest and best that it should be so. It sometimes cramps and narrows the individual worker intellectually, especially under our manufacturing systems.

Unquestionably the division of labor and the specialization of employments in manufactures and commerce greatly increases the production of material and benefits the race. In agriculture, however, nature has set up barriers against carrying specialties too far or in too narrow lines. Some of those barries I will describe further on. But to a certain limit specialties, farming, concentration of intelligence and effort upon fewer crops and kinds of stock, is wise.

I have said that the objection to a certain kind of "mixed farming" is well founded. I have in mind a typical "mixed farmer" of the sort I don't believe in. No matter when and where I knew him, nor how many there are of him in Ohio, Iowa or Wisconsin. He is always mixed and so is his business. He has "more than he can carry," at least like the tipsy man, he "might better have gone twice for it." Three large farms he has, and keeps buying and renting more land. He doesn't want "all his eggs in one basket" and so has as many baskets, he can neither watch eggs nor baskets. He has all sorts of crops, stock and industries and seems to need them all to make the "two ends meet" or rather the forty ends. He has three maple sugar camps, and you can smell burnt syrup in some one of

the three pretty much all the time, when the hired help gets careless or asleep. He has two summer daires and one winter one and is on the anxious seat half of the time about their feed.

He keeps sheep too, and raises lambs and pigs and colts. A good colt amused himself by chasing the sheep; the father of the flock turned on him, played Roman battering ram, and broke the colts front leg. He whirled and with the three legs left kicked the breath out of the hundred dollar buck, and then had to be killed himself. It was a fair fight and a draw game, as between buck and colt, but it cost the "mixed farmer" $200.00. He raises all the crops in the catalogue. His sugar making and bucket washing run into oat sowing two weeks, and that into potato planting as much, and that into corn planting, and that into the next thing, and so on. He is two weeks behind, all the time, and winter sets in with potatoes undug, corn unhusked, and half an acre of piles of cider apples frozen around his cider mill. He goes into every new thing that promises to make him rich, and has 200 bushles of Bohemian oats that he is waiting to have the "company" take off his hands at $10 per bushel. He has a brick yard and gravel bank, and threshing machine and portable sawmill and a number of strictly agricultural interests.

He and his family work early and late, but with little system, or on the same system on which the man drove his oxen, "gee, haw, Buck and Berry, go just where ye dum please; the hull field's got to be plowed."

He's always behind hand with his work, as I have said, and never gains any on it, not even as the dog gained on the wolf. The hunter, you know, lost sight of them, and panting on after them met a man.

"Did you see a dog and a wolf just over the hill?"

"Yes."

"Was the dog gaining any on him?"

"Well, y-e-e-s. It was nip and tuck, but when I seen 'em the dog was a leetle mite ahead, and doing his level best to gain."

That is the only way this "mixed farmer" gets ahead of his work. It is always driving him, and he seems to dread it as the brave dog did the wolf. He has more than he can manage. He's like the setting hen you've heard of. "Mother," says the boy, "I've set that old hen on a hundred eggs."

"Why, my son, she never can cover a hundred eggs."

"I know she can't kiver 'em, marm, but I jest wanted to see the old fool spread herself once."

That is the trouble with some of these mixed farmers. They are spreading themselves too much. They never hatch a chick, but spoil most of the eggs. Now you will readily understand that I do not believe in that sort of mixed farming. Still I do believe thoroughly in the right kind of mixed farming, as against narrow specialty; I would lay down these four guiding principles:

1st. Successful farming must combine or "mix" crop raising with animal industry in order to keep up the soil's fertility.

2nd. Rotation of crops and order of work should be so arranged as to furnish the farm force steady and remunerative work nearly or quite the whole year around.

3d. The farming should not be so mixed as to multiply fields, fences and the kind of machinery necessary for profitable work, or so as to waste the time in changing from this to that, or in puttering with small non-paying jobs.

4th. The farmer should make his money on his farm, in legitimate farming, and not in outside work or speculation.

First then, successful farming must be mixed, so far as to combine crop raising with some form of animal industry. Our domestic animals are the heaven appointed means of keeping up the soil's fertility.

I do not believe it can long be kept up without them. I have tried to explain this in my lecture on manures. These animals, if good individuals of good breeds, have the power of taking from our grass and grain crops their feed value, or money value for our pockets, and leaving in their voidings almost their entire manure value for our fields.

Specialty farming without a fair proportion of live stock kept, and their manure wisely saved, has, after a time, invariably exhausted the soil or brought disaster of some kind. Witness the cotton fields of the South, the peach lands of Michigan, the potato lands of

Lake Co., O., and the wheat lands of the Genessee Valley, N. Y., where the farmers that trust to clover alone, without much live stock, were driven out of their specialties by diminishing returns. One of the most successful potato growers in the country manured heavily up to three years ago, *i. e.*, the immediate effects continued until then. In 1881, 1882 and 1883 he had 47½ acres of potatoes which yielded about 10,700 bushels of potatoes, or 225 bushels per acre. In 1884, 1885 and 1886 he raised a few more acres, but kept almost no live stock, and trusted mainly to clover for manure, and his average yield per acre for these three years has shrunk nearly half. But the weather was on the whole and on the average as favorable for potatoes the last three years as the first three, as shown by the fact that the average yield for his own state was 4.1 bushels larger, and in his own county was but five bushels less the last three years than the first three.

I can see no possible explanation except the almost entire discontinuance of the use of manure the last three years, under continual cropping of over one-half his arable land in potatoes. While he manured heavily he had big crops. When he stopped manuring his yields fell off nearly one-half. I have never known a case where potatoes (of all crops) were sucessfully raised repeatedly on the same land, even with a rest of a year or two with wheat and clover, unless large quantities of stable or yard manure were applied, either furnished by live stock kept on the place, or drawn from neighboring city or village.

In the lecture on the "Value and Management of Manures," I have given other striking illustrations of the great value of regular old-fashioned, barnyard manure. I repeat, then, my first proposition, that we must "mix" stock-keeping with crop-raising, in order to maintain the fertility of our soil.

Second. Rotation of crops and order of work should be so arranged as to furnish the farm force with steady and remunerative work nearly or quite the year round. This seems impossible with any mere crop specialty, even where it includes two or three crops, but no live stock.

The Dakota specialty, wheat farming, gives employment only about six or seven months in the year; and potatoes, wheat and clover, as a specialty, without live stock, will give employment for only seven or eight months. But the farmer must find employment the year round on his farm, and it can be done where live stock are kept. For example, my own farm of 126 acres has a good maple sugar camp of 1,500 trees, including one-half rented trees; fifteen acres of orchard, just come to good bearing condition, and about sixty-five acres of land, nearly all tile-drained, and suitable for rotation crops, and the rest rather rough pasture, including the sugar grove. If I were farming it now myself, with one or two sons, my plan would be as follows, which is, in the main, my plan now, working it, as I do, absent from it most of the time, through a hired foreman: From November 1st to April 1st, much of the time would be given in the warm, bank-barn to care of winter dairy, selling milk or butter or cream in the neighboring city; feeding well and high, saving all manure, solid and liquid, with great care, and drawing it upon the snow or frozen ground to the fields, to be ready to be plowed under for spring crops. Wisconsin practice might need to be different, owing to inability to raise winter wheat, and common custom of fall plowing for spring crops. From February 15th or March 1st to April 15th, devoted chiefly to making and shipping, to first-class customers, strictly first-class maple syrup, in sealed packages, with brand of maker on each package. This is an exceedingly profitable branch of my farming, yielding over $850 one year, and often over $500, with little real outgo, and no manure required, or feed, except to the men and teams not then otherwise busy. After April 15th, the pruning of the orchard and the planting of 10 acres or so of early potatoes, and 10 acres of Hungarian grass, late in May, and of 3 or 4 acres of sowed corn for dairy. Potatoes planted with Aspinwall planter and dug with McCallum digger. Care of potatoes and sowed corn would occupy the time till the cutting of the 20 acres of clover and timothy hay, about July 1st; then the cutting of 20 acres of wheat, threshing wheat, digging and marketing potatoes, cutting Hungarian grass for hay, preparing wheat ground and sowing 20 acres of wheat, to be seeded in spring to clover and timothy mixed (advantages of mixing). Wheat sowed about September 10th; then finish marketing

potatoes, if not finished; pick, pack and market winter apples; then fall work—building new fencing and repairing old, marketing wheat, if price suits, and general fall work, and beginning care of winter dairy. The specialties would be (beginning in the spring) maple syrup for sale, clover and timothy and Hungarian hay and corn fodder, all for winter dairy and teams; wheat and potatoes and apples for sale, and products of winter dairy for sale. The dairy would be dry four months of the busiest time in summer, and would take little care, being out at pasture.

This in brief would furnish regular remunerative work for a force of two or three men and four horses the year round. It would bring a good income. Sell only condensed and chiefly carbonaceous products that do not much exhaust the soil, and make a royal lot of richest manure, from some 24 cows, 4 horses and a few heifer calves each year, to replenish the dairy.

This is my idea of one way of combining specialty farming with mixed farming so as to combine the excellencies of both. Only one kind of stock, besides work teams, and a few pigs and chickens to pick up the waste of the dairy. Only a few crops or products for sale, and those of the best possible quality. Large fields and few fences.

Pasture, if possible, all in one field, except calf lot. Land for rotation all in one field if possible, and hoof of horse or cow never allowed on that field. Horses kept up most of the year and their manure carefully saved. Tillage thorough; clover freely used as an aid but not as a dependence. All necessary tools and machinery for the best handling and marketing of the few crops and products raised, which would be impossible if very many different kinds of crops and products were grown for market and various kinds of stock kept. That would also necessitate many small fields with increased expense of working and of fencing, and for proper machinery for handling.

This really covers my third point, viz, Third: the farming should not be so mixed as to multiply fields, fences and the kinds of machinery necessary for profitable work, or so as to waste time in changing from this to that or in puttering with small non-paying jobs. This point scarcely needs further remark.

Fourth. The farmer should make his money on his farm in legitimate farming, and not in outside work or speculation. Mixed farming properly managed will enable him to do this. He should not mix his farming too much as I have said; that is he should concentrate his best thought, study and work upon a few things and excel in these, rather than divide his energies too much, or scatter fire like my fathers old flintlock musket that would scatter shot all over the side of a barn, and kick so as to "scatter" the fellow that fired it, all over the barnyard.

Some farmers make their farms simply the basis of their trading operations. Trade everything they can lay hands on; act as agents for all farm implements, fertilizers and supplies; join stock companies for this and that; trade horses in particular and come home with a new one at least once a week, or even trade with the professional gypsey traders that come along. You hardly know how universal this spirit of dicker and trade is among farmers in some sections.

A gypsey horse trader came along one day and bantered me for a trade or swap for my little black mare. He had a lot of choice trading stock strung on for three or four rods behind his covered wagon—the halt and the maimed, and the blind, the spavined, heavy, pollevil sort you know; the balky, the vicious and the sinful.—I told him I never swapped horses in my life. He took his pipe out of his mouth in utter amazement and with mouth and eyes wide open said:

"Wal, hev I found that man at last?"

"What man," said I.

"Why, a farmer that won't trade hosses."

"Yes sir," said I, "and you'll find that sort of a man here every time you come past my farm."

"But why not, won't you trade, stranger?"

"Because I can't hold my own with you in lying."

"Get up," said he, "'bleegged fer the compliment."

But after he had driven a few rods he stopped again.

"Stranger, I'll tell ye what I'll du. I'll give ye a theousand a year 'f you'll le'me take ye reound the kentry 'n show ye fer a show.

The sarcasm was not against me but

against the spirit of trade and dicker so universal among farmers. If the farmer has more horses or anything else than he wants let him sell of course; but why he should continually swap one horse for another horse I never could see, unless he expects to "beat" the other man. If he is going to beat a professional trader he must be a professional himself with all a professionals dishonesty and wandering, roving habits and he can no longer be counted as a farmer.

The point I am trying to make is this, that the farmer should make his money on his farm and by legitimate farming; and not in outside work or speculation, and that "mixed farming" of the general kind I have described *i. e*, a combination of animal industry with cropping is the only kind of farming that can furnish steady remunerative employment the year round and keep up the farm's fertility.

Of course a successful farmer may be legitimately called away from his farming wholly or in part, as I thought I was seven years ago to become Secretary O. S. B. Ag'l, and again less than a year ago to become Pres. I. A. C. and as my friends, Terry and Gould of Ohio are to spend half their time, or nearly so in writing and in lecturing. But I can no longer be classed as a regular farmer. My private farming of my Ohio farm must be done by proxy or, if you please, with plow handles and forkstales 700 miles long, while my official farming as Pres. and General Manager of our great college farm, must be largely of an experimental sort. My friends Gould and Terry too, though both of them still bona fide farmers, must plan their whole years work on a basis more or less different from that they would adopt if they were at home the whole year and if farming were their whole source of revenue.

My effort in all my writings and lectures is to keep this fact sharply in mind, and to recommend to the actual farmers such things and such only as I practiced when I was actually and only a farmer, and as I hope to practice if I return to my farm in partnership with one of my sons when this harder, more anxious and exacting work I am now doing shall have worn me out once more as it did over twenty years ago.

THE investments in cattle in Colorado amount to over $50,000,000.

Specialties in Farming.

[J. B. Dwinnell, Lodi, Wis.]

Webster defines specialty to mean "a special occupation." That which one makes an object of special attention.

Perhaps my subject would be better stated as special versus mixed farming; and we have only to take a look at almost any of the farms in this vicinity to see that it is pretty well mixed.

Is it not a fact that we are nearly all farming in a sort of hap hazzard way, spreading out our best thought until like a leaky vessel that will hold no water, the profits should accrue from the hard labor of the farmer, his wife and children are not to be found. A newsboy once said "there's a best way and a worst way to do almost everything." I try to get the best. In these times of short crops and low prices let us inquire if there is not a better way than we have been pursuing.

As before intimated our farming has been very general, including the raising of almost all kinds of grass, grain and stock. We have for instance in our dairy what for the want of a better name is called a "general purpose," a cow that will on an average make say 100 pounds of butter in a year, and produce a calf which, if a heiffer, will make a cow just about as good as the mother, and if a steer will, when 1,000 days old, weigh 1,000 pounds.

Then we find one or two mongrel brood mares, a cross between the native and something a little better, the foal from which may, if well cared for at three or four years of age, bring $75 to $100. We find the swine are very slick and fat, but bred so fine and fed so much fat producing food while breeding that they are an easy prey to cholera or any other disease to which the hog is subject.

Waldo F. Brown, of Oxford, Ohio, says in *Farmer's Review* that not long since the swine disease swept through his neighborhood and that although his hogs were in a pasture adjoining that of a neighbor who lost nearly all that he had, that he (Brown) lost only two from quite a large herd, and he attributes it to the fact that he fed his breeding stock on muscle producing food, such as oats, bran, etc.

Then we have sheap, half Southdown and half Merinos or Seicester, and the

clip is neither fine nor coarse, long nor short.

We find the poultry a little Cochin, Plymouth Rock, Leghorn, Houdan, Brahma and Langshire, well mixed. We call them nice birds; but they don't make a very plethonic pocket-book at four cents a pound. Then of grasses and grains we raise timothy and clover, corn, oats, barley and wheat with a little sorghum thrown in to sweeten the mess. And to cap the climax our buildings are illy adapted to the purpose for which they were intended. Our fences are expensive and we almost cover our farms with machinery.

S. L. Sheldon estimates the machinery on the farms of the state of Wisconsin costs on an average $600, and that it is replaced every eight years. What an enormous tax upon the farm! Then, what is worse than all, there are so many irons in the fire that some of them are sure to get burned. Now, some one may say, all very true, but what are you going to do about it? What I propose to do is to give a few hints in the line of specialties on the farm. Perhaps some of you have a taste for dairying. You like the cow, and do not seriously object to spending an hour each morning and night in milking. You like to manipulate the milk and cream and butter. You like to study the markets, and choose the best; in short, you like all the details connected with a butter dairy. If this be so, arrange your buildings for this business. Have a barn that is convenient, and can be kept clean and well ventilated. Build a dairy-house, or convert some of the buildings used in the mixed process into one. If the silo has come to stay, build a silo, buy the most approved dairy utensils and machinery, such as a steamer for warming the water in winter, a power grinder and cutting machine. Raise fodder corn for soiling in summer, and with that and the ensilage one cow can be kept a year from the produce of one acre. Whereas, under our present system, it takes from three to four acres. And, most important of all, stock with some one of the best dairy breeds of cows, and feed the machine for all there is in it. Test the milk of each cow with an oil test churn, or in some other way, and send to the butcher all that will not, at full maturity, make 300 pounds of butter per annum.

If the farm is better adapted to the production of beef, or the fancy is in that direction, take any breed that is short in the leg, broad across the loin and deep in the brisket, such as the Shorthorn, Polled Angus or Hereford. Feed the calves the new milk, and at three years old make them each weigh 2,000 pounds. This has been done, and can be done again. Such steers bring, in Chicago, from $1 to $2 more per hundred than the 1,000 to 1,200 pound steers we are now sending to market from our farms.

Geo. H. Harding, President of the Wisconsin Shorthorn Breeders' Association, said, in a paper read last winter at the Agricultural Convention held in Madison: "A few years ago I made steers of two Shorthorn calves. I wanted to see them grow. At three years and three months old I sold them to Layton & Co., of Milwaukee, for $252. They weighed 4,000 pounds. The average price of 3 year old steers that day was $30," and I think he might have added that it cost no more per pound to grow the steer that brought $126 than the one that brought $30.

I saw at the fat-stock show in Chicago two years ago, grade Shorthorn steers, three years and six months old, that weighed over 2,300 pounds, or a gain of 1 and 82–100 pounds a day from birth.

If the farmer desires a comparatively easy life and still keep up the fertility of the land, he might stock with sheep. For this the buildings need not be expensive. The fences may be built low, and if the wolves or dogs are troublesome have a herder boy with them through the day and yard them at night. Three years ago this winter I selected from my flock one hundred weathers worth $2 50 each, and fed them a little grain and clover hay until about the 1st of March, when I sold them to O. A. Kilbourn for $500.

If you have a farm adapted to raising corn, then adopt swine husbandry. My friend George Miley has truthfully said the hog has rooted the mortgage off from many a farm. Some years ago I knew a farmer in Dane county, this state, who owned a farm of 100 acres. He bought an adjoining farm of 140 acres, for which he agreed to pay $8,000 and mortgage this 240 acres for the

amount at 10 per cent. interest. He built a hog house 100 feet long; purchased a set of burrs to grind his grain; made arrangements for cooking the feed, and stocked with from 250 to 300 Poland China hogs. He kept no other stock except one cow and horses enough to do the work. The result was that in a few years he had the mortgage paid in full, and one of the best farms in Dane county.

The breeding of horses is, perhaps, all things considered, the most profitable at present prices of any of our industries. Who does not like a good horse, one that will step a mile inside of three minutes and as well can draw the plow, or do almost any kind of farm work?

Probably the most serviceable general purpose horse is one that will weigh from 1100 to 1200 pounds, and if there is heavy hauling to do put three abreast. But I am not at all sure, but there is more money in raising for the market the Percheron or Clydesdale. There is now a market for them at good figures. As examples of success in this specialty the Messers Roys, of the town of Hampden in this county might be named, who are breeding both the American trotter and the heavy draft horse.

With any of the specialties named, and to further increase the fertility of the soil, mammoth clover might be grown for the seed. I am acquainted with a farmer living in the northeast part of this county, who keeps on his farm 400 sheep, and last season raised 300 bushels of mammoth clover seed from fifty acres, for which he has been offered at Portage $5 50 per bushel, or $1650. He thinks that by taking off one crop of seed, and then turning the roots under, the land is becoming more fertile.

With our present system of diversified farming we must make a study of every kind of stock; how to breed, how to feed, and the best time and place to sell. I assert without fear of successful contradiction, that there is no business on God's footstool requiring so much hard work, hard study and good management in order succeed, and what I plead for in this paper is not more work or more thought, but concentrated thought and work.

A mother once said: "If I can train my boy to plain living and high thinking, to fear God and keep his commandments, I shall not have lived in vain." Most farmers have enough of the plain living, but let us have more of the high thinking concentrated upon some specialty in farming; then there will be more money and greater satisfaction in our work.

Some have used as an argument for mixed farming that with a large variety to sell we will hit it on something; but I can see but little difference whether we sell one thing high and the rest low each year, or once in five or six years have a low price for all we raise to sell. Besides, with a little cash in bank, which the specialist would be sure to have, he could "hold over" the produce for a better market.

I have said about all I care to say to my farmer friends on this subject. I have only hinted at some changes that might with profit be considered. Anything worth doing at all is worth doing well. Think on these things.

Sorghum, Its Culture and Uses.

[By William Frazier, Viroqua.]

While I have devoted much thought and study to the process of manufacturing syrup and sugar from sorghum, I have never made a specialty of its culture and uses. To write upon this subject may seem almost like taking up a dead issue.

It is well known that the Chinese varieties of cane were introdnced into this country about thirty years ago. The African varieties some years later. During the last years of the civil war, and for some years afterward, cane-growers' conventions were held in many of the Western States, and much was written upon the subject—thousands engaged in the business. Many were certain they could and would make sugar. However, but few succeeded, and the business was almost wholly confined to syrup making, which flourished for a time and then subsided. Only a few continued in the business.

About ten years ago the business revived again, under the name of the "Early Amber," which is a superior variety of Imphr, or African cane. Since which time many conventions have been held and much has been written on the subject. Again thousands rushed into the business, determined to make a fine quality of syrup, and sugar, too.

Again there is a subsidence, espe-

cially in Wisconsin. Cane-growers' conventions are no longer held. Our papers seldom mention sorghum. Our merchants send to Chicago for their syrup. Yet, sorghum has a better reputation than it had fifteen years ago.

During the last few years it has been fully demonstrated that a superior table-syrup can be made from the northern cane, and that sugar can be as surely made from many varieties as it can from the beet.

That this country, with its grand advantages, will continue to import $100,000,000 worth of sugar per annum, I do not believe.

Now, if we pay for our sugar with wheat, at present prices—sixty cents per bushel—it will take 50,000 tons. We know that wheat contains much of the best elements of our soil; and if this cereal is worth $5 00 a ton for manure, then we ship $250,000 worth of the very best elements of our soil out of the country every year, and get in return, a commodity, if it is pure sugar, utterly worthless as a fertilizer.

Chemists tell us that the elements which make sugar are drawn from the atmosphere, not from the soil.

CULTIVATION.

In the first place, be sure you have good seed; then put your ground in much better shape than you would for corn. When you get a piece of ground in what would be called good condition for corn, then bunt and harrow and harrow and bunt, until the ground is thoroughly pulverized and the surface smooth. The ground to be plowed in the fall by all means. Then mark out your rows, say three and one-half inches apart. I use a marker with wide runners, so constructed that they can't make a furrow more than three-quarters of an inch deep.

I prefer to drill the seed. Use an onion-seed drill. Plant two or three times as much as ought to stand. Cover one-half an inch deep; then roll the ground, and continue to harrow and roll two or three times a week, until the cane is ready for the cultivator. Then, with a hoe, thin the plants to three or four stalks to the foot.

The cane field should be frequently and thoroughly cultivated until the plants are about two feet high, when it should be left to take care of itself.

Fresh barn-yard manure is wholly unfit to be put on ground that is to be planted to cane, as it will, if used in large quantities, render the syrup black and almost worthless.

ITS USES.

It is pretty generally understood that sugar and syrup are used very extensively in this country, and that their consumption per capita is on the increase, and that they are principally used for sweetning purposes.

But, I presume it was expected that I should tell something about its other uses, and how the by-products may be utilized.

Sorghum is believed by many to be superior to corn as a fodder crop. I believe the seed is worth as much as corn to feed to any kind of stock. I am quite sure it is superior to corn when fed to milch cows.

I feed the skimming to my hogs, with good results. Some make excellent vinegar from the scum.

The crushed stalks are used by some manufacturers for fuel; others spread them over their field for manure; but, if they are properly cured, they make pretty good fodder.

A few years ago I cured several tons of bagasse and left a number of cocks in the field, where they had been spread to dry. My cattle ate freely of it; at the same time they had access to a stalk field from which the corn had just been gathered. Have fed my horses considerable of it; they prefer it to oat straw, but will take good hay in preference. I think the stalks—I mean the crushed stalks—are of some value for food. Of course the blades make excellent fodder.

Home Dairy Cheese.

[By Mrs. J. W. Cade, of Viroqua.]

The idea I wish to present to the farmers at this meeting is that all farmers should make cheese enough for their family use during the entire year. The manufacture of home dairy cheese has been neglected for years, so much that few people have little or no idea how to make it.

Factory cheese fills our markets, and farmers have turned their attention to the manufacture of butter, neglecting to make what cheese they need for their family use. Being of secondary importance it has become secondary in quality in many respects as a matter to follow.

At the present time the majority who buy cheese will choose the factory cheese;

though it seems that people who like cheese best are the ones who prefer home manufactured. This is owing to the education of the taste.

But will it pay the farmers to manufacture cheese from four or five cows? I say it will. You can make enough from this number in two or three weeks for a family the year and save buying at the grocery store.

We never think of buying butter for the family use.

The time when we should make cheese is in July or August when it is most difficult to make butter. This will give you warm weather enough to mature your cheese before it gets cold. I have made cheese a number of summers and have never yet saw the time but that I could sell more than I could spare.

I will give you my method of making cheese. The number of cows varying from four to twelve.

Cows should have as good care in making cheese as butter. The rennet should be prepared before hand. Rennet a year old is better though fresh will do. Into one-quart glass can I put in one half a rennet; eight ounces of dairy salt, a handful of sage, one half tea spoonful salt peter, fill can with water and let stand three days. For coloring I use anaits dissolved in white lie or soda.

I strain the milk in a tub for that purpose while warm. Then add one tablespoonful of the rennet and one teaspoonful of coloring to each twelve quarts of milk. Stir well and cover with a cloth to keep warm for a half hour.

Cut with a wooden knife to the bottom four or five times each way, let stand a half hour, until whey rises on the top one inch deep and has a greenish cast. It is now ready to dip off into a box I have which is three feet square, six inches deep, that will hold water, on one side there is a spout to carry off the whey. Put some slats across the bottom of the box and lay a piece of dairy cloth over the box. Into this dip the curd and handle careful. Sift corners of cloth until whey has nearly all passed off. Then cut each way several times with a knife. Tie the corners of the cloth together and each time a little tighter. Each time cutting a little finer adding a small weight at last.

When the curd seems firm or no whey runs out, I cut the curd in slices and spread around in the box with the strainer and rack under it, and let it remain until morning.

In the morning I put cold water on the curd and let it remain until I have the morning milk made into a curd then I cut both curds the size of a bean and mix together. I sometimes let my nights milk stand in the creamery cans until morning, then warm it to the same temperature as the morning milk then mix the two quantities.

I have my hot water in a tub or boiler a little hotter than agreeable to the hand. Into this I put the cloth with curd in, and stir with my hands to prevent it from adhering together. Let it remain in this water 10 minutes. If it is too hot it will wax together. When it will squeek between your teeth when you bite it lift it out of the water into the box. Stir until cool which is about one half hour. Then stir the salt about one ounce to five pounds of cheese.

Put in the hoop with the cloth on the follower to be loose enough to not bind. Put in press. I prefer a lever press. A light weight is to be put on at first. Let it remain in the press two to four hours then change the cloth and turn, put back in hoop and put on more weight, then let it remain twenty-four hours.

When pressed I bandage with thin factory cloth and grease through each day with oil of butter and turn. Keep in an airy place that is dry and watch the flies well.

Potato Culture.

[By Wm. Cox, Virginia.]

My task is to try to give some practical hints on potato culture. This may seem rather a common place subject, as almost everybody is supposed to know something about raising this commonest of crops. I would say, however, that the methods, recommended here, are applicable to other cultivated crops. In writing this paper we do not aim so much to try to advance new ideas as to stimulate to more thorough work in the enriching and pulverization of the soil. We hear and read a good deal, about better methods and more thorough work, but do we practice it, or do we set it down as mere theory, something not practicable, for the go-ahead farmer. We believe that the best way is the safest, and the most profitable, that if one acre of potatoes, or

anything else, can be made to yield a handsome profit, two or more can be made to do better, from the fact that after being thoroughly equiped with the proper tools, we may go on indefinately, according to our ability, or the means at hand. Here the idea of specialties is suggested, it requires quite an outlay to procure the right impliments for the cultivation of certain crops, and a considerable expense to properly house and take care of them. We will not stop here to theorize, but will proceed to give our method.

First. As to selection and preperation of soil. This should be a fertil, sandy loam, or a light clay loam. Heavy clay, I should not consider good unless well underdrained and thoroughly enriched, it might do. Peachblow or those varities that throw out heavy tops, root deep, and spread out over the ground. Experience teaches us, that new land about the second year's cultivation is good for potatoes. The vegitable matter is now available for plant food and the soil light and fine, with fertility enough to push the crop to early maturity. With such soil properly planted with good seed and thoroughly cultivated, we should expect to have a large crop, say from 250 to 300 bushels to the acre of smooth, clean, uniformly large potatoes. Attractive in appearance, and good in quality. Now, as we cannot always have new land, how shall we bring our old land up to the desired condition. My plan is, first, if I have a clover sod rich enough, I prepare it in the manner soon to be described; if not rich enough, I would take the clover sod or other land, and plow deep in the fall say, one or one and a half inches deeper than it has been plowed before. It should not be less than six, better seven or eight inches deep. Draw out all the barn-yard manure I could afford in the fall, or winter, and spread it eavenly over the ground; harrow the ground good in the spring, and plant to corn, if the corn is worked well and late enough to insure no foxtail or other weeds. The land will require but one plowing, after a thorough harrowing or cultivating the following spring before planting the potatoes, cut the corn low in the fall and keep the cattle off the ground when it is wet. In case of a clover sod, I should plow in the fall, thoroughly harrow in the spring, and plow again, so as to turn this fine mellow soil down where the potatoes are to be planted. Now, harrow again before marking out. A harrow that the teeth can be slanted, or made straight is best, put on three horses and get on and ride if necessary, or when necessary. I like to harrow before the ground gets dry, as the clods crush easier. This is important. Harrow all up to the plow before dinner, and again at night. A great deal depends upon this thorough pulverization of the soil. The Acme harrow is higly recommended for this purpose.

I would plant as soon as I could get the land ready in the spring; the early kinds first, the rows should be made straight, that by going once in a row, with the cultivator, the ground may be all stirred, and about four inches deep or a little over, and three feet apart. I propose to have a marker, something like a corn marker with guide attached, as on corn planter. Now, open the furrows with a small stirring plow or large shovel. This shovel may be attached to the plant pinion cultivator, following with a V-shaped chunk of wood, to crush the lumps that will fall into the furrow. This process may seem somewhat tedious, my answer is, not so very, if we would have a large crop of potatoes, and good ones, we must have the mellow soil. If our ingenuity leads us to shorter methods, all right.

When I dig my potatoes, I like to pick out what I call an ideal potato, one that is smooth, just about the right size and shape, these I prefer to keep in the cellar at a low temperature, manage them so as to have a strong healthy sprout about planting time. The first sprout is the best, each succeeding sprout being weaker, and more of them, I believe in cutting to one eye: first, because I get larger potatoes, and less small ones; second, because it takes less seed; from six to eight bushels of large potatoes will plant an acre in drills. If two or three eyes are used, it would take from twelve to twenty-four bushels. There is a very good curved knife made, on purpose to cut seed potatoes to one eye, leaves them more chunked and not so liable to dry out, commence at the stem end, cut one eye at a time until you get to the seed, and I usually clip that off and throw it away. I like to cut the potatoes same day I plant, drop the sets from thirteen to eighteen inches apart, according to

the variety, and cover as soon as planted. I used a device made for pulling the dirt into ruts in the roads, for covering mine last year; it is made of two pieces of oak plank, eight inches wide, two inches thick, and five feet long made like a V, open a little at the point, and drawn by the open end. It should have a piece of strap iron or steel on the inside lower edges; this covers them very nicely and leaves a little ridge behind, so you can see where the rows are.

Cultivation commences almost as soon as planted. If it should rain the next day, before the ground got dry, and while it was in the best condition to pulverise, I should run the light smoothing harrow over it, and never allow a crust to form. Use the harrow until the sprouts begin to break through the ground. Now, a good plan is to take the sulky corn plow, set all the shovels to throw the dirt in, and cover the rows with a light coat of fine dirt. As soon as I can see the rows I start the cultivator, I use the Planet Junior with a board attached behind, to level the ground, and of such shape as not to pull the dirt away from the rows, as there will be no piling up, more than what we shall be able to work up, whilst cultivating. This board or follower answers also to keep the cultivator from going to deep. What we want now, is a fine mulch two or three inches deep, to hold the moisture in the ground in a dry time, and loose on the surface that the water may evaporate readily in a wet time. Narrow up the cultivator, as the tops grow and the season advances. Adjust the board, so the cultivator will run about two inches deep; it should be rounded on the bottom, and long enough to run lightly, close to the vines. Keep the cultivator running long enough, so there will be very few weeds when you come to dig.

I believe that picking the bugs off the vines by hand is the cheapest and safest. Success depends on picking the old bugs thoroughly. I would go over the patch two or three times, until no more could be found that day, put them in a covered tin pail, to be s calded when done picking, pick of the leaves with eggs on, throw them in the middle of the row to be covered with cultivator or dried with the sun; when the eggs hatch, the larva may be knocked of into a pan with a long handle attached to it. If the work of planting, pulverizing, etc., has been thoroughly done, buging business will be materially aided by pushing the crop at a lively rate.

When to dig? It is my opinion that if the above conditions have been complied with, potatoes will keep better in the ground than in any other place, until the cold weather sets in. If the weeds that have escaped the cultivator have been pulled by hand, and the ground left mellow and light, a good hand, with a potato fork, after a little practice, will dig from 60 to 120 bushels a day and take them clean. Potatoes should not be exposed to light and air any longer than necessary to dry them when dug. A very little unnecessary exposure spoils their flavor. Early potatoes, intended for market, whilst the skin will slip, should be carefully picked into boxes holding just a bushel, and covered from the air and sun, carried to market. In this way the consumer can get them in the best possible condition. It may be argued that all this extra trouble will not pay, My answer is, that potatoes grown and handled in this way will be worth to the grower five or ten cents above the market price, and we believe more than that to the consumer.

Before closing this paper I want to say that I am indebted to the gentleman that was here last year, and especially to T. B. Terry of Ohio, on this subject for new ideas and valuable suggestion, and especially for stimulas to extra effort to raise larger and better crops, not only of potatoes but other important farm products.

Farm Management.

[By Mr. Daniel Williams, of Summit.]

A proverb of Solomon puts the case in this way: "I went by the field of the slothful and by the vineyard of the man void of understanding; and lo! it was all grown over with thorns, and nettles had covered the face thereof, and the stonewall thereof was broken down.

Then I saw and considered it well; I looked upon it and received instruction."

Whatever we do receive in some degree the impress of the mind of the operator.

Whether we speak, write, or build houses, or lay out and work farms and gardens, we put our private mark on it

all, and the shrewd observer of the results of our labor will find therein an almost certain clue to our character.

This fact did not escape the keen eye of the wise monarch of Israel whose words we have just quoted, and we today would be acting the part of wise men if we would consider and receive instruction thereby.

Every man who owns a patch of ground under circumstances where he has a fair opportunity to avail himself of its use, is responsible to his fellowmen for the use he makes of his land.

To those who desire to improve their condition as tillers of the soil, we propose to offer a few suggestions as to the manner of managing the farm, which may be of some possible benefit to some one and possibly to all.

First. Deep and thorough tillage of all land cultivated. The depth to which land may be ploughed varies with the soil, so much so that no definite rule can be given. I am satisfied by experiment that all of our land is not tilled as deep as it should be.

When I commenced farming in Wisconsin I was told that from three to four inches was deep enough to plow, and that deeper plowing would be an injury. I commenced to increase the depth with beneficial results until a depth of eight inches was reached, and with the best of success, Beyond that depth in soils which have an underlying strata of gravel, deeper plowing will be an injury.

Our system of tillage in this county has been one which has had a tendency to diminish rather than increase the original fertility of the soil. The object of most farmers has been to spread their work over a given number of acres without considering whether they had sufficient teams and time to do the work in a proper manner.

As a rule teams used on farms are too light for the proper performance of the work required. One of the maxims of Benjamin Franklin in his sayings called Poor Richard was "plough deep while sluggards sleep, and you will have corn to sell and keep."

The thorough destruction of all weeds injurious to the growth of crops should receive the careful and considerate attention of the farmer.

To such an extent had this evil spread that it has been found necessary to enact laws to arrest the evil, and in many cases the operations of the law are producing beneficial results.

The building and repairing of suitable fences to protect cultivated crops and prevent their destruction by the stock on the farm should receive the early attention of the farmer. Our fences are the greatest item of farm expense: hence to build and maintain suitable fences the fields should be so arranged that the least possible amount of fence shall answer the purpose intended; hence, as far as possible, lanes running through fields should be avoided.

To economize travel on the farm, and also to reduce the expense of building fances a central location of the buildings will do much to accomplish this result.

All substances likely to obstruct the successful cultivation of the soil should be removed from the surface of the fields intended for cultivation as soon as possible, it being a saving of time in cultivation and preventing the annoyance of breakage of all implements used.

It is an established principle of agriculture that no crop that is profitable and useful can be grown where surface water is allowed to accumulate and remain for any considerable period of time during the growing season, thus showing the necessity of providing suitable drains for the purpose of getting rid of all accumulation of surface water.

How this may be done cheaply and at the same time thoroughly is a subject in which we are all more or less interested.

The greater part of Waukesha county has an underlying strata of gravel at from two to four feet from the surface, which will allow of small pools being drained through the gravel by digging to the gravel and filling in stones, stumps, or any substance that will allow water to run through to the gravel.

It is a waste of time and labor to attempt to till land that is liable at any time to be covered with water, and the prudent farmer will not be satisfied until his land is in a suitable condition to be successfully worked in all reasonable conditions of weather.

An energetic Scotch farmer drained a piece of land so wet as to be worthless at an expense of one hundred dollars an acre, and afterwards in speaking of the improvement to a friend he was

asked the question if it would pay, he replied, "Aye, it costs a deal more not to do it," pointing to his own field covered with luxurious vegetation, while his neighbor's had nothing of value growing upon it.

The subject of the selection of seed is too much neglected by nearly all farmers. It is a common remark among farmers after grain has commenced growing in the spring that it stands thin on the ground, and almost always accompanied with a statement of the amount of seed used per acre and an expression of doubt as to what should be the cause. The difficulty is usually the result of the farmer's own carelessness in the care of the seed. Grain that has been stacked either to green or wet passes through a stage called sweating, both in the stack or mow and in the bin, and all such grain is unfit for seed on account of the germ being injured, and in many cases the vitality of the seed will be entirely destroyed.

Seed corn is often injured by not being sufficiently dried before freezing weather, and if not dry at that time its vitality is sure to be destroyed.

One of the greatest of mistakes in the selection of seed is in planting small potatoes. It is not possible to raise a crop of merchantable potatoes from the use of small seed. Select for seed good, well-formed potatoes; throw away the seed end, as it is usually called, cut the remainder into pieces, not having more than two eyes each and use but two pieces to each hill, and the result will be, under favorable conditions of weather, that nearly all the crop will be fit for market. Flat culture for corn and potatoes will usually produce the best results.

A three year's rotation of corn, grain and clover is about as good a system for this county as any yet adopted.

Farm building should be sufficient to store all the crops raised. It is poor management to put anything in stacks, eapecially hay. Hay contains, in the dry as well as in the green state, matter that is soluable in water. For this reason all exposed hay on the exterior of stacks is subject to have washed from it this soluble matter. A large proportion of this food is subject to loss by leaching, rains, by moulding, and by actually rotting in badly constructed stacks.

Farm stock need attention at all times, and to get the best possible results a judicious system of feeding should be pursued. What that system may be is a subject upon which men differ materially. But certain fixed principles underlie all successful efforts. Among these are sufficient and suitable food at all times and an ample supply of pure water; a uniform time of the feeding, and good shelter. Salt should be furnished to stock in some manner so that it will be accessible at all times, thus preventing the unpleasant consequences resulting from the occasional feeding of salt so common on many farms. The regular use ot salt for swine will do much to prevent the diseases so common among that class of farm animals.

It is not the purpose of this paper to recommend any particular breed of the different species of farm animals, as each have their peculiar excellence for the purpose for which they were intended; but of its kind keep only the best.

The care and preservation of the land left for timber should receive greater attention than is usually given to that part of the farm. Cut only such timber for fuel as would not be likely to improve if left standing, and use care in removing timber from the woods, so as to do as little injury to the standing timber as possible.

The orchard and garden should receive more attention than is usually given to that department. No farmer does justice to his family that neglects to provide a good garden and orchard for their use.

The slack and careless manner in which many farms are managed, and the neglect of most farmers to surround their home with many of the comforts which people in cities enjoy, lead young men to think there is an easier and more respectable way of making a living than by following farming. The true source of wealth is in the soil. Deeper and more thorough culture will bring it out. The brain must be cultivated as well as the soil. To succeed in farming, do not attempt to cultivate too much land, keep a record of receipts and expenditures, keep posted on progressive agriculture, avoid outside speculation, and, of the science of farming it is especially true, that what is worth doing at all, is worth doing well.

Ought the Farmer to be Educated?

[By John M. Coburn.]

Unquestionably the farmers should be educated. That that class of our citizens who form the foundation upon which the social fabric is erected should be the victims of mental darkness and ignorance is a theory which no civilized man will accept, much less maintain. Not only should he be well educated for the welfare of society at large, but that he may maintain his rightful position and importance as a distinct class among all other classes. For, whatever poets and philosophers may say to the contrary, there is a constant warfare raging among the different classes for ascendency and whoever dominate the farmers' class, have within their power a rich mine of revenue.

The time is passed when one individual can be possessed of all knowledge extant and the average American farmer, although blessed with multiplied bounties of nature, has so severe a task to win a few of the essentials of a decent existence that he must exercise rare discretion in his selection of those things which he must learn. It has been said that a little learning is dangerous. It may also be said that much learning in the wrong direction is more dangerous. So the vital question in the education of the farmer is: "What should he know?"

First he should apply his labor to the soil that he may meet the wants of existence, and he should know how to intelligently apply that labor. He should also understand those pinciples of economy which form the bases for accumulating wealth. And the very best school in which he can be placed to acquire that knowledge is a practical contact with the soil. The young man, with nothing but his hands and a disposition to work to bank upon in his struggle for the possession of land and a home, has but tittle use for scientific farming: Scientific experimentations as to the relative strength of fertilizing elements and the chemistry of feed rations are not very profitable employment for the farmer who has his living to win, a mortgage to lift and farm improvements to make and maintain. The school training necessary for what is known as the scientific farmer is of doubtful utility and the time may be counted misspent. Usually it eradicates all disposition for manual labor and implants in the subject whims and fancies which are always barriers to his success as a farmer. "The best education in the world is that got by struggling to get a living."

But in the present the one thing paramount to all others which the farmer should know is, if he obtains a fair division of the product of his labor, and if not, why. The farmer has reached a breathing spell and it is his opportunity to discover if during the time all of his energies have been absorbed in production, he has received a just and equitable division of his product. If he has not, if not robbed, he has had his standard of comfort lowered and his provision for the future lessened. From 1860 to 1880 the farmers of the country comprised about one-half of its population. The increase of their wealth for the same period was $4,122,588,481. The wealth of the other half of the population, whose prosperity depends upon what the farmer produces from the soil, increased during the same period $23,-359,794,851. Or in other words, while the farmer's wealth increased one dollar, he comprising one-half of the population, that of the other half. whose prosperity depends upon the products of the farm, increased six. Again, in the yaar 1880 the capital, including farm implements and live stock, invested in farming in the United States amounted to the sum of $12,104,081,-440. The gross profits of farming for the same year were $2 213,402,564. The capital invested in manufactures in the United States for the year 1880 was the sum of $2,790,223,506. The gross profits of manufacturing were $5,339,-667,706. With a capital invested nearly five times greater, the farmers of the country received not quite one-half the sum in gross profits that the manufacturers received. It appears, the land being the source of all wealth, that those who till it do not receive a fair share of their product, but that it is absorbed elsewhere, and by other classes. This the farmer should know, and how and why it is done.

The farmer should understand the question of markets. He should know what comprises his markets; where they are; what they demand; where the prices of his products are regulated, and what regulates them. Especially should he study this question in the present, for the production of the

products of the farm is now in advance of the demand for them, and to increase it, without an increased demand, is to lessen the margin of profits and, ultimately, to smother ourselves in our own abundance. He should discover and oppose all artificial limitations imposed by legislation upon his freedom to market his products. For nothing can be more pernicious to industrial activity, or more harmful to the interest of the American farmer, than unnecessary trade restrictions. Our capacity, as a country, to produce farm products is as marvelous as it is little understood. The area of arable land in our country is computed at 1,500,000 square miles. Of this area 302,500 square miles now produce all of our grain, hay, cotton, sugar, rice and garden vegetables. The future possibilities of our productive capacity are brought into stronger light when it is known that all the land now used in the growing of corn, wheat, hay, oats and cotton in the whole country is less in area than the single state of Texas, that the entire wheat crop of the United States could be grown upon wheat land of the best quality selected from that part of the area of Texas by which that single state exceeds the present area of the German empire, and that the world's supply of cotton could be produced upon an area equal to only 7 per cent. of that of the same state. In the light of these facts the farmer must see that anything which obstructs his access to the markets of the world is inimicable to his prosperity and deprives him of the greatest return for his labor.

A close, searching scrutiny of the methods and purposes of taxation is the duty of every farmer. For there is no other legitimate power of government which can be so cunningly misapplied to the purpose of injustice and oppression as the power to lay and collect a tax. No form or system of government has yet been discovered or invented from which the taxing power can be eliminated. It is the mainspring in the mechanism of government which gives life and direction to all of its functions. No government could exist without it for a day. In no case can the taxing power be exercised by the government outside of its own jurisdiction. So whatever moneys it may levy and collect must be taken from the resources of its own people. The purpose for which a tax is levied and collected must be a public one, otherwise it is not a tax. Also when collected into the public treasury it must be expended for a public end, otherwise it is diverted from its true and logical purpose. The burden of taxation should rest equally upon the people of a country, that is, each person should contribute his just share toward the legitimate expenses of the government. Therefore, though the taxpayer should willingly and ungrudgingly bear his share of the burden of taxation, every tax is a fair subject for suspicion and should be rigidly scrutinized.

If one class of citizens escapes its share of taxation the result is that so much more must be added to that of all other classes who already bear their fair proportion. Or if one class of citizens, through the operation of government, is made to profit by means of the taxing power, that profit is unjustly taken from all other classes of citizens under the same government; for the government has no other means of obtaining money than by taxation and it can tax none other than its own people.

Thus the farmer should know whether he pays more than his fair proportion of taxes for the support of the government, and whether he is compelled by existing tax laws to contribute a portion of his earnings to swell the profits of those engaged in other industries. He should know why the farmer, having his earnings invested in lands and improvements, which compose, with his labor, his source of revenue, should be taxed thereon, while the professional man who has invested his capital in an education and derives a revenue therefrom double that of the farmer, is exempt from taxation. He should know whether it is of advantage to him as a grain producer that he be compelled to pay a bounty to the wool raiser; whether as a producer of beef it adds to his profits to have part of his earnings taken from him and put into the pocket of the manufacturer of iron; in short, whether the more he is taxed the greater will be the sum of his prosperity.

The farmer should also learn to conduct his business upon the plan of self-respectful, self-sustaining independence. While claiming and compelling his just dues he should not seek through

the power of legislation to add to the profits of his own by depressing the profits of other industries. All profits which are not won under the operation of the natural and legitimate laws which govern production and trade must be taken from the earnings and resources of others without rendering an equivalent in return. The ancient and honorable industry of agriculture should not stand in the false attitude of a public mendicant.

The Farmer's Garden.

[Geo. J. Kellogg, Janesville.]

Every farmer ought to have one acre of garden fenced with woven wire and lath, or so the chickens will not trouble. That acre should be long, and all rows run the entire length of the ground, so that the horse can be used in cultivating. The site, if it can run over a knoll so as to give southern and northern slope, will prolong the fruiting season about ten days.

Plow deep, and after plowing put on from twenty to forty loads of well-rotted manure and harrow it in. Do not plow manure in, as you loose nearly one-half its value.

If the garden lays sixteen by ten rods north and south, take the east side, four feet from the fence, for a row of asparagus. Where this stands, if a dead furrow can be made deep and filled with good manure and six inches of earth plowed on before the plants are set, it is best, and the only case where I recommend burying manure. This row of asparagus will last a life-time, therefore put it on one side of the garden.

On the west side, six feet from the fence, plant a row of grapes eight feet apart. Set Moore's Early, Worden, Concord, Brighton, Delaware, Pocklington, Niagara, Empire State, and if you use tobacco, plant a few Janesville's. These kind can be had at ten to fifty cents each.

Second row, eight feet from the grapes, currants and gooseberries three feet apart, Red, Dutch, White Grape and Fay's Prolific for currants, and Smith and Downing for gooseberries. These will cost from five to twenty cents each.

Third row, blackberries. eight feet by three feet. Lucretia Dewberry, Snyder, Stone's Hardy and Ancient Briton. These cost two cents each in quantity, except Lucretia, which are two dollars per dozen. This is the most productive trailing blackberry known, and as easily covered as strawberries, the others can be covered by loosening the earth beside the plant and with a fork on the bush and the foot at the base bend in root and cover with dirt.

Fourth row, eight feet by three feet, red raspberries. If you will keep down the suckers plant Turner, Marlboro and Cuthburt if not, plant Purple Cane, Philadelphia and Shaffer's Collossal, the row of 82 plants will cost $1 to $2 50 according to kinds.

Fifth row, black raspberries. Tyler Souhegan and Gregg. Cost of plants two cents.

Sixth row, strawberries eight feet from the last and two feet in the row, in this row put only perfect blooming kinds. I will give a list embracing early and late, of excellent quality and productive, 25 May King, 25 Wilson, 25 Miner's Great Prolific, 25 Parry, 25 Mt. Vernon.

Seventh row, four feet from the last, and two feet apart: 25 Crescent, 25 Windsor Chief, 25 Manchester, 25 Jewel, and 25 Cornelia. The last row are all pistillate varieties, and must be planted near some variety with plenty of pollen. You may ask, why plant any pistillates? They are, when properly pollenized, our best bearers, and by planting, as I have described, you can always find pure plants on the outside of each row; and you want to plant a new bed each year, and after two crops of strawberries plow under the old bed. This is the reason why the last rows are next the vegetable garden. The other rows may continue on the same land for ten to twenty years. Use white hellibore or paris green on the currants as soon as the worm appears. One or two applications are sufficent.

The two rows of strawberries—250 plants—will cost you one cent each, unless you want all Jewell, but the prices given are when the kinds and quantities are taken. For instance, while Niagara grapes sold last spring for $2 each, I should not want to furnish many at 50 cents, but the kinds and quantity given can be furnished as stated, and the two rows of strawberries, well carred for, will yield, the following year, about 500 quarts of choice fruit, worth more than the whole investment for plants, and after the sec-

ond season all the rows, except the strawberries, will increase in value and production until you will have to set up nights to eat fruit, or let your wife or daughter have the surplus to sell. You, Brother Farmer, furnish the plants and let the wife and daughter furnish your table with all the fruit you want three times a day, on condition that they can have the surplus, and I will risk your having to buy sandy berries from Michigan.

Good land, well fenced, long rows, good plants true to name from some reliable nursery, not a traveling man, well tended, properly mulched in November, and you will be happy, have less doctor's bills and eat less pork.

Now a word about the vegetable garden. Plant potatoes or peas next to the strawberries, so the ground will be in good condition for your next two rows of strawberries, plant all rows through the whole length of the garden and wide enough so you can cultivate with a horse. Put in plenty of seed, tend well, thin out properly and then what room you have left plant to sweet corn or potatoes, and this acre of ground well cared for, will be the most profitable acre on the farm.

If you will save a little of your cigar money and buy a dozen Jessies and put them in your strawberry row, I have no doubt but what you will be pleased. I have named well tried and profitable kinds. I might have put in Sharpless but it is so tender in bud and blossom we lose the fruit three years out of four every time. If you want the latest novelty that is on the boom, plant Jessie.

County Roads.

[By Prof. L. D. Livermore, Beaver Dam, Wis.]

The age and respectability of this subject is enough to secure it our respectful consideration. First, let me say that I consider it a far greater mark of careful thought to be able to lead in a new or fitter way than to condemn as useless that thing or way, which is so nearly connected with the present as well as the past, as the improvement and use of county roads. You will agree with me when I say that there is no other thing in which such a degree of responsibility is incurred, that we have been so ready to engage in as the laying and opening of highways, and from this cause, if no other, arises much of the trouble.

Petitions for this purpose are circulated and signed with much the same feeling as a petition to congress. The responsibility of the matter is left with the one most interested because you see he might want a public road to our pasture. Some day I would need these same names. Or better still nearly all good fish ponds are back of some man's homestead. Now who would not sign a petition to divide the farm with a four-rod lane provided our convenience and pleasure might at once be satisfied and at the public expense.

The pioneers of any country meet and must overcome obstacles which to late generations would seem insurmountable. In our hilly broken country it is a wonder how the early settlers ever found and located these now comfortable and productive homes. It was not then how may I with the most convenience and ease cancel this tax and be relieved from this obligation, but rather how may *we* by our united effort reach a certain point and make it possible to reach our neighbors with team and wagon rather than on horseback or on foot. In those days we often traveled forty miles to reach our nearest city market and return really only six miles distant.

Those were the days of extravagance, waste and poor results, for example: with a little over one-half mile of road to make across soft ground our town of Trempeleau has expended money enough to build the road and make it permanent for three times that distance and it is not completed half way across yet. Why? I take it we are here to tell some of our experience rather than to formulate a theory.

The highway referred to was through heavy timber. In the winters of '59 or '60 men and teams were at work and logs about sixteen feet long were laid down the whole distance, partly on ice sometimes, on a stump cut off close to the level of the ice. The holes between these logs were clinked with bits of wood. On top of this some sand was laid. Bridges were set on mud-sills resting on sand. This job was accepted and paid for as per contract and that before the frost went out. It needs no words of mine to tell the result of this experiment. It was never open to the public. About '65—another trial—it was graded with quick sand and muck thrown up from either side and, like the parable of old, the rains beat on

that road only a little and it moved on down stream, the logs and a little sand was left. I am safe in saying, that many parts of this road has been filled twenty times and we are filling them yet.

Three years ago next June, being a member of the Board of Supervisors, we concluded to try on a small scale what could be done. We again made the fill with earth, ripraped the sides and on top broken stones were laid ten inches thick. Since then that part has not needed one cent for repair, or its maintenance. We have now about seventy rods of this road always ready for use, and needing no repairs.

This kind of road will cost in soft ground, when the gravel must be drawn, close on to $20.00 per rod, depending, of course, upon the price of stone and labor. The time has come for towns to work together in this matter in a systematic way, that the main lines of highway between points where trade centers and where farmers products are wanted, may always be ready for use. Else when the roads are good the markets are overdone; the rest of the time prices are above what commers can pay, with no supply. The producers in these changes are always at a loss. The ability to move a quantity from one place to another is measured by the rise of some grade on the depth of mud or road. These may not be frequent, but as often as they do occur, limit the moving force of your team.

The earnest inquiry of all is how can we better our condition. I say not by paying more taxes. Any reform that looks toward the reduction of taxes may be inaugerated by the popular vote. We are assessed on an average for every four miles $1.00 for road purposes. It takes the time of the farmer, his team and hired men to pay this heavy tax. If they do but little this time is gone. I am confident that one-half of this amount, if paid in with other taxes and worked out on the basis of ten hours for a days work, under a system of general improvement, would be greatly to our advantage.

We attempt too much and accomplish but little; building too much for ourselves, forgetting that in a few years we shall be done with. Work and trial, and our grandest monument is some lasting benefit to our fellows. We are not fair, wishing to inaugerate complete and *pay for* the whole. With iron produced in our own state we can no longer afford to build new bridges once in eight years, when for twice the money a structure of iron could be placed on stone foundations, good for fifty years at least. For small culverts a 12-inch tyle drain avoids risk from broken plank and are durable.

Let us see to it that the roads are made passable and permanent, that taxes are lowered, and that durable material is used in the construction of bridges and culverts.

The Value and Management of Manures.

[By Pres. W. I. Chamberlain, of Iowa Agricultural College, Ames, Iowa.]

We must be convinced of the value of manure before we shall really look to its careful saving and wise management. Especially is this true in each new and fertile region. It takes a full generation to make the farmers there believe manure is worth saving. In Illinois they used to say, when the manure heap got so big they could neither go over nor around it, they moved the barn. Six years ago I asked Mr. Dalrymple, the Dakota wheat king, what he was going to do with certain vast piles of manure accumulated in five years on his huge wheat farm. His reply was this: "The Lord only knows; we've got no earthly use for it." And yet, I had just come through Southern Minnesota where fifteen years cropping with wheat and without manure had reduced the wheat yields from twenty-five bushels per acre to six bushels or less, so that they were driven into dairying or stock raising to restore their soil's fertility. The idea of Mr. Dalrymple making such a speech right in sight almost of such facts. But in these, as in many other things, experience cannot be had by proxy. "Peck's Bad Boy" hits it when he blubbers out between the sobs and tears of his latest thrashing, "seems to me grown folks 'spect little boys to know things before they've found them out."

Let me emphasize the value of manure in a dry year, even on new and rich soil by giving a few facts.

On the I. A. C. farm this year potatoes were grown on land that had over thirty tons per acre of best rotted stable manure, plowed in the fall before. From the time the potatoes came up till the time the vines died they only

had one-sixth the usual rainfall, and the last eight weeks most vital to their growth, they had only 1·28 the usual amount and that came too late to do them any good at all. But the manure gave us 150 bushels per acre from our ten best varieties. We know it was the manure, for land close by as rich otherwise and with as good seed and tillage gave only forty bushels per acre, and even that was far above the average for our county and for the whole state of Iowa.

It was the worst drouth ever known in the state, and came just at the right time to hurt potatoes the worst. Thousands of acres were never dug. Manure gave us 150 bushels per acre instead of 40 or even nothing. Manure then pays on good soil in a dry year, for Iowa soil is very rich by nature, second, as a whole, to that of no other state unless it be Illinois.

Manure pays, too, on good land in a year of abundant rains. You know my neighbor, T. B. Ferry, the "potato king" of Ohio. December 15, 1813, he gives the following testimony in the *Ohio Farmer*.

"Last year," he says, "I raised a piece of Hubbard squashes. The ground was manured with about 50 loads per acre of rich, rotten compost. That land this year was planted with potatoes, and it was there that they rolled out so large and numerous as to yield at the rate of 500 pushels per acre. Just over the fence on the part of another lot where no manure had been applied for many years there were only 200 bushels per acre. Difference in soil and kind of potatoes might account for some of this great variation in yield, but I think it fair to say that 200 bushels of the best yield was owing to the manure put on the ground for squashes the previous year. The potatoes were none of them sold for less than 40 cents per bushel, so we have at least $80 per acre cash benefit from that heavy manuring, the second year, to say nothing of $240 an acre which the squashes brought."

These, of course, were extreme yields, but they were attested by witnesses. Let me give facts to show the permanence of manure on clay soil of medium fertility. Nearly forty years ago, as a small boy I helped draw manure from a village and put 40 big loads per acre on 2½ acres one year and on 3 acres adjacent the next year on my father's farm, now mine in Hudson, Ohio. As a first result one lot had 36 and the other 33 bushels per acre of wheat, and ever since the crops have been better on that 5½ acres than on adjacent land not thus heavily manured then. Thirty years later I raised wheat on 10 acres including that 5½ acres. The whole field yielded 46½ bushels per acre, and the remarkable fact that the 5½ acres yielded 60 per acre, while the other 4½ acres yielded only a trifle over 30.

Well might the old Scotch farmer give this dying advice to his eldest son, standing by his bedside. "Andy mon, niver rin in debt,— —niver—rin—in—debt. But whan ye do rin in debt, rin in debt for doong."

The small boy's definition of salt is a good one for manure.

"Salt," said he, "is the stiff that makes potatoes taste bad, by not being put on 'em." Manure, I should say, is the stuff that makes potatoes, corn, wheat, &c. yield badly by not being put on them.

If now we believe in the great value of manure, believe in it clear down to the bottom of our boots, it is time for us to discuss its management. Or rather first we must discuss its production. By manure I mean the voidings of domestic animals mixed with the necessary bedding and absorbents.

"Mixed farming" of which I speak more fully in another lecture, has one of its chief advantages in the fact that it produces much valuable manure and gives the best means of saving und utilizing it. Especially is this true of grain raising combined with dairying, so common here in Wisconsin. This kind of farming seems to work best both financially and especially in the production of manure. The cows need the grain and corn fodder for feed, and they turn it into cash and save nearly all, say 90 per cent. of it, its plant food in their voidings for future crops. The cows, too, need the refuse straw and stalks for bedding and absorbent or to balance the ration where ensilage is used, and they thus work large quantities of both straw and stalks into the best of manure, best because saturated with their rich voidings.

On most grain farms there is too much straw and cornstalks for the live stock, and hence the stalks are left uncut in the fields and even the straw is sometimes burned, an awful sin agriculturally speaking. On the other hand

on most dairy farms there is too little roughage and absorbent. A combination of dairying with grain raising makes it exactly right. Of course soil, climate and surroundings will decide whether grain-raising or dairying shall be the principle thing on any farm, or in any region; but in Ohio and Iowa, at least, our best farmers in the regions specially adapted to grain-growing are keeping far more cows and establishing stock or co-operative creameries; while our dairymen in our more clayey regions are now raising far more grain, especially on their tile-drained fields, and are finding that they can actually increase the number of cows and the net proceeds of their dairies, and still devote constantly increasing portions of their farm to grain-growing for cash sales.

The first point is to save all the voidings of the cows, both liquid and solid. For many years the entire liquid portion was wasted as worthless, until chemistry, aided by field tests, proved unmistakably that the liquid voidings of our cows and horses and sheep were worth as much per day as the solid voidings.

How to save the liquid? This is easily done for a dairy by laying a double floor of inch boards, breaking joints well, and making a water-tight manure gutter in the rear of the cows, and keeping this well filled with straw, sawdust or other absorbent, and with the drier and porous and heating manure of the adjacent horse-stable. The idea is to soak the urine all up and incorporate it with the solid voidings and with the bedding, so that it can be shoveled directly from this gutter with shovel or six-tined fork. The handling of liquid manure separate, by saving it in a cistern and spreading it on the land with a cart sprinkler, will not pay for the average farmer. It should be mixed with the solid manure for best results, at any rate, for it has relatively too much nitrogen or ammonia, and the solid has relatively too little. Nature meant them to go together. Much attention should be paid to kinds of feed, not only with reference to their feed value, but with reference to their manure value. And here, too, chemical science has done much for the farmer by demonstrating a fact not only most remarkable, but most fortunate for dairymen, viz.: that the kinds of feed best adapted to produce milk are also the richest in manure value.

This is especially true of oilmeal, cottonseed meal, wheat bran, oat middlings, brewers' grains, early cut clover and timothy hay and fodder corn, ensilaged or cut and fed dry or steamed with meal or bran. They are specially rich in nitrogen and phosphoric acid and potash. I have known dairy farms in our Eastern states, once scarcely more than drifting sand or barren clay, now rendered most fertile by the wise use of these kinds of feed. But their owners have carefully saved all the liquid manure even to my own knowledge carting in dry sand and clay dust, placing it as an absorbant beneath and behind the cows until saturated with their liquid, and mixed with their solid voidings it has been carted out upon the fields again. And the soil has much of it actually passed through the stable on the road to fertility. Now to one who has actually seen this most laborious process of creating fertility it seems amazing that we in the west who have fertility as a legacy from the centuries past, should take so little pains to preserve it to the generations to come. Theoretically a dairy farm should deteriorate less, or rather it should increase in fertility faster than a grain farm. An hundred pounds of cheese sold from the farm removes scarcely one-fifth as much nitrogen and not one-tenth as much phosphoric acid as $100 worth of wheat, oats or corn, while $100 worth of butter removes almost nothing of value to the soil.

But the trouble is, on our dairy farms in old times little straw was raised for bedding, and so the liquid voidings were permitted and even encouraged to leak through the floor, and often the solid manure was thrown out beneath the eaves to have its very life washed out by the drip and wash of the eaves, until one is reminded of what the author of Talpa says of "Drychaffs dung cart, that creaking hearse that bears to the field the dead body from which the spirit has departed." The liquid voidings are worth twice as much as the solid, ton for ton; so that he who wastes the former through a leaky floor and saves only the latter throws away his gold and keeps his silver.

By all means, then, have tight floors, and save the liquid and mix it with the solid, the bedding and the

horse-stable manure. A tight floor down on the ground adds to the warmth of the barn, and keeps timbers from rotting. Warmth of the barn is, however, a greater economy of the food value than of the manure value. The first thing the cow does with her feed is to warm her own body. This is done by an actual consumption of the carbon of the food. If the barn is cold it takes more carbon to keep the cow warm—just as if the wind whistles through loose doors and windows and siding of your house, it takes more carbon (coal) in your fire to keep you warm. But the carbon of the hay and grain is largely what makes the butter and cheese, and if the cow has to use it up to warm her body, she must make just so much less butter and cheese.

Management of manure.—After the liquid and solid manure are thoroughly mixed and incorporated with each other, and with the absorbents in the manure gutter, the next question is what to do with the manure. As to time, place and manner of applying manure, I must speak briefly. As to place, it is a good rule to put most manure on crops that require most tillage, *i. e.*, corn, potatoes, Hungarian grass, etc. For potatoes, it should be well rotted and mixed with the soil. For corn and Hungarian grass, it does not matter, if it be evenly spread when green and plowed under. As to time, "circumstances alter cases." It is a question partly of labor and partly of comparative results. To save time and forward spring work, many of our best Ohio dairymen are drawing the manure from the stables or yard piles, on the snow or frozen ground, directly to the fields, and placing in small, compact piles ready to spread and plow under as soon as the ground is fit in spring. Corn, oats or Hungarian grass is raised, removed in time and the ground sown to wheat in fall. In working the ground for wheat, the manure, now well decomposed, is thoroughly mixed with the soil. My own experience is, that the manure thus treated, and drawn upon by the Hungarian grass, actually does the wheat more good than if rotted in the yard or large manure pile all summer and applied directly to the wheat. Those who have the Kemp or other manure spreader naturally favor piling and rotting in the yard and spreading with the machine in fall for winter wheat, or for fall plowing, as in Iowa and Wisconsin for spring crops. But if the manure is piled great care must be exercised to prevent loss in two ways, either by wash or by heating. A compact, broad topped pile three or four feet deep, well-packed and away from eaves or surface wash, and kept from fire fanging by tramping or by applying water moderately at the right time, will save most of the valuable constituents of the manure. If it is under a large shed and constantly littered with straw and tramped by hoofs during its formation it will save the urine and have as little wash from any sourse as possible. Hogs are good mixers on the pile and will save all grain that posses the intestines.

But I must say that I like to plow under unrotted straw manure in the spring for corn or Hungarian grass on clayey soil. It seems to be all saved and its mechanical effect in loosening the soil as it rots is excellent. A German friend gave my views pretty well: "Vhen I blows dat manures undter dem furrows, I'fe got him dere efery dimes. He can't get avay no more for efer. Und den dot corn schmells dot manure all summer long and grows like vot you nefer saw before, already."

Top dressing may be best for light soils but even then I should prefer to incorporate the manure thoroughly with the first two or three inches of the soil. Clover is an excellent aid in keeping up the fertility of a farm if rightly used. There is no doubt that the roots develop and bring into available form not only the mineral elements of the soil but the nitrogenous. They bring them up from deep down, and they render them fit for food for less greedy plants. Prof. Halsted of our college has been critically examining the behavior of clover roots during growth. They are greedy marauders, scavengers, eagerly laying hold of what other plants cannot assimilate. Dr. Holland makes an Irish character in one of his books, says this of a pig:

"The pig, faith, is the prince of beasts, a rale economizer; he kin ate what there won't nothing else ate, and then you can ate him."

This seems about the office of the clover plant among the plants. It can assimilate plant food either too dilute, too deep down, or too insoluable for other plants, and dying, leave it in its

big cone-shaped roots ready in position and quality for the young growth of other plants. Its roots aerate the soil. Its dense growth and foliage shades the soil and favors the formation of nitrogen from the air through the soil. That it adds any mineral elements to the soil is untrue, and that it adds nitrogen, except in minute quantities, has never been proved. But clover is a most excellent aid in keeping up the fertility of the farm. It should not, however, be made a sole dependence, to the neglect of keeping stock and saving their manure. Only when wisely fed to live stock does it give its best results.

Plowing under clover for manure is practiced far less than formerly, from the growing conviction that it is wiser to let the cattle to get the money value of the crop before returning the manure value. For our grasses and grains may in a rough way be said to contain two classes or kinds of elements; the one chiefly carbonaceous and fit for food for animals; the other class partly nitrogen and partly potash and phosphoric acid, and fit chiefly to be the food of future plants. Now, when the cows, or horses, or sheep eat the hay, or grass, or meal they simply take the part they can use, and make it into animal life, heat, flesh, blood, bones, wood, butter, cheese, muscular strength, and they reject the plant food almost undiminished in their voidings. That is, the plant food is or may be nearly all saved for the soil in the voidings, and the food for the animals is a clear gain. The soil don't need it or can't use it in so large proportion, and so it seems wise to let the animals save it. That is to put it to the use for which nature intended it. Just as we do not feed raw corn or hay to cats or men, or meat to cows or sheep, and just as we do not eat the sheep's wool with the mutton but make it into clothing, just so should we feed to cattle the part of the clover crop they can eat, and to the land only the part it can use.

To be more exact, an acre of heavy clover hay contains about 3,800 pounds of carbon, 100 of nitrogen, 90 of potash and 30 of phosphate acids. The land needs about 99 per cent. of the potash and phosphate acids, and only about 25 per cent. of the nitrogen and 10 per cent. of the carbon, while the cattle need almost exactly the remainder of each that the soil does not need. The growing plants can take their carbon from the sunshine and the air; the cattle can get theirs only as it is stored up for them by the plant in the grass, or grain, or hay.

As a rule, then, it is wisest to take the food fit for animals from the clover and other grass and grain crops before returning to the soil the food fit chiefly to be food for future crops. In short, the animals can sort out for us the money value of the clover and leave the "manure value" almost intact in their voidings. But their may be times when the price of clover, hay, beef, wool and dairy products is so low, and the price of wheat, potatoes and other vegetable foods for man so high, that it will pay to return the clover intact to the soil.

Of course, I have not had time to discuss the matter of profitable breeds, or kinds of animals to feed. That point is most essential in getting the money value of the hay and grain.

The men who feed wisely, save and use manure wisely, and till their crops wisely in all respects, are not numerous, but fast becoming more so, for their example is contageous. Plant one such man, even in a township or county, and the thrift about his premises will soon convince his less careful and enterprising neighbors of the wisdom of his practices. Such a man is a regular agricultural missionary. The contagion of his example is worth a fortune to the town or county where he dwells. These Institutes, with their relations of experience, etc., are calculated to increase the number of just such men.

Our Country Schools.

[By D. O. Mahoney, Superintendent of Schools, Vernon County.]

The school can trace its paternity to that admirable system which, confessing limitations upon human power, recognizes certain aptitudes, and is known as division of labor. The needs of progressive society has been the chief cause of its growth.

There is no substitute for material affection, when affection only can guide the child safely in obtaining that early knowledge which through life must bear the stamp of instinct. During that period of childhood there can be, and there is no deligated trust. The mother is the school, the fountain of knowledge, the world, and with such tender solicitude for the child's future does

this first and best teacher impart her instruction that it is never forgotten, though it may go unheeded as time wears off the feeling of dependence.

But the mother's cares soon multiply, and the child's needs grow beyond the province of immediate affection; the school then assumes duties, which are too complicated or too burdensome for the home. It becomes a parent, and must necessarily perform a parent's duties in order to meet expectations.

The public school becomes a necessity; because in the present state of society, success in the ordinary affairs of life requires a certain amount of formal knowledge and also that faculties be trained to apprehend quickly and act intelligently, because the heads of families are unable to give this training or bestow this knowledge,

Then, to educate her children is recognized by our state as one of her primal duties. Engrafted into her constitution is a mandatory provision for the establishment of free public schools of uniform character. Simple legislation has given life to this wise provision, and as a result, we enjoy the benefits of an educational system that, as our citizens take pride in believing, ranks among the foremost in the nation.

But though a large number of the children of the state avail themselves of the school facilities which have been provided, and though a fair percentage of the entire population of school age is in school,this has not been deemed sufficient.

Public sentiment holds firmly to a conviction that ignorance is subversive of free government and promotive of crime, and that sentiment has been crystalized into a law, which attempts to make attendance at school compulsory. In all this we see not the bestowal of a a charity, but a far-reaching public policy, adopted to the end that there may be trained up men and women, who shall be intelligent to understand and efficient to rule the affairs of the commonwealth.

The public school system is constructed upon the theory that a certain amount of education widely diffused is a state of necessity in a country ruled by the popular will, and that this education is best secured in schools existing under the authority and regulation of civil law.

It is not an ephemereal glow of enthusiasm characterized as a "craze," but it is the intense activity of the age, assuming all the force of a logical conviction, formulated into a complete system and made a part of the public administration of the state.

Nor is this a new-born theory. The early fathers of the republic and the wisest of statesmen of the nation, saw the necessity for educating the masses of the people, and the older we grow as a nation the more complex all our political questions become and the more do we need to educate every citizen by giving him some idea of what his obligations are when he shares in a free government.

The public or country school is the important school of this country. It is the people's college. It is here, where the very large majority of our people obtain an education, hence, it should receive great care from persons who are in any way connected with it. It is very evident that from country districts must come the chief supply of the students for our higher institutions, of the teachers of our various graded schools, of the farmers and mechanics of the next generation, of the members of the already crowded professions, and of the leaders in society, in the church and in civil life.

Now in what condition do we find the vast majority of these schools, which we are now considering? Far be it from me to undervalue or decry the work accomplished in them. No class of laborers associated with us command so fully my hearty sympathy as the earnest and conscientious teachers in our rural neighborhoods.

I look with admiration upon the many young *men* and *women* in these places who are striving to obtain with poorly supplied and ill-suited facilities a fairly thorough and liberal mental culture. I cannot withhold warm commendation and praise from the great number of fathers and mothers toiling in the humblier industrial pursuits, sacrificing many comforts of life and executing the most successful plans, even under the adverse and depressing influences which rest upon the schools near their homes, in order to give their sons and their daughters the best advantages secured in our country schools.

We must not be blind to the fact that very many of our skilled citizens, our managers in the religious and political

spheres, our wealthiest tradesmen, the thriftiest cultivators of our land, and the active instructors of our youth, have received their principal, if not their entire, mental training in our country schools. Here has been gendered that remarkable spirit of self-reliance and ambition so characteristic of the people of this country.

You will find a straight route from the lowliest district school house to the palace of the millionaire, the court room of the judge, or the mansion of the president. With all the excellent results which these schools are producing, still their defects are manifest and lamentable. The weakest points in our educational system are found here. The most ardent admirers of our common schools, while extremely sensitive under all criticisms upon their management and their results, must admit that they are capable of great improvement. There are some well-informed people who assert that our rural schools are no better than they were thirty years ago in the quality of their *instruction* and *discipline*. Those who stand at the head of our leading educational institutions say they are compelled to admit that our elementary schools are in too many cases inflicting upon their pupils ignorance of the simplest elements taught in their ill-formed habits of study and thinking and loose morality in observing the essential laws of the community and the needful regulations of school life. The fault lies not so much with the scholars nor with the teachers, nor with the mass of the supporters of our rural schools as with the educational ideas which control them.

No where in our country are extreme views so firmly held as in some of these country school districts. This state of affairs pertains not only to the election of school officers and the choice of teachers, and the attendance of the scholars, but more especially to the notions and customs which virtually regulate the whole management of the schools. They dictate the rules which govern the teacher in forming the classes, in conducting the recitations, and in correcting mischievous and lawless children. The intense individualism brought out in some of these districts exposes the schools to be influenced by the local jealousies, the partizan prejudices, the neighborhood quarrels and the personal piques which exist in many of these localities. The frequent changes of teachers in our district schools are owing, in a great measure, to these conditions. The teachers have been visited with the hatred of some faction, which they have failed to conciliate or suppress; some disobedient and self-willed boy has enlisted the public sentiment against the teacher; a new man or woman must be called to take the charge to avoid a disturbance or hard feelings; some parent whose wishes have not been consulted by the school officers, or the teacher, decides that the school is a failure, and that his children must, therefore, remain at home.

Where so many school officers have to be selected in all the districts, and each set among so few inhabitants—and the choice is often determined amidst the discordant elements of the neighborhood—it is no wonder that many of these officers are utterly indifferent, or incompetent in the administration of school affairs, and fail to comprehend the imperative needs of the school. A cursory glance will show that these schools, in their ideas and operations, are quite independent of each other and of the authority of the state. In reality they decide, in most part, what shall be the amount of money to be raised for their support; regulate courses of study, and determine the qualifications of teachers whom they hire, and establish the code of rules for the government and discipline of the pupils. It is too true that our state system of public schools is largely a collection of separate district schools.

Large liberty is given under these circumstances to run the schools on the narrowest and most stingy notions of economy. To maintain schools at starvation prices is to invite the teachers to accept other and more remunerative occupations and for the district to secure a premium for stupidity, incompetence and meanness.

To obtain better results and be satisfied with the investment of our money, we must be willing to pay more for energy, experience, high culture and stern moral character in our teachers.

Our common district school shows less upward movement than any of the others. Wages are low. School apparatus insufficient. The teachers are mostly young girls who do not intend

to stay long in the work and whose conception of the important task undertaken is dim and indefinite. They have no fitness or adaptation for the work other than a mere smattering of the branches of study required by law. The *older* and *better* teachers have found their way to the city and village schools where they obtain better wages and enjoy more social privileges or have been driven from the work by insufficient remuneration.

These schools are taught then by constant succession of beginners or experimenters who have little or no knowledge of the child's needs. Is it any wonder that many of our brightest boys and girls have dropped by the wayside, never to return to the schools. But school officers often use their fallacious argument in support of their position, that any one is good enough to teach our school because the pupils are young and not very forward. I want to say in reply to that, *your* child and your neighbor's child is entitled to and deserves—and ought in fact to have the best instruction possible while at school. Is the teacher competent to give the *best?*

When we take into consideration that the average boy in our country school receives about eighteen months instruction in the school from the time he arrives at twelve years of age until he turns his back on the school house forever, it seems to me that the quality of the instruction received for this short period of school life, should be of the very highest kind. It takes the very strongest teachers to do *just* that kind of work. Our higher schools all recognize fully the importance of the instruction in the primary or elementary schools and take the greatest pains in selecting their primary teachers. Teachers should be strong enough to inspire their pupils with the best. Shakespeare says: "The want is, but to put these powers in motion that *long* to move."

What is this work of a faithful teacher — this unfolding and building up from the mystery of infancy and childhood to the grander mystery of manhood and the tomb—What is it? Can you measure it?

Where shall we find a stimulus and uplift for these schools? I suggest better teachers. The teacher is the great factor of the school. Nothing can take the place of the competent teacher in the school. Everything else is subordinate. If we would hold them, our inducements must be greater in the way of better wages and steadier employment. The latent interest which is too manifest in too many of our schools must be aroused and made active. Somehow a greater appreciation of good teaching must be created and a greater demand for good teachers. To this end superintendents must be sustained in the perforformance of their difficult duties. There must be a more general acquiescence in the fact, that one of the foremost duties of the County Superintendent to his constituents is to refuse certificates to incompetent teachers. The new state tax, or what is commonly known as the one-mill tax should give no increased efficiency in the schools in the poorer districts of the county. It must not become simply a relief to such districts from the burdens of necessary taxation. The lengthened school year is another important advance.

It should bring with it increased and more regular attendance. The schools of Vernon County compare very favorably with the schools of adjoining counties; but the faults which have been mentioned as pertaining to the schools of the state as a whole will apply, in some degree, to our own schools. In looking at this whole subject from a business standpoint, I think I am justified in saying that in no public enterprise of such greatness and value is there such a waste of time, money and labor on the part of parents, teachers and pupils, and the most of it inexcusable too. I maintain that the common school should be the firstling of our heart and hand and treated as a judicious parent treats his child; not pampered with lavish praise, nor yet checked like a bondsman; all its faults observed, set in a note-book, learned and conned by rote, to cast in its teeth. Not this, and still the truth should be acknowledged, and when necessary, a correction applied speedily, fearlessly and intelligently. Our public schools are a great blessing to the state and every citizen. It is because they are so precious that it is worth our while to scrutinize them closely and never to cease our efforts to improve them.

D. O. Mahoney.

Honey is much used in curing hams now, instead of sugar.

Bee-keeping for Farmers.

[Prof. A. J. Cook, Michigan Agricultural College.]

Bee-keeping has been called the poetry of rural pursuits. There is something very interesting and attractive in a well-kept apiary. The scores of neatly pointed hives, arranged like the squares of a city, or the blocks in a garden, upon a rich well-kept lawn—that matchless carpet of nature's own weaving—under protecting shade, it may be of a beautiful well-trimmed grove, is indeed a fascinating sight. The incomparable sections of immaculate comb honey, as they are taken from the hives, are sure to win praise and admiration. To taste this nector, fit for the gods, as it roofs over the flaky biscuit at the evening meal makes one even more loud in praise of the honey bee and the bee-keeper's art. To see this much and naught besides would convert any one to the poetical view of apiculture. It is also said that "bees work for nothing and board themselves." Surely there is much to admire in such employees. I fear it would be more true of many hired laborers in these days, to say that they do nothing, and expect board and washing thrown in.

But the reality of bee-keeping like the reality of every other important industry is not all poetry. There is that "business end of the bee" as one American humorist styles it, which, though little feared by the experienced bee-keeper, is not exactly poetical nor are poetical utterances the kind it calls forth.

The woodman's axe, that fell destroyer of our forests, has let lose the sweeping winds, so that our winters have become terrible in their severity. The bees—natives of a warmer clime—cannot endure the rigors of our late winters, and often whole apiaries are swept off by this besom of destruction. Surely it takes a veritable Mark Tapley to be or feel poetical not to say jolly as he sees his all swept away as by a tornado.

Again, bee culture is no idle pursuit. True the labor is not excessive for much of the year. Yet no business demands more prompt attention, and during the busy season, from May to September, the bee-keeper must work with all his energy. Nor is the call for mere machine work. Earnest thought, close observation as well as hard physical effort are demanded to win success in apiculture. Let any intelligent person thoroughly prepare himself for this business, and the study which this requires will be its own reward. And then if he combine with this the qualities just named, he may feel assured of success, and find in the apiary as pleasant and as profitable employment as is to be found in any other of our manual labor pursuits. And the credit of this industry, be it said, that the capital it demands is far less than that of any other branch of agriculture.

In the brief space of an hour's lecture. I cannot give even in outline the wonderful life history of the honey bee, nor portray the marvelous economy of the hive; nor yet can I describe the various impliments which aid to bring success to modern apiculture; or detail the methods and operations which bridges over disaster and loss, and surely wins success in this fascinating pursuit. Indeed it is not well that I attempt this; the many admirable bee books do this to perfection; while the numerous excellent periodicals keep every live, reading bee keeper, the only ones that succeed in these days of low prices and sharp competition, thoroughly informed as to the newest discoveries and latest improvements in this, perhaps the most progressive of the arts. I shall the rather speak of the great importance of this industry and explain why every farmer and horticulturist is or should be vitally interested in the success of bee culture in his own neighberhood, even though he may never own a single colony of bees, or taste a drop of honey. I shall also show that bee-keeping may become a valuable adjunct of the farm, and shall endeavor to explain how and when it will fail of success, and how and when it will succeed; hoping thus to add not a few to the long list of successful apiarists that are now doing honest, valuable service in the nation's great industrial work shop. I may also do the no less important service, that of teterring some from entering this field of labor. Persons who are not fitted for the work, or cannot meet its requirements, and who if they undertake it will only win loss and disappointment.

There is no fact in science better established than that of insects to the full fruitage of many of our most valuable farm trees, vines, grains and vegetables. Many of our plants like those forming that most valuable field crop,the clover, will almost fail to produce seed, except

that insects act as "marriage priests" and bear the fructifying pollen from anther to stigma. Even in plants like the clover, where each flower bears both male and female organs, we find that nature has so ordered that unless insects can effect cross fertilization the development of seed will be scant, and often times fail entirely. In many plants like the squash and pumpkin the anthers, with their burden of pollen are in one blossom, while the stigma which must receive the fertilizing dust is in quite another. Here even the novice need not be told that without insects to bear the pollen from stamen to pistil no fruit can develop. As you all know most of our very finest varieties of strawberries are pistilate. You practice on the knowledge that staminate varieties must be close at hand; but even this would not avail except that insects come to bridge the distance from one kind of bloom to the other. True, most of our fruits and berries arise from perfect flowers; yet it is a thoroughly demonstrated truth, that we can never secure more than a meager crop except that insects swarm upon the blossoms in quest of pollen and nectar, and thus while the Liliputs of the animal world are busily gathering their own livelihood, they are also, at the same time, giving to the vegetable world a rich return for the good they receive. In the grand economy of nature, the insects and flowers are not only companions, but they are mutual friends, aye more than friends, each is the savior of the other. The plants save the insects from starvation; while the insects return a no less valuable service, in that they protect the plants from sterility.

Chief among these insect friends, especially in the early spring when nearly all our fruit trees and vines, and many of our vegetables are in bloom are the honey bees. Most other nectar-loving insects, like the wild bees, the wasps, the two-winged flies and the flower berths, are all unprotected against the storms of win er, and myriads of them succomb to the rigorous blasts. Even those that do survive live solitary or in pairs, and increase so slowly, that their accomplishments, at least till quite late in the season are quite insignificant. Not so the hive-bee. From its very nature and habits it is housed against the chilling blasts of winter, and thus comes forth at the awakening of spring fresh and vigorous. Again, bees do not live solitary or in pairs, but in colonies, each numbering thousands, and thus even in the early spring time, myriad bees come forth to greet myriad flowers.

You have all noticed that red clover will not seed only very partially from the June blossoms. You all know that there is no such failure with the second bloom that makes fragrant the fields of July and August. It is well known that our hive bees do not work generally on the red clover. The flower tubes are too long for the hive bee's tongue. Hence the red clover is dependent upon the bumble bee for fertilization. Early in the season when the first red clover bloom adorn the meadows, bumble bees are very few and entirely inadequate to the important work. Later they have increased and by the time of the second blossoms, they fairly swarm upon the flowers, the cross fertilization is effected, and the farmer rejoices in a bountiful crop of the valvable seed.

Red clover was introduced into Australia and New Zealand, and as there were no bumble bees there, even the second crop of red clover failed to produce seed.

Within a few years bumble bees have been taken from England to these far-off colonies, and now the clover is commencing to yield seed, as you all know, the first crop of white and Alsike clover seed, readily from the first bloom, and all bee keepers know that the most abundant and beautiful honey crop comes from these same clovers. Could we breed a race of bees that could work generally on red clover, we should not only bless the bee keeper, but the farmer as well. Dr. Beal, who has experimented largely in this matter of cross-fertilization, has suggested to me the importance of experiments looking towards the protection of our bumble bees, so that we might start off early in the season with a generous supply of these valuable friends of the husbandman.

A few years ago the bees were generally destroyed near the gardens of one of the most noted seedsman of Massachusetts. The next season this gentleman was astonished with a very meager yield of squashes, melons, etc. Surmising that the absence of bees might be the cause of his failure, he secured a number of colonies, since which time his success has equaled his fondest hopes. Only last month I had the pleasure of addressing the horticultur-

ists of Ohio at their annual meeting in Dayton. I took occasion to urge this very question of the importance of bees to the horticulturist. Mr. Farnsworth, an extensive grower of small fruit in Lucas County, near Toledo, reported that a few winters ago the bees of his neighborhood were very generally destroyed. The next season his crop of fruit was very disappointing. He was very positive that his ill-success was owing to the absence of bees and the consequent lack of fertilization. Not one in that large audience of intelligent fruit-growers but what praised the bees as a valuable adjunct in fruit culture. It sometimes happens that cold or storm during the time of fruit blossoms in May keeps the bees shut close in their hives. Such an occurrence warrants the prediction of a light crop. Many a pomologist has been puzzled to know why so little fruit would set in occasional years after a most bountiful season of bloom, not dreaming that the key to the solution lay in this very matter, of failure in the flight of bees during the blooming period. Our point then is just this: Every farmer and horticulturist is directly interested in the success and development of bee culture in his immediate neighborhood, for its success is his success.

I need not say to any such audience as will come out to these Wisconsin Farmer's Institutes that bees never in any way injure the flowers that they visit. They are always and entirely beneficial. Nature would never have added the attractive coloration, or spread the rich feast of nectar, only that the flowers needed the bees. Whenever you see a beautiful flower, or the pearly nectar drop that bathes its corolla cup, or enjoy the delicious perfume that is even sent out to call the bees, you may be sure that such bloom needs the aid of insects. These are the distress signals they cry out to the passing bee, "love or I perish."

It is true that our large Carpenter bees do sometimes pierce the long flower tubes of such plants as wild bergamot, that they may reach the hidden nectar. But from very long and close observation I feel quite certain that the honey bee never does this. Even this slight tearing of the corolla is no damage to the flower or plant practically. The showy part of the flower, as we have seen, is only a signal, and when the bee comes its work is done.

Again, bees never disturb our stock while it is grazing, though one Wisconsin farmer at least has thought to the contrary. Every close observer knows that no bee in its quest for honey, or while sipping the nectar, will volunteer an attack. Hence, a bee in its foraging tours in the fields will never sting unless pinched. It is absurd to say that bees ever drive sheep or cattle from pasture. If you ever see any actions that lead you to think such may be the case, look for the bat flies. The sheep bat fly which lays its eggs about the nose of the sheep, and the cattle bat fly which deposits along the backs of the cattle, often annoy these animals seriously, and will cause them to rush about the field in wildest excitement. These flies are about the size of bees, and look not unlike them, though they have but two wings; but their evil deeds must not be laid upon the shoulders of the honey bee, for its work is of an entirely different type.

Another truth is equally potent and quite as thoroughly established. That is, that bees never injure sound fruit. Even though the anatomy of the bee, did not refute this oft repeated charge their nature and habits would assuredly do so. The bees are not like the woodpeckers and titmice, that go chizeling about for their food. The bees never bore for their sweets, but always sip from the bottles that nature hand out to them, and which are always uncorked by the same friendly hand that proffers the gift. If anyone ever states in your hearing that bees puncture grapes, or bore into any fruit, you may give the assertion unqualified denial. True, if bird or wasp, or as is more generally the case, dame nature herself breaks the skin, so that the rich, sweet, juice begins to ooze out, then the bees, true to their instincts, which abhore waste, rush to the wounded fruit that they may gather the nectar and bear it to their hives. As every grape grower well knows, this fruit is very liable to bleed if it becomes very ripe, and then is confronted by any hot, damp, or sultry weather. This accounts for the fact so frequently noticed that bees often rush upon a vineyard at the time of vintage as with one accord. It is at just such times the bursting fruit and oozing juice call all to the banquet. Does this look as if

the bees have turned into miners? Then one or two wise ones with sharper tools would be seen plying their new vocation, and not a whole apiary wise all at once.

The only just complaints than that can be laid upon our friends of the hive are these: Often at the time of the vintage the grapes will burst, and the bees will swarm upon them. The vine grower may still find it profitable to secure the grapes for the purpose of wine making, and finds the bees an insufferable annoyance. Hidden among the clusters, they are not perceived by the pickers and stings innumberable will be the cost of plucking the grapes. Again, to many the dread of being stung will be almost as terrifying as the stings themselves. Again, if grapes are placed in the sun to dry, for raisins, the oozing sugar will surely attract the bees. In such cases the bee will greatly injure the fruit. Lastly, if bees are placed very near the street, unless a barrier of trees, or a high closed fence separates between bees and the street the bees may sting passers by and provoke anger, and perhaps cause serious loss. The first case, annoyance at time of picking the fruit, is not serious, as it happens only on occasional years, and then only at rare periods, when the ripeness of the fruit and the sultry heat combine to crack the grapes. In such cases the grape grower can do much to protect himself by keeping his fruit closely picked. The The bee keeper should read Romon's twelfth chapter, eighteenth verse: "As much as lieth in you live peaceably with all men." If possible the bees may be shut in the hive or removed for a few days to a cellar. Some of the nicest comb honey should be sent as a present to the grape grower at just this time. And it will pay well even for the bee man to help pick grapes for a day or two. He can show how it may be done with the least danger from stings. And as we all know it takes a very vicious man to carry on a quarrel where his antagonist is all kindness and love. In case of the raisins they should be dried under cover. The bee man can assert his rights, for the bees had possession before the raisins were thought of. Surely, if both parties are good Samaritans, they can arrange to remove the difficulty. and each carry on his business, and yet be neighbors and friends. "Where there is a will there is a way."

I have already suggested a way to keep bees close by a street or much traveled thoroughfare. A close thicket of trees between bees and streets will look well, and will so direct the bee's flight upward, that their near presence to passers-by will cause no fear or annoyance. In case the trees must be grown, a close board fence, though not a thing of beauty, may be endured,for a short time till the trees are grown and will answer the same purpose. Sometimes early in the spring the bees will spot the clothing on the line. When such snow-white clothing made clean by my wife's hard effort, and while on the line spotted, as I have seen clothes, I confess I should feel provoked. In this case the bee-keeper may talk over the danger with his neighbor, and may discuss some fine honey presented at the same time, and find out the time in early spring when the clothes are to be exposed, and see to it that the bees are shut up at such time. In the spring time there is little danger from closing the hives, as at this season the bees are too few in numbers to receive harm even if the hive is closed, especially so as the weather is rarely very warm. The main thing is for us to possess the true neighborly feeling, and then I feel sure that bee men and grape growers can live peaceably side by side. Indeed, as we have shown, they must live side by side even for the fruit man to receive the full fruition of his labors.

WHEN SHALL FARMERS KEEP BEES?

If, as we have shown, the whole country is benefitted by the presence of bees, then surely farmers may well enquire into the policy of making bees a part of their possessions.

Some of our best apiarists claim that only specialists should keep bees. The arguments they use are these: Bee-keeping demands thorough preparation. Such will only be given by one who makes apiculture his special business. Again, success in the apiary will brook no neglect. People in other walks of life are busy and so will neglect the bees. If we grant the second premise in these arguments there is no escape from the conclusion. But I stoutly deny "its truth." Among the very best bee-keepers of America, men who have grown wealthy in this pursuit, and have honored the calling by the skill, and in-

telligence which they have shown in the apiary, are doctors, ministers, mechanics, farmers, teachers and even lawyers. Truth is even stronger than theory. And so long as some of our very best bee-keepers are men who are amateurs, or only make apiculture an avocation—indeed some are ladies who, besides caring well for the work of the house, carry on the apiary with a skill and efficiency that takes off its hat to no one, not even these boastful specialists. So long, I say as such is the case, I can never accept the view that only those who make bee-keeping a specialty shall enter the ranks.

But it will be asked: Do not many attempt bee-keeping and utterly fail of success? What say the empty hives piled up behind so many farm-houses, if it be not failure, and so we do well to ask why the failure?

There are several requisites to success in bee-keeping, the neglect of which will bring failure as surely as a dissipated life brings want, distress and ruination.

First, no one should keep bees who is so susceptible to the poison that to be stung means pain and distress for hours afterward. Some people are so affected that if stung on the foot the eyes will swell shut, the flesh will become inflamed and the whole body will be feverish for many hours. Every bee-keeper will occasionally taste the "sweet uses of adversity," in the shape of stings. If then the sting is so severe, bees and bee-keeping should be given a wide berth.

But here it should be said that one person is no more liable to be stung than is another, except as he is more nervous, and so is less self-possessed. Experience will allay the nervousness, and remove the susceptibility. Again, one may be very nervous about bees, and by working among them lose all the fear, and care no more for their presence than for that of his cow or horse. Here I speak from experience. I love the study of bees, and would watch and handle them, though at first I was in mortal dread of the stings. Now I think no more of danger than would I, were bees stingless. Again, bee venom, like most poisons, as recent investigations are proving, may inoculate a person so that he is less and less affected by stings. This has also been proved by my own experience. When I first commenced working with and studying bees a sting would swell badly and was severely painful; now the stings rarely swell at all, and I may be stung two or three times, and in a few minutes cannot even tell where I received the stings. This is the common experience of apiarists. It should be said here, that persistence in handling bees soon gives one confidence, removes nervousness and makes the danger from stings almost nothing. Again, no one should commence apiculture until he had become thoroughly acquainted with the science and the art. One of the charms of the business is that it is founded on science, and its labor must ever combine the mental and the manual. He, then, who is not willing to study thoroughly the science of bee-keeping should remain outside the ranks. It is to the credit of agriculture that one may eke out on the farm a precarious livelihood and know very little of the technical operations required on the farm. In apiculture so much depends on accurate scientific knowledge that success can only be reached through study. This may be got speedily through the hard, close study of books, or by the longer, more tedious road of experience, which, as in all other cases, involves vexation and loss. Lastly, apiculture demands the punctual keeping of engagements. Neglect is the rock on which many an apiarist is wrecked. If your farm takes all your time and energies then don't undertake bee-keeping. If any of you like bees, will thoroughly study the subject, and this will pay you in the fascination of the study. As the natural history of bees is so full of interest, that he must be dull indeed who does not find a rare charm in its study; and lastly, if you can find time to attend to the wants of the bees, which of course will be gauged in amount by the number of colonies one keeps, then you do well to add apiculture to your farm, shop, or profession. When you may find, as has often been the case, that your bees pay you better than even your regular business.

A HINT WORTH CONSIDERING.

It is often a vexed question, "how to keep our boys on the farm." Usually the question comes with most force and significance when the boys are between the ages of twelve and eighteen. Show the bright farm boy who so loves his home that it requires real persuasion

to induce him to leave it, even for an hour; the boy whose evenings are spent at home, because he rather be there than anywhere else, and I will show you a boy who maketh a glad father, and rejoiceth the heart of his mother. A boy who will make a success whether he stay on the farm or where'er life takes him. I know intimately just such a home. The father has a large, well-stocked farm and two boys. As the boys were about to cross the bridge between childhood and youth, the father secured some fine, pure-blood fowls for one of the boys and a colony or two of bees for the other. He purchased two or three of the best books treating of poultry, and the same of bees. A good journal was subscribed for treating of fowls, another of bees. That winter the books and papers were thoroughly studied and discussed by father, mother and boys. Who shall say that this study and the interest it awakened were thrown away, even had they had no practical results? One of those boys is now eighteen, the other is fifteen, and either one will discuss bees or poultry as intelligently as any bee man or poultry fancier of the country. More, either boy is qualified to take charge of and manage successfully a large apiary. Granting that there had been no income from the bees, would any one say that the course of that father had been foolish? I tell you that father rarely thinks of his bees that he does not think of the boys, and methinks he often whispers "blessed bees." But now as to the results: The bees increased without the loss of a colony until eighty colonies adorned the bee yard by the orchard. Until last winter not a colony was ever lost in wintering, and then only because the advice of a celebrated bee-keeper was followed, against the judgment of the owners, and the cellar was kept at too high a temperature. Even then the loss was not great. In 1884 and 1885 the proceeds of these bees exceeded the income of all the balance of the farm. And yet this is one of the best tilled and best managed farms in Wisconsin. The capital invested in the farm, stock, tools, etc., cannot be less than $10,000 or $12,000. The capital invested in the bees is not more than $1,000. And the bee business has grown up without a dollar's outlay since the first purchase, except as the money came in from the bees. From the first the bees have far more than paid all expenses. The wise advice insisted upon in our best books, to go slow was strictly followed, and no bees have never been purchased since those first colonies, except the purchase of a few queens.

Others have interested daughters in a similar way, and at the same time have secured for the girls labor in the open air, and healthful exercise, which in itself has paid for all the expense and labor, even were it not richly paid in the money income. I know of a mother in Michigan—one of the best bee-keepers I ever knew—who commenced to keep bees solely for health's sake. To quote her own words, she has found health, and secured a good profit on her investment and labor. Can any of you meet with the same success? Not one of you but what can. If you will fit yourselves with the same studious care and then exercise the same diligent pains-taking effort to meet every requirement of the bees with absolute punctuality.

It only remains to be said that honey is just as sweet, just as wholesome and just as valuable a food as it was in the olden time when the "Promised Land" was lauded as a "land flowing with milk and honey." The bee-keeper, besides contributing to the value of farm, garden and orchard, besides engaging in a healthful, pleasant and remunerative vocation, is also adding to the wealth of the whole country in securing a valuable food, which, without his care, energy and business thrift, as expended in the apiary, would be lost to mankind, doubly lost, for as we have seen, it has a double mission: It blesses man through the bees and through the plants.

A. J. COOK.

Injurious Insects and How to Fight Them.

[Prof. A. J. Cook, Michigan Agricultural College.]

This subject of injurious insects, to which I have given much study, is one of tremendous magnitude, whose importance is rapidly growing as the years go by. We are taking the natural food plants from our native insects, as we clear away the forest's brush wood, and the more humble herbs of fen and upland. And the insects, bent on getting

even with us, are robbing us of our fruits, grains and vegetables. Each year sees some new insect enemy, which often comes as a devastating flood upon whatever of fruit, grain or vegetable it may attack

New imported insects, of all these miserable pests the most to be dreaded, are coming year by year to our shores. So emphatically true is this, that were we not also, at the same time learning more of the ways and habits of these insect hordes, and discovering new and more valuable methods to combat their mischief. We might well stand appalled in hopeless dispair, as we should see in prospect a revisitation of the seventh of the old Egyptian plagues, when every green thing was swept by the devouring locust, from off the face of the whole earth.

It is no slight embarrassment to stand before so great an evil, with but the one weapon of an hour's time, and know where best to strike. Yet in this practical age, before an audience of practical folk, I can not go amiss in describing some of our worst enemies, each typical of a large group, and showing you just how you can best overcome the fearful ravages which they inflict.

In opening with the Codling Moth, I have the advantage of introducing an old acquaintance. You have seen him, I wont say tasted him, nor will I hint that he has enriched many a glass of cider, over which we have all smacked our lips. You know how the little gray moth with its front wings copper-tipped, is hardly more than one-half inch in diameter, how it wakes from its *pupa* slumber from early May even to July depending upon the temperature, how the female moth lays a single, white egg in the calyx end of each fruit - apple, pear or quince; how the little larva or caterpillar eats about the core, filling its mine with its own filth; how in four or five weeks it crawls forth from its dark tunnels and under some bark scale, in some old birds nest, or in a crevice it weaves its delicate cocoon of finest silk, and soon changes to a *pupa* or chrysalis. In about two weeks it bursts its somber garb, and again flits forth a gay and handsome moth—nay not handsome of handsome is as handsome does—for now it again stocks the fruit with the baneful eggs. This second brood is like the first. only the wee white larva—the so-called "worms"—do not leave the fruit so quickly, but often remain domiciled in the luscious pulp, till long after the apple is domiciled in cellar or storehouse.

As the one first to demonstrate the wondrous efficiency of the Paris green remedy for this worst enemy of the apple orchard, I am specially happy to explain and commend it to you. The old band method was utterly impracticable. It required labor and attention just when the tension of the busy season was at its height, and so the remedy failed, for want of needed labor and attention.

The far better hay remedy is only complete when the "wormy apples" are all felled to the ground. This labor of thinning is often very richly rewarded, in the finer fruit secured because of thinning. Yet, as with the labor of removing the bands, it is apt to be neglected, and thus the remedy fails to give satisfaction. Again in seasons of scarcity, when fruit is money, and when from the very nature of the case, Codling larva will be the most destructive. This remedy is only locking the stable door after one horse is stolen in hopes to save the other horse. At such times, when both horses are so valuable, the mere saving of one is far from satisfactory.

The use of the arsenites Paris green or London purple, saves both horses and is a cheap and easy way to accomplish this important work. My experiments, which have been elaborate and have extended over several years, established several points: First and most important these arsenites kill the insects before they enter the apples and so the fruit is preserved sound and beautiful. Secondly it takes a surprisingly small amount of the poison to sound the death knell of the insects. The faintest trace of these arsenites always kills, and thus we should be thorough in our application; but use a very dilute admixture. Again the moth is even waiting for the blossoms to open, and so the fatal egg is often laid before the blossoms have fairly fallen from the trees; therefore we must apply the death dealing potion very early, before the young fruit is larger than a two-grain quinine pill. Here is where some have partially failed in the use of this remedy. They have waited till the larva has hidden within the green pulp, and is safely out of harm's

way. I would not make the mixture stronger than one pound to two gallons of water. Were I to modify this at all I would make it weaker. To spray an orchard the barrels should be drawn in a wagon, and so fastened that they could not possibly be thrown out. The head of the barrel should be tight so as to prevent waste, with two holes one for the pipe from the force pump the other for a stirrer. The force pump should be fastened to the barrel, and may be worked by a crank attachment to the wheels of the magon. The liquid should be destributed in a fine spray, so that while we use but little we are sure to touch every part of every apple and leaf. The Cyclone nozzle works well, though a new nozzle made and sold by A. H. Nixon, Dayton, Ohio, is by far the best arrangement I have ever seen. By the aid of this, in connection with a good force pump, we need have no fear of imperfect work or failure to effect our purpose. Here let me urge again that this remedy be not deferred too long. One application made before the apples are larger than peas, effects surprising results. Let me further urge that all make use of this remedy. If this lecture should induce you—or even the most of you to do so, how good it would be that I came among you.

But what of the danger of using such virulent poisons on our fruit? Let me say that I have considered that point most fully. I have called in the aid of the microscope and the chemist's reagents, and both have said: *No danger.* I have used fruit thus treated now for seven years and have no fear of poison. When the chemist's delicate tests can find no sign of arsenic, when the sharp eye of the microscope sees no trace of the poison, nor can find any trace for weeks before the fruit is to be used. I feel that we may safely use and recommend these arsenites in this warfare.

I would not use or recommend white arsenic. In all cases that I have heard of where persons have been poisoned by use of these poisonous insecticides it has been the result of gross carelessness. Many people are born careless and never recover from it. To use white arsenic, which looks so much like many culinary articles, makes the danger from carelessness *far greater.* Paris green and London purple are so distinctive in their color that this alone forms the skull and cross bones that will effectively set danger aside. The danger from pasturing under trees charged with these poisons is not great, owing to the very dilute mixture and the fine spray. Yet it is always wise to keep stock from such an orchard till a heavy rain has washed off the little poison that may have fallen on the grass.

I would never use Paris green on fruit that is to be used within a few days from the time the poison is applied. Thus I would never use it to fence out the currant slug. The usable fruit and the insect in this case are often upon us at one and the same time. Neither would I use these arsenites on cabbages. Certainly not after the head has formed, for the very conformation of the vegetable makes such use daugerous. Again, no one should ever use or handle these substances with the bare, unprotected hand—especially is this caution necessary in case of any abrasion of the skin. Neglect of this caution resulted in the death of a very talented young horticulturist of Indiana some years since. I am free to say, and I have probably handled these poisons as much as any one in the country, that reasonable caution makes their use perfectly safe.

In using these arsenites to destroy the Codling moth larva, we at the same time kill the Conker worms, the several species of leaf rollers that often fairly dig out the buds in early spring, and are very destructive; the old American tent caterpillar that flounts his tent in the orchardist's face just as the leaves are putting out in May, and thus in using this remedy we are killing not simply two but several birds with one stone. I would also use three insecticides, to protect against all leaf eating insects, where there is no danger. Thus on shade and ornamental trees that are being defoliated, on fruit vines and trees early in the season, and on such vegetables as potatoes, melons, etc., where the foliage is not used to swell our larders.

It remains to be said that as this poison must be eaten to destroy, it is impotent against the plum cursulio, as here the egg is pushed by the mother weevil through the poison beyond the reach of harm. The same is true of all lice and bugs. They do not munch and chew, but insert their sharp beaks and suck the rich juices of the plant. Hence, they can pump the very life out of the

plants, though the latter be thoroughly coated with Paris green, and not even receive the first gripe of stomach-ache.

Imported cabbage butterfly *(Pieris rapae)*. This beautiful butterfly that has so recently invaded our fair country, needs no introduction to any of you. How well it illustrates the truth discovered by the great Charles Darwin, and to which I have already referred, that the newly imported species do most mischief and are most to be dreaded. "It is the new broom that sweeps clean" would be paraphrased thus: It is the new insect that makes a clean sweep. As you all know, the fine white butterflies, with their neat black buttons come sailing leisurely into the cabbage garden early in the year when the plants are just well started, and again in midsummer when the heads are nicley, formed. And how well protected are the green eggs which are scattered about the cabbage leaves. Their green hues are so like that of the cabbage, that it requires a bird with very sharp eyes to secure those eggs for breakfast. Soon the green caterpillars the so-called "cabbage worms," come crawling forth from the eggs. Nature has also dressed these caterpillars in a mimicing robe, as in their green dress they escape detection except from the sharpest ken. These fat, slick, larva grow very rapidly, as we should expect from the way the cabbage leaves melt away. The ragged leaves, and the abundant droppings of the larva make it not difficult to find even these insects which owe so much to color protection. The second brood tunnel far into the cabbage, and are not infrequently sliced in exquisite manner by the same knife that prepares the krout or slaw for the table. In three or four weeks the little acrobat lies its tail end to some barrel, ledge or to the cabbage, spins another rope which it swings under its shoulders, and then presto, it just gets out of its own trousers in a marvelous way, and we have the queriest, greenish-gray chrysalid. After a few days of quiet in summer or the lapse of the long winter this pupal skin bursts, and the clean handsome butterfly flits forth once more, to repeat the same round of mischief.

For this insect California Pyrethrum or Buhask is a most efficient and satisfactory cure. This insecticide consists of the powdered stems and flowers of a a composite plant, the Pyrethrum Cinerariaefolium. This powder is now cheap and entirely non-poisonous to the higher animals. It has two objectionable featuras, it loses its virtue upon exposure, and so the first article is the the best. Again, it is not always efficient, as some insects are not destroyed by its use. The California Bupact Co., Stockton, California, are engaged extensively in the growth and manufacture of this article and so we should expect, they are not likely to send out a worthless article. I have used this Bupach with marked success both as a powder and mixed with water. In water I use a table spoonful to the gallon of the liquid.

Prof. Tracy and Mr. Alwood, of Ohio, both say they have succeeded perfectly with the powders, but very indifferently with the liquid mixture. My experience is quite the reverse. I have succeeded better by use of the liquid, only, as I think, because I applied it with a force pump, and the application has been more thorough. I presume the reason why our friends have failed, is that they have been too gentle in making the application. We must remember that the Bupach has to touch every insect, and so we must dash it onto the plants, and not sprinkle it on in the gentle way that it would fall from a sprinkler, would we do good execution.

Pyrethrum is excellent to kill house flies, poultry vermin, and even lice on cattle.

For lice on cattle, etc., however, I prefer to wash the animals in a strong decoction of tobacco. And I have no hesitation in saying that it is far more rational to kill these annoying lice by aid of tobacco poison, than to use the dirty weed to kill off our boys. I can endure the foul stuff while I am scrubbing a steer or heifer for a brief five minutes, but to have the stench and filth ever about, poluting air, car, audience room, and worst of all that blessed sanctuary, the home dwelling, is surely asking quite too much. To treat cattle place a half pound of the tobacco, the very cheapest will do as well as any, in a pail, and turn on to it a gallon of hot water. As soon as it is cold enough, so that we can wring out clothes in it with the bare hand, the animal is to be scrubbed thoroughly with the decoction. I have gone over a fine, large Shorthorn in five minutes. If the day is cold the animal should be kept in a warm

stable and covered with a warm blanket. In a short time it will dry off, and it will never feel any inconvenience. If done on a warm day it will not be necessary to blanket the animal. The next morning the animal can be groomed, and will look as smooth as ever. Pyrethrum will kill the lice, but it often requires to be applied two or three times in quick succession to make the work thorough, while one thorough application of the tobacco decoction usually is sufficient. I say usually, for as all stockmen know some individuals among our cattle are just bound to be lousy. In such cases even the tobacco decoction may be required two or three times in a winter. Of course sweet, whitewashed stables will be an aid in this work of extermination. Crude kerosene, or some mixed in lard, will also kill lice very effectively if thoroughly applied. But it is very disagreeable to handle, owing to its oily nature, and the animal is altogether too much stuck up to suit us, at our house. We don't believe in being "stuck up."

Plant Lice Aphides.—You are all familiar with the small, flask-shaped aphides, which so often fairly cover the stems and foliage of our trees and vegetables, and are especially free and at home on our house plants. I am said to have a weakness. I call it a strongness, in that I am specially interested in what interests the ladies, and when the object is a thing of such rare beauty, and the giver of such wholesome, lasting cheer, as those window boquets which loving hands so patiently, carefully and thoughtfully train and care for. I should be doubly ashamed not to be interested.

These plant lice are green, or as seen on the cherry and dock, black, or occasionally when they work on the twigs they are gray. These are of the bug tribe and so of course have long piercing peaks with which they puncture the leaves or stems, that they may pump up the rich sap. They are good pumpers, rapid growers and increase beyond all computation. How often we notice that a few lice on a plant one day will in a few days be succeeded by a multitude. Indeed, were it not for other insects—our great but little friends—that feed upon and destroy these lice, I doubt if the farmer and horticulturist could succeed at all. The peculiar mode of propagation among these lice is strongly interesting and anomalous. Both, male and female lice, appear in late autumn. After pairing the female lays her many eggs about the twigs, among the buds of the plants. In the spring only females develop from these eggs. And these females continue to give birth to other females the summer through, so that there are no males at all till autumn comes again. The fecundity of these *agamic* females is something wonderful. It is estimated that a single pair might be, under the most favorable circumstances, the ancestors of over a billion lice in a single summer. In green houses and on house plants they are specially harmful, for in such cases there is no check by cold, and the agamic reproduction may go on indefinitely. And in case of plants thus protected the predoceous and parasitic insects are fenced out, and the lice go on with no let or hindrance, except that artificial means are employed. The past season, owing to the wide spread and almost universal drouth, was especially favorable to the rapid increase of these pernicious sappers. Many a plant was utterly devitalized because of these myriad sap suckers.

In all my extended experiments I have found nothing equal to the kerosene and soap mixture as a specific against these pestiferous lice. I make it thus: Mix one quart of soft soap and one pint of kerosene oil thoroughly together, then add one gallon of water. If thoroughly mixed this liquid will not injure even the most tender foliage, and if dashed onto the plants by use of a force pump, or a Woodason spray bellows, I will vouch that no guilty louse will escape. I have used this now for years and with the most perfect satisfaction. By use of the atomizers sold in the drug stores this kerosene and soap mixture can be readily applied to our house plants, and if the latter are set in a zink, or on an oil cloth, the application can be made with ease, and as the odor soon escapes, the remedy is not an unpleasant one.

It only remains to be said that this same kerosene mixture is very deadly to almost all insects, and if thoroughly applied to them is very effective. Wherever the arsenites are ineffective, or forbidden by the possibility of danger, and where there is no objection to the use of kerosene from its odor and taste, then I would recommend its use.

Bark or scale lice will succumb to this same substance, and are especially susceptible to it if the application is made just as the young lice hatch. Again, we have found that those terrible pests of the gardener, the raddish, onion and cabbage maggots are vanquished, surely vanquished, by the use of this liquid. True, many will use it and not succeed; only, however, because they will not be sufficiently thorough. We all know that these maggots tunnel far into the stem of the plants, and are thus safely out of harm's way. The only surety of success lies in making the application every three or four days. This is not very expensive and pays well. We turn a half gill about each cabbage plant, or in the case of radishes and onions turn quite a stream along each row. We have thoroughly proved the efficacy of this remedy both in the garden and in the labaratory.

The Currant Slug.—The currant saw fly is another enemy which has come to us from over the sea. As you all know it is a bad one.

These flies are about the size of the common house flies, and to the casual glance look not unlike them. The female, as is generally the case with insects, is the larger. She is yellow with black markings while the male is black with yellow lines. The female in May and June, by use of her wondrous saw, prepares a place on the underside of the currant and goose berry leaves along the veins, for her white eggs. When these are laid, they look not unlike strings of beads. The larva are first pale green, and though very small, can be quickly found by the perforations in the leaves. Little circular holes—often several—will show in each infested leaf. The slugs grow rapidly, and soon get too big for their skins.

Then the skin bursts and the slug relieved, again stuffs himself till he feels ready to burst again. These moltings, as the casting of the skin is called, occurs five times. After the first molt the color is dark green with black spots, till the last molt, when the light green again appears. Soon after this the larva goes under some leaf and forms a cocoon of firmly woven silk in which it soon pupates. In a few days the flies again appear and soon we have the second brood of larva. These remain as pupa through the winter.

I need not say that the presence of these insects in any currant vineyard means death to the currants unless prompt measures are taken to eradicate the slugs.

White hellebore is a safe and effective remedy. While it is a vegetable poison, it is in no way so severe a poison as the arsenites, though it destroys quickly the voracious slugs. It has been used for many years in both Europe and America, and I have never heard of any harm from its use. It can be applied in the same way as directed for pyrethrum, and I have found it more satisfactory than Bupach in this warfare. This hellebore may be used for all slugs where the arsenites or kerosene and soap mixture are not permissible. On shade trees I prefer the arsenites, on rose bushes, the kerosene, on raspberry vines, white hellebore.

The Wheat-bulb Worm.—This is an old insect, which was noticed in Michigan more than forty years ago. Dr. Fitch described it in part in 1856, and Dr. Riley gave an account of it in 1869, and referred to injuries to wheat about St. Louis. Ten years later, 1879, Prof. Lentner refers to this insect as a serious enemy to the wheat in New York.

More recently still. Prof. Forbes, the very able state entomologist, of Illinois, has given a very full and complete description and life-history of this pest. During the past season I have discovered one new peculiarity not mentioned, I think, elsewhere, that this insect also attacks the oat crop.

In its results the work of this insect is not unlike that of the Hessian fly, and doubtless has often been mistaken for Hessian-fly ravages. The wheat-bulb worm, *Meromyza Americana*, works as does the Hessian fly; first, in autumn in the young plant, and again the following summer in the nearly mature stock. The maggot or larva is slimmer than that of the Hessian fly, and has the two black longitudinal hooks, so common in *Dipterous larva*, but which are absent in the Hessian-fly larva. Again, in the stock which ripens prematurely the slim, greenish maggot is always found above the upper joint, and inside the straw, and not on the lower joints inside the sheath. The pupa is also easily distinguished from the puparium of the Hessian fly. This has none of the seed-like appearance, which gives rise to the common name, flax-seed state, applied to the puparium.

The fly is also quite different. It is more the form of the house fly, not slim like the mosquito, as is the Hessian fly. Its antennaes are short, not long and slim. Its body is conspicuously striped with three dark, longitudinal bands, and its wings are straightened by four longitudinal veins, with three cross veins. So we see a little observation will quickly distinguish this insect from the other. I have no doubt but that in many of our Northern States this pest does very serious damage.

Prof. Forbes recommends late sowing, the same that is usually urged to defend against the Hessian fly, as the best remedy against this bulb worm. He also says that quite likely sowing spring wheat for a year might exterminate this pest in any particular region where its ravages are serious.

I am inclined, from my observations, to recommend the exact opposite for both these enemies. Early sowing, with the best culture, and strongest growing varieties of grain. In both cases it is the fall brood that does most injury, and as all may observe, if the wheat is early and vigorous, it will tiller out and often wholly recover from quite serious attack. Again, we cannot tell of a certainty that either insect will ever come in numbers sufficiently large to do damage. Though if the flies are abundant on the volunteer wheat in late August, we may expect them. If we knew the insects would certainly come, the late sowing might be wise. As the chances are that they will not, the parasites and untoward fortune are usually too much for them. I feel safest to work just as I should to get the best crop irrespective of the insects, and in the large majority of cases I win. So I urge you all to take hint from these wheat enemies, as from low prices, and by better tillage, more ample fertilization, more than make up for the evils that confront the wheat grower.

As I do not wish to extend this lecture so long that there will not be time for discussion and questions, I will only refer to two new enemies which I know to have camped down upon the Wisconsin apple growers. I refer to the plum gouger, which so gouges your apples that they look so gnarled and deformed that one would hardly recognize them as our king of fruits. The other is the apple maggot, which attacks fall apples, and upon such fruit is far worse than the coddling moth, as the latter does not entirely ruin the fruit which it attacks, as it confines its filthy work close about the core. Several of these maggots may be found in a single fruit, and they tunnel the apples through and through. Hence, to eat such fruit means to devour a score or less of maggots, which, unless one is on the lookout, he is quite likely to do. The apples do not show the condition of things as do those attacked by the codling moth larva, and so one, unless warned by a previous victim or a less pleasant previous experience, is almost certain to destroy more or less of these insects by a very sure if not a perfectly agreeable method.

For both these enemies there is no remedy like that of swine in the orchard. Apples attacked by the maggot will almost surely fall, and so, with no pains on the part of the orchardist, the fruit and insects are converted into pork. In case of the gouger I presume the fruit might need to be shaken off. I have not been able to study the insect in the field. If so it would pay well to do it. I am greatly in favor of turning hogs in an orchard. If rings are in their noses they do no harm; while they enrich the soil, and become insect-destroyers on a grand scale.

My Experience and Success in the Dairy Business.

[Mrs. A. M. Bragg, Viola, Wis.]

In the little *Farm Journal* it says, take pen and paper, and sit down by the winter fireside and do part of your summers' work. Or in other words, get ready.

So in April 1, I got me a large book and wrote on it, "Cow Book." Then at the top of each page I wrote, 1st, "Butter churned in 1886." 2nd, "Butter sold and money received for same." 3d, "Butter shipped to Merrill & Eldridge, number of pounds, cost, sold for, net proceeds, date of shipment. And other firms the same way: 4th, named each cow, and placed her name and age at the top of page.

Do you ask why I did this? I wanted to know by test and not by guess, what each individual cow was worth, and how much she would bring me in a year. As I had no oil test churn or any other appliance for testing, as each cow came in, I set her milk for one day by itself, and churned it by

itself. Then I wrote under her name thus:

Rose, 3 years old, calf named Prince, April 9th, 1886. Tested her milk May 9th, calf 30 days old. Milk 28¼ pounds, butter 1¼ pounds, making 1 pound of butter from 2 ¾ pounds of milk. Next,

Leo 3 years old, calf named Stay, April 18 h, 1886 Tested her milk May 18th, calf 30 days old. Milk 20 pounds, cream 2 pounds, butter 1 5-16 pounds making 1 pound of butter from 15 5-21 pounds milk. Then,

Dolly 4 years old, calf named Frisk, April 29th, 1886. Tested her milk May 29th, calf 30 days old. Milk 27 pounds, cream 2 6-16 pounds, butter 1 9-16 pounds. Making 1 pound of butter from 16 22 25 pounds of milk.

I did the same with the other nine, they averaged about alike. These tests were made on grass feed, made no change, only saved the milk the 30th day. Then I wrote under this, weight of milk one day each week, so I could get an average of what she would do for the season.

Then knowing that the milk was richer in the fall than in the spring, I retested them, and found that Rose tested thus:

Oct. 16th, milk 16 pounds, cream 3 pounds, butter 1 1-16 pounds, taking 15 1-17 pounds of milk to make a pound of butter; it took 22 3-5 in the spring,

Leo, Dec. 20th, milk 13 9-16 pounds, cream 2¼ pounds, butter 1 5-16 pounds, 10¼ pounds milk to make 1 pound of butter. She made the same amount of butter from 13 9-16 pounds of milk that she did from 20 pounds in the spring.

Dolly, Dec. 27th, milk 10 pounds, cream 2¼ pounds, butter 1 1-16 pounds, taking 9 7-17 pounds milk for 1 pound of butter.

They had hay and 4 pounds of feed per day, cornmeal, bran and squash, all together making the 4 pounds. After getting the average weight of milk to make a pound of butter, I added up their weights for the season and found out what each individual cow was worth:

Rose, 4228 pounds of milk in 8½ months. If it took 18 pounds of milk to make 1 pound of butter she would make 235 pounds of butter in 8½ months, 235 pounds at the low figure of 15 cents, she would earn $34.25, besides her calf and skimmed milk.

Leo, 2688 pounds of milk in 8 months. If it took 13 pounds milk to make 1 pound of butter; she would make 206 10-13 pounds of butter in 8 months. 206 pounds at 15 cents, she would earn $30.90, besides her calf and skim milk.

Dolly, 3220 pounds of milk in 7½ months. If it took 12 pounds of milk for 1 pound of butter in 7½ months, 268 pounds at 15 cents, she would earn $40 20 besides her calf and skim milk.

Please remember that this milk and butter were given under the most trying circumstances. Nothing but dried up grass and water. We set the milk in cans up to November. Let it set 12 hours and then feed the milk to the calves, two calves to one cow.

Then as butter came up in November, I set the milk in pans and in that way I got 6¼ pounds of butter to the hundred-weight of milk.

Hon. Hiram Smith says if he gets 5 pounds to the hundred pounds of milk he is satisfied with the result; 5 pounds at 30 cents (I believe he gets that per pound) would bring him $1.50 per 100. I got 6¼ to the 100 pounds, and sold it for 24 and 25 cents per pound. At 24 cents I get $1.50 per hundred. He gets more per pound. I get more butter per hundred, and both get $1.50 per hundred weight of milk. So I know and do not guess, that our herd of cows give good milk, good cream and in sufficient quantity to make them a money-making investment.

Let me say here that I believe that no work on the farm will pay so well as work spent in weeding out unprofitable cows, and the best way to fill their place, is with heifers raised from the best cows in your herd.

How I make my butter.—As I could not get all of the cream in cans, with the conveniences I had for setting, I bought pans and set in them, in a room 8x8, kept warm from my sitting room fire. The men keep pans and milk clean. We have a strainer made like a six quart pail, no strainer in the bottom as the force of the milk pushes the dirt through. It has three strains on the side, and on the top of this I pin a towel, folded double, with clothes pins. Let milk set 36 hours, skim, and put in cream can. When ready to churn ripen my cream by setting the cream can in a pail and putting warm water in the pail and stir the cream till it warms up to 70 degrees. Keep it warm and it

will be sour by the next morning ready to churn. Then I put in the coloring. (Let me say here that the churner should know what the cows are fed, as with some kinds of feed you will need more coloring than with others and if you do not know your churnings will not be alike in color. I have my cream in winter 63 or 64 put in churn and with paper in one hand and churn handle in the other I am ready to churn.

As soon as it grains, I stop churning and put in a little brine, so as to pour off the milk more easily. Then put in water and stir with a fork. I always felt the need of something to stir the grains with so I made this fork. When the water runs clear, let it drain ten or fifteen minutes. The rule is one ounce of salt to one pound of butter, but I put in more as my butter is so solid I can hardly make it take in any salt. Stir in the salt with fork and when the salt is dissolved, put it on the butter worker, and with a few light strokes of the lever press out the extra brine and it is ready to pack and ship.

Have the cows come in August, all of them, so as to make butter enough to to ship. It does not pay to ship in small lots, the cartage will be 25 cents on 10 lbs. or 100 lbs. By coming in in August you will have the warm month to feed the calves in, and in September you will be ready to make butter when the price is high; make butter in winter.

Let the calves take their mothers milk for a week, and then make them a feeder. We take new milk to learn them on, it very seldom takes more than two lessons. When they drink nicely, we put in half skim milk till ten days old, then skim all the time. I place a large iron kettle on the stove and fill it half full of water, put skim milk in a can, and set in the water to warm. Have clean pails (I wash them out every day with a brush broom and once a week put them in the wash tub and give them a good scrubbing and dry them in the sun).

A little care in this respect will make the difference between a poor sickly calf, and a large healty and thrifty one Then carry the milk out to the calves that have been first fastened in some Stanchels. If I see any signs of sickness or over feed; the next feed I give them only half a mess, and put an egg, in it. I treat calves like baby cows like mothers.

Keep them fastened for a half hour or so, then turn out to grass, or give them hay as we were obliged to do this summer; this winter after we put them in the stable we found that they would pull the hay down under their feet. So Mr. Bragg got up this arrangement and it works like a charm. no more hay on the floor.

Experience has taught me that I must make my butter to suit my customers. Suppose W. D. Wood started out to edit a paper, and made a paper just as he liked it, without regard to the likes of his customers. Wrote about things that his mother taked about, printed his paper by hand because his father did. Folded it by hand; never colored up his writings to make them attractive, because his mother thought it wrong. Then spent the remainder of his time grumbling because people did not want his paper, and insisting it was because they did not like him. For surely his paper was just as good as any in the land. If he done that, I think his purse would be as thin as his flesh.

But did he do that way? No, he was wise enough to know that his butter would not come that way. He selected the farmer as needing help, so he got up the "Dairyman." Then studied the individual wants of each. Tell one how to raise better corn; another how to get a better breed of cows; another how to make gilt edge butter; tells how to make, how to ship, and who to ship to; when a new thing comes along he posts you in that. He keeps up with the times by acting wisely. His intelligent paper is the farmers' true friend. The editor is a public benefactor.

And we farmers must step out of the old rut that our mothers trod in, and lay aside the old dasher churn. Cease to work it with our hands, because our mothers did. Let white butter be a thing of the past; forget there is such a thing as barrel salt.

But intstead, let us make butter that the market asks for, and is willing to pay a good price for it; when there is a change in the market, change again. Why, if Merrill & Eldridge should write me that my butter would sell better if colored green, the next tub would go out green. By keeping up with the times, we can only hope to make dairying successful. ADELE M. BRAGG.

Ensilage.

[By H. S. Weeks.]

In responding to the invitation of your committee to prepare a paper for this occasion on the subject of "Ensilage," I have felt that my brief experience in dairy farming hardly warrants my undertaking to impart knowledge to others who have spent their lives in that pursuit, and it occurs to me that my friends and neighbors, from whom I have frequently sought and obtained valuable advice and assistance, may smile and think that I would be more successful in telling them what I *don't* know about farming, than in trying to expound any of its principles.

However, I take it for granted that I am selected to say something about "Ensilage" because I am, to the best of my ability, carrying on the work of my father, the late Dr. L. W. Weeks, who, though taking up dairy farming at an advanced age, was yet progressive enough to adopt the ensilage system when it was comparatively in its infancy, and built, I believe, the first silos ever used in this state, becoming an enthusiast on the subject and urging others to follow his example.

Since then the merits of ensilage have been recognized by progressive farmers everywhere, and silos have multiplied all over the land until they are no longer looked upon as an experiment, but a solid fact, and "have come to stay." Yet I suppose there may be some here to-night who have never investigated the subject and who hardly know what a silo is, but have a general idea that they are a sort of luxury which those only can indulge in who have the money to spend in "fancy farming."

To such, if any there be, I will address myself, because there has been so much said and written on the subject, that to the initiated I can hardly hope to offer anything new.

My good father used to say, "Ensilage solves the problem of carrying a large amount of stock on a small amount of land," and when I tell you that I carried last season forty head of cattle, old and young, from Dec. 1st to June 1st on the product of sixteen acres of Southern White corn converted into ensilage, you will, I think, agree with him; this of course refers to forage, for my objective point being cream, to reach it I feed liberally of grain and mill feed the year round. This year, owing to the great drouth, which, as you all know, extended over the entire growing season, my crop of ensilage corn was light, and I was unable to entirely fill my silos, and have had to supplement my ensilage with other course feed. This, however, might have been avoided had I adopted the "new departure" which has lately been taken in cultivating and curing ensilage. As at first introduced into this country the pratice was to sow the corn in this latitude from the 1st to 10th of June, and cut about September 1st, while it was quite green and juicy. Experience, however, has proven that better ensilage, as well as much cheaper, is produced by sowing a month earlier and allowing the corn to become quite mature and the ears partially glazed before cutting. Had I done so this season my corn would have got a start which would have enabled it to stand the drouth, or rather it would have all germinated and grown, and I should have had a full crop. And here let me give an experience which will apply to cultivating corn whether for ensilage or other purpose, viz.: Never despair of a corn crop, for as they often say of a very sick person, "while there is life there is hope." About the middle of last July, by reason of having been sown in perfectly dry soil and not having been even dampened with rain, my field of ensilage corn looked *sick* indeed, and my friends advised me to look sharp about me for something to feed my cows the coming winter. Advice which I was not slow in heeding; but at same time with the energy of despair, I set about doctoring the invalid, or in other words, cultivating the corn. I put all hands at work with hoes and cleared it of every weed, and kept it clear, also stirring the soil with cultivators every few days the balance of the season, and was rewarded by witnessing the most astonishing growth that could be imagined, though the hot sun poured down upon the thirsty earth, and the simoon from the south parched it day after day, and no alleviating showers came to its relief, yet it continued to grow, and many stalks reached the full height and size that had ever been attained in the best of seasons. The drouth had also matured it to a greater degree than usual, and I was enabled to make comparatively *sweet* ensilage, which is a point in the new department mentioned

above, the merits of which can not be doubted.

By the old method it was necessary to have a large force of men to get the crop into the silo, as haste must be used, and this made it expensive. As now practiced however the cost of building silos and of filling them is cheapened so that it is within the reach of any farmer. All that is required for the building is lumber, in the form of an ordinary ice house, with double walls of matched stuff and tarred paper put on the studding between to form dead air spaces, the bottom of cement to make air and water tight. I am informed that the corn can be cut with a sweep rake reaper, which would be an improvement over doing it by hand, but I have never tried it. When cut, it should lie on the field a day or so to wilt, then haul to silo, cut in one-quarter to one half inch lengths with a feed cutter, and fill in slowly, letting it heat to about one hundred and forty degrees, then add more, and so on till filled, taking as much time as necessary to do the work with ordinary farm help, meantime tramping thoroughly as put in, particularly close to the walls at sides and ends. When the silo is filled level it off and let it stand a day or two, then put on layer of dry straw or marsh hay four to six inches deep, and cover with planks fitted closely at ends and laid snugly together so as to exclude the air as much as possible. Some put tarred paper under the planks but I have not found it necessay. In the matter of weighting there is much diversity of practice, from no weight at all to heavy weight. I have not followed any rule but this year used sacks of bran of 200 pounds weight each, laid closely together, which answered all purposes. Stone boulders are used. Wood may be used, or earth, if nothing else at hand. It is customary to let the ensilage stand a month to six weeks before opening the silo, when it should be thoroughly settled and cured, and come out slightly moist with little or no acidity, and will be greedily eaten by all kinds of stock on the farm, even including poultry, and to equal advantage and profit, it is claimed, though I can only speak as regards cattle, particularly milch cows, which I have found will with the proper grain ration, respond liberally to it in milk and cream of the choicest, and if dry keep in fine condition without other feed. There is, I believe, a vague unfounded prejudice against ensilage, on the ground that it affects unfavorably the flavor and keeping qualities of butter from cows fed on it, but if the guests of the Plankinton House, Milwaukee, fail to detect it in the butter furnished by Mr. Hiram Smith, or the cream furnished by your humble servant, I think it is safe to chance it with the average consumer.

Other equally unfounded objections have been from time to time raised against feeding ensilage but "the ball keeps rolling," to the contrary notwithstanding, and bowls them all down, and it will soon, in my opinion, be a question whether any farmer can afford to be without a silo, some of the following being the "reasons why:"

First. Because more stock can be carried on the farm than by any other system of feeding. Second. Because by that means greater fertility of soil is secured, and larger crops can be raised. Third. Because it furnishes the best and cheapest succulent food in winter when dairying is most profitable. Fourth. Because it requires less space to store it, and does away with the necessity of large and expensive barns.

The Possibilities of the Day.

[By Jennie Robb, of Mount Sterling.]

To-day we meet to exchange ideas, to take advantage of the experience of others, that we may carry forward better the work of civilization, which becomes the *absolute duty* of every individual of this generation, whether or not that individual recognize it as such.

To progress, is our mission! Yea, and progress has come so powerfully over the wilds of the Red Man, that *now* United States of America, even in its infancy, vies with great powers of the world in its catalogue of wonderful achievements.

The *results* of these achievements are so *familiar* to us, and come to us so naturally that we scarcely realize that it has not always been so. We see little but fiction as we read the story of a hero of the May Flower, who awaking from his long sleep, and coming to view the sights of the nineteenth century, sees necromancy in the friction match, falls down in worship before the locomotive which he mistakes for God's chariots of fire, and trembles in the presence of magetic telegraphing, thinking it a

modern system of witchcraft. We talk of the "good old times" when "one man's cow was just as valuable as his *neighbor's*," except that *one* was Cherry and the *other* Brindle or perchance, by some accountable good *luck*, one man owned an old Fill-pail. Though the days of these quaint thoughts are gone, and *with* them those men, who with all the knowledge their age afforded, wrought the problems the times brought; yet they left for us the heritage of their life work.

So to-day we stand with all the results of past labor spread before us, ready to be used as the foundations of the work we would do.

That these vast resources *are* being used in the business world is evident by the magic spirit of enterpriese which characterizes our large cities, and which, through the Institute and other means is working its way into the country.

So much for man's work! What of man himself?

Our Wisconsin poetess has beautifully and wisely written:—

"Make thy life better than thy work? Too oft
Our artists spend their skill in rounding soft,
Fair curves upon their statues, while the rough
And ragged edges of the unhewn stuff
In their own natures, startle and offend
The eye of critic heart and friend.
If in the too brief day thou must neglect,
Thy labor or thy life, let men detect
Flaws in thy work! While their most searching gaze
Can fall on nothing which they may not praise
In thy well-chiseled character, the *man*
Should not be shadowed by the artisan.

This brings to us the question is the man to-day as superior to the man of the past as his *work* of to-day is superior to the *work* of the past. Physically he certainly is not. *Why* not? The air is as vital with life-giving principles *to-day* as it *ever* was; the sun shines as brightly and earth yields as plenteous and as wholesome food: yet the *women* of our land are more broken down and unfitted for life's duties and pleasures than those of any other country, and the American people are styled a *race of dyspeptics*. The cause is simply this:—In the eager chase for fame or money, for so vain a thing as fashion, or so worthy an end as knowledge, we rush headlong, drawing upon physical force as though it were an inexhaustible store. Tho' our bodies are our servants, yet they refuse to do our bidding upon any other terms than by the law of supply and demand. Notwithstanding our labor-saving machinery, the *demands* upon physical force are greater now than ever before, and must be met by a like increased intelligence. Our ancestors seldom carried either their labor or their pleasure into the small hours of the night. In every way they lived simply, and knowledge of the simplest law of life served their requirements. But to gain that degree of physical perfection which is necessary to meet *our* requirements and which the high civilization of the times has placed within our reach, we must adopt more of those simple habits of life, and must take every possible advantage of a thorough and practical knowledge of the *science* of right living.

Every progressive farmer is learning to *work* scientifically. Is it not just as practicable to *live* scientifically? How many a horse is bred and reared with every advantage of the latest scientific methods, while the man who drives him is still a victim to that ignorant living which has made us a race of dyspeptics! The improvements, which the farmer has made in his stock by a close study of the laws of heredity, of the requirements of the system at different stages of growth, and for different results sought, as well as by the intelligent selection of the food given to supply these needs;—the results thus achieved *should* be an honor to him, but, when they go side by side with ignorance and indifference to the relations which *these same* things bear to the welfare of himself and his household, they become a standing monument to his shame.

Any child, with a sound constitution for a foundation, nurtured by pure air and proper food, and properly protectd by clothing, is no more subject to disease, and no more liable to be stricken down by Providence in the spring time or the prime of life,—than is the well-cared-for horse. A comparison, homely but *true*.

Then it will pay us, not simply in dollars and cents, but in all the richest blessings of life, to take time and money, to study and to put into practice sanitary measures; espcially to adopt the more intelligent methods in the selection and preperation of food whose object is to *supply our needs*, and not to sumptuously load the table or to satisfy the depraved appetite.

The subject of dress, though much simpler than others, as ventilation and food, calls equally for reform.

Mrs. Dr. Stockman, of Chicago says:

"No one can realize more than I the devastation and ruin, alcohol, in its many tempting forms, has brought to the human family. Still I solemnly believe, that in weakness and deterioration of health and moral principle, tight clothing has more to answer for than intoxicating drinks. What affects the physical, affects the spiritual. What What affects the animal life, affects the mental."

It is said that women are coming to breathe *perpendicularly* instead of horizontally, and girls are to-day accused of *shallow thinking due* to *shallow breathing*. O! girls, let us adopt wiser habits of dress, let us show an intelligence of so high an order in these matters, that will reflect more credit to us intellectually. Fashion must not make *us*, but *we* must make fashion and make it so as to combine simplicity and grace, and even elegance in harmony with physiological laws. Did we but *half* realize how directly our happiness and our success in every undertaking, depends upon the physical stamina put into it, we certainly would not be so slow in giving these things our attention.

We would make an earnest effort to hasten the day when there will be fewer sickly children, and fewer parents who, ere they reach half their three score years and ten find *life* a *burden*, when there will be fewer homes without a mother. Parents should *maintain* their vigor and strength not only for their *own* good, but that they may be capable of being companions for their young people. How can the mother, whose utmost strength will go no further than to cook and sew for her children, have that intellectual vigor which is necessary to exert any powerful influence over their youthful hearts and minds. Woman to be a power, must be intelligent.

In speaking of the present intellectual status, *ours* is said to be an age of universal education. Indeed, we are so accustomed to hearing eulogies upon the common school that we might suppose that this universal education had reached its maximum of perfection; and that it is necessary simply to give the child a book and send him to the district school, and if there is any material in him he will turn out a Washington or a Webster. Even in these days the idea still exists that a common school education is all that can be used on the farm. And many who admit the advantages of a more liberal education—look with profound suspicion upon the higher instituton of learning, and hesitate to put their sons and daughters; in reach of these advantages, lest they come home from college so highly educated that they are unfitted for their work. Alas, there must be something wrong, and we turn to the school system to find it. O, misapprehended school system; far from perfection, but not nearly so far from it as our *home* education. The cox-comb and the enperficial girl graduate are mental deformities, no more the outgrowth of superficial *school* training than superficial *home* training. Further, they are but few compared with the *many* classmates who, find for every need of life their thorough education to be their greatest resource. It is one of the very laws of nature, that true education will produce *good* results and none *but* good. It is the *little learning* that disdain to enter the common affairs of every-day-life. A well balanced education is a *living power* and will assert its authority in our daily lives as truly as in the halls of Congress. It would teach us, not to shun the kitchen, but to avoid that condition in *ourselves* that would make it the circumference of all that we *know* and *think*. It would free us from slavery to igorant and misdirected work and would teach us to be its masters.

It would give our minds a more wholesome food than the exaggerated details of petty annoyances. The boy or girl who has imbibed any comprehensive views of life from his home influence, will be proof, against the *evil tendencies* of the higher schools and colleges, and will use their opportunities to develop within himself resources of power and happiness. Tho' such opportunities are not the only means for affording this discipline they are most effectual ones, and it is too often the case that he who is not willing to make the effort necessary to obtain the greater will also neglect the lesser means, of intellectual development.

In the State University, short course in Agriculture, which is intended especially to benefit those who are unable to secure the longer course, is pursued by a class of twenty-six members; and not one of them from our

county. Is there not one farmer in Crawford County who is as anxious to improve his *children* as his farm, and who has the *means* and the *inclination* to give his son a chance with these twenty-six? Is there not one farmer's son who has the ambition to place himself among those who are to be the enterprising farmers of the future?

"Paying his own way," is undoubtedly a much more inspiring theme to talk of in connection with some self-made hero than, it is for the average young man to put into practic; but it is much better than being left behind.

There are three reasons why the farmer needs a good education—the more the better.

First.—He needs the mental drill. A well-developed intellect is as much to his advantage as to any one else.

Second.—He needs a practical knowledge of the science of farming.

Third.—*And above all he* needs it as a means of self culture.

He needs it to so fill the home with the good and the beautiful that there will be no room for the vices which *have* been confined to larger cities; but which are now working their way into the country. And do we not realize that country life is vanishing? Railroads and telegraphs, daily papers and travel connect completely city and country life now-a-days. For instance, notice how quickly fashion wings its way into the country, compared with the time it used to take. Hasn't the toboggan craze, even reached this little village? Notwithstanding that country girls and boys used to be old fashioned, there was sterling worth developed by country life which is being displaced by dissipation of city customs. The enterprise which brings so many advantages into the country, bring *with* them new dangers and responsibilities. If parents would not have their children frivulous and sensual they must develop in them a taste for that which is elevating and ennobling.

If your daughter finds her chief delight in the "looky dress" or in the ball-room; if your son finds anything attractive in the saloon or in the low and degrading pass-times, it is because they know no higher enjoyment. Let music, books and other means of culture give their refining influence to home pleasures, and let debating societies and literary clubs and entertainments be among their social gatherings. If there is no taste for such things, it is because they have not been *educated to* such tastes. If we are content simply to drift with the onward tide of progress if we seek no greater improvement in ourselves than that which our times *force* upon us, this age of universal education, with all the advantages of our boasted Nineteenth century, can avail us but little. We must be an element in the work which is to lift us to a higher plane of thought and action.

O, when there is so much to *learn* and *do* that will enrich and brighten our lives, how can we think the winter evenings *long* or be content with those amusements which simply "pass the time away." Rather, let us try what we *can do*, what we *will* do now that as the years roll by, it will not be ours to echo the lament of the follies of this world or the sigh that life is a weary burden, but that we

> "May sing the song that gladdens,
> Leave out the sad refrain;
> Raise up the drooping spirits;
> We do not live in vain,
> O, glorious life! to feel the thrill
> To live, to work and sing!
> O, golden hours! drift slowly by;
> Life is a priceless thing."

Nearest Home.

(By Geo. C. Hill, Rosendale, Wis.)

Friends from the farm and the home, while we meet here, those, so well qualified by their wisdom and experience, to teach us how to double the number of blades, which means better and more profitable farming everyway, we invite you to stop a while nearer home.

Philosophers say, we should eat to live, not live to eat. So should the farm, or any business be subservient to the home; not the home and its welfare sacrificed to benefit the farm.

Devotion to business is commendable; we admire and covet broad and well-cultivated farms, luxuriant crops, fine stock, tidy fences and good buildings. They have their reward. They are useful object lessons. They bring more wealth, which should mean better dwellings; more comforts within and without, and increased powers to bless the world.

It is possible, that in our devotion and haste to get to the meadow and pasture, and the herds and the flocks, and other important matters, we shall neglect the home surroundings.

Doubtless some will be disappointed

when they hear this paper, supposing that "Nearest Home" is the inner sanctuary itself, where, "Be it ever so humble," is the one earthly paradise to those who will have it so. Alas! that from any fault or ignorance of ours it is not so. But this subject is too sacred for my unskilled pen. I leave it for those, who seeing the needs and possibilities of ideal farmers' homes, shall give us the much-needed teaching that shall result in country homes, equal if not excelling any on earth, in all that ministers to the well-being of the family and the state.

It is just outside the door we look for that part of the farm which is nearest home—the lawn, the garden and the orchard. We have seen the marvelous change in the architecture of buildings in the suburbs of our cities. Wealth is lavished to give an odd and pleasing effect to the dwellings, while the effort to improve and beautify the lawn, so it shall be a worthy setting of the gem, has been fully as great and even more successful. Such a wealth of green, covering a broad open lawn, with single and clumps of shade-trees; clusters of shrubbery by themselves, and vines over the porch. Walks and drives all in perfect order; restful seats under the shade, and room for croquet and other games; a miniature park. The lawn of the wealthy. A little of this, we can have about our dwellings; as much and no more, as shall be kept in perfect order. There are two things that should be in front of every farm dwelling. First, grass, and second, trees. There is beauty and utility in both. The lawn should be smooth and kept closely shaven from the street to the door. Drive out the pigs and build a fence around them in the clover. Use the colts and calves no longer for lawn mowers of the house yard. Remove the wood-pile, the leach-tub, the swill-barrel, the lumber wagon and all other convenient rubbish to a proper place, and have a nice clean place to look upon, and where the children can play without seeking a grassplat in the streets, or go to the woods for shade. If we have not the facilities for watering in time of drought, we can compensate by keeping it well enriched.

Trees are among our greatest blessings, and unexcelled in substanial beauty. Some of them we should have about every house. They break the force of the winter winds, and shield from the heat of the summer sun. Under their shade we may sit in the heat of the day; in their branches the birds will build their homes, and from them the children can hang their swing. There were trees in Eden, and there are trees in heaven. Thank God for the trees of our time and country. We sympathize with the dwellers of our treeless plains. A former resident of this county, visiting his old home here last summer, said he would give $500, if two of the trees growing there, could be moved to his home in Russel, Kansas. But because trees are so desirable, let us not make a mistake of having too much of a good thing. A forest or a thicket, is out of the place in the house yard, unless the house and its belongings are such as had better be hid from view. Away with the Lombardy poplar, and balm of Gilead, and give us of our noble elms, oaks, hickories, spruce, hemlocks and maples. Give them room to grow a hundred years. They will increase in beauty with each generation. The noblest trees I ever saw were some white oaks, on a farm near Philadelphia. Apparently they were 200 years old, vigorous, majestic, standing out alone in their grandeur. In the presence of such we uncover our heads.

Much of the rockwork, or "stoneries," as I have heard them called, is anything but ornamental. When we come to this sort of thing there is but a step from beauty and fitness, to the ridiculous. And what shall be said of the Gypsey contrivances for hanging gardens, and the effort to imitate nature by planting unsightly stumps near the door, to be hid by morning glories! Nature kindly hides defects which cannot be got rid of otherwise, but turns her stumps and logs into food for living things. Those who study nature, find her beauty simple, while full, round and restful, with plenty of room for all she undertakes, and with something new to present, at every turn. Such, in a small way, should we try to make the bit of landscape at our door, which with the neat cottage or well painted house, will be a thing of beauty to the traveler, and a joy and comfort to the dwellers there.

It is but a step from the lawn to the garden. The same neatness and order should prevail, but in a more precise way and for a different end. From the

growing of fruits and vegetables, we expect to derive profit as well as pleasure. There is no part of the farm, corresponding to its size, that returns so much for the labor bestowed, as a good garden. By this is not meant the "patch," so generally found on the farm, professing to answer the purpose. The shiftless and unprofitable thing is a disgrace to the thrifty farm, on which it is too often found.

The practical wife and housekeeper well knows the value of a good supply and variety of fruits and vegetables, pleasing to the eye, and tempting to the taste. It gives her the power to banish a half civilized style of living, and puts within her reach, the means to prepare a table fit for a king.

So she urges her lord to prepare the garden spot. He replies that, "We are too busy, and it does not pay any way. We shall have a supply of potatoes, and there will be plenty of green corn in the field." So, although, sooner or later the garden is made, it is done with little faith or hope. A thing to be done and got rid of, like other necessary evils, without regard to any system of cultivation, or the needs of fertilization. Soon the grass and weeds and insects come on, like a mighty, determined host, and take possession, and behold our farmer's garden. It is a good subject for the scythe. Wife says sorrowfully, "our garden is almost a failure this year; we shall have to buy our cabbage, if we have any." Husband replies indifferently, "it's the cheapest way anyhow." So the patient housewife contrives to make a variety for the table by first boiling the potatoes, next by baking them, and lastly, she fries them. To have a garden worthy of the name, select a piece of land containing from forty to sixty rods. In shape a parallelogram The measure of success depends on two things: First, on abundance of fine, rotted manure, which should be prepared the summer before. Second, through cultivation, which can only be economically and easily done with a horse. To facilitate this, everything should be planted in rows running the long way of the garden, with room between the rows for the cultivator. It is not a tithe of the work to keep a garden clean and mellow, by horse cultivation, as it is with a hoe. The garden should be protected on the north and west from cold winds. On the vegetable side make an asparagus bed. Well made it will last a lifetime. From it we get our first dainty dish in the spring. Then come the peas. I find nothing better than "American Wonder," with successive plantings. No bushing; no trouble from birds; of excellent quality. We need a row of pie-plant. Then there is lettuce, radish, cucumber, summer and winter squash, Lima beans, early and late sweet-corn. tomatoes, which should be pruned and trained to a trellis about three feet high. Melons, cauliflower, cabbage, celery, parsnip and turnip, all of these were grown in a farmer's garden in Rosendale the past season.

Onions and potatoes were grown as a farm crop. These give a constant succession and variety. There are other vegetables which might be preferred in the place of some mentioned. Some of these vegetables grow in perfection and, brought fresh from the garden, are real luxuries. Such are sweet-corn and Lima beans, with visions of succotash the year around. Such are tomatoes grown on a trellis, away from the dirt, and exposed to the sun. One of the finest sights the garden affords is a trellis covered with tomatoes grown in this way.

The small fruit side of the garden is fully as important as the vegetable side. Others are to discuss the cultivation of small fruits. We will only name some fruits which have been a success in our garden, and delicacies on our table. First comes the strawberry; a real luxury. By growing a number of varieties the strawberry season has been lengthened to five weeks. Next comes the raspberry, red and black; several desirable varieties, early and late. Then comes the currant and gooseberry, the value of which the housekeeper well knows; the easiest of all the small fruits to grow. Their enemy, the currant worm, is easily headed off. I wish all injurious insects were as easily managed. After the currant comes the blackberry, which is becoming popular. The last of the small fruit is the grape, and this is the most delicious of all. Grapes have been a success with us for the past twenty years, with three or four exceptions. The grape season can be extended for two months and longer by careful preserving. This list of fruits will furnish

a dish of berries or fruit, every day from the middle of June to the first of December.

The number of varieties grown need only be restricted by the time to devote to and the taste for eating them. With me it has been a great pleasure, both to grow and eat them. The following extract taken from The Michigan Horticulturist so nearly expresses my thought on the garden that I quote: "The garden is the poetry of the farm, and though you may never scribble upon paper, to be familiar with the growth and beauty of an orderly garden, will fill your soul with the same kind of delight that it would to spend an hour with your most favorite author. If circumstances prevent me for a day or two from going into my garden, I get real lonesome for a sight of it, and usually embrace the first opportunity to visit this always interesting spot. My children love the garden with its vegetables, its fruits and its flowers, next to the love they have for the house, for it is a part of the home, and there are no forbidden fruits there."

The apple orchard, more or less of it, is found near almost every farm house. It was considered by the early settlers of as great a necessity as the potato patch; and if as much persistency had been used to overcome the difficulties of apple growing as in fighting potato bugs, we might still be in possession of the orchard. The apple of all fruits is the most useful and desirable. On account of its healthfulness and delicious flavor, its excellent cooking and long keeping qualities, it is acknowledged to be the king of fruits. Where the apple grows, there is my country. Where the apple will not grow, there will I not dwell. Oh! the apples of our childhood home; apples red, yellow, green, striped, blotched and russeted; apples big and little; sour and sweet; early and late; apples for cider and sauce; for pies and for dumplings; apples green and dried; apples raw and baked; apples twelve months in a year.

Does it not commend the wisdom of the old serpent, as well as the good sense of this fruit-loving generation, that chose the apple of all the fruits of Paradise as the one best calculated to entice Mother Eve? Was it any wonder that one of her grandsons was so reluctant to leave the old gentleman's apple tree, of ancient spelling-book fame?

Shall we have the orchard by our home? Covered with blossoms in May and laden with fruit in September? We confess to being much discouraged, and the orchard itself looks yet more discouraged. "Well," says the man who has hauled his last appletree to the woodpile, "what are you going to do about it?" The tree peddler is on hand with answer, "plant more trees from our hardy list," and shows flaming pictures of new kinds, which he will sell for one dollar. "The quality is truly 'Nonesuch and they bear enormous crops of fruit the second year.' Very likely nothing will be seen of either fruit or tree, the second year. Selling fruit trees is an honest and useful business. Moreover, the great waste of money, and failure of success, is as much the fault of the planter as the seller. But I have had a little experience, and I advise to "look a leetle out."

Standard trees of the best quality, should not cost over 25 cents, delivered. Some of the best trees I ever planted cost only from 12 to 15 cents. There are only a few varieties that will pay for planting, and they are plenty and cheap. Somebody must try the new varities but they are generally a costly experiment, often ending in failure.

We have a few varieties that are absolutely hardy, but they are mostly early fruit. There are three or four more that, if planted, will pay for themselves. Others will be found, so that we hope to have a good orchard in Wisconsin.

There are growing on my farm in Rosendale, two apple trees, which to the best of my knowledge, have been bearing good winter fruit, for upwards of thirty years, and are good yet. We are not here, recommending special varieties, or discussing methods of cultivation but the fact of an orchard.

We do not advise planting commercial orchards in this vicinity, but we do advise and exhort every farmer, to plant in a good place, 25 apple trees, selected with the best knowledge to be had, and cared for, and protected as living things. If the selection is best, and the treatment such as they deserve, the trees may be expected to bring forth fruit a hundred fold. And every one of them have a pet name.

In after years, while our sons and daughters, turn back in their memories to the wood-lot and pasture, the hillside and brook, the different cows and horses and the old barn, their thoughts

will return oftener and remain longer nearer home. The grassy yard, where they held their sport within sound of mother's voice; the garden with its fruits and flowers and the old orchard with its favorite apple trees, all remind them of the best home, which the sun ever shown upon, and from which they went out to make like pleasant homes, and be living examples of all that is good and noble and useful.

Granulated Butter.

[By John Gould, Ohio.]

The present method of granulation of butter may be set down as one of the most valuable features yet introduced in butter-making, and where practiced, has produced a marked improvement in this product of the dairy.

It is now ten years or more since the introduction of this method, and it has made steady progress in popular favor, but thousands of butter-makers still continue to make by old methods, preferring to gather the butter in the churn into large lumps, or balls, and work out the buttermilk by a mechanical process. These same persons claim that washing butter not only washes out flavor, but blanches color, impairs the keeping quality of the article, and often gives the butter a porous and spongy character.

These objections seem to be fullly refuted by the best butter-makers, who now are adherents of the granular system and attribute much of their success to following it. The rules are very simple, and no one need hesitate, for fear of a complicated process, to try, and prove whether the new system is not only a great saving of labor, but also a means of obtaining most positive and better results.

The best method to obtain perfect granulation is to have the cream well aired, and churned at the first stages of acidity. Cream should, if possible, be churned every day in summer, and at least every two or three days in winter. It is also best to churn at a point as low as possible, especially limpid cream, which may be classed as cream somewhat sweet in character, while if the cream be tough and tenacions, a higher degree will be needed. Major Alvord found that range of creams of all kinds and conditions, to obtain best results at the churn, 55° to 70°, but cream in proper condition can be churned with satisfactory results as low as 50° to 52°.

As the butter assumes a distinct form, the process of granulation should commence. There is some difference of opinion about this point. But it is safe to begin the granulation at the first distant sign of butter, or a little later when the butter grains begin to show about the size of small shot, and here the operation of churning should cease, when a quantity of cold water, in which a little salt has been dissolved, should be added, enough in quantity to cool the mass down to 55°, which seems to be about the poiut where hardening of the globules can be carried, and not prevent cohesion among them. The lower the temperature, the more force is needed to mage the butter compact. and it may be made so low that the butter will be dry and crumbly, a matter that should be aveided. The use of salt with the first, and even all washing, or granulation of the butter, is now generally recognized as an important aid. The salt has its office in increasing the gravity of the cheesey elements of the buttermilk, and if a quantity of water, nearly equal in bulk to the amount of cream, is used each time to graduate and free it from buttermilk, there will be very little trouble in geting a perfect seperation, and very little if any use for strainers and sieves to catch escaping butter. Salt is useful in giving butter a cleaner look in the process of washing than can be secured without its use.

The granulating process should be so conducted that the gathering of the butter in a mass shall be prevented as much as possible, for herein lies the full measure of success. If we churn so as to gather the butter in lumps in the churn, the butter has also inclosed a large per cent. of the albuminous matter and buttermilk, and while in working over, a part of this fluid (caseine and sugar), may be expressed, yet a part remains encased, as it were; and the working over is but to divide and subdivide it so as to make it invisible. This, then, is clear that the nearer we can get to keeping the granules separate during the stage of washing with brine, the more nearly we shall accomplish our purpose in freeing the butter from buttermilk, and exchanging this butter-

milk moisture of the butter for one made of pure water and salt.

To how many washings granulated butter shall be subjected judgments differ, but if a little salt is used each time, it is safe to repeat the operation until there is no showing of milk. Lately there has been much discussion about how granular butter shall be salted. As no butter-maker now advocates using more salt than will readily dissolve in the butter by its own moisture, it then stands to reason that all we can do for butter is to put it, while in the granular stage, in a bath made of all the salt that water will dissolve, and allow it to absorb this saturation, filling the interstices among the globules with the dissolved salt. To do this effectually, it would be best to first allow the butter to drain as freely as possible before the brining process commences, so that there shall be as little weakening as possible of the last salt solution.

It may be urged that this washing in two or three waters takes more time and labor than to work by old methods. To do good work, a person needs tools adapted to the requirements of the case, and so the making of the granular butter is best done in some of the forms of revolving or rectangular churns. By their use the agitation needed is done by one or two turns of the churn. If a little salt is used with each washing it produces a yet greater difference in the gravity between butter and the caseinous matter, and if quite an amount of water is used the butter, after the agitation, quickly comes to the surface, and the buttermilk or brine wash is then at once drawn out from beneath the butter, and it is as quickly renewed. It is always well to have the temperature of all the washings at about 55°, as a warm bath is liable to give the butter a shiny look.

The salting may be done by incorporating salt and working it into the butter, setting it away to dissolve before working over, or it may be put into this bath of strong brine, where it remains for an hour; but it needs a little agitation occasionally, as the tendency of the butter is to rise above the brine, and the object is to coat each little globule with a film of salt, and when the working over takes place the brine fills the places once occupied with buttermilk. It is said that brine-salted butter is not salt enough. It is certainly as salt as butter salted by any process that does not contain more salt than is readily dissolved by the butter. Any salter butter must be full of undissolved salt, and that would not add to but rather detract from the keeping quality of butter.

The reason why brine fails to give proper salt flavor in the hands of some operators, is that they do not take cognizant of the fact, that the butter at the start is full of water which reduces the strength of the brine by so much. And if the butter is allowed to absorb this "saturated solution" salt for some moments and then is withdrawn, a new supply of salt disolved in this same brine; and then returned to the butter, the last "bath" completes the work, and the butter now has its full amount of one-half ounce to the pound.

With granulated butter, whether brine or dry salted, there should be very little working over—just enough to press out the unneeded moisture. Some makers put this butter on a worker, and with a flat lever press it into compact form and pack. In brine salting, it is possible to take the granular butter out of the bath, and by putting a small quanity into the package at a time, work it over sufficiently by the one operation of packing. But the "potato masher" used for that purpose should never be turned or twisted in the butter, but rather pressed down, and the moisture removed with a damp cloth which is frequently rinsed out in the brine.

To sum up, the advantages in brief for granulated butter are: There can be no injury to the grain of the buter, or "salving;" working over butter is practically avoided; and the butter is rinsed free from the butter milk, obviating the mechanical part of expelling it by force. The injury liable to be done by coarse salt cutting the grain of the butter cannot happen and the salting is even; taking on color alike by the action of the salt, the butter is made uniform, and if it is handled in this method, and the cream at the start is well ripened and mildly acid when put into the churn, there is little need of the thousand and one grades of butter now found in the market. And the poor house wife will find that the butter was made with half of the labor, and two chances for success now, by the old methods the one not always secured.

Potato Culture.

[By A. W. Penney, Weyauwega.]

The first thing to be considered is the and on which the potato is to be planted. Experience has shown that new land which has raised but one crop of grain is by all means the best, providing the land was thoroughly broken and cleared of grubs; if not it would be better to take off two crops before planting to potatoes. In case the farmer must depend upon old land to raise a crop of potatoes, he should turn under a crop of clover in the month of August, ploughing rather deep and endeavoring to turn the clover all under, ploughing again in the spring but not deep enough to turn up the rotted clover. This method insures mellow land well fertilized, and with proper cultivation one should get a good crop. Potatoes should not be planted too often on the same piece of land. Experience has shown that we do not get a large yield and the quality is greatly inferior. At least three years should intervene between crops. Land that is a little rolling in my opinion is preferable to low land, as potatoes planted on low ground do not get sufficient air and in consequence are more liable to blight than those planted on higher ground. Agricultural writers claim that blight is caused by an insect that attacks the tops of the vines and works down to the potato, its ravages being much increased by wet, followed by warm sultry weather. Hence the importance of the vines getting the benefit of any air that may be stirring. Next in importance is selecting and preparing the seed. Use good sized and well shaped potatoes, cut so as to leave two to four eyes in each piece; if seed is cut in small pieces it is liable to rot in case of wet, cold weather after planting. A good sized piece is necessary to properly nourish the germ. Farmers should avoid cutting large quantities of seed and putting in bags or piles, for they will heat very quickly and destroy or weaken the germ. If circumstances compel the use of small potatoes for seed, I would recommend planting them whole after clipping the seed end. I would also recommend sprinkling the cut seed with land plaster as it prevents loss of moisture and acts as a fertilizer. Extra care is necessary in selecting seed this year on account of the second growth formed on our last crop. The leading varieties now in the market are the Burbank, Early Rose, Beauty of Hebron, Dunmore and Peerless. I would advise planting the Early Rose and Beauty of Hebron for the fall market, but avoid planting what are called the late Hebron, which is a large, coarse, deepeyed potato with a yellow coat inside, they do not cook well and are not wanted in the market. For the winter and spring market plant Burbank, Dunmore and Peerless. In consequence of the largely increased competition of Michigan, Utah, and Colorado our markets at St. Louis, Kansas City and other southern points is cut off, the quality of our potatoes this year being inferior to those grown in other states. Unless farmers and dealers take all possible pains to put our potatoes on the market in the best condition, "Waupaca county potatoes" will never again have their former good reputation. Large quantities of land in Michigan from which the timber has been cut, is being broken up and planted to potatoes. This land is a sandy loam and produced large crops of a superior quality. We must expect to meet this competition every year, hence the necessity of improving the quality of our potatoes. Look at the market report in any Chicago paper, and you will see Michigan potatoes quoted several cents higher than ours. It is very important that potatoes should be put in cellar dry and bright, in order to have them come out with a good color. Farmers should not dig when the ground is wet and weather damp and cloudy; digging in the first half of the day and drawing in the afternoon unless the sun is too hot, is in my opinion the better way. A bright, clear appearance aid to sell the potato in all markets. Care should be used to keep cellars dark; strong light injures the appearance, also the quality. Cellars should be aired frequently as possible, and kept as cool as they can be and not chill the potatoes. Avoid bruising or peeling when storing in cellars, a smooth plank with strips on the sides is a good arrangement to slide down baskets or boxes into the cellar—spouting them into the bins is not a good practice. If all farmers would sell a part of their crop in the fall and put the balance on the market during the winter as the demand requires, it would be much better for growers and dealers. Potatoes cannot be stored in Chicago or Milwaukee without going to heavy expense and

the tendency in all markets is to buy only as required for immediate use. It is not best to attempt to rush our crop into the market too fast at any time of the year, for heavy shipments break down the price and injure the farmer and dealer. As Michigan can ship her crop to Chicago, Milwaukee, St. Louis and all southern points at much less for freight, than Waupaca county crop can be moved, the great importance of securing more railroads is readily seen. We can never hope to get as good rates of freight as the Michigan producer with but one railroad leading to our principal markets.

The Durham in The Dairy.

[By Prof. Wm. Brown, Ontario Agricultural College.]

My subject is not a new one certainly, even in a comparatively new country, for much of this land has had a great deal to do for half a century with the class of cattle called Shorthorns, which I think should be called Durham.

The development of the dairy industry during very recent years has warmed up on all hands the wonderfully uncertain field of breed records and individual "cow records" of breeds, and these have been of such a sledge-hammer character from several quarters that many of us have simply stood with open mouths. This kind of work will lead to good eventually, though at present it is somewhat misleading.

Before such a company as this it is quite unnecessary to talk Shorthorn history as we have it in the books, and necessarily you are also well up in all recently published accounts of your own favorites as well as of other breeds. I considered then that you would be interested in hearing what Canada thinks of the red, white and roan, and what has been our experience of them during 1885, in dairy products.

And, one or two thoughts before submitting some facts—what Ruskin would call "sapling truths" applicable to the subject.

I think it is very desirable in this day of 1885 to decide upon some things in live stock anywhere. And surely it is time to distinguish between disputed degrees of usefulness among classes of cattle and to summon, as it were, the national energy to what is universally best. We have been reconciling ourselves to the infliction of breeds, by custom we have come to tolerate and indeed to respect by custom, that which is comparatively valueless for the average farmer. Of course, in order to ascertain that which is best we have submitted to many long contests under the best of authorities, and I declare in all charity and impartiality, it is now time to call a halt, analyze, and say good-bye to several. We have by the best of evidence, in some classes of cattle, things that cannot possibly be crushed out by any tricks of fashion or booming, or change of markets.

As I have had occasion to say to our people lately—and I am not afraid to anticipate with you now by saying—that although you are not old, neither are you young in experience nor in enterprise. Naturally during the past ten years the fever of breeds has occupied much of your attention along with other nations, and while admitting the liability of the outside markets, such as ranching, to change, there can be but little in the future to affect your local wants. Your *rural* conditions are not of a kind to be twisted about by every wind of farm speculation, for like Ontario, you are solidly crop growers and must always remain so. It is not necessary at present even to touch upon the legitimate fields of live stock open so favorably to us all in breeding for others—in classes of cattle that are not so desirable for ourselves.

As crop growers, therefore, you must always remain prominent producers of cattle, even assuming you had no outside market. We require cattle directly and indirectly for beef production, and cattle for the dairy. I know of no other local cattle wants. Were the dairy to become one-half of all our agricultural interest, and one-half of our arable area become permanent pasture, we would perhaps hesitate in bidding good-bye to the half-dozen breeds that we think must bow to the Durham, but will the northerners ever change from the six months dry fodder and beef. We are also still of opinion that north country judgment will always admire the milk, and butter and cheese, as seen through the greatest consistent allowance of flesh, so that could we possibly get all the desired value from an Ayrshire, Holstein or Jersey, their size and form are against them. To say that this is foolish, may be right commercially, but what is be-

lieved and bred in the bone, is said to be invaluable so long as it is believed. And now for my subject:

Only one method of criticing a breed: To compare it with others, under equal conditions.

I. DURHAM TYPES:

1. Booth and Bates.
2. Cow most comparable with Ayrshire.
3. Our ignorance of forms of animal life, that gives certain re-results.

II. THE "CHARACTER" OF DURHAM MILK:

1. Globules.
2. Free milkers.
3. Centrifugal evidence.
4. Evidence by grading.

III. QUANTITY OF MILK.—1. Extremes prominent, causes of this. 2. Mismanagement.

a) No choice of bulls.
b) No choice of families.
c) No choice of individual cows.
d) Improper feeding.
e) Calf suckling.

IV. CREAM PER CWT.—1. Not a safe practical guide always. 2. The O. E. Farm Butter Factory, of 1885. All Shorthorn grades.—140 days.

1. Milk set in cans 20x8½, set in 50 inch tanks, with ice or spring water.
2. Gathered and paid for 62,899 inches of cream.
3. Paid $8,552.28 for said cream.
4. Made and sold 63,350 pounds of butter.
5. Received for butter-milk. $550.
6. Received for butter, $12,250 60.
7. Paid $1,420 for making butter.

The Shorthorn lesson is: Two hundred patrons of Shorthorn blood got $43 each during five months, for part of their cream, and used the sweet skim milk in making calves; in a neighborhood famous for high-bred Shorthorns, where dairying is not a profession, where therefore this money was simply pin money for wives and daughters.

V. BUTTER FROM MILK.—1. Not a matter of summer product only.

VI. BUTTER FROM CREAM.—

VII. CHEESE.

THE ONTARIO EXPERIMENTAL FARM. DAIRY TEST—SEASON 1884-85.

SOURCES.	Milk Per Season.	Cream Per Cent.	Butter per 100 lbs. Milk.	Butter per 100 lbs. Cream	Cheese Curd per 100 lbs. Milk.
	Est'd				
Holstein	7000	11 9	2.4	34.5	10.9
Ayrshire	6000	16.9	4.5	43.5	12.9
Ontario Grade	5000	9.5	4.4	41.6	12.2
Shorthorn Grade	4500	16.8	3.7	46.3	14.9
Guernsey	4000	16.1	2.5	44.5	12.7
Quebec Grade	3600	14.0	3.4	52 9	13.9
Jersey	3500	19.9	5.1	55.0	15.6
Devon	2800	11.6	3.7	51.2	11.9
Galloway	2500	11.8	2.3	34.0	11.7
Aberdeen-Poll	2300	12 8	3.5	28.0	10.1
Hereford	2000	9.5	2 3	45.0	9.3
	3800	14.0	3 5	43.7	12.5

CHEMICAL ANALYSIS OF MILK.

SOURCES.	Fat.	Solids other Than Fat.	Water.	Total Solids.
Je sey	6.62	8.03	85.35	14 65
Ayrshire	5.72	7.81	86 47	13.53
Ontario Grade	4.65	8.60	86.75	13 25
Galloway	4.38	9.90	85.72	14.28
Devon	4.13	8.02	87.85	12 15
Quebec Grade	4.08	8.77	87.15	12.85
Shorthorn Grade	4.03	8 55	87.42	12.58
Holstein	3 73	8.15	88 12	11.88
Guernsey	3.60	8.20	88 20	11.80
Aberdeen-Poll	2 87	8.70	88.43	11 57
	4.44	8.54	87.02	12.98

Proper representation of the Durham:

1. Duties of such Societies as this.
2. Why not being boomed for the dairy?
3. Are you giving special encouragement to dairy merits?
4. Testing at Ontario Provincial.

CONCLUSIONS.

1. The Durham is a heavy milker.
2. The Durham is a long milker.
3. The Durham is a prominent butter maker.
4. The Durham is a heavy cheese maker.
5. The inducements to special breeding:
   Ranching.
   Dairying twelve months.
   Stall feeding.
6. No breed so amenable to man's purposes.

MILK COMPETITIONS ONTARIO PROVINCIAL EXHIBITION. 1885.

Breed.	Milk per Day.	Time Since Calving.	Butter per 100 lbs. Milk.	Net Cheese Curd per 100 lbs Milk.	Total Value.
Holstein	29.20	124	2.97	16.6	53
Ayrshire	24 50	129	4 27	22.7	67
Jersey	25.50	100	7.28	29.3	94
Shorthorn Grade	35.50	137	3.37	20.6	99
	28.70	122	4.47	20.0	71

XXIV.—SYNOPSIS OF DAIRY VALUE OF BREEDS OF CATTLE, PER 100 LBS. MILK, AS GATHERED FROM O. E. FARM EXPERIMENTS.

Breed.	Cream.		Butter.		Cheese.		Mean, per Season of 210 Days.	
	Winter.	Sum'er.	Winter.	Sum'er.	Winter.	Sum'er.	Winter.	Sum'er.
Jersey	$0 77	$0 80	$1 03	$0 71	$1 42	$1 90	$54 00	$57 00
Shorthorn	0 71	0 67	0 88	0 56	1 25	1 76	47 00	50 00
Ayrshire	0 75	0 75	0 83	0 68	1 20	1 52	46 00	50 00
Shorthorn Grade	0 62	0 72	0 70	0 56	1 45	1 70	46 00	50 00
Quebec Grade	0 52	0 56	0 75	0 58	1 40	1 52	44 00	45 00
Devon	0 60	0 47	0 80	0 46	1 47	1 18	48 00	35 00
Holstein	0 40	0 55	0 40	0 39	1 00	1 18	30 00	35 00
Guernsey	.....	0 65	.....	0 42	.....	1 10	.....	36 00
Galloway	0 47	.....	0 39	.....	1 30	.....	36 00	.....
Aberdeen Poll	0 50	.....	0 59	.....	1 10	.....	36 00	.....
Mean	0 60	0 65	0 71	0 55	1 29	1 48	43 00	45 00

Subject to the actual quantities of milk and the duration of the milking season, as may characterize each breed, we obtain from this table a good idea of their value by every hundred pounds of milk for any special line of dairying; cream is charged at 4 cents, butter at 17 cents, and cheese at 10 cents per pound.

It is not at all likely that Ontario will agree for many years to come, as to the average quantity of milk per season from different breeds and grades; Europe is still quarreling over this subject after one hundred years' experience; it is necessarily much more difficult than quality in all its forms, so that all we can do at present is to talk "*per* 100 *pounds milk.*" A very superficial glance at this table gives rise to some very serious dairy thought.

If cream be the particular subject desired in value per 100 pounds milk, the Jersey, Ayrshire and Shorthorn with its grade make a very close competition and are away beyond comparison with others; a middle range is taken by all the others.

But if butter is wanted it would not be sound argument, necessarily, to follow the bulk of cream; were this the case, some that are high would stand second only to the Jersey, but they do not, the Ayrshire now ranks with the Jersey and Shorthorn in first-class value of butter from the 100 pounds milk.

Still further, if cheese be the principal object of the dairymen, the choice becomes more difficult, because it appears that the properties required for it are much more evenly balanced amongst breeds than either cream or butter. The Jersey and Shorthorn grade are about equal in value of cheese per 100 pounds milk; the Galloway, Ayrshire and Quebec grade are average, and the others under average.

Another view of the respective merits of the breeds for dairy purposes is through a "mean of things." As the table is arranged in that order, it is unnecessary to repeat the list. Observe, however, the extraordinary range between the extremes of $57 and $30 per season of 200 making days. If the Ayrshire is taken as a standard—a position we have already given it on another subject in this report—its annual mean value of $48 is just the mean of all the ten breeds, and we shall allow 5,000 pounds of milk for this standard annually from this standpoint. The following would be the *amount of milk required from each breed* in order to make each equal in value per season, for a mean of cream, butter and cheese, during winter and summer.

Breed in Order of Milk Quantity Required.	Quantity of Milk required per season of 210 days.
Holstein	7 270 lbs.
Devon	5,714 "
Quebec Grade	5,393 "
Ayrshire	5,000 "
Shorthorn Grade	5,000 "
Jersey	4,324 "

Now, will any of the breeds produce in 200 days the milk placed opposite

its name? We say, decidedly not for the Devon and Quebec grade, but on an average the position of all the others is possibly not wide of what is actually the case—not high for the Holstein, high for the Jersey, but otherwise a very good average.

Having gone this length with indications of value per season, it is but fair to add that, *granting the quantities of milk* as given, it could well be argued that some of the breeds would return more money by making a specialty of a *line of dairying*—whether milk for direct consumption, cream for butter, or for cheese.

MILK PER SEASON: ESTIMATE OF AVERAGE OF DIFFERENT BREEDS.

BREEDS.	Milk—Lbs.	Value of Milk Alone.	Mean Value of Milk, Butter, and Cheese.
Holstein	7,000	$52	39
Ayrshire	6,000	45	47
Ontario Grade	5,000	37	33
Shorthorn Grade	4,500	34	43
Guernsey	4,000	30	33
Quebec Grade	3,600	27	39
Jersey	3,500	26	46
Devon	2,800	21	35
Galloway	2,500	19	28
Aberdeen Poll	2,300	17	26
Hereford	2,000	15	25
	3,850	$29	33

I believe no one could do more than estimate this subject, for nowhere can we find enough material for definite figures. But from European and American testing, from public and private dairies, exhibition tests, and factories and experimental stations, an approximate estimate can be made of the average quantity of milk given by different breeds during a season—which ranges from 200 to 300 days, according to peculiarities of breeds and their management. In criticising the above estimate, therefore, remember the variety of the source of information, the more extensive use of some of the breeds in dairies, in comparison with others—such as Ayrshire vs. Hereford; consider, also, the duration of the milking season as characteristic of breed, the physical conditions appropriate or otherwise, for such production and continuance, and particularly, we must cautiously handle the record of individual cows that have of late been so much offered as public property.

PASTURES.

How to Make and How to Improve them.

[By Fred E. Carswell, Lone Rock.]

The subject of pastures is one that is of importance to nearly every farmer in the county. Twenty years ago there was but little attention paid to it.

The customary mode of handling cattle in this western country then, was to feed them from straw stacks during the winter and let them hunt their living in the woods or on the commons during the summer. But as the country grew older, western people have learned what the eastern farmers learned several years in advance of them, that the handling of live stock is one of the best methods the farmer has of gaining a livelihood and acquiring property.

This has led to more advanced methods of feeding and pasturing cattle, as well as improving the fertility of the farms, and more than this it has taught farmers to study, think and act for themselves, without jogging along in the same old ways year after year.

Now, as dairying and stock raising are becoming the leading industries of the country, the pasturage as well as the care and feeding of stock is becoming one of the principal topics of conversation and argument among farmers.

My views may differ from yours, and if so, I hope you will criticise and give your views in return.

Pastures that are best suited for beef cattle may vary somewhat from those best adapted for dairy cows. This point I will pass over for you to illustrate more fully in your subsequent argument than I have time to give the subject. In speaking of pastures my remarks will mostly be confined to pastures for milk production as my experience has been mostly with that kind.

The subject I have taken may be divided into two distinct topics. First, "How to Make a Good Pasture." Second, "How to Improve it."

First, all plowable land should be fall plowed and thoroughly harrowed before seeding. Extra harrowing and well pulverizing land are essential for good success in grass seeding. Use a variety of grass seed, such as red top, Kentucky blue grass, timothy, white clover, Alsike clover and orchard grass. Use plenty of red-top seed on low land and bluegrass on the high land. Alsike clover is preferable to mammoth red clover for pastures.

A black sandy loam with clay subsoil, makes the best natural pasture land, although most any of our Wisconsin land can be made good with proper handling.

The best pastures for all seasons consist of part low land and part upland. Low lands yield the most bulk of feed per acre and stand drouth the best but upland pasture is more nutritious and is prepared by cattle.

The hills we have make splendid pasture lands by clearing off the timber and brush and then sowing grass seed just as the snow is leaving the side-hills in the spring while the ground is yet soft and loose from action of the frost.

Seventy-five to one hundred pounds of land plaster should be sown per acre, as soon as the snow leaves the ground. The earlier the better. Land plaster sown with grass seed when seeding wild land that has been cleared of brush will facilitate the germinating of the seed and give the young plants a vigorous growth.

Our bluffs and steep side hills make the best pasture by never trying to plow or cultivate them. There are from two to four inches of very rich soil on the surface that produces an abundant growth of tame grasses that is preferred by cattle to the grass grown in the valleys on cultivated land. So, don't sell your farms because they have bluffs and hills on them, for they make the best pasture, and the cattle can graze on both sides of the land, which they can not do in a prairie country. In arranging your pastures for dairying purposes have at least a day pasture and a night pasture, never allowing your stock to feed on the same field night and day. It is better to have two day pastures and two night pastures; then change your cows the first of the week from one day pasture to the other, and the middle of the week change them from one night pasture to the other.

This plan will give them fresh feed every three or four days, and allow the grass a better chance for growth. We should not allow too large a growth to get the best results from dairy cows, although very close cropping will decrease the quantity of grass production, and permanently injure the grass roots. This we cannot always prevent, especially in very dry seasons like the past summer has been.

I believe grass to be the most succulent and best adapted for milch cows when it is from two to four inches in height. Beef cattle fatten better on grass that is a little larger and more mature. As pastures diminish in production in the months of August and September, feed green corn and other feed to supply the deficiency, so that your pastures may never be very closely cropped. If on a portion of your pasture the cattle seem to shun the feed and allow it to grow up large without feeding it off, sow it heavily with land plaster, and you will find the next season they will feed on it as well as any portion of the field.

Cattle should not be allowed to graze on pastures in the fall when the grass is covered with frost, as they will destroy in an hour as much feed as they will eat all day.

Keep your cattle off from grass land in spring, when it is very soft, as they do a large amount of damage tramping down grass roots. Always try to give your cows an abundance of pasturage, but keep it fed close enough to preserve the succulent and nutritive qualities of the grass. A great many plow up their pastures too often, the older the pasture the better feed they produce. Old pastures not only produce a better quality of food, but also a greater quantity if they have been well managed.

One of the cheapest and best methods of renovating worn soil is to pasture it a few years. If it is badly worn it will also need rotating a few times.

Sandy soil makes splendid pastures by using mostly clover for seed, with land plaster and plenty of barn-yard fertilizers.

Fertilizers with a large amount of ammonia in them are very beneficial to cold, damp soil which cattle are very liable to shun, owing to a lack of nutritive qualities, this being absorbed by the grass roots.

In conclusion I will say, fertilize your pastures as you do your meadows, and aim to give the grass roots plenty of nitrogenous food if you desire good milk and good results from dairy cows.

The Horse.

[C. S. Ogden, Weyauwega.]

Having used horses in different kinds of business for over sixty years, forces me to form certain opinions and theories in regard to them.

My experience teaches me that a horse should be of such size, form and

disposition, suitable for the work which he is to do, and then should be treated right to make him useful.

There are several kinds of horses and different kinds of work for horses to do. Every man who uses horses has an idea what kind of horses suit him.

Having at different times in my life used and worked horses on the race track, on the farm, on the road, and in the lumber woods, causes me to believe in the horse that I shall describe to you.

As a great many men think a fast horse to be the most valuable, we will first describe a race horse as we understand him.

A successful race horse is one that can go fast at his particular gait. He must be a light horse, and have the right kind of muscles to be a successful race horse. Like the violin strings they must stand the strain to be brought to the right pitch and hold it. If he fails in this, he is like the poor violin strings, worthless as a race horse. He must have the right action, and a disposition to do his best when called upon. With all these good qualities, he must have a certain unseen power, a power which never can be seen or known except upon trial.

A horse may have a perfect form and action, and a disposition or willingness to do—be what a horseman would call, to all appearances, a perfect horse—and then be a failure as a race horse.

No man can tell the speed of a horse by his looks. The hidden power that connects the will with the muscles, is the principal thing in furnishing speed.

If the connection of the brain or will power with the muscles is perfect, the horse will be able to go fast. This power, with the form, gait, and disposition all right, the horse can go fast, and if in right condition can hold his speed to any reasonable extent.

This nerve power works some like electricity on the telegraph wire. The instant that the operator touches the keys at one end of the wire, the message is delivered at the other end. So it is with the horse. When he wills the foot to move, it moves, and the quicker this nerve power acts, the faster the horse will go. It don't matter what the breeding may be. A horse may be what is called standard bred, and have a pedigree a yard long, and then be a lubber as a race horse.

It is an easy matter for a man to talk horse; to show and explain the good points of a horse. You will find such men at nearly every cross-roads. They will tell you how to breed such horses, how to select and handle them. They know all about it; in their own estimation they know more than their neighbors. For some reason these great horsemen generally fail to bring out any fast horses.

The fact is that raising this class of horses is like buying lottery tickets, you may draw a prize the first time trying, and you may try it a thousand times and draw a blank every time. So it is in raising fast horses; you may get one the first time trying, you stand one chance in about 10,000. My advice to you is, don't invest too much on such chances, unless you have more than you have use for. If you have more funds than you have use for and wish to benefit your neighbors, it may be well enough to experiment some in this direction. I will not at this time undertake to tell you how to train and fit horses for racing.

If you want a horse for moving heavy loads, you will need one with large bones and muscles, large shoulders and hips, short and broad back, short legs, a good walker and a disposition to pull steady. Such horses generally find a ready market, making it a safe business to raise them.

This being a farmers' meeting, I suppose you generally have a greater interest in the horse suitable for farm work, than in other classes of horses. The condition and circumstances of farmers differ so much that a proper horse for one might not be suitable for another in different circumstances.

A horse to suit me for farm work, or one that I would select to work on the farm, would be a well-bred horse, at least one-fourth thoroughbred, weighing from 1,000 to 1,100 pounds, with good feet, and flat legs of medium length—one that can work on the farm the year through without shoes. Without good feet and legs, a horse is nearly worthless for any purpose. He should have a strong neck, shoulders, back and hips, be easy to keep, so you can raise some grain to sell or feed to other animals; a good walker and a fair roadster. Such a horse, if well cared for, will draw the plow all day, then go to town at night if necessary, will work, if well taken care of, the year through and last

till he is 30 years of age and do good work. A larger horse may pull a heavier load for a time. He will be more expensive to keep and wont last so long. He cannot go without shoes so well, will tire quicker on soft ground, is more liable to lameness, and when lame or injured cannot perform so well as a light horse with same injury. You can also use lighter implements and tools. You don't want a four-horse wagon for two horses; neither do you want a poor plow. Some plows draw like pulling a cat by the tail. Three-fourths of the plows used run too hard. A right kind of a plow will draw from 50 to 100 pounds lighter than our common plows. Have farming implements suitable for your teams.

With all the good qualities mentioned, a horse needs a good disposition for any and all kinds of business. He may be perfect in all other respects and have a bad disposition, making him nearly worthless.

Horses are a good deal like men. Some men are stubborn and contrary, some are foolish and cranky. Such men are difficult to get along with. You avoid such men as much as possible. It is unpleasant dealing with them. They are not liked by their neighbors. Generally you want to get rid of such neighbors as soon as possible. So it is with the horse. When you get a cranky or a fool horse, go to a regular horse trader, who will generally exchange a good horse for a poor one and some money; and if you wish to make a good trade, don't publish the faults of your horse any more than necessary. Let the next man tell them.

If you wish a good horse to perform well in any place or business, you must fit him for it, feed and water him regular, give him regular exercise according to the work you want him to do, give him a suitable stable, with good bedding, where he can rest comfortably. A horse that works hard should have the best of care.

Race horses are kept in large, roomy box stalls, turned in loose, cared for in the best manner possible, so as to be in perfect condition for their business. Give your work-horses just as good care and treatment as you do a race horse; he deserves it. Then when you call on him, he is able and willing to respond to it. When you neglect your horse, fail to care for him properly, you have no right to expect much from him. You neglect a horse to your injury, and justly too. The man who abuses the horse is not fit to own or use one.

In the first place make up your mind what kind of a horse you wish to raise, then select the dam and sire; there is as much if not more depending on the dam than on the sire. The old adage that, like begets like, sometimes fails. Some of the best horses in the world don't take after the dam or sire. Horses are like men in this respect. Some of the ablest men the world ever produced had weak specimens for parents, and some of the ablest men and women have weak and foolish children. Some of the best horses have poor colts. The dam and sire must be suitble for each other in order to produce the right kind of colts; then they should be healthy, have regular exercise, have proper care and food, not over-fed.

Colts should be fed on bulky food such as clover, wheat, bran, and roots of different kinds. Anything that will expand the chest, make bone and muscles, and keep them growing and healthy, let them run loose in a lot where they can exercise, with good sheds for shelter and feeding in the winter, and clover pastures in the summer, with good water and a little salt, then if you fail it wont be your fault. Colts kept in this manner, when three years old, if used properly are able to earn their keeping.

If your horse gets sick, nearly every man you meet will give you a sure cure prescription. They have tried it, have seen it tried, often if you follow their directions, you will surely cure or kill. Having been something of a horse doctor, I will give you a prescription which I seldom knew to fail, it wont cost you anything for the medicine, or for the information: when you just discover that your horse is sick, give him a handful of salt, then turn him loose in a good room and warm place where he can lie down, roll and move about when inclined to do so. If you don't know the cause of his sickness, don't give him any more medicine; if he is very bad go to some horse doctor who knows, who will tell you the cause, when you know the cause you can safely give him the proper medicine. Never drive or work a horse when sick. A horse when sick needs to be quiet just as much as a

sick person, and they need about the same treatment. Don't rely on quack horse doctors, if you do you had better get out of the horse business.

If you have a good horse or colt be careful how they are handled. Don't let any one use or handle them unless they know more than the horse. A man must have good horse-sense to handle horses successfully. Many kind and well disposed colts and horses are spoiled by bad management. A child will generally show their bringing up; so will a horse: treat a horse as you would a man, have him think that you are his friend, don't swear at him; don't whip him; don't talk loud to him; don't ask him to do an impossibility; treat him as you would a friend, then if he wont stand such treatment get rid of him. Nearly all horses can be coaxed and managed by kind treatment. There are some men that cannot be persuaded or coaxed to do right, without a club. And it is so with horses. There are exceptions to this as to other cases. A horse or man who can not be coaxed or persuaded to do right will generally yield readily with a club. They are cowards when they learn that they will get hurt unless they yield, they are very apt to surrender. A coward wont fight much after he gets hurt. A kind and well disposed horse will resent bad and harsh treatment.

If a horse wants a club and a loud mouthed profane and blustering man to handle him, exchange him for one who prefers kind treatment.

There is much if not more depending on the training and treatment of a horse to make him useful and beneficial than upon their breeding.

A horse that is naturally stubborn and willful, may be broken of their bad notions, or rather educated to a higher and better plane and be useful. It will pay one who uses horses, to study their nature and dispositions, and if the horse has faults teach him to overcome those faults. There are but few horses but what have intelligence enough to be taught new tricks and habits: teach him as you would a person. There is an enjoyment in cultivating good habits in a horse, as well as man. Show your intelligence and good disposition by treating your horse well. When you go to town, don't hitch your horse to a post and let him stand in the cold and chilly wind while you are getting a glass of beer or a smoke; put your horse in the barn and put a blanket on him even if it does cost you ten cents; better pay two shillings than spoil your horse.

There are more horses injured by standing hitched to a post, in the cold chilly winds, in this country, than by all other means combined. I have seen horses standing hitched in the streets of Waupaca for half a day at a time, when a man could not stand out for half an hour without shivering. A man ought to be imprisoned for treating horses in that way, besides loosing in the value of the horse, many times horses are injured and stiffened up by standing exposed to the chilling blasts of a cold and raw wind, when the owner thinks his horse to be foundered by an over-feed or watering when too warm. Nine tenths of the stiffened and crippled horses are made so by this brutal treatment. Some horses are injured by overworking or driving while too young. Young horses while growing are tender, spavins, ring bones and wind puffs, are generally made before the horse matures. You seldom find a strictly sound horse in this country. A horse should not be put to very hard work before he is seven years old. In my opinion horses do not get to their best before seven years old, and some don't before they are ten. Some get hurt easier than others; there is as much difference in the strength and powers of endurance of horses, as there is between the strength of steel and iron. All horses are more easily injured while growing and tender, than after they mature. Some horses are injured by bad shoeing; a shoe should be put on level so as not to tip the ankle; some smiths pare the foot more on one side than the other to prevent interparing, which is wrong and unnecessary. A horse whose toes turn in never interferes unless he is crippled.

Now you can readily see that by working the toes in like a pigeon-toed horse your horse wont strike his ankle; then the shoe should be set so that the frog strikes the ground as nature required it to do; it is hard to impose upon nature. Horse shoes are generally too thick and heavy, the calks too long, raising the foot too far from the ground; a shoe half worn with short or no calks at all is better than the common shoe. The shoe should not be so stiff and strong, but what it will give some, have a little spring to it; then it should not remain

on a horse's foot more than three or four weeks at the longest before setting.

A heavy stiff shoe, if on too long will cramp the foot, create a pain, making the foot sore and tender. When the work of a horse will permit, it is better for him to go without shoes.

Farming and Calf Raising.

[By Aug. A. Paulsen, New Holstein.]

The tilling of the soil is the noblest employment of man. We are here directly among nature's arts and in the full enjoyment of all things with which God has been gracious enough to bless our earth. The husbandman, above all, should then be thankful for his noble position. Years ago farming was not such an enviable calling. What is to-day called progressive farming was then in its infancy. To-day farming is a pleasure; then it was drudgery. The inventive genius of man has entirely revolutionized it. A knowledge of the chemistry of the soil has put us in a position to know wherein the producing power of the soil is deficient, and we are able to supply it with fertilizers that, years ago, were unknown. Machinery has been brought home to the farmer, which not only lightens his labors, but also increases the yield of his crops.

The merits of the different breeds of cattle have been fully developed and made public, and the farmer is at liberty to select from these, either for a special or a general purpose; and, above all things, dairying has been reduced from a science, in the full possession of which, only a few were favored, to a simple but very remunerative knowledge. Under these conditions farming is no drudgery, but is pleasant; a vocation not to be despised.

Farmers are divided into two great classes, viz.: The special and the general farmer. The former is again divided into theoretical and the theoretically practical, while the latter constitutes the practical. I do not claim that all special farmers are entirely theoretical, but mostly all theoretical farmers belong to the special class. Like every other rule, this one has exceptions. The theoretical farmer is by no means to be condemned. To him we owe our present advanced state of the agriculturist, both practically and intellectually. It is he who has solved the intricate problems in agriculture, and has explained them so that the general farmer could develop and put them into practical use. The theoretical farmer experiments and gives the results to the agricultural world; the practical sifts these results, utilizes those that are good and rejects the others. It goes to follow that both are necessary in developing our agricultural resources; they go hand in hand and unitedly have produced our present advanced system of agriculture.

In these days of competition, it becomes imperative for man, if he would succeed in any vocation, to start out with a firm resolution, and with his whole energy bent on success. The man who stands by, with his arms folded, and looks calmy on at what happens about him, will get the least benefit out of this world. This is the case in every calling in life. The merchant, if he would have a good trade, must try his utmost to satisfy his customers. The manufacturer, if he would merit the confidence of the public, must turn out machines of the very highest order. So with the farmer. He must put his whole energy into his work; he must aim to make his acres produce the very best of grain and at the same time the most, with the least possible expense.

Allow me to give you a brief sketch of the "general farmer" and his position in the world. Imagine him comfortably situated on a finely improved farm. He has no mortgage and no debts on the place; in fact, he is as free as the lark. (By the way, this is about the most enviable position a person may want to occupy.) Of course, he has a fine orchard and a cleanly kept garden; his broad acres of beautiful grain bear evidence as to the care with which he prepares his soil; his herd of cattle look well-kept and contented; his dairy looks clean and inviting, and proves that the good housewife takes extra pains in the manufacture of butter. He has a little of everything, wheat, barley, oats etc., stock and a dairy. Of course, this idea will be rejected by the special farmer, but in every agricultural country we must have these general or perhaps, more correctly, general purpose farmers, and happily, they are by far in the majority.

No suggestions will be deemed necessary in regard to grain-raising. All farmers know that it must be done, and all know how to do it. There is one subject however that I wish to devote a

little time to and that is, in regard to cattle on the farm. It is a foregone conclusion, that on every well-regulated farm there must be stock for reasons that are obvious. Through this medium we keep our land from deteriorating, and besides it is very remunerative. The cattle industry is divided into two great branches, to-wit: Dairy and beef, or what is still more profitable, perhaps, both combined, if circumstances are favorable. In the selection of a suitable breed of cattle, we must use the utmost care. If we choose correctly, success will crown our most sanguine expectations; if wrongly, stock-breeding will be a failure. It will not be necessary to here enumerate the points in which one breed excells another; suffice it to say that we have the special butter, cheese and beef breeds.

If any one wants to start out in any of these, he may choose accordingly. But right here arises a question that is often, but seemingly unsatisfactorily discussed. Is there no general-purpose cow? Science and theory say no; but experience whispers yes, to some extent. Let me say right here, however, the latter is only true in the case of the general farmer, but not where any special line of farming is followed. That the general-purpose cow has done her share in developing the dairy interests of the country there is no donbt whatever, and we should therefore give her due credit. Even to-day I know instances—and not a few—where a herd of such cows do as well as a herd of any other breed. Still, it seems that the time has come when we must advocate a more systematic mode of dairying, and then, perhaps, it is more profitable to invest in the special dairy cow. In order to have a cow, we must first have the calf; and indeed, a good thriving calf is half the cow. Here then we have one of the most important, if not *the most* important subject in successful animal husbandry—a subject to which the farmer cannot give too much attention. It may at first thought seem insignificant to many, for, indeed, a calf in itself is an insignificant little animal; but when we stop to think that such a little being combines all the requisites which go to make the cow, its importance will suddenly dawn upon our minds. Again, owing to the increasing consumption of meat and cheese, and the comparatively early age at which beasts are hurried to the shambles, the rearing of calves becomes more and more a subject of importance and worthy the attention of the farmers; besides the high prices paid for butter, cheese and milk, and the comparatively high price of feeding stuffs, brings the subject even more prominently before the people.

Owing to the cheese industry, principally, farmers have not given, and are to day not giving, enough attention to the raising of calves. In order to bring a large amount of milk to the factory, the little calves, at the tender age of one or two weeks are hurried off to the butcher, and that is the last ever seen of the pretty little creature. The career of what might have developed into an excellent cow is thus cut off in the bud. The effect of this recklessness must be apparent to all. The direct result is, that the average milk yield of our cows has been lowered, because not enough attention is given to improving them, which can only be done by raising the calves from our best cows. This carelessness on our part means less milk in the future, and consequently smaller receipts. Two requisites must be had in view in successful calf-raising—warm and comfortable quarters, and rich and nourishing food.

As regards the former, we would say that exposure to cold is injurious to the young animal, for which extra food is little compensation, to say nothing of the complaints that are induced by the exposure of the body to low temperature. Even the liquid food should be given warm, and, after the animal is past the infantile stage, when put upon a full bite of grass, it should not be out at early morning or late at night, till balmy weather fairly sets in. One-half the food is often spent by the unfortunate animal standing gazing and shivering at the gate.

Calves should either be tied up or kept loose in stalls, and the calf-house should be cleaned out every day and kept comfortable by dry litter. The house should also be fairly lighted and aired, as well as kept free from cold currents of air. Chilly draughts are more detrimental than an equal degree of the same temperature in a still atmosphere. Why does an animal require food? First of all to maintain heat. All our domestic animals maintain an internal temperature of 100°, and whether in winter or in summer, so long as health is perfect, there is but

little variation. An animal loses heat in several ways. It is estimated that 5 per cent. of the total heat of the body is expended in cold wea her, in warming the air taken into the lungs. This means warm stable. Another 5 per cent. is expended in warming the food and drink up to the ordinary temperature of the body. This proves conclusively that the liquid food given calves should be warmed. If an animal gets chilled, it requires extra food to restore the normal temperature. Food is required to furnish the material for the growth of young animals, which in some is very rapid, and requires proportionately libe al feed. The ratio of albuminoids, or muscle forming foods, to carb hydrates, or fat-produc ing foods, of one of the former to four of the latter, is good enough for growing animals. Another substance—phosphate of lime—constitutes a large pro portion of the bones of animals, and this is especially needed by young ani mals in building up the skeleton; but inasmuch as all grains and grasses contain this among their mineral constituents, it is not necessary to supply this separately.

We now come to the food required by the young calf. The food which naturally suggests itself first in the list of such, is new milk. This is nature's food, and we must admit that it is the best. Nature provides, in this food for young life, every element required to build the bones and extend the frame —to grow the muscles, tissues and nerves, and to round out into lines of beauty and harmony the whole animal. To know the value of milk as a food, we must look into the combination of elements in it. The following is an average of the composition of cow's milk. Caseine, or flesh-formers, 4½ per cent., butter 4 per cent., milk sugar 4½ per cent., and water 87 per cent. It will be observed that milk is rich in nitrogen, or muscle forming nutriment. It furthermore clearly shows the great office performed by caseine in the growth of the young animal. It furnishes the nitrogen in the formation of the muscles, nerves, and brains and furnishes it in so soluble a form that it can reach every part of the body.

We shall next consider the value of milk from which the butter, in form of cream, has been taken—skim milk. This contains all the elements of new milk with the exception of 4 per cent. of butter. It still contains the most valuable nutriment found in new milk —caseine. In practical feeding we find that skim milk is nearly as valuable as new milk, and, with a little care, may be made even more so. After the calf has been fed upon new milk for three or four weeks, skim milk may be gradually introduced. It may be made as nutritious as the former by adding flax-seed gruel or any other food that contains oil or fat, because the oil in the milk has been taken from it in the form of butter.

Now, in regard to the ration. Prof. Stewart, in his excellent work on cattle-feeding, after giving his ration for the calf, says: "That it should have its fill two times a day." This, as experience has proven, is a mistake. A calf should never have all it wants. If it is given all it will drink, its digestive organs will be impaired and instead of gaining it will lose flesh. A good ration is the following: Begin with new milk, giving two quarts three times per day. Gradually increase this to eight quarts until the calf is three weeks old. Then substitute skim milk; beginning with eight quarts, increasing this quantity to twelve quarts by the time the animal is three months old. To make the skim milk as nutritious as new milk, boil oil meal in four times its bulk in water and mix this one with two parts of skim milk, and feed blood-warm. During this time the little animal should be taught to eat grain. A good feed may be made by mixing ground oats and bran in the following proportion: To one part of oats add two parts of bran and feed as much as it can digest.

It will be perceived that the oil-meal will make good the loss of the cream in the milk. We have raised calves on this ration quite the equal of those running with their dam. Have made calves gain 2¼ to 3 lbs. per day. In regard to the amount of liquid food given we must of course be guided by the season of the year. The above is a winter ration. In summer an extra allowance must be made for the heat; for on hot days an animal will, of necessity, require more to drink than in cold weather.

We shall now consider the value of whey as a food for growing stock. Although it is an easy matter to raise a fine calf on milk deprived only of its cream, this single element being easily supplied—the successful use of milk

deprived of both cream and caseine, or cheese, leaving only whey, requires much more skill and a knowledge of the composition of different foods.

Sugar, one of the elements of whey, is an important food, but only one—and no animal can live upon sugar alone. Whey contains mostly mere sugar of milk, although there is a trace of caseine, a little solluble albumen and phosphate of lime. The composition of whey is as follows: Water 93 per cent., milk sugar 5 per cent., 1 per cent. albuminious compounds and 1 per cent. fat and mineral matter. We see then that whey has but little feeding value, and our advice is "don't." It is much better to feed pure water, and substitute the cream and caseine with some other product. I have recently experimented some in this direction, *i. e.*, feeding calves on water and substituting the fat and caseine with some oil-meal. I used the Royal Calf Meal, and succeeded quite well. Of course, care must be exercised to get the little animal used to it. The best way to begin will be as follows: Give the little calf new milk for the first two weeks of its life. For the next two weeks give new milk, morning and evening, and skim milk at noon. The succeeding two weeks feed skim milk mornings and evenings, and meal and water at noon; and at the end of the sixth week get the calf entirely on the meal and water. If good care care has been taken, the little creature will have got fully accustomed to the feed and will make a good growth. In addition to the water and meal, feed as much grain—oats and bran are best—as it will digest. I do not claim that this is the equal of milk to which is added oil-meal, but those farmers who find it impossible to feed milk would do well to try the above way. A little more experimenting in this direction might yet show a better method than the above.

Corn is often recommended as a good food for growing stock. Now, while this is excellent for grown up stock, it should never be fed to calves, at least not before they are six months old. Corn is entirely too heating and fattening to be of any use for young calves. It contains nearly 9 per cent. of fat producing matter and only 1 per cent. of nitrogenous muscle-forming food. In the feeding of calves, we should be guided by the fact that they must have principally muscle and bone-forming food, and must make our selection accordingly. Corn is the best food for cattle that are to be fattened; and even for cows in milk a little will do no harm, but for calves it will never do.

As regards the feeding of calves, we have demonstrated, that, if it is impossible to feed new milk, skim milk may be successfully substituted by the addition of some food that will replace the cream. Furthermore, if it even should be impossible to feed skim milk, then calves may be raised on water to which is added food that will replace the caseine and the cream. We do not claim that as good calves can be raised on water as on milk; but with care and attention they can be raised to give satisfaction.

In closing I wish to emphasize, raise the calves. This becomes imperative, if we have in view the improvement of our cows. This, of course, every farmer wants to do. His aim is to possess a herd of good cows, and with this end in view he must raise the calves from his best cows, for then he can always expect *better* cows. By all means raise the calves, if for no other purpose, for their own sake, so that they may for a few years, at least, enjoy the beauties and pleasures of this grand world of ours.

The Slaughter of the Birds.

[By Ida E. Tilsen, West Salem Wis.]

Longfellow's poem commemorating the birds of Killingworth, deserves many a reperusal at the present time. Briefly told, the story is thus: One spring, Killingworth's thrifty farmers, being surprised by an unusual number of birds, and alarmed for their crops, solemnly met in town-meeting to discuss matters. The case went against these lawless rovers over garden and field. A price was set upon their heads and a ceaseless fusillade rang out, till the birds fell dead, or crept away wounded, and their young perished by famine. But with summer came myriads of insects, far more destructive, and now no foe checked their march. Too late, the farmers saw their error, and repealed the cruel law. As the dead come not back again to life, another spring by order of town-council, birds were gathered from all the country around and, in a wagon, over-arched with evergreens, upon whose branches hung wicker cages, were carefully convey-

ed to Killingworth. Their songs, when released, must have run in lines of burlesque and satire.

Beyond doubt our native wild birds are threatened with extinction. Naturalists and poets, their special observers and friends, all unite in saying so. And one poetess writes;

"Though apple boughs are white with bloom,
And cowslips star the marshy mead,
No litle lovers build their nests
On leafy limb and swaying reed.

The woods are hushed, no matins break
The silence drear of field and glen;
No whir of wings in happy flight
Is herd along the sedgy fen."

In my own vicinity, eight years ago, quails, blue jays, cedar-birds, snow birds, chippies, larks, thrushes, woodpeckers, blue birds, robins, orioles, scarlet tanagers, wild canaries, and even sky bobolinks were all numerous.

Most of these kinds nested upon my father's farm. Few of them are now seen about the dwelling or yard, and a wooded pasture, their favorite home, is but thinly inhabited. We are reduced to bold blackbirds and semi domestic barn swallows, and promised English sparrows. The destruction of our feathered friends has been so ruthless, it is estimated that if it stopped now, a century would hardly restore the birds to their number ten years ago. Surely a worse than Killingworth's massacre is here.

Its causes are not hidden, nor agents unknown. A yearly settlement and cultivation of new lands, makes constant encroachment upon their chosen haunts. Larks, plovers, quails, and all birds nesting on the ground, find the breaking- ploughes furrow their writ of eviction, for our meadows, which might answer, are so often changed in rotation of crops, that the home-loving birds have no abiding place and form no attachments. Red-winged and yellow-headed blackbirds and others frequenting marshy places, behold them gradually drained and reclaimed. As our forests are rapidly filled, the very homes of many species are taken from over their heads, exposing them to the weather and their enemies. How heavy is the aggregate destruction by light-houses, electric and other lights, which innocently become decoys. The well-nigh invisible telegraph and telephone lines have hurt more birds in unheeding flight, than the wire fences have injured stock. These natural and uncontrollable circumstances should excite our apprehension and win our pity, but to them must be added barbarous and unnecessary slaughter.

Game laws, though they protect during certain seasons of year, do not prevent that indiscriminate butchery which often follows the termination of their restrictions. A few years ago, at the robin roost in Kentucky and at the pigeon roosts in Wisconsin and New Mexico, greedy hunters bagged tens of thousands just for the mere delight of killing, vast quantities of game spoiling on their hands, and utterly wasted. On a smaller scale, this useless sacrifice frequently attends ordinary hunting-expeditions. The small boy with a gun does not lack cruel intention, only his poorer marksmanship keeps him from committing as much sin. When grains and small fruits are ripening, and birds make an effort to get their share, mistaken farmers bring out their old muskets and blaze away.

Some thousands of feathered creatures are annually killed to make ornithological museums, and eggs are gathered for the same purpose. Law and taxation might wisely regulate this, and restrict collections to those of assured worth and usefulness. Will the undirected, desultory gathering of eggs, now fashionable among children, improve their minds more than any other sport? Science, to be worthy of its name, should do nothing inconsiderately. An embryo or dead bird is only valuable anatomically. Bird nature and bird ways are only learned from living specimens. It is asserted Thorean never used a gun and never killed a bird. He made his wonderful studies of sentient life by aid of a field-glass, when objects were not near enough to be seen by his unaided eye. Surely an example of "the wisdom that is first pure, then peaceable." Ada Marie Peck and Olive Thorne Miller, are well versed in bird love. I am ignorant whether they prize slain birds for purposes of examination, but the whole tenor of their writings is contrary to such a supposition.

Woman, ever before supposed tender and compassionate, has, nevertheless, occasioned and sanctioned the most cruel and greatest destruction of feathered species. We may congratulate ourselves that an earnest crusade has begun against the thoughtless fashion

of adorning bonnets and dresses with bird skins and wings, though not less than 5,000,000 birds were last year killed for millinery purposes. This does not include young ones starved, nor eggs spoiled. A prominent naturlist wrote me a letter, describing scenes, he witnessed while traveling in Mexico and Texas the past summer. For instance, in one night, plumage hunters with clubs, killed 500 brown pelicans sitting on their nests. The next day he went to the spot, and saw and counted their carcases strewed about, only a small portion on the breast of each being desired or taken. A single village and district on Long Island sent, in four months, 70,000 skins to taxidermists. During one month, 1,000,000 rails and other birds were taken in the vicinity of Philadelphia and marketed there. One auction store at London sold 700,000 South Americen birds in four months. Naturalists, hunters and dealers assure us that these figures are but examples of the slaughter going on throughout our country. Many such statements must have met your eyes. One street-car, in New York city, was recently reviewed by an ornithologist, who reports as follows. Thirteen passengers were women, eleven of whom wore birds on their hats. We counted twenty six birds in all, two women having as high as seven little birds each, in one case making a solid square foot of this hidious ornamentation. In one Sabbath school of fifty four persons, I found the hats of fifteen girls and that of one prominent lady teacher decorated with wings. Unfortunately, the kinds demanded, are our most useful and beautiful birds.

Meanwhile, field crops have been suffering from an increase of insects, at no time more noticeable than the present. It is estimated these pests yearly destroy in the United States more than double all we export of wheat. Such a loss makes breadstuffs scarcer and higher priced for all. One-half the apple crop is generally ruined, and some orchardists consider it ineffectual to plant more trees, till stringent measures are taken for protecting their feathered allies. Wisconsin shade trees are being defoliated, and even our woods assailed, an experience already old in Iowa and Illinois. A beautiful and natural poplar grove on my father's farm, was, last year, nearly destroyed by leaf-rollers. Many oaks and butternuts there are infested with caterpillars. Other and older countries afford similar testimony. An English farmer destroyed some 10,000 small birds in one season, and yet had crops below the average of his neighborhood. Some years ago, France and Germany were over-run with sportsmen, as this country is at present. Birds and crops diminished together, till those governments intervened, and, by general, stringent laws, saved the farmer's best friends. Instead of following a bitter experience to its very end, can we not learn wisdom from our predecessors on the same road? Farmers are better aware than most people, how close the fight for possession of our earth is, between man and insects. Individually he is larger, numerically they are stronger, and their quickness, persistence, and prolificness have an inverse ratio to size. As you are doubtless aware, Audubon, Wilson, Edwards, Forbes, Lintner, King, Weed, and many other authorities, unitedly affirm, birds annually destroy insects to a number inexpressible by figures, and are nature's force for "preserving the balance of power." As high as fifty worms have been found within a bird's crop. A pair of thrushes were seen to carry their young over 100 insects in an hour. Prof. C. V. Riley, entomologist, U. S. Agricultural Department, lately issued a bulletin showing that kerosene, cold water, and various insecticides have been over-estimated. I have found pyretheum and hellebore not always doing their work. Paris green and London purple are poisoning the land, and have already thinned the ranks of our friendly toads. If our birds were all destroyed, is it not probable that this country would speedily become a desert? The spider family then would be our best and almost only hope. "Killing two birds with one stone," an expression traced to the dark ages of thin settlements, thick forests, and denser ignorance, better be relegated there.

But the value of some birds is disputed. Blackbirds and blue jays, however, have many friends; there seems a tie on bobolinks. English sparrows, with cow buntings and shrikes, are respectively accused of assault, theft, and murder, with relation to swallows, pewees, wrens, chippies, and other peaceable, industrious tribes. Such miscreants might be killed, and the 'the survival of the fittest, thus expedited. It is respectfully suggested that ornitholo-

gists with due diligence hasten to settle every point decisively, as the United States entomologist has done by giving his public verdict against English sparrows, which, therefore, may go upon our bonnets, or anywhere away from our gardens and better birds. On small fruit-growers, too, rests the heaviest portion of bird support, from their produce is taken the largest toll. But, after thorough investigation, it is decided that even robins and cedar birds, by their destruction of insects, more than pay for what fruit they eat. Necessity, already mother of a mighty family, will surely produce some invention to preserve ripening fruit from birds, at this one time when their company is undesirable. Nettings have been successfully used. An acquaintance hung a bell among his cherry trees, an occasional ringing of which, substantially saved his crop.

After leaving economic grounds, with their far reaching scope, still higher points of view present themselves. Our summer joys, our æsthetic development, our poetry, largely depend on bird life. Has ever instrument of man equaled sweet music of lark, thrush, and mocking-bird? If the songsters were annihilated, and their free concerts forever done, would the bellowings of hungry herds and the hurdy-gurdies of locust and grasshoppers compensate? How much the eye would lose, that delights in grace of motion and figure and in delicacy and vividness of color! What a blank in art and literature! The dead birds used for millinery purposes are lusterless or colored, minus legs, and otherwise mutilated, with cheap, staring eyes and unnatural, sprawling positions, surely as poor and unacceptable a travesty on nature and real art as are cheap chromos and dauby paintings.

A prominent argument in favor of bird protection, is the general damage to national character arising from disregard of life. Death's awful change only God understands. Life, even in its lowest forms, He alone can give. Do children have reverence for these solemn mysteries, and will they show mercy to the aged, poor, and sick, when parents contradict gentle teachings by inconsistent actions? The boy who kills for pleasure, will not make the best type of man, because it is impossible to be cruel or even inconsiderate in one line, and not be selfish in other directions. Character is not divided into compartments. What occupies one portion, pervades the whole. Humming-birds and red-birds are not merely killed, but skinned alive that their plumage may retain more lustre. A tender regard for life need not betoken effeminacy. President Grant, statesman and general, with a healthy admiration for fine stock, disliked the cruelty of what is called sport. When the late Mr. Forster, member of parliament and secretary, conspicuous among leading statesmen of Europe, was asked whether he ever diverted himself with shooting, he answered indignantly: "I have never killed a fellow-creature for amusement." There are at present so many games and implements, little excuse remains for hunting the innocent and pretty game of our small woods.

The continued use of birds in millinery, may hinder reforms in which women are vitally concerned. Already intemperate men plead woman's pet adornment, with its involvement of selfishness and wastefulness, as an offset to their own pet potations with similar concomitants. A wine-maker's journal, published in New York, made an extended argument on such premises, in an article which met my eye.

Some wings, stuffed specimens, etc., purchased by me for decorative purposes, now cause regret at every sight, though I keep them in the spare chamber where I wont often see them So, I believe no true woman, having once had her serious attention directed to this barbarity, will then become an ally of bird butchers. Like many another wrong, it has been a thoughtless and unconscious one. Perhaps our sensibilities have been dulled by the continual slaughter of other creatures, going on around us, a necessary accompaniment of modern life. The world is crowded, and the inferior creation must yield us food and clothing, strength and comfort. However, we raise more beeves, sheep, poultry, and silk worms, and in far better condition than characterizes a wild state. To a certain extent, we ourselves provide that we consume, and thereby gain an added right in its use. The principal fur-bearing animals, too, stand on a different and lower plane from our feathered friends. The fox pounces upon wild turkeys, partridges and pheasants, in their nests. He likes to visit the farm yard in search of poultry and eggs. Lynxes and martens even climb trees in pursuit of birds; the

mink feeds largely on marsh birds, and is also an active depredator in the poultry-yard. When in them, naturalists discover virtues enough to over-balance such tricks, mercy will become our duty, though what contributes to warmth and comfort can ever take precedence of that which is decorative only. There are numerous substitutes for birds in millinery. Silk pompons and ostrich plumes are graceful. Ostriches are carefully and tenderly reared. Their plucking is probably no more painful than the shoeing of a horse. The beautiful feather bands, manufactured from poultry down, involve no additional loss of life, but utilize another product of creatures destined for food.

To save and restore our birds, concert of action is needed. They will be relieved from long flights under a mid-day sun, if some trees are left when clearing land, and others set along streets and line fences. The choke-cherry and black cherry are especially beloved. Wild animals go with the soil. A farmer can claim as his property, the birds nesting on his trees, and obtain legal redress from hunters who, without permission, start and catch, within his domain, other game than noxious beasts of prey, like wolves and foxes. At least Iowa, New York, and New Jersey have new and special laws for bird protection. More stringent regulations are proposed in Wisconsin. A list, distinguishing valuable from injurious birds, is conspicuously posted in each French commune, as a guide to sportsmen, and the rudiments of zoology are required taught by her primary schools. Parents and instructors everywhere have a duty and an opportunity to educate children in gentleness and refinement. The American press is doing a gratuitous and noble work for birds. The Anti-Plumage League, of London, and Audubon Society, in New York are active. Branch organizations are multiplying, a recent addition to their number being at Des Moines, and headed by the governor's wife. Queen Victoria, Princess Christian and Lady Mount Temple frown upon the use of bird plumage. On woman, indeed, as chief cause of bird destruction, rests the duty of righting this wrong. As long as demand continues for bird wings, law will be evaded, and supplies will come. Only fashion's disapprobation can save our birds.

As the same poetess entreats—

"O sisters, let our protest ring
Through all the saddened, songless land,
Lest He who notes the sparrow's fall
Shall ask the slain birds at our hands."

Progress In Agriculture.

[By A. Barkhausen, Theinsville.]

Most of us that are assembled here to-day, I presume are aware of and familiar with the aim and object of this present gathering, yet I may be allowed to add a few words for explanation, in order to preclude any possible high expectations, to fulfill which was originally never intended.

For several years past movements have been afoot in this state to secure to young, incipient and inexperienced farmers a better agricultural education. In the last legislature our law makers could not come to an agreement on this point, yet they felt that they had to do something for us farmers, and appropriated a sum of money, for the purpose of holding a number of farmers' meetings in the state (these so-called Farmers' Institute), the expenses of which are to be covered by the sum appropriated.

Already more than forty years ago, similar agricultural meetings were called into life by the governments of some countries in Europe; they however were by no means considered and calculated to serve as substitutes for institutions of learning, in which young farmers are to be trained and educated; but some competent person, well versed in higher agriculture (called also an agricultural missionary) was sent to various parts of the state, for the purpose of holding discussions and consultations on such topics in which the farmers of that special locality needed enlightenment and instruction. A great deal of benefit to those farmers has been derived from such meetings. Now it cannot be denied, that for our young, inexperienced farmers the instructive influence of our Farmers' Institutes is of comparitively little value, inasmuch as their ideas of rational farming as a whole, are necessarily as yet very loose, vague and incoherent. On the other side, however, these Farmers' Institutes are well adapted to awaken with us older farmers thoughts and ideas which perhaps have long been slumbering in our minds, and which are aroused into active execution by these occasions.

Notwithstanding the fact that the majority of our farmers have an invincible

dread and aversion to all innovations, and although there is much truth in the old adage: "What little Hans has not learned, big Hans will learn nevermore;" yet this should not deter us from bringing before them by word and deed, such things as have been acknowledged good and useful, and for this our Farmers' Institutes offer an admirable opportunity. And if it is only one little grain that finds a fruitful soil with the one or the other, in the course of time, with profitable application, more and more grains will begin to take root, and you know many grains in due time make bushels.

In many of the Farmers' Institutes held heretofore, as well as in many agricultural periodicals, we have been accustomed to hear glowing accounts of extraordinary crops, yielded by one product or the other, of fabulous results obtained in one branch of stock-raising or the other, of wonderfully remunerative products of the dairy, etc. But what factors and circumstances have contributed to bring about such most favorable results, we are informed in but too small a degree, as to render immediate imitation recommendable. I am of the opinion that certain doubts are not unjustifiable, whether a person that reports such prodigious results, is in fact a good farmer. We all know that instances are by no means rare, where a farmer comes home from an agricultural fair, richly rewarded with prizes, because he has exhibited some big potatoes and turnips, or a bushel of well cleansed, perhaps hand-picked grain; while his fields at home present a scanty, poor appearance. Perhaps he has also exhibited a few heads of well-kept and well-cared-for animals, while at home the rest of his live stock is half starving and not worth looking at.

Such a farmer does not deserve prizes, on the contrary he should be punished for such malpractices. It would not be amiss perhaps, in order to prevent such humbug, to have in every county a committee of competent men examine the farms, and the best kept and best regulated ones to be awarded with premiums out of the state treasury.

A proper, judicious tillage of the soil is one of the foremost requirements to secure a good crop, of whatever name and nature it may be.

Therefore we should above all devote our first attention to this matter, and in the following I will proceed to give some practical hints to those who may not be quite familier with them. The most important instrument in tilling the soil, is the plow; and those constructed in this country are as yet unsurpassed by any manufactured in foreign countries. But I am positive in my belief, that there is many a farmer who still lacks the knowledge and skill of properly and correctly applying it. To be able to plow a uniform, perfectly straight furrow is only a mechanical accomplishment, which every one who has a little spunk in him, can easily acquire. But whether he that is able to do this can be called a good ploughman and whether he has a correct understanding of the work of ploughing, is very questionable. How many nicely plowed fields do we see, that are afterward covered with the poorest of crops, choked by weeds and speckled by stagnant water. He who makes a claim to be a good plowman, and to have a correct understanding of the work, must be able to judge of the physical properties of the soil, he must know how and when the plow must be applied; he has to take into consideration the proper time and weather; he must know how to treat the manure in its different forms with the plow, so as to make it easily accessable to the plants and to secure an even uniform groth of the crops. Some of the most important rules for plowing are as follows: Immediately before seeding never plow deep. Soil brought up from deep down is not congenial to young plants; they grow and are developed only scantily for a long time, and recuperate only when it is too late for the formation of kernels. Rust and rare-ripe kernels are not unfrequently the result. In the shallow furrow however the young plants enjoy themselves better, develope quicker, and are better able to keep down the weeds; and if by this means the time for an early harvest is accelerated only for a few days, much is gained already. If time and circumstances permit, the surface of the newly sown field should be pressed together with a roller that is not too heavy; the seed will then sprout sooner and stand more uniform. Manure should be plowed under as shallow as possible, especially on porous, pervious subsoil. He who wishes to deepen the surface mould, should do this before winter, but never in the spring. Should a field after plowing become hard and compact through length of time or weather it

cannot absorb the fertilizing substances contained in the atmosphere; therefore it is well in such cases to render the soil again susceptible for them either by the plow or some other instrument.

A plow which lays down the furrows too level is objectionable. The furrows should have a ribbed form. If it can be done, the furrows should be given such a direction, as to prevent the gathering of water in the field, without however allowing ditches to be torn by it; and where it is possible let the plowing be so arranged, that no water can enter the field from outside. A field can always be kept cleaner from weeds, if no water is allowed to stagnate on it, and the less weeds there are we know the easier and quicker the harvesting can be done; and the more paying is the yield.

If grain crops are to follow on clover or grass land, it should be plowed shallow in the fall, in order to quicken the decomposition of the clover or grass sward in the shallow furrow.

The fertilizing substances produced thereby are of easier access to the young plants next spring and favor a more rapid development. For hoe-crops, clover and grass land must be plowed deeper, and an additional thorough manuring is very desirable.

Immediately after harvest a field can be plowed easier, than if allowed some time to dry out. If we wish to destroy weeds, we must plow as shallow as possible, but only at such times, when the sun has sufficient power thoroughly to pervade and to dry up the shallow furrow. But some time before plowing for seeding, the surface should be well dragged. He who wishes to plow the the stubble field but once before winter, should plow under the weeds as deep as possible, for then they can make their appearance when the young, growing crops of next spring are already well started and able to check the growth of weeds. I take occasion here, again to advise another sure method for the destruction of weeds, which is, to bring the fields to such a state of fertility that the growing crops choke the weeds. But time does not allow me further to discourse on this subject. I therefore refer to your kind consideration my former correspondences on plowing and application of manure, that were published last spring in several periodicals. A fit place for a more detailed discussion on these subjects are the smaller farmers' clubs and meetings.

On the Institutes held heretofore a number of farmers have advanced the opinion, that *mixed farming* is the most recommendable, and I fully agree with them. But what is mixed farming? As far as I understand it, it means: To draw the greatest possible profits from all branches of agriculture and stock raising. But all this requires a much greater knowledge, skill and science in farmers, than where farming embraces only a few single specialties. For our farms that are yet in the first stages of developement and culture (and the greater part of our state can be included in them) mixed farming has so far been the system best adapted to them. But it now becomes our task to subject to a closer examination all the experiences which we have made in the past, and to adopt into our system, what is most suitable and adequate to our condition, climate, weather, and soil. And since many of our farmers still lack the requisite knowledge of the soils, and are sadly ignorant of the proper mode of preparing the different varieties, and besides do not have a rotation of crops suitable to their soil, or none at all; this all has contributed that the greatest possible yields of their farms have not been reached by a great many, and yet none of them will admit to have made mistakes. All failures are ascribed to other causes, except to ones' self, for everybody claims to be the infallible prophet. A great part of our present farmer generation has grown up, imbued with the good old customs; and to satisfy the self-interestedness of parents the sons were never allowed to leave the home clod; hence he must be a bright, clever boy, who will ever succeed in acquiring a knowledge of his vocation, superior to that of his father.

For several years past, the prices of our farm products have not only been deteriorating to an alarming extent, but the prospects are such, as to warrant no expection of a bettering up for the near future. Exceptions will be only transient and of short duration. But what shall we do meanwhile, in order that our income may afford us some degree of satisfaction? In the first place, we must learn more and more, as above stated, to draw the greatest possible profits from every branch of mixed farming, and secondly to limit those of our wants, that are not absolutely nec-

essary for life. For us farmers there is no use in striking, and the strikes in other occupations only help much to make our own situation still worse. Even our government treats us in a step-motherly way. Now and then a crumb is thrown to us, to stop our clamor, but that there is need of broadening the knowledge of our vocation nobody seems to comprehend or care about.

The smaller a farm the less advisable it is for its owner to expend considerable means for the acquirement of additional agricultural knowledge. But the larger the farm, the greater are the opportunities for a farmer of more than ordinary agricultural education, to turn into use his higher knowledge, and derive the greater profit from it. For the former it must be sufficient once in awhile to look over the fence into the doings of an intelligent neighbor; but for the latter, the knowledge acquired beyond the mere practical, will certainly be a source of much profit. For this purpose we must provide an education for our young generation of farmers by which theoratical and practical agricultural knowledge can be gained, and it is the duty of the state to provide for it. And thirdly, while we have to depend upon our soil, we must also take the greatest care that our soil can depend upon us. The science of the soils is therefore of the utmost importance to a farmer. The different kinds of soil need a different mode of cultivation and tillage. If a certain crop does especially well on one kind of soil, we may give to that crop the preference on it, but we must not expect the same good results from a soil which is less congenial to that crop. But let no farmer be tempted by the good looks of a crop while growing, continually repeat to raise it on the same field; for the good condition may have been the result of other favorable influences; it may have a bribing appearance and yet not unfrequently will yield much straw and few kernels. The strength of the soil is wasted by too frequent repetition of crops, without any profit whatever. It is a mistake to raise a crop on a soil, which it can produce only with abundant manure. It is also wrong in farmers to apply abundant manure to one part of the fields, and let the other part starve. It not unfrequently happens that the one field, from its exuberance, yields much straw and few kernels, while the other one, which is treated step-motherly, brings neither straw nor kernels.

The farmer himself can help a great deal toward securing a uniform and even standing of his crops, especially when he understands it to bring the grain crops, food crops and stock raising into proper relative proportions. But above all it is enhanced by a regular rotation of crops. But what is a change or rotation of crops? It is a period of time comprising the number of years that must elapse before clover is to be sown again on the same field. One and the same rotation is not suitable to the same kind of soil; but the circuit must be adapted to the soil and the marketing facilites. The more capable a soil is for clover, the narrower may be the limits of the circuit; but with less capability for clover the stages of the circuit must increase in time.

For the purpose of giving a presentation of a regular rotation of crops, I have exhibited here the map of a farm, accompanied by schedule and statistical tables belonging thereto. This seven-field or seven-year circuit has been executed with success since the year 1869, and has given no cause of making essential alterations, as the yield of the fields for a number of years has been greater than at the time when the soil was still in its original freshness. In examining the statistical tables of the map, it may perhaps appear to you that too little has been harvested; but this is not the case. The crops show a more uniform yield and satisfy pretty high claims; the soil has become less and less weeded, and as, in this case, it has become more productive, crops requiring greater strength of soil may yet be inserted into the circuit with impunity. Such a regulated rotation nevertheless allows a great deal of play room, which gives to the farmer ample opportunity to utilize his knowledge and highten the yields. Each kind of crop has, as it were, its own peculiar soil, in which it can be brought to its highest state of perfection without great exertions. Just so each crop has a soil not at all adapted to it, in which it can be produced only under the most favorable circumstances and with more than due application of manure. From this we are to draw some most important conclusions: 1st. A crop needs more or less manure in proportion as the soil in which it grows is more or less congenial to it. 2d. Its yield is less in proportion

as it is raised in places unfavorable to its nature, or where it does not belong, and that are not congenial to it. This is a rule of utmost importance to us farmers.

It is true that in agriculture much can be accomplished by forcible means and great expenses, that nature in itself does not favor, but this is seldom done with profit and impunity.

If we follow the course indicated by nature as near as possible, and evince as little as possible desire of deviating from it, or mastering nature, we sail with the wind, and beat the surest, easiest and shortest way to success.

Dairying Made Successful.

[By Mrs. E. S. Robinson, Viroqua.]

Dairying as carried on at the present day is one of the most important and successful branches of farming. By the system of cropping without fertilizing, as pursued on most grain farms, the robbery is very apparent to the beholder in every thing—in the fields, the buildings and fences—even the man himself has a "don't you come near me" air, while the poor, half-frightened cow who stealthily makes her way over, under or through the apologetic fences, is ever on the alert for the dog or beating that is sure to follow her every attempt to get a fresh bite of the growing grain or her living in anything but a starved pasture. Contrast her with your dairy neighbor's cows, that stand knee deep in clover lazily chewing their cuds in a "don't care whether school keeps or not" manner. You approach them, put your hand on one, she turns her great eyes toward you and seems to say, "If you want to go by me you must turn out yourself I am immovable. I am petted, caressed and catered to like the very queen. I am of this domain at least, and for all this I give you in return veal, butter and cheese, and I finally yield up my whole body for beef. The result of her work is everywhere visible. In the rich fields, the substantial buildings and fences. She supports a home wherein her owner, as a practical farmer has expressed it, "takes more comfort to the square inch than any Wall Street operator or bloated bond-holder." A home where, if his heart is in his work, the man with a trained mind and skilled hands will banish all drudgery, one whose enthusiasm will surmount all difficulties and who will inspire his help and all that come in contact with him, to work with a will, producing very different results from the same work done by compulsion while, in constant companionship with his faithful friends (the older ones winning added respect as their value is realized, the young ones, from the very care they make him, becoming objects of tender interest) the years devoted to dairy farming will pass more rapidly than those of any other years of his life and he will find himself asking for more time and strength to devote to it, his great danger lying in the fact that his ambition carries him unconsciously into excessive labor that benumbs his thinking faculties, forgetting until reminded by an ache here and there, that he cannot make brains and hands work successfully at the same time. Work, steady faithful work, with head and hands and heart, is the key to success in dairying. We must throw ourselves into the fight with well-considered judgment. We must know that why those in other kinds of business succeed is that they take advantage of every circumstance that can be brought to favor them. We know that it is only in excessive production, in the greatest economy and in the utmost activity of exchange that the possibility of great success lies and the farmer must not only work with all his mind and all his strength, but he must work for the love of money and as only the love of money can make him work. In manufactures the helpless men have become the operatives, in trade they are the broken down clerks, in farming they are the hand to mouth farmers who count for just so much as their labor is worth and no more. We can do nothing for them but try to help them to sufficient energy to wake up and help themselves. The time is not far distant I hope when those women who are now suffering from wasted energies by monotonous toil at the needle will awake to the fact that they should have just as good an education for the practical affairs of life as a man has and will take up this work of dairying as the most profitable and and healthful of any they can engage in. The history of nearly every patriotic state in the Union abound in incidents of young women who during the rebellion usurped by necessity the rights of fathers, husbands or brothers who were at the front, and not only directed the operations of the farm but carried on the various processes in person, and the

cases are not rare here in the west of women now managing and cultivating farms as a pursuit more agreeable to them than in-door employments, and taking into consideration the machinery by which farming is now carried on, the comparatively slight amount of severe manual labor requisite and which can be hired for the emergencies makes the labor less severe than that of many other trades. Our climate is a pretty tough one but like every other brave enemy so often a friend in disguise the only way to conquer it is to meet it boldly. None suffer so little from the weather as those who are out in it every day and all day. The great danger is in staying in the house by the stoves and hot-air register and not out in the east wind or north-east snow storm. The successful farmer of to-day has learned that he cannot compete with the cheaper lands west of us. He cannot grow beef as cheaply as it can be raised on the great grass ranges of Texas, Colorado and Kansas and so he has turned his attention to dairying and to producing animals that will give him twice the butter that his scrub cows do. When such cows as Jersey Belle, Eurotas and Mary Anne each give their owners from twenty-two to thirty-six pounds in one week, one on pasture and five pounds of ground oats daily, while the highest grain feed of Eurotas was only eight quarts for any one day during her whole year. These and over 1,000 Jersey cows that have been tested and found to produce from fourteen to forty-six pounds of butter in seven days, the most of them on moderate feed and not on the high pressure plan of risking the life of the cow, ought to convince us of the wisdom of the man who turns his attention from growing beef to dairying.

Mr. Sibley, of Penn, says that he has some poor cows in his herd, but that no man can pick out of it two cows that cannot make over 365 pounds of butter in one year, and that any herd of average excellence can do as much or more. None of us can obtain such cows at once, perhaps, but any of us can place at the head of our herds of the best native cows an animal from a family of exceptionally rich milkers that will transmit the excellencies of his dam to his offspring. In this way we can by selecting cows that are free milkers and that hold out well before drying up obtain most valuable herds. In winter I provide them with warm quarters made of boards, battings and tarred paper that for the money will be cheapest material to be had. Have closely fitting windows to admit sunlight and provide good ventilation some say, though I've never found any trouble with bad air during most of our winter weather. I would give them bedding of straw, knee deep on cold nights, and would feed them to their fullest capacity for butter yielding but the instant you pass that point the loss begins, not only in waste of food but in actual damage to the cow. Only the most careful and intelligent help should be allowed to do this work. The water should be kept fresh in windmill tanks and they should be induced to drink all that its possible to. It should be warmed in winter as the influence of drinking ice cold water is lasting and many fine cows have been ruined in that way. A draught of it in winter cuts short the milk yield from 1 to 2 pints.

A not less important work is to get good milkers—intelligent workers with their eyes and ears open, who put themselves right in sympathy with their cows thereby gaining their confidence and the last drop of milk in them. It should be strained as soon as possible through a fine wire strainer covered with double dairy muslin into tall slim cans. The object being to bring as much surface of the warm milk to the cold water as possible. It should remain in the cold water twelve hours then skimmed and the cream ripened for churning. Ripening the cream is one of the most important and troublesome operations of butter making. By the old way of setting in open pans the cream often remains on the milk too long and then again is skimmed too soon. No matter how hard you try, this variable climate will upset all your calculations, some of the cream will be just ripe enough to churn, when you skim it some not ripe enough. You must either let some get too ripe or lose much of that not ripe enough, so that by standing over it constantly one could not make a tub of butter of uniform quality, and it is just here that creamery butter gets ahead of the dairy make by the open pan system, by the submerged way the cream is dipped off sweet and cold of even consistency, not leathery and tough, then set away in a cool place until enough has accumulated for a churning, then all warmed and ripened together. For ripening, a cream closet can be made with little trouble that will be an immense help. It can be made

13 inches square on the inside and about 5½ feet high with close fitting door the whole length, with 16 inches from the bottom to the first shelf. In the bottom place a can of hot water, on the shelf above the pail of cream that has previously been warmed up to a little higher temperature than that desired for churning, doing it by gradually making the water warmer in a large dishpan in which sets the pail of cream. When it is warmed way through the warm water beneath it will keep it just about right for the twenty-four hours it must stay there to ripen.

You must not forget to stir it frequently until it gets warmed through as cream is a very poor conductor of heat and it must ripen evenly or it will not all come to butter at the same time. As soon as it shows signs of acidity put it in the churn and churn it. If you haven't a churn without inside fixings that brings the butter by dashing the cream from side to side, get one. You cannot be too particular that your cream is at just the right temperature all the way through before putting it in the churn. The exact temperature is 64 degrees by my thermometer. You will see it stated all the way irom 60 to 68, a difference accounted for by cheap thermometers. If your churning is not satisfactory at 64 you may know that it ought to be higher or lower according to your thermometer if it is not just right, don't try to warm or cool it rapidly because it can't be done. It will not do to over look the proper color either. If you make it a bright June color the year around you must use color. Put it in the churn with the cream, how much will depend on circumstances. You will have to use your very best judgment not to get enough to show that it is colored and yet enough to look well. You will also have to be careful to have the different churnings in the same tubs exactly alike or you will realize 3 or 4 cents less per pound for your butter. I had an experience in that way myself. I had become possessed of the idea that I was making such a good article that never received anything but praise from the buyers, that I could safely leave it in other hands and on the strength of its reputation go away from it a few days. The returns from what was made at that time was accompanied with an inquiry asking what was wrong about the butter, had I been buying speckled cows? That only reminded me that too great prosperity leads to indifference and that only the most faithful work will answer for dairying.

Careful attention to another point will save labor and make better butter if you stop the churn as soon as the particles of butter have formed about the size of wheat kernels. You can then draw off the butter milk and wash it so thoroughly that it will require very little strength to work it if it is necessary or desirable to work it at all. I wash twice with cold, salt brine, then float in a weak brine of about 55 degrees for a few moments. If not particular abont the temperature of the last washing the butter will be too cold to make together conveniently and make it difficult to handle. When you have drained it thoroughly sift over it a half ounce of salt to a pound of butter. Let it remain a short time to dissolve the grains of salt, then turn the crank several times when it will be massed together and quite as evenly salted as hand-working could do it.

Do not let the lever or ladel go over it with a sliding plastering motion. You may squeeze or pound it with impunity almost but every time you rub it over you spoil as many grains as you touch and so much of it is no better than oleomargarine. For packing use the best made, best looking ash tubs you can find. Scald out with hot water, soak with strong brine twenty-four hours, turn that out and fill to the brim with scalding hot brine, let cool and your tub is fit for use. Pack as solidly as possible, cover tightly and set in a cool place until ready for shipping. Most of the older butter makers think that you take all the flavor out of butter when you wash it, little dreaming it is not the taste of butter at all they are so fond of but simply butter-milk, others scald and even boil their butter-milk until all the delicate flavoring oils are dissipated and nothing but a tallowish grease is left. You will hardly find two farmer people who will think the same sample is first class. But when you send it to a great city you may be confident it will be graded about right. There is too great a demand for strictly first-class butter for a commission man to let it go for less than best prices. He will want more too badly, but of course he cannot get more than it is really worth, you may be sure of that, and you may be sure also that if you feed rightly, keep the barn free from

smells by dusting the floor daily with plaster, that if you are very careful to keep everything about the milk and cream perfectly sweet and clean; that you churn it as soon as it is perfectly sour and is of a proper temperature; that you stop churning as soon as the butter forms in small particles; that you wash thoroughly in strong brine, salt and work lightly and pack it in sightly, properly-prepared packages and keep milk, cream and butter away from the air as much as possible, you cannot fail to have butter of a high-priced flavor that will command creamery prices and may be termed "Dairy butter in a quality equal to creamery."

The Farmer's True Vocation.

[An address of welcome by C. H. M. Peterson, delivered at New Holstein.]

I am very much pleased to see this hall filled by hard toiling men and women, by tillers of the soil, who came here to listen to the addresses of men well versed in the different branches of agriculture,

So should it ever be! Time spent in the effort to enlighten our mind is well spent; hence neglect no opportunity to improve your mind, to qualify yourself for your adopted vocation by listening to the teachings of others. Work while it is day—life is short, it is but a dream which paints in glowing colors to some a picturesque landscape, to others it presents a dreary barren desert.

Life has its charmes and its woes. Some it blesses with exquisite pleasure, while it is dooming others to sigh, groan, struggle or sink beneath a load of pain and sorrow. To a great extent, however, men are the moulders of their own destiny; they form an essential part in the shaping of their own future.

Commence while young and vigorous to lay your plans for the future; adhere to them with dexterity; clear your way of obstacles by systematic and progressive work; let no opportunity pass during your struggle to improve your mind as well as your body; be ever ready to submit to the guidance of good and sound principles; let humanity lead you to assist in enobling mankind; and (I assure you) your life, your dream will present a picture, upon which your eyes still will rest with contentment and pleasure, when at last you are sinking into that ever dreamless slumber.

If your vocation is that of farming, study it. Farming, husbandry, or agriculture is a science; it is founded upon principles; it rests upon experiments and observation. It requires therefore not only physical labor, but also knowledge, wisdom, skill. Prosperity, success in our enterprise should be our aim.

In order to make farming a success, nothing is of more importance than a judicious application of our time, a devoting of a portion of it to mental labor.

Mental labor is an indispensable factor in our noble strife for success; and besides this, by the exercise of our intellectual faculties we are accumulating a treasure within, which no thievish fingers can touch, which will prove to be a permanent and paying investment and a continuous source of prosperity, contentment, peace and happiness. Cultivation of the mind is the fundament upon which rests civilization; it is the only real and imperishable jewel worth fighting for, it is the fountain of all positive enjoyment. Our present state of existence without spiritual exercise would be a life without life.

To accomplish our mission as farmers we should be faithful and diligent in our vocation, keep pace with the times, and study in particular the latest investigations in the theoretical and practical agriculture. No man ever attained to a state of perfection or the point of excellance in his chosen profession.

There is a chance for improving at any time during our lives. Even the successful farmer will at some time or other be forced to admit, that, had he been taught years ago certain principles, which only recently came to his knowledge, or had he adopted certain experimental results in agriculture in times past, he would have added materially to his wealth, comfort and happiness.

It is a matter of fact, that it requires more skill, more intelligence at the present time to manage a farm successfully, than it did a half century ago. Our virgin soil brought forth splendid crops without much exertions on the part of the farmer, while now its fertility is partly exhausted, it requires more work and our best efforts, it is more expensive to fertilize our soil and make her yield a profitable return. While of late the quantity of our yield diminished—the prices realized were very low, caus-

ed by over-production at home and competition abroad.

Old England has for years encouraged the raising of grain, particularly wheat in her Dominions—India and Australia—partly to develop the natural resources of those countries, partly to free herself from the dictates of a few short sighted speculators on this side of the Atlantic, who ventured to monopolize the wheat trade of the world. The scheme of these "would be" monopolizers met with a complete failure, while they succeeded most wonderfully in driving our best customers from our shores. England supplies her subjects with merchandise and receives in exchange their whole surplus of grain. We are compelled to dispose of our grain, not needed for home consumption, at prices far below the cost of production. Thus, what we do raise on our farms are sold at ruinous prices. Add to small crops and low prices the fact that men of genius contrived to imitate some of our productions and the cup of anxiety and grief is filled to overflowing. The manufacture of butter substitutes for instance has reached large proportions, is damaging the interest of those engaged in making genuine butter and it has already reduced the price of the article considerable. Though our prospects for success may be shrouded in darkness, take courage, night precedes the dawning day. Times like the present, which demand hard labor and in return allow but small profits (if any), are well adapted to set men of common sense to thinking of how to manage their business to increase their annual income, in order to meet the never ceasing but ever increasing demands made of them by family, town, county and state. They will hail with delight and make use of any opportunity offered, which might enable them to control their business in a more profitable manner. They know that method is indispensable in order to conduct farming to advantage, hence they will seek the advice of good farmers or men of learning, adopt their views, after being convinced that by so doing they would meet with better success.

It is the object of our present assemblage, to give every attendant desirous of gaining in knowledge a chance to acquire it. These Farmers Institutes were created for the purpose of instructing the husbandman of this state in the various branches of agriculture, thereby elevating husbandry to a higher degree of perfection and laying the foundation to a more prosperous future.

The state has liberally donated to these Institutes and I have reasons to believe the present legislature will be even more generous.

Let us acknowledge our appreciation of this liberality by listening with the strictest attention to the lectures and debates, by interesting curselves in the work, by taking an active part in the proceedings. Interchange of thoughts and ideas leads to a better understanding of the subject under consideration.

In conclusion let me extend a hearty welcome to you, gentlemen, who came here to impart knowledge, to take the part of teacher, as well as you, my friends and fellow-workmen, who came here to listen—to be taught. Our thanks are due to those ladies and gentlemen who assisted the committee in making this Institute a successful one so far as the number of attendants is concerned, and I think I am justified in the assertion, that not many will leave this hall at the close of the session without having derived some benefit from this Institute. It is but natural I should express the desire that a good seed may here be sown, that it germinate, grow and bear fruit, upon which in years to come your eyes and those of your descendants will rest with pleasure. Again, a hearty welcome to all of you!

The Farmer's Home.

[Miss Annie Boie, New Holstein.]

The father of our country has truthfully said that "agriculture is the most noble, the most honorable, and the most healthful employment of man."

Agriculture is the greatest among arts, for it is first in supplying our necessities. It is the mother and nurse of all arts. It creates and maintains manufacturers, gives employment to navigation, and materials to commerce. It produces every species of industry, and opens to nations the surest channels of success. It is also the strongest bond of well regulated society and the surest foundation of internal peace.

Of all occupations, that of farming produces a love for the country and makes it dear to the heart. None is more honorable, and none produces that peace, tranquility and happiness which make life pleasant and beautiful. It is more independent than any other voca-

tion and therefore produces in a person an inate love for liberty and freedom.

The farmer stands upon a lofty eminence and looks down upon the bustle of city life and the everchanging success and failure which attend man in any of the other occupations in life. In farming only we can truly enjoy the beauties of nature. We are there out in the clear atmosphere, we breathe the pure air, and we walk abroad in Nature, not as artists to study her scenes, but as children to rejoice in her beauty and to learn to appreciate her grand works. Farm life is conducive to genuine happiness and to real comfort. Happiness is defined as one large and beautiful precious stone—a single gem, so rare that all search for it is vain effort, for the reason that it is hopeless. But it is not. Happiness is not rare; it is found all over. Happiness is in us, and our surroundings tend to bring it out and make it produce sweet flowers and beautiful fruits. It is true trials and adversity may appear to us in our life and darken for a time the horizon of perfect happiness, but with a strong will and Nature's aid we can overpower these and the sun will shine all the more bright through the dark clouds of misfortune. Farm life inspires us with hope even under the most trying circumstances, because we are with Nature and her grand works surround us.

Farm life is beautiful, honorable. The husbandman is free and independent. He does not necessarily interfere with his fellow men, and they need not interfere with him. If this is true of the occupation itself, and it is, the same must be true of the home in the country; the farmer's home. John Howard Payne has truly said:

"Mid pleasures and palaces tho' we may roam,
Be it ever so humble, there is no place like home.",

Home is defined as a dwelling place; but is this all? The word home in its full meaning covers a brighter and a broader sphere. Home is where the heart is; where peace and happiness dwell in close relation; where discord and ill-feeling are not admitted and where everything is beautiful and pleasant. The marble palace or the strong and inpenetrable castle is not always home; here unhappiness and discord but too often prevail. But there are brighter places, not necessarily elegant residences, often, very often, only humble habitations, where love and affection abound, and where all the members of the household unite to help carry each other's burden; where everything is peace and joy and happiness; unbounded happiness. We cannot, of course, overlook the artistic surroundings of such a habitation; they are both beautiful and suggestive; but they alone can never, no never, make a home.

Far reaching as the earth's remotest span,
Widespread as the ocean foam;
One thought is sacred in the breast of man,
It is the thought of Home.
That little word his human fate shall bind
With the destinies above;
For there the home of his immortal mind
Is in God's wider love.

Home! That word so dear to every heart; so grand, so sweet, so pure. Every person, however humble, strives to possess one; but alas! how few in the storm-cast sea of life really find it.

Those of us who have just stepped upon the stage of life as active members of the enormous troupes of actors, can best judge whether our homes have been abodes of pleasure and inspirations or whether our youthful days were spent in sorrow and despair.

If the former, we step into the world with a bright and cheerful heart; if the latter, indifference will be our companion. Home has a powerful influence over the future destinies and welfare of man. Under the fostering care and watchful eyes of our parents seeds are sown that, as we grow up, will ripen and bear beautiful fruit. And where can this be better accomplished than in the farmer's home?

Here we are always with our parents. We are always by their side; assist them as much as we can and try in our at first feeble way, to lighten their arduous labors.

We accompany our father into the green and beautiful fields, where a love for the grand and true cannot help but be inspired. In the admiration of the acres of golden grain we cannot but be grateful to God for his great goodness and to admire his noble works. Then when wearied from the day's toil, who greets and welcomes us as we step into the house? Who else but our mother? Mother! Who inspires us with hope and resolve; who watches tenderly over us in our youth; and it is mother again who is most anxiously concerned in our future happiness and welfare.

Oh! Would that time would not change the blissful days; would that we were always young and could forever stay with our parents.

Compare for a moment the farmer's

home with the home in the city. Do we find in the latter that close relationship which distinguish the former? That idolatory love which the inmates manifest for each other? We do—but rarely. In the city the father is away from home in the day time, in order to attend to his business. In the evening he either attends the club or finds recreation in some other pastime. He only comes home to take his meals, and even then he has no time to be social. The effect of this constant absence must be apparent. It creates a feeling of enstrangement towards his family, and this cleft will be widened as years roll on. Then, is the mother all that the word implies? Can she watch with tender care over the welfare and prosperity of her children; can she give to the home that feeling of peace and tranquility which we all so much admire; and above all, can she give to the household that love—a mother's love—which alone is conducive to perfect happiness? We answer, "No!" Society makes too heavy demands on her time. Her thoughts are led from the quietude of home to the broad fields of fashion. Besides, finding no willing assistant in the father, she too, like he, finds more pleasure and comfort in the wide, bustling world than in the quiet recesses of home. The effect of the indifference will manifest itself in the children, they too will take pleasure—not at home—but away from it. We see then that the farmer's home, above all, will produce the most tender and loving affection. There is another agent that makes home pleasant, and that is literature. To-day there is to be found in every farmer's home a library. The price of books has been materially reduced so that they are now within the reach of every person. Books cannot fail to have a charming influence on home. The inmates are drawn closer together and look upon home with more reverence than if there is no literature.

Home of our childhood! how affection clings,
And hovers round thee with her seraph wings.
Dearer thy hills, though clad in autumn brown,
Than the fairest summits which the cedars crown!
Sweeter the fragrance of thy summer breeze
Than all Arabia breathes along the seas!
The stranger's gale wafts homeward the exile's sigh,
For the heart's temple is its own blue sky!
O happiest they, whose early love unchanged,
Hopes undissolved, and friendship unenstranged,
Tired of their wanderings, still can deign to see
Love, hopes and friendship, centering all in thee!

Bees and Their Management.

[By Geo. W. Jones, West Bend, Washington Co.]

At the request of your committee of arrangements, I appear before you with a few notes upon bees and their management. I realize, not because I feel myself capable of giving you instruction upon the subject, but because in these Institutes, I believe it every farmer's duty to put his shoulder to the wheel and fullfil to the best of his ability the part allotted to him; and because, while the horse and the cow, the pigs and the poultry are being pushed to the front, I am unwilling to see the busy bee—the peer of them all—left in the background.

History informs us that the honey bee has been the companion of man from the earliest ages of civilization, and was introduced into this country in 1621.

Notwithstanding this fact, of its ancient origin and the further fact that the revenue and profits derived from apiculture far exceed those received from any other branch of agriculture, in proportion to the capital invested—the vocation of bee-keeping has, until very recently, been looked upon by the great mass of people as "small business"—and even now it is no uncommon thing to hear people say that it all depends on "luck" and may do well enough for cripples and imbeciles to "fuss" with, but that it is a waste of time and money for a farmer to bother with bees.

In my judgment this is a mistake, and as the farmer keeps a few chickens, and thus utilizes what would otherwise be lost, he should also keep a few colonies of bees and save for his table that delicious sweet, distilled by nature in such profusion in the innermost recesses of the beautiful flowers, that would otherwise be wafted into the realms of space, by the summer breeze, and lost forever.

A colony of bees, besides the pecuniary recompense it returns, is well worth the labor and expense necessary for its care, for the wonderful and interesting facts and lessons we may learn from it.

Come with me in imagination to a colony in a normal condition just previous to swarming time—we will find there a queen, twenty to thirty thousand workers and a few hundred drones.

The queen is the only perfect female in the hive and lays all the eggs. Bar-

on von Berlepsch, the great German scientific bee-keeper, made several different experiments to ascertain the number of eggs laid by a queen in a given time. In the first she laid 1,604 in 24 hours. In the second an average of 1,913 daily for twenty days; in the third 2,400 for twenty days, and in one instance 3,021 in 24 hours, and six in one minute. She has nothing to do with governing the colony and her sole function is the laying of eggs, thus, mother bee, would be a more appropriate name than queen. When she becomes old or barren, she either dies or is killed by the bees and a young one raised by the workers, takes her place.

The same egg that will produce a queen, may, under different conditions, produce a worker. If a queen is to be produced, the egg, or larva, not more than five days old, is placed in a cell the base of which is as large as three worker cells, she is fed abundantly on a rich food called royal jelly, and the cell when completed is about as large as, and looks very much like a common peanut. On the sixteenth day from the laying of the egg she cuts the capping of her cell until she can push it open with her head and emerges, a virgin queen. If her wings should now be clipped so she could not fly out of the hive all of the eggs which she would lay would hatch only drones. But if her wings are perfect and the weather suitable she will make her wedding tour on about the fifth day, and in five days more she will begin to lay, and lays drone or worker eggs at her option. Her natural life is from one to four years.

If the bees desired, however, to produce a worker from the same eggs it would remain in a common cell and be fed very sparingly on a food nearly, if not quite the same as that fed the queen, which is prepared from honey and pollen in the bee's stomach, and on the twenty-first day it would emerge a worker or undeveloped female, with entirely different instincts from the queen.

These wonderfully different results from no other causes than slightly changed conditions during the growth of the bee from the egg to the imago, are an object lesson to us that will not pass unheeded by the intelligent observer.

The workers perform all the labor of the hive, build the comb, nurse the young, gather the honey and pollen, carry the water, clean, guard and defend the hive, etc.

The drones are the male bees, they have no honey tongue and no sting. They are great lusty fellows and consume large quantities of honey, and as soon as the honey season is over—in all colonies containing a fertile queen—they are driven out by the workers and left to starve, sometimes upon the very door-sill of their own hives.

If we look closely we will find some of the bees with little scales of wax between the rings on the abdomen. From these scales the comb is built and when complete it is one of the most wonderful creations in nature. Its walls are so constructed that they exactly fulfill the condition of holding the greatest amount of honey with the least possible consumption of material in their construction. Apropos of this I will give you a somewhat abridged version of a very interesting article found in volume two of A. B. Journal.

"Many years ago, Maraldi, being struck with the fact that the lozenge-shaped plates (forming the bottom of the cell) always had the same angles, took the trouble to measure them, and found that in each lozenge the large angles measured 109 degrees 28 minutes and the smaller 70 degrees 32 minutes, the two together making 180 degrees—the equivalent of two right angles. Some time afterward, Reaumer, thinking that this remarkable uniformity of angle might have some connection with the wonderful economy of space which is observed in the bee comb, hit upon a very ingenious plan.

Without giving his reasons threfore, he asked Koenig, the mathematician, to make the following calculation: Given a hexagonal vessel terminated by three lozenge-shaped plates, what are the angles which would give the greatest amount of space with the least amount of material? Koenig made his calculations and found that the angles were 109 degrees 26 minutes and 70 minutes 34 seconds, almost precisely agreeing with the measurements of Miraldi. Reaumer, on receiving the answer, concluded that he had very nearly solved the difficult mathematical problem. The difference between the measurement and the calculation being so small, (only 1-30 of one degree) as to be practically negative in the actual construction of so small an object as the bee cell.

Mathematicians were naturally delighted with the result of the investigation, for it showed how beautifully practical science could be aided by theoretical knowledge.

For a long time these statements remained uncontroverted. Anyone with the proper instruments could measure the angles for himself, and the calculations of a mathematician like Koenig would hardly be questioned. However, Maclaurin, the well known Scotch mathematician, was not satisfied. So he tried the whole question himself and found Maraldi's measurement correct, viz. 109° 28′ and 70° 32′. He then set to work at the problem which was worked out by Koenig, and found that the true theoretrical angles were 109° 28′ and 70° 32′, precisely corresponding with the actual measurement of the bee cell.

Another question now arose, How did the discrepancy occur?

On investigation it was found that no blame attached to Koenig, but that the error lay in the book of Logarithms which he used. Thus a mistake in a mathematical work was accidently discovered by measuring the angles of a bee cell, a mistake sufficiently great to have caused the loss of a ship, whose captain happened to use a copy of the same Logarithmic tables for calculating his longitude.

In the light of the above facts, how true are Darwin's words, "He must be a dull man indeed who can examine the exquisite structure of comb, so beautifully adapted to its end, without enthusiastic admiration."

Though we have given you but a glimpse of the wonders of a bee hive, our time admonishes us that we must leave this subject and give you a few hints on the practical management of bees.

It will be understood that these hints are designed, primarily for the recruit or beginner, and not for the old veteran who already counts his colonies by the score or by the hundred.

Right here let me give you a word of caution. Langstroth says, "There never will be a royal road to profitable bee-keeping. Like all other branches of rural economy it demands care and experience, and those who are conscious of a strong disposition to procrastinate and neglect, will do well to let bees alone, unless they hope by the study of their systematic industry to reform evil habits which are well nigh incurable." This was written many years ago when honey was worth from 20 to 30 cents a pound. It was true then, and is doubly true now.

The first step is to get possession of a colony of bees, and in order to insure success it is essential that you get a good colony and at the right time of the year. To make sure of this, any fine day about the first of May go to some successful apiarist who keeps bees upon the modern principle, no matter if it is an all day's journey to reach him, but in this locality you surely have a choice of them within a few miles of you, put him upon his honor and tell him you want a good strong colony of Italian bees, with a queen not over one year old in a two story movable frame hive.

You had better pay eight or ten dollars for such a colony than buy one at auction from an old fogy bee-keeper, in February or March for two or three dollars, unless you are especially lucky at drawing prizes in a lottery. Take them home and place them upon a stand about four inches high with entrance toward the south, and an alighting board reaching from the entrance to the ground. If you got them within two or three miles of home, just before you release them, give them a few puffs of smoke at the entrance and place a board about a foot wide and two feet long in a slanting position leaning against the front of the hive. This is to cause them to mark their new location, and thus prevent them from returning to their old home with their first load of stores.

Keep them confined to the lower story and warmly covered above, with chaff or its equivalent until they swarm. If they do not swarm during fruit bloom, feed a half pint of sugar syrup at the entrance every fine evening until they do swarm. Hive the new swarm as expeditiously as possible in a new, clean hive, kept in the shade, containing nine wired frames of foundation and one comb from the old colony containing unsealed brood, which comb must be replaced by a wired frame of foundation. You can wire the frames yourself by punching six holes equal distance from and exactly opposite each other in the top and bottom bar and weaving through these holes, No. 30 tinned wire. Be sure to draw the wire tight, and if the top or bottom bar springs, hold them apart by

a little strip of wood or folded tin. Have the foundation cut a trifle larger every way than the frame, lay it upon a smooth, wet board, a trifle smaller than the frame, about § in. thick, having previously warmed both the board and the foundations to about 90° Farenheit. Place the wired frame upon the board with the wires resting upon the foundation and the frame resting upon the table (or better still upon a larger board, to which the thin board should be securely nailed). Draw a common button hook with a notch filed in the back along each wire so as to imbed it into the septum or base of the cells, and press the edge of the foundation fast to the frame on all sides with your fingers. If the temperature is just right you can do this quite rapidly. Be sure and have this done in advance of swarming so that your frames will be already when the swarm arrives.

As soon as the bees are all or nearly all in the new hive, place it where it is to stand permanently. If there are a few bees flying no matter, they will find their mates or return to the old hive.

Give ventilation more or less according to the weather. If very warm, shade in addition. You need have no fears of their taking French leave the next day, as in all my experience covering scores of swarms, I never had a swarm leave a frame of unsealed brood. In about five days destroy all but one of the queen cells in the old hive, this will prevent any more swarms. In about three weeks, if all is well, the young queen in the old hive will be laying, and by this time, if not before, you must fill the upper story with wired frames of foundation. The upper story of the new hive should be filled when the lower story is about two-thirds filled with honey and brood.

As soon as you find the bees beginning to seal any of the combs in the upper story you may begin to extract, and the oftener you extract the more honey you will get, but you must be careful if it is thin to keep it in open vessels in a warm, dry room until it is evaporated. I would advise you, however, to leave three or four of the first sealed combs in the upper story of each hive for wintering. If the season is fair and the locality not overstocked you will have secured at least 100 and perhaps 200 pounds of honey by the end of baswood bloom, and the honey season will be substantially over unless you have a buckwheat harvest, which in my locality is very rare.

And now we come to the wintering problem, the rock upon which so many are shipwrecked. To make a reasonable certainty of successful wintering requires close attention to details and considerable labor. About the middle of September confine your bees to the lower story and the first of October remove all combs containing pollen. If there be any containing brood and pollen leave them until the brood hatches and then remove them. Place the four combs (which were reserved in the upper story) below and confine the bees to six combs by a division board on each side. Fill the space between the boards and sides of the hive with chaff or cut straw. Place upon top of the frames a "Hill device" or a substitute made by nailing five pieces of lath 14 inches long to two strips of inch board 8 inches long, 1 inch wide in the middle and tapering to a point at the ends, in such a manner as to form a clustering place on top of the frames, thus insuring that at all times the bees will be within easy reach of their stores. Cover this with burlap or an old grain bag and fill the upper story with chaff. If they are in a chaff hive this is all the protection necessary, but if in a single-walled hive by the last of October they should be covered by a box four inches larger each way than the hive and closely packed with an additional four inches of chaff, taking pains to have a clear, unobstructed opening from the outside to the entrance. Stand a board slanting over the entrance, against the hive, and except to be sure that this entrance is at all times unobstructed by dead bees or ice, you need give them no further care or attention until they begin to bring pollen in the ensuing spring from the willow or soft maple. Then remove the "Hill device" and cover the frames tightly with a piece of enamel cloth, being sure to keep them warm over the brood nest, leaving all the chaft packing until at least the middle of May. As the bees increase in numbers you may gradually add the combs which you took away from them the autumn before, breaking the cappings of the honey as you do so, and the cycle of the year will be completed.

If you have spent a fair share of your leisure time during the winter as you should have done, in studying one or more of the various text books upon

the subject, you will be abundantly able to take care of them for the future without any further advice from me.

Now one word more and I have done. It is thought by some that too many are already keeping bees and that there is an over production of honey, hence the low prices. A glance at the figures will show us the fallicy of this bugbear of over-production. Wisconsin ranks above the average of her sister states in the production of honey and the last census shows us that in 1884 (which was a good season for honey) she produced 1,432,766 pounds, an amount which if equally divided between every man, woman and child in the state would give to each the munificent allowance of not quite one pound.

This is over-production with a vengeance. The trouble is not over-production but under-consumption. The majority of people look upon honey as a rare luxury to be used upon fete days or carefully stored away for sickness, while its place is occupied on the every day table by the vile, death dealing glucose syrups. Producers must show consumers that this is a great mistake. Honey is now so cheap that at least the children should be allowed to have all they want. If this were done there would not be honey enough to go round.

Solomon, the wise man, said, "My son, eat thou honey because it is good." And Isaiah prophecied of Immanuel, "Butter and honey shall he eat, that he may know to refuse the evil and choose the good."

Does the Bible anywhere say, "Glucose syrup and oleomargarine shall he eat, that he may know to refuse the evil and choose the good."

Nature in her laboratory has given us the butter globule in milk and the golden drop of honey in the beautiful flowers, and all the ingenuity of man cannot duplicate them, and until they are both found upon every table in the land every day in the year there can be no such thing as over-production of butter and honey. Ere that time arrives, if the bee-keepers and dairymen of our state will but utilize the resources which nature has placed at their command, Wisconsin, with her babbling brooks and verdent pastures, her forests of Linden and broad fields of clover, her balmy winds and refreshing dews, will become, like the promised land of old, "A land flowing with milk and honey."

Has the Silo Proved Its Claims?

[By John Gould, of Ohio.]

The remarkable change that has been made in sentiment respecting ensilage within two years is no greater than the character of the ensilage itself; and they together, present the chief innovations upon old and established farm methods, the mere departure from any one custom known in modern years. It has been in reality a battle of the kids in agriculture, with the most sturdy, bearded veterans, a struggle with those "who do as their fathers did," and a later generation who propose to do that which is most profitable and allow the fathers and their ways to sleep in peace.

The struggle has been persistant. Ensilage has been fought on the outside by not only farmers but men who never owned a farm, by men of science and men of scientific schools, and even by professional agricultural editors; and yet, step by step, and in the face of the most determined opposition, this new food—or rather food preserved in a new way—has made its fight and has at every turn showed improvement in every respect, and has made its way in public favor until it has now gained a firm foot hold, and holds the fort with a gain of 100 per cent. in number of silos over 1885, and is now a recognized factor in the production of milk in the best private and commercial daries of the Middle States and Europe.

Could ensilage have been divorced at the start from some of its over zealous friends, I think the opposition would have been less detrimental; but like new converts they made most extravigant claims and met as a result many reverses. It can now be seen that there were good grounds for the opposition. But now, with the experience of seven years, and the proverbial Yankee spirit of improvement rife, the man who would now object to ensilage because it was not first-class feed in 1881–2, could with as much justice condemn twine and wire binders because in 1878 they failed to do satisfactory work.

The ensilage of 1882 was washy stuff, pungent with acid odors. But in some way cattle throve upon it; it was certainly better than hay, costs compared with results. As the struggle went on, the wide awake Yankee saw chances to improve the crop, to lessen the cost of the silo, to cheapen the cost of the labor element, and last, to so store it

that it will not lose any of its nutritive qualities; and lastly avoid the pungent acid odor that has in the past held it up to ridicule as "cow kraut."

At this juncture came Prof. Miles with his theory that the trouble had been that the filling had been too hasty; that it needed the development of heat to hold in check the acid formation; slow filling and then light weight to keep out the air. The change was remarkable, But it was left to an Ohio man, A. S. Emery, to go farther, and prove that crops should be cut near mature, allowed to wilt slightly and be cut slowly into the pits and covered but not weighted in the silo. By this method it was shown that one could have the long desired sweet ensilage. The Ohio man caught at the idea. Last year the greater part of the Ohio silos were filled on the new plan, and the result left no cause for criticism. This year all the silos in Ohio were filled by this method, and so far as opened, every one has the ideal ensilage. Sweet, free from acid, not odorless, but having an agreeable smell, that in no way reminds one of the ensilage made from half grown corn fodder and hasty filling.

These things established to the satisfaction of the dairymen, the matter of the crop was next looked after. The plan of broadcasting two bushels of corn was seen to have great disadvantages; first, the purpose of a corn plant is to produce an ear of grain, and if we defeat that, there is no object before the plant to develope the elements needed to bring the grain to perfection, and there will be a corresponding lack of such preparation. The crowded stalk could only put forth a few sickly leaves, shaded, crowded, and roots overrun with a thousand other rootlets. The plant grew but did not mature. So from broadcasting to drilling, and from drilling to regular rows, and from two bushels per acre we in Ohio are down to twelve quarts, to sixteen at the outside, in rows three and a half feet apart The result is we get a greater weight of fodder, a fair yield of corn, the stalks are great lusty fellows. And a field of ensilage fodder before cutting is a wonder.

The transportation of the silo is going on, and while in some sections stone and sand are so plenty that cement silos are quite as cheap; but as a rule the silo built of lumber in a corner of the big barn is taking its place. The methods of cutting and drawing are now reduced to science, and the "awful work" of filling a silo is not longer heard.

Now, for a few moments of moralizing about silos, and then we may take up in detail some of the things that go to make a good cheap silo and abundant and comparatively cheap filling. Now, I do not want to be called an ensilage exhorter, or shouter, and I do not want any one to go on my say-so, and build a silo, but I do want you to carefully consider what I may say, and think of the matter, and investigate, then if you feel inclined to build a silo, do so, and apply these things to your comfort.

Then why should ensilage be better than the same crop made into hay or corn stover. And I want to ask these few questions for you to answer at your leisure: When does our stock fatten and thrive the best ? When in the stable fed on dry hay, or in the pasture? When do our cows give the most and best milk? On hay or June grass? Why do we batten our stables, warm the water, feed the best hay and ten pounds of mill-feed per day each, to make our cows give as much as they do when fed on grass alone? Why is it that the grass that a cow consumes each day, dried into hay, only furnishes her with one-third of the needed food, when that same hay in grass will support her, and enable her to give three gallons of milk per day?

There can only be one intelligent answer to this. Green or succulent food is the natural ration for an animal. This condition is most favorable for digestion, for it is in practically a soluable condition ready to be acted upon by the gastric fluids, without any breaking down or disolving process, and without any save the normal expenditures of animal force, is ready to go into the system of assimilation. On the other hand, the same plant dried has first to call upon nature to moisten it with the mucus of the mouth, the stomach must pour out additional fluids to disolve and soften the moody fiber, so that they will release the dried contents of the cells, and finally nature is called upon to put nearly three times the digestive power in operation to digest the solvable parts. So that it is ready to be assimilated or appropriated by the system that it does when eating green

herbage. In other words, the difference in weight between a ton of dry hay and the three tons of ensilage dried, is exactly the extra food that nature requires to produce animal force to digest the dry food. The less you require of your stock to put forth in exertion in digestion the better must be the results at the milk pail. Why do we advocate warm barns? To save animal force in way of heat. So we say that up to a certain point boards are cheaper than hay. Why do we not say warm the water for the winter milkers? Save animal force in way of heat, to produce animal heat ex ra food is required. Why then is succulent, or green food best? Simply that it saves animal force in the shape of expenditure of digestive power, and that expenditure must come from food, and that over and above food the force needed to digest soluable food. Why not dry food and soften it? Possible; but no nicromancy of steam can overcome the chemcal change that has taken place in drying. The restoration has at last to take place in the stomach of the cow and it takes too long to digest it, (*i. e.*) that nature has got to be supported and the forward movement of digestion that is ever carrying the food onward irrespective of its character, does not give complete digestion, and appropriation of all the food.

The loss of food value in the silo with the later system of filling must, from the very nature of things, be far less than when the crop was put in with less than one-half of the nutritive value of the same crop grown less dense, and better developed. As the crop now heats less, develops no acetic acid, and preserves the original sweet of the growing plant, the 10 per cent. loss of food once asserted cannot now be charged. Dr. Gosseman found that while there was a slight loss in the albuminous, there was a corresponding gain in the carbo-hydrates or fat-formers. "So at last," says Prof. Arnold, "there is now less change in the character of food in the silo than there is in the cud of a cow, from the grass it is made of."

The demonstration that Southern white corn is the great reliable crop for ensilage, and that clover, millet, etc., are side issues or help, it may therefore get at our silo crop, and fill our silo with ensilage.

The silo has undergone a wonderful transformation within ten years. The fact that all that was required was that the walls should be strong and air proof, made the wooden silo preferable. The wooden silo is now either built of two thicknesses of inch boards, with tarred paper between, as the inside wall is firmly nailed upon 2x10 inch studding, or lathed and plastered, on the inside part. The best form is a hovering pit twice as long as wide, and as deep as wide. A good form is 32 feet long, 15 feet wide and 16 feet deep inside measure. Such a silo well divided into ten pits by a partition, holds about 160 tons of compact ensilage, enough to winter 25 cows, and the crop should be grown on six acres of good land.

The best ensilage crop is corn, drilled in not over 12 to 14 quarts of seed per acre, in rows 3½ feet apart, and should be tended the same as field corn. At present the most popular variety is the white Virginia corn, although some contend that the best varieties of Wisconsin field corn is quite as good. As soon as the corn is matured, the corn ears well advanced in the milk, it is ready to cut, it is most chiefly done with a reaper leaving the fodder in good-sized gavels. This fodder is then transported to the silos and run through the larger sized straw cutters cutting it into inch lengths. The power required to do this may be had by using sweep, or tread power, and for the larger silos a cheap engine is preferable.

The object is to obtain sweet ensilage and this is obtained by more slower filling the pits, and allowing each day's filling to heat up to about 125 degrees, when another layer of the fresh cut corn is put on. This process partially cooks the fodder and the fresh layers absorbs the heat, cooling down the lower layer to about 80 degrees. By shutting away from the air, reheating is prevented, and the heating will prevent any further attempt to ferment, and thus we have secured sweet ensilage by the agency of mature fodder when cut, heating the ensilage in the pits up to 125 degrees while filling, and excluding the mass from the air. This also avoids the use of weights, as the slower filling and heating has caused the mass to settle about it well, and all we need now to do is to keep the air out of the pits which is chiefly and effectually done by covering the contents with tarred paper, a layer of boards and two or three loads of hay or similar weight to hold the

cover firmly down upon the ensilage; this plan does away with the useless handling of dead weights, and use a material for weight that can be utilized for the feeding of the stock, and is all in the direction of economy of work, and storage of hay and fodder.

When the time comes to feed the ensilage, it is best to remove the entire cover from over the pit of the silo, and take evenly from the whole surface; then there is no chance for any change to take place in the food as the twice removing from the surface each day, prevents any possible chance for freezing, or change by warm weather. The latent heat of ensilage is not far from 80 degrees, and with ordinary precautions there is no danger of frost.

The ordinary cow will eat from 50 to 60 pounds of ensilage per day, and if the fodder was thinly grown, so that there was a fair growth of ears, such a ration with the addition of 8 pounds of bran will be ample for a cow in winter milk.

The character of the ensilage ration and its formable effect upon milk and butter none can longer call in question. The butter and cream of some of Wisconsin's largest and best known dairies, produced from ensilage is sold at fancy prices to the great hotels and restaurants of Milwaukee and Chicago and are now regarded as standard goods.

The cost of growing ensilage is put by different farmers at from 40 cents to $1.75 per ton in the pits. That it is the cheapest ration yet devised for stock to be fed in conjunction with other farm produced rations seems established. Can the Wisconsin farmer remain indifferent to its claims and refuse even to investigate its merits.

Disease Germs.

[By Chas. V. Porter, M. D.]

"It is honorable to cure, but noble to prevent disease.—CICERO.

I propose to talk about some of the disease germs that we meet in the home and on the farm. As you well know, very many diseases, both of men and animals, are contagious—that is, communicated by direct contact, or infectious—that is, the air, water. etc., are pervaded with poison derived from one case of a given disease which may give rise to a second case. Now this infectious something is not a gaseous principle diffused through the atmosphere, as people used to think, but it is in the form of minute organized bodies which under the microscope are seen to have different shapes and sizes. Thus the germ of American hog cholera is in the form of minute rods; that of diphtheria appears like little dots; that of Asiatic cholera is shaped like that mark in punctuation we call a comma. Just as the seeds of common plants differ in shape, size, color, provision for distribution and tenacity of life, so in these microscopic seeds of common diseases of men and animals we find similar differences. We might indeed liken the germs of our swine plague or hog cholera to the thistle seed because they are easily diffused; borne upward and wafted by the breeze from one pig pen to another. The little berry-shaped germ of diphtheria might be compared to the burdock bur, sticking and cleaving to mucuous surfaces and clothing and thus spread. The typhoid germ has been likened to the chickweed, the germ neither flying nor often stealing a ride, but simply asking a place near the habitation of man, where in filth it can either flourish or lie dormant until a more convenient season calls it into activity.

Now, disease germs are generally of vegetable origin. This is not true of a very common disease around us. That disease is caused by the burrowing of an eight-legged animal under the skin. Towards evening this animal begins to travel, and its owner begins to itch. But most disease germs belong to the lowest forms of vegetable life; they are one-celled plants. There are three families of these germs, but the one which most interests us now is that of bacteria.

The two principal types of bacteria are the one consisting of small, round, shaded dots or bodies, called micrococci, and the other consisting of bodies several times longer than their thickness and called bacilli, the Latin word for little rods.

Now what diseases will these different kinds of micrococci produce? It is asserted by men who ought to know, that one species of micrococcus gives diphtheria; another is the germ of scarlet fever; another of measles; another of cerebro-spinal meningitis; another of yellow fever; one of dysentery, another causes pyaemia, the poisoning of the blood by the absorption of unhealthy pus into it; and another micrococcus causes erysipelas. What of the bacilli? Some are innocent. Many are deadly. One is the germ of true typhoid fever;

another, taken into the system is said to give malarial fevers, ague and remittent. A very slow dormant germ gives leprosy. Another species gives glanders to man and horses. Another gives whooping cough, while one which may lay dormant for years is now thought to be often conveyed from consumptives to healthy persons and is believed to give tubercular consumption. Then the deadly blood poisoning we call septicaemia, which kills in childbed fever, and after accidents is caused by the introduction of bacilli into the system. Another rod germ is that of American hog cholera, and still another species gives the distinct disease, European swine plague. Another gives rise to that disease of cattle, sheep and horses known as anthrax or charbon, a disease sometimes contracted by tanners, wool-pickers and plasterers who handle wool, hair and hides brought from some infected locality. One form of bacteria is the germ that causes putrefaction.

Why are farmers' wives so careful to dry their milk pails and cans in the sun and why do they avoid mixing even a drop of water with the new milk? Because the milk keeps sweet much longer. May not this fact be due to the exclusion of the *bacterium termo*, the germ which causes putrefaction? I do not think the bacteria which cause meat and other organic substances to putrefy are often the direct cause of infectious diseases. This question has been asked: Which lying in your cellar is the more harmful to the occupants of your house, a putrefying rat or a decaying potato? Which lying under your house is the more detrimental to the health of your family, a decaying cat or a decaying cabbage? The decaying animal smells louder but is probably less harmful. Milk poisoning. It has occasionally happened that whole families and even large assemblies have been made violently ill by partaking of the same particular article of food. My friend, Dr. Craig, of Iowa, treated some thirty sufferers made terribly sick by eating ice cream at a festival. Three hundred persons in Michigan were sickened by eating ice cream at a banquet. At Long Branch last August seventy-three persons were taken sick after supper by using milk. Last June in Michigan eighteen persons were sickened by eating ice cream, and Dr. Vaughan of the university set to work to discover the poisonous principle of that cream. He separated the poison crystals and named it tyro toxicon. Fed to a cat it produced retching, vomiting, and prostration. At Long Branch the State Board of Health investigated the matter. They found the poison was due to a changed condition of the milk used. It was not due to chemicles added to keep the milk sweet; nor to polluted water, nor to disease, nor to improper feeding. But here was the trouble. The cows were milked at midnight and midday; unusual and unnatural hours. The noon's milking, that which alone was followed by illness, was placed while hot into close cans, then carted eight miles without cooling, during the hottest part of the hottest days in August. Within five hours that milk was an active poison. It caused nausea, vomiting, cramps, collapse, dryness of the throat, and a burning sensation in the gullet.

How can this change in milk be prevented? Simply cool the milk soon after it is drawn from the cow. After the poison is formed, boiling or heating to 180° dissipates the poison. But how shall we prevent these diseases of animals and men? European swine plague, chicken cholera, anthrax and black leg, four distinct diseases, can be given in a mild non-fatal form by inoculating with cultivated virus. Our American swine plague or hog cholera is a different disease from the European and has not been, I believe, mitigated by inoculation. You want to regard it as highly infectious. Then keep your hogs away off from the road toward the center of the farm. Keep away from them every man or animal that has been near infected pens. Cooked feed will be safer. Don't put your faith in any vaunted cholera remedy. Save your money. Buy carbolic acid crystals for a preventive and cure. Give ten drops diluted in water three times daily for every 150 pounds of hog. Dissolve it only in pure water; not in swill nor alcohol. If your hogs get sick put the well ones away in a clean pen and treat all with the acid. Burn or bury deeply the dead hogs. When the disease comes let the farmers call a mass meeting and agree to aid in stamping it out.

We hope in time to learn so much of the natural history of disease germs as to be able to inoculate with cultivated virus in those diseases of men and animals which occur but once and thus to communicate a mild form of the disease

whatever it may be. Until that time we must work to prevent the spread of all infectious diseases.

This is the way the Louisiana Board of Health prevented cholera and yellow fever germs from entering New Orleans and the Mississippi Valley last year. Vessels from infected ports were met at the health station by a tug boat constructed for the purpose with great furnaces for burning sulphur and a big fan for forcing the gas into the interior of the infected vessel, which was filled with the gas. The deck was then washed with a spray of corrosive sublimate in water; the clothing taken to a room and heated to 220° and the spray thrown over it. In that way cholera and yellow fever germs were killed and quarantine shortened.

That is the way they stamp out pestilence to-day, for neither cholera nor yellow fever will ever visit us again unless the seeds of those diseases are brought to our shores.

Look back four centuries and see how men tried to stop pestilence. Plague swept over Europe and in three years destroyed 25,000,000 of people. It visited London and nearly depopulated it. Here is the way they tried to stop it. They mounted a man on a platform in a public square and set him to crying, "God have mercy on us;" "God have mercy on us;" and he cried until hoarse and then they put up a fresh man so that day and night and night and day that piteous wail went upward. But the plague didn't stop. For all that time the streets and alleys of London were filled with every describable kind of filth—dead horses, dogs, cats, piles of excrement and every other abomination.

But we are learning how to live longer than formerly. In the Sixteenth century the average duration of human life was only eighteen years, says Dana. Now it is forty-one years. One hundred and fifty years ago three out of every four children born died under 5 years of age; now, except in large cities, only three out of ten die under 5 years.

Three more children in every 100 born in 1886 will live to the age of 15 years than if born 25 years ago. The death rate is now 2 in 100 annually. Scientists are confident it will be reduced to 1 in 100 annually, and the amount of sickness curtailed to one-fourth what it is now. This result has been brought about largely by our increased knowledge of the causes of diseases and the dissemination of knowledge regarding their prevention.

The germ theory concerning many diseases is no longer a theory, but an established fact. Let us hope that scientific investigation in this direction will be as prolific of good results in the next thirty years as it has been in the past third of a century.

What Will the Coming Farmer Do?

[By Seymour Brooks, East Troy, O.]

In pursuing this theme, you will please allow me some latitude, and pardon me while I endeavor to carry your thoughts a little in advance, and to a higher plane than the average farmer has attained, even into the realm of the ideal, and unveil the coming farmer as he will appear in the light of the Twentieth century.

The coming farmer, will, by inheritance or purchase, become the possessor of a portion of the public domain, and will begin to make a home the grandest place ever conceived in the heart of mortal man, with all the blessings the thought contains. He will record with the title of his farm the vow that here he will live, and here he will die and be buried; and will proceed to make this the most beautiful and lovely spot within his means. He will commence where the Divine Father left off when he pronounced the work of creation good, and in imitation of the divine thought he will discover that it is not good for man to be alone. Common sense and nature will teach him there is no real home without a companion—a wife—someone to love next to his Maker—better than all things else; a sharer of his joys and sorrows, his other and better half. In choosing his companion, if he will be true to his own heart unbiased by the God of the world, he will make no mistake. This point settled, he takes this woman and this farm for better or for worse. This will relieve him from all desire for change for some other occupation. He will hang out a sign for all to behold, inscribed on it will be, "Come to Stay! Sink or Swim, Survive or Perish, I Fight it out on this Line," instead of the one most commonly seen now a days hanging conspicuously in the door yard, "This Farm for Sale." He will build a neat and tasty dwelling, if not costly will have a liberal lawn in front, in which to plant trees and cultivate flowers, where his family can bask in the sunshine and rest in the shade in

the sight of beautiful flowers which some child has designated to the thought of God. His house will be furnished with a view to comfort and everyday use. No shut up rooms for special occasions. His library filled with books from the best authors, his center table loaded with daily papers, magazines and reviews, from which the minds of the whole family will be fertilized every day. Music, vocal and instrumental, will not be strangers here. This home will be noted for its good cheer and hospitality, where none in want or affliction will be turned away empty. His garden will be a thing of beauty as well as utility, its long straight rows of vegetables showing thorough cultivation and fertility of soil, all the varieties of small fruits—the luscious strawberry, the toothsome raspberry, the health-giving grape, the useful current and blackberry. His orchard will supply an abundance of fruit for family use, and some to spare to his less painstaking neighbors; carefully trimmed from all superfluous sprouts and branches to let the sunlight in to paint the cheeks of the fruit, also imparting the richest flavour, a place where all stock will be excluded—except perhaps the pigs, to pick up the windfalls at stated seasons.

The coming man will plant trees on rough parts of the farm, all the nut varieties, white and black walnut, butternut and chestnut—useful help to pass off a long winter evening; trees, also, for fuel and timber, a help for a copious supply of rainfall and wind-breaks, a prime factor in the make-up of the landscape, views, which is an incentive to thought, a relief between sky and earth. These views have more to do with the make-up of early impressions of our children than we think—they look and wonder, and meditate on the whence and whither of all things.

The coming farmer will grow no scrub stock. His animals will all be of the most approved breeds, adapted to his farm and system of farming. He being a rustler himself, will want a nimble-footed horse that can step to the time of Yankee Doodle, and not Deaths' March, a 16-hand 1200-pound horse, with slanting shoulders, short back, muscular perpendicular limbs, round, deep, black foot, wide open jowl and nostril—a horse of all work always kept in the box or paddock. His cattle will be chosen for a special purpose, for dairying or beef as he shall elect, always to be found in the stables or feeding lot, never to roam over the farm, the stables and yard will be cleaned every day, the fertilizer taken immediately to the grass-plot and spread. Fall rye, clover, early sown oats, millet and fodder corn will be cut daily, and carted to them in the barn or feeding yard according to the season. Some green succulant food will form a part of their ration every day in the year. Ensilage sandwiches with cut hay and straw, bran meal and linseed for milch cows and fatting cattle, lumps of rock salt where they can have access all the time, and so kindly treated that they will have no fear of their attendants. Water will be accessable to them at all times, warmed in cold weather to blood heat by some process not in use at the present time.

The coming farmer will put up an abundance of ice, the cheapest luxury he can have. He will arrange in one building an ice house, a cool room and dairy room, a tight hopper bottom under the ice, conveying the drip to a tank in the dairy room, supplying the needed cold water for setting the milk, also for all cleaning purposes. The cool room for storage in his dairy room will be furnished with the best appliances for manufacturing butter all propelled by electricity or some cheap moter yet to be invented. The milk will be strained when drawn from the cow, also at the dairy room. The gilt-edged article produced here will be forwarded twice a week to grace the tables of our city cousins, for which remunerative prices will be secured—the skim milk and slops conveyed to a tank into which middlings will be mixed—the most economical food for pigs, a factor in successful dairying.

Should you ask me, "will the coming man keep sheep mainly for fleece?" I should answer, I should say *perhaps he may*, if that good time should come when the average man should be willing to part with his cow, and our lawmakers get into sympathy with the men who feed and clothe them, and pay the major part of the taxes to support the government which they do so effectually misgovern, so eager to do missionary work for the welfare of all people but their own.

The coming farmer will have a wind mill to elevate water into a reservoir from which he can convey into all his buildings by pipes. He will have fountain in his yard, a thing of beaut

and utility, for watering plants and shrubs, tempering the heated, dry, atmosphere, the overflow conveyed to some place where stock water is needed. The bath-room will be supplied from this reservoir, also, so that the whole family, servants and all, will be Godly because cleanly. A hose attached to this reservoir will water his lawn, and perhaps save his dwelling from the flames, or wash his carriages or supply the tank of the steam thresher.

The coming man will have a telephone plant in his house, by which he can order meat from the market, call the physician or chat with his neighbor, wish him a "Merry Christmas" or a "Happy New Year." His wife and daughters can call Mrs. A——— and enquire after the baby or invite company to tea, or a thousand and one things, I will not stop to enumerate, which will suggest themselves readily to your minds.

The coming farmer will be a member of a farmers' club, twelve in number, who will meet alternate each month at each others homes, cultivating friendly feelings with each other, where questions will be discussed pertaining to successful farming, how best to keep up the fertility of the soil, rotation of crop, different breeds and management of stock, when, where and how to sell and buy; the ladies discussing house-keeping, home-making, and mind cultivation and topics discussed at the last Farmers' Convention, when Mrs. A—— introduced a resolution demanding equal rights in our Agricultural College for female students.

Perhaps I ought to say right here that women have had full franchise for a number of years, which will partially account for this new state of things, though she has at times been a strong support and tower of strength to her lord in great deeds of public enterprise, yet she still loves home best, because it is her nature, she instinctively cleaves to her home, the empire from which she rules the world. The ballot has only added a laurel to her crown.

The coming farmer will regard his farm as his bank of deposit on which he is to deposit all the fertilizers he can produce on the farm, or any other source he may be able to draw from, by the purchase of gypsum grain, hay, straw, from other farms, also, mill feed and linseed to be fed on the farm to enlarge the compost heap. He will strive to make large deposits—so he can check out liberally, and not have his drafts dishonored by overdrawing his account—the safest and best bank for the farmer to deposit in. He will work clover for all it is worth, a necessary factor in keeping up fertility, furnishing a very succulant food for all stock, the vast amount of roots running far into the sub-soil bringing up plant food, washed down by rain, also drawing nitrogen from the atmosphere, might truthfully be named the farmer's bonanza. Clover hay fed to stock, in connection with some concentrated food and the droppings returned to the soil, is the best way to economize all the elements of fertility which it contains.

The coming farmer will take his sons into partnership while in their teens, give them an interest in his business, put responsibility upon them, teach them by precept and example how to do business, inventory and strike the balance at the end of the year, see where they stand, whether money has been made or lost, if lost, see where and how it was lost, profit by experience, the best school to learn in, the best kind of an Agricultural College. When the sons arrive at a majority they will be ready and able to paddle their own canoe—if it be on the farm, well, if not, there is always a place open for good honest industrious boys, for of such is the hope of the nation. Boys raised on the farm, double-breasted, full of vitality and energy, and good habits make generally good merchants, good mechanics, good artisans. "With proper training" if inclination runs that way. But above and beyond all they make good farmers, good citizens. The most valuable crop the farmer can raise is a large crop of good healthy boys, and if he should be so unfortunate as not to have any girls the boys will bring them.

The coming farmer will not be that selfish creature which many of us are to-day. He will be more careful of the rights of his wife and daughters, he will provide some way by which they will always have money in their purse to supply their needs, without the humility and meekness of a beggar in approaching their lord for a little allowance of pin money. And if their request is granted, it is done many times in a grudging and patronizing way to make them feel like dependants instead of equals.

If dairying be not the principal business of the coming man, he will keep cows enough to make more butter than the family needs. Raise some surplus poultry and eggs with other odds and ends. I will not stop to enumerate, to swell the purse of the better half and daughters.

A man always feels better and more independent with a little money in his pocket; so, also, the woman. I wish to emphasize this thought, "for it is a crying sin." Have you prospered, it is because your wife has done her full share towards that prosperity. If you have earned, she has picked up and saved. If you are able to drive a high stepping nag and carriage when you go among your fellows, provide a gentle horse and carriage for your wife and daughters for their sole use. If you like to have money in your pocket, see to it that their purse is not empty, do this because it is the right thing to do, and my word for it, you never made a better investment.

The coming farmer being an educated man himself and knowing the worth of it and his wife an accomplished woman, they will to the best of their ability educate their children, beginning where all education begins, in the family, hearing nothing but correct speaking as fast as the child gets the use of words they will be correct from imitation. Careful to speak full rounded words and correct sentences, the children will soon appear ltke little men and little women minus the baby prattle of the present time.

The major part of the education will be obtained at the district school, which can be more economically done than any where else. Good schools will be maintained at home regardless of expense, the best teachers will be employed and all help procured to maintain a first-class school. Music, vocal and instrumental will be a necessary qualification of a teacher. He must carry a first grade certificate, be a gentleman or lady in deportment, with good executive ability, able to qualify boys and girls for most stations of life. Such a school will be an agreeable place to spend a leisure hour, a help to the parent to maintain a youthful spirit while growing old. Such schools will receive a larger share of public funds now so lavishly spent for the education of the few and the masses practically shut out by circumstances which they cannot control.

The coming man will be progressive, zealous, positive, ready to hitch on to any enterprise, the tendency of which is to build up and benefit mankind; that will put the working-man where he rightfully belongs. The peer of the soft-handed, the lords of the earth, who will assume this title and point to their trophies. Wherever civilization and humanity are known as the best bred as well as the best fed men in the world, he will be temperate in all things, not defiling his mouth with the vile weed, or allow it to be grown on his farm. He will advocate stringent laws to punish by fine and imprisonment those so-called men who meet to pummel each other like brute beasts for a purse and the renown of the scum of creation. He will drop like a monkey would a hot potato, the newspaper which prints this disgraceful business, he will be a sworn enemy to rum, the great instigator of poverty and crime.

A friend and alley in every good cause, a positive foe to all wrong doing to everything that degrades and pulls down, a help to every measure that savors of reform in the grand march for progress and reform for right living, for higher civilization, while all avocations will vie with each other for the front line. The coming farmer will not be last in the procession, such meetings as this where all can take a part are great helps in the right direction, for improvement not only in better modes of farming, but for discipline of mind and manners, teaching how to collect thoughts and express them. So we shall be relieved from calling on the lawyer or minister to do it for us, this is my idea of the coming man, and if I have advanced any ideas that will stimulate thought on which you can build something tangible in the way of progress and reform then I have accomplished all I desired.

Advantages of Summer Feeding.

[By H. C. Thorn, of Turtle, Wis.]

It seems an incongrous thing for a young man with comparatively no experience, to undertake a subject of this magnitude, before men whose experience had run into the scores before I was born. It is just this thought that emboldens me to stand up and do my duty. The man who owned or partially owned a 160 acres of land in 1856,

whose every principle of life and living was founded upon an economic basis, who labored from dawn to sunset, who fed his horse better than he did his wife, who sheltered his flock better than the little ones, who sapped the life from a burdened mother, who heard the boom of the cannon in '61, who at once proceeded to be patriotic and stayed at home to take advantage of war prices, who saw his farm paid for, saw houses spring up on every boundary, saw smoke rolling from mills in the new town a mile away, felt his land grow rich beneath his feet, and knew that he was well-to-do, this man, I say, is not the one to infringe upon the methods that did him well enough, to call into question the means that made him rich. Generally speaking, he is the man to let well enough alone. Of course there are many exceptions, every additional gray hair in Hiram Smith's head seems to add its weight of intelligence. It is the young man, the man of young experience, the man of unsuccessful effort, the man who, though successful, wishes to better his condition, to these men I direct a little talk on a subject of common interest.

I have had experience enough to prove most conclusively that it is a problem of import to get 1095 meals for a family by feeding four and one half cent corn to three and one half cent steers. Land at $12.50 per acre taken in conjunction with cheap labor and few wants of the owner may yield a subsistence with the ordinary methods of farming. Ceaseless toil coupled with the most rigid economy may warrant a suit of $12 clothes once a year and fresh meat once a week. But land at $75 per acre, high-priced labor with old time luxuries turned into necessities, the old routine must be changed and a radical revolution in handling the soil and products of the farm must take place, 160 acres of land at $75 is $12,000; interest, $960; taxes, $75; repairs, $225; insurance, $30; labor, $250; family expenses, $500; decline in value of improvements, $160, amounts to $2,200, without including interest on stock and machinery and damage to the latter. These figures do not appeal very sharply to the man who has everything paid for and only has it to see to that he turns off enough during the year to make two ends meet and perhaps leave a surplus bank account. But to the young man of limited means who has this condition of things on his hands and wants to make it pay, there is a peculiar lustre in the eyes of a balance sheet that bodes but little weal. Says the "healed" and hard-headed farmer and business man have a little common sense, and you will come out all right, exactly! what is common sense as they view it. Do they infer that one can succeed in any other occupation than farming without sense? I followed another occupation before farming. Could have held the position even if I had no sense.

When I began to turn over the furrow, school district advisors and leisurely merchants were profuse with professions that a little common sense would pull me through. Do they mean a thorough knowledge of the nature and character of the soil and its fruitful power under divers conditions, the genie of its products, the proper rotation of grain and grass, correct processes of fertilizing, raising, buying, feeding and selling of stock? No, their definition comes after you have shown an ability to do and know these things. Common sense means to them an aptness to see a dollar, seize it at once and then hold it with a clutch that makes Uncle Sam's bald eagle squawk again. Among so many men as are found in the rank and file of the tillers of the soil need we be amazed to find now and then one who loves literature and music, who feels a pleasure at the soft rustle of a costly fabric, who likes to smile condescendingly at a conductor when he is able to show a pass, who gets restless and disconted under the burden of taxes and public measures, as he sees the monopoly bank borrow money of the government, which he loves so well, at 3 per cent., while he pays 8 or 9 with his home for security? Such men are found, woe be to them, how much happier were they if bread and water would suffice. A professor of astronomy may further his science to any height and still be in debt, an inventor may lighten the toil of millions and be unable to pay the butcher. An evangelist may move many an immortal soul to higher things and yet employ a church committee to buy his groceries. It's a pretty hard thing to be a full man in every particular, like a tree, round and even from base to crown. In most men there is a jog, an ugly notch that swerves inward or outward that mars the contour of his make up.

But let us drop back upon the hard-headed definition and try to buy a dollar's worth with seventy five cents, I will speak of the summer feeding of beef only, leaving the sheep and the hog to the tender mercies of some other "new theory crank." The beef cattle interest of this country is assuming enormous proportions, I could give statistics that would make Hoard's little Jersey cow swallow her cud in amazement, could string out a line of figures that would set the smart boys in arithmetic agog.

Some ingenious individual has estimated that a column 12 abreast would stretch in an unbroken line from New York to San Francisco. Quite a steak for the human race to swallow without a wink, the difficulty is somewhat palliated by the fact that teeth can be obtained at the low price of $6 a set. A large proportion of this vast army of cattle is grazing upon government land, land of nominal value under a summer sun the season round. Every blade of grass is sweet and undefiled by trampling feet. These cattle roam at their own will, no fence to fetter their inclination, no bark of dog or neigh of horse to wake their dreaming but once a year. The herds are governed by foreign capitalists and home monoplies and are thrown upon our central markets to compete with cattle which have been grazed upon high priced land, stabled and fed six rigid months in a year. It is sharply apparent that we cannot expect to equal them in the production of quantity, and our only remedy is to outrank them in quality. In order to do this we must put ripe, well turned and corn fed steers upon the market and deliberately down their grass fed cattle on the ground of superior excellence. The question arises, how can this be done with the least possible outlay of money.

As you know the usual method is to raise or buy calves, put them through the initial winter on poor hay, and turn them on grass in summer.

Repeat number one process during number two winter, turn them out again and the third winter feed them as best you can and in the spring grope blindly for a profit on a three years' investment. I will say here that the price usually obtained is in the main a fair one considering the grade of cattle turned off. Whether the price you get is one of profit is a question depending largely upon the grade and character of the stock handled, the existing prices of feed and the selling price. Every thing must act conjunctively in your favor or the balance will make you smart. Another method is to buy two year old steers in the fall, feed during the winter and turn off in the spring. Let us look at this way a moment. A two year old steer weighing 900 pounds costs $28 in the fall. He eats $8 worth of hay. For 150 days he eats 20 cents' worth of corn meal or $30, making the actual cost of the steer the 1st day of May $66. If the average steer weighs on the 1st day of May 1,200 pounds, he has done as well as is generally expected, at any rate he has done fairly well. Say he commands $5 per hundred weight (which he probably will not do), $60, a net loss of $6, allowing manure to pay for care, risk, shelter and interest on the investment. One illustration: E. M. Ruse, of Illinois, purchased Nov. 1st 40 steers, which, after shrinkage, weighed 1,100 pounds per head. He turned them on good pasture and gave them all the pumpkins they would eat. Dec. 1st he began to feed them corn, and by Dec. 15th he had them on full feed. May 11th they were weighed, showing an increase of 5,520 pounds of beef on the lot. He fed 2,800 bushels of corn worth 33 cents per bushel or $840. At the time he began feeding he turned 23 weighed hogs with the cattle, making a net profit on the hogs of $195.60—a total profit of $499.20—a net loss of 16 cents on every bushel of corn fed. The cattle were regularly fed, watered and salted. The cattle had all the corn they would eat, fed in mangers so that nothing was lost. Ye advocates of winter feeding where is that man's hay. If you want any more encouragement on this line weigh your steers in the fall, weigh your feed and estimate your hay, sell by weight and see in the spring how large a hole there is in the pocket where the profit dollars ought to be, and then stand up like a man and give your experience. How out of this dilemma?

For an apparent reason I have no figures to support the subject of this paper. There is always a theory before a practice. Always an experience before a figure. The reason I have no figures is that I never saw a summer-fed steer, never saw a man who had fed one, is that straight enough, how many have, how many have seen a steer run in pasture from May until December on

full cornmeal feed. Iowa, Kansas, Missouri and Nebraska have been feeding cattle on grass and corn at the same time and they claim that it pays. But their estimates wont help us much, they don't weigh as a rule, their climate is different. The most of their feeding has been done during short pasturage, when growing feed was short or dry or dead, and still they claim it pays. What I want is corn meal and luxuriant green-growing grass, if they can make it pay under their conditions what's the matter with mine, the foundation to successful beef raising is good stock. These professional men will make you believe that "blood tells" without any aid from this paper.

The keynote to rapid growth is good care of the calf during the first winter, have a warm comfortable place with a dry floor. Give them liberty, good hay, ground feed two or three times daily, let the main part of the feed be oats, the remainder barley or corn and a little oil meal. The calves will walk out in the spring with the bow of an ordinary two year old, they have growth and frame. They are active and have straight backs, their hair is glossy and lays well, their eyes are bright. Then comes the grass. Wisconsin grows good grass, we would not have a butter and cheese record if she did not. All kinds of grass from Babbitt's Turtle flat and Northrop's boggy slew to the timothy and clover which has no equal as a meat producer. These yearlings begin their second winter stalwart fellows whose limb and barrel begin to show the round the graceful contour of maturity, for the second winter a good tight shed on three sides, open to the south, kept well bedded, answers every purpose. A manger on the inside of north, east and west will do for the hay. It may have a grain box attachment or a grain rack in the yard will do as well perhaps. Would feed enough to keep them in good growing condition with hair having a live look, when grass is ready to turn into would arrange feed boxes in the pasture. It's not a good plan to turn 50 head of cattle into a 100-acre field to hunt for a white livered spear of grass that trembles as it looks around in fear that it has made a mistake in the season. By judicious feeding would have them on full feed in 15 days and keep them there until sentimental people began to lug evergreens through the streets. Here now is the theory for that blessed dollar, two year old beef is too young for the market as we raise it. Have you ever heard one man say or a hundred men say that a three year old steer ate his head off the last winter he owned him.

Our pet steer is going to drop right into that big hole between immature beef and a three year old with his head eaten off. He is two years and six months old and will cover the block before the third and fatal winter comes. Your steer has a free and easy action and is not heated and strained with dry hay and dry corn, you have not an eager, pushing, hungry and frozen animal to feed all winter. Cattle lice don't mow hair and corn at your expense, you don't pitch manure out of the back door every morning to run over on your neighbor's farm the next spring. You don't spend three or four weeks drawing out the husk of manure that is left after Jones gets the meat across the line.

You are not feeding 60 per cent. of your grain and hay to keep a fire in order that your charge may live. And your hay, that's a clean profit, and hay is paying about as well as any farm product, what have we besides the hay, a large growthy steer to start on. A summer sun and quiet shade and tempered water to help you, a green and succulent grass that is infinitely better than any mow or silo can furnish. A climate and condition of things that will make more than two pounds of meat where you made one, on the same feed in winter. Manure of number one quality well distributed without waste or labor, and above all you have a steer in the fall that is a steer. In symmetry of outline, in maturity, in fat, in handling quality, in every point that goes to make up a butcher's pride you have an example that will make any lousy, half-haired manure bedaubed winter stall-fed steer crawl into a hole that his summer friend can't get into by 300 lbs. Why have we not tried this method of feeding, we are conservative. Our fathers fed the old way and did tolerably well, yes, but they had the advantage of us, land was cheap, no western competition, their wants were few. Old "sense" says, live as your father's did, our only answer is, what's the use of being a roman, another reason is, we are a sort of hand-to-mouth tribe. If we can only make the grain supply last until grass grows we draw a long

breath of relief and begin the new year with the old leaf fluttering to the wind as ever before. Because corn costs 32 cents to produce it, it is no evidence that 32 cents is all it is worth. You buy a watch of "A" for $5 and "B" at once offers you $10, you attempt to hand it to "B" and drop the thing on a stone walk, how much do you lose. Buy corn, if cash and credit don't blush to meet you, buy corn until you get a start and when you get a start sell your hay and stay started. Manure your land with some one's grain who don't see as you see, and the more grain of any man's raise that you feed the more cattle you can keep on your pasture. Some one says, "cattle don't bring anything in the fall, generally speaking right. They do not command a high price, that is, such cattle as are usually turned off. Short-sighted farmers are appalled when the first snow covers the ground, they have miscalcuated, no room, unexpectedly short crops, low exchecquer, taxes close at hand, cattle unfitted for market, no preparation for this emergency, they must go, feeders, stockers, scalawags, old cows are sold to third rate butchers or hurried to the stock yard.

Bargain drivers are anxious to minister to your wants. But our steer is not a competitor to this class of cattle, neither is he a competitor to the great flood of western cattle. The local respectable butcher must have good beef to sandwich with the great fall clearing out. He is willing to pay something near a fair figure for that which justifies his pretentions. He wants something good to hang on the first peg next the door, turn to a summary of the market reports for the past eleven years and as a rule you will find the November and December quotations low. But near the top you will find good cattle bringing good prices. Many of us make a great mistake in fitting cattle for the block, not big cattle but fat cattle. Dont keep a steer three or four years to make him big. If you can combine size and finish so much the better, but by all means have them fat if you want to get the top price, 1200 lb. steers often outscale those which weigh three quarters of a ton. For this class of cattle the November and December markets rarely fall behind that of March and June and often outrank it. Will the plan work! try it, any plan that has in view the hanging of a good quality of meat on Chicago and New York hooks at a fair profit is worth the trying, you have the theory, what do you think of it.

Shorthorns, Past, Present and Future.

[By Fred. Hatch, Spring Grove, Ill]

When a man begins to advocate the merits of any particular breed of cattle he is not called upon to prove that those who keep some other breed are a little short of fools.

In preparing a paper on Shorthorns we find we have to do with a breed that has been more petted and extolled and yet more abused than any other. In days gone by they were the cattle of the aristocracy and among *cattle* the aristocrats, but as numbers increased and fashion changed they have gradually shifted off to good farmers until over two thousand breeders are recording Shorthorns in the Herd books of today. They were the pioneer pedigreed cattle that gained a foot-hold in this country and their records were first commenced in the United States by Lewis F. Allen of Buffalo, N. Y., as early as 1846.

It may be worthy of note that no less a personage assisted in compiling their early records than our present president of the United States: we find in the preface of Vol. V published in 1861 the statement that in the compilation of the 2d,3d, 4th and 5th Vol. of this work "I take much pleasure in expressing my acknowledgments to the kindness, industry and ability of my young friend and kinsman Grover Cleveland Esq. of Buffalo, N. Y., a gentleman of the legal profession who has kindly assisted my labors in correcting and arranging the pedigrees for publication, and to him is a portion of the credit due for the very dreditable display, which our American Shorthorns make before the agricultural public".

With the advent of hard times came naturally a falling off in prices and a general dispersion of herds at public auction till the Shorthorns are no longer owned by companies and moneyed individuals, but by the *farmer*. Being then, as Warfield of Kentucky says, somewhat down there is generally a disposition to kick the long time champions of the bovene race. Doughty cavaliers that once were unheard of are now eager to break a lance with the petted and abused Durham. We are told by many that in large part they have departed

from their former excellence that there are few or no good Shorthorns in America today and even that they never were all that they were trumped up to be: a few summers back even the poet sang something about bringing up "Shorthorn Calves on Jersey cream." Let us see if they are really as black as they are painted or if they are the same grand red, white and roan of our fathers.

Though the Shorthorn has the oldest and most authentic history of any of the improved breeds yet its first origin is lost in obscurity.

We have, in the Princess tribe a clear line down to the dam of tribes bred by Mr. Stephenson, of Ketton, Eng., in 1739 and suggestive evidence beyond that she was but one fair sample of the local herds at that date. And from facts obtained from history we are forced to the conclusion that really this cosmopolitan breed which adapts itself over the world so readily in successful amalgamation with the cattle of any country it may invade, is but a relic of the huts of the Benedictine monks the best pioneers of agriculture as far back as the Seventh century who could from their many connections over the world combine from all countries what was found to be the best in the native cattle and was originally imported in their hands across the North Sea; being a gradually grown up conglomerate of the best of all breeds with which these monks became acquainted during the course of accumulated centuries.

In ancient times the cow was kept more for her labor and milk and the production of beef did not so fully enter into the calculations of the agriculturalist, that impulse came with the increased demand for animal food among the manufacturing population, so when England became the leading manufacturing nation of the globe she also led all other nations in the line of beef cattle.

We shall scarcely be in danger of contradiction then when we say that the Shorthorn was first brought into notice in England by its compound character, its usefulness for any purpose and for all purposes rather than by its special and supreme usefulness for one purpose.. Not alone its early maturity, not alone its extraordinary power of improving other breeds, not alone its sometimes enormous yield directly of milk, or indirectly of butter, brought the Shorthorn to the front: but it was the rare combination of these and other properties (such as easy adaptability to change of climate, small consumption of food in proportion to produce and a constitution strong and hearty) that gained for the Shorthorn its early and wide distribution over the British Islands and subsequently commended it to the favorable notice of our own stock breeders.

No breed is more elastic in its adaptation to the objects of its breeder and the circumstances of its life than the Shorthorn.

The type then which first came into prominence was a milk and beef animal in which the balance between dairy and grazing was more or less even.

Such a type was highly artificial, and therefore the tendency was to revert to one or the other of the simple types, to produce a dairy cow at the cost of the weight and rapid growth of flesh, or to produce a beef animal at the cost of the loss of milk.

Such cattle were bred by the pioneers of Shorthorn history. Bates, the Collings, Mason and others.

Such cattle were first imported to this country, cows with great udders, broad backs, prominent hips, tapering necks and inclined to be long faced. They were brought into the eastern and middle states from 1796 to 1830 where they have been kept quite true to the original type; but when the great companies for importing cattle were formed in Ohio and Kentucky in 1834 to 1854, and the cattle were brought to those great grazing districts, the change for fancy beef cattle began with us and soon turned many of our milk and beef animals on the beef side.

So many varieties, however, by this time had been inported, that by the year 1856, the United States possessed according to their number, as valuable a selection of Shorthorns as could be found in England itself.

From the earliest importations to the present time, the Shorthorn has increased in popularity, and prices have sometimes reached fabulous figures, many thousand dollars having been paid for an individual animal.

Up to within a few years the Shorthorn had the field to itself and a glorious work it did, then came its would-be rivals, the Hereford and Polled Angus for beef and the Holstein as a milker, they had been here before, but could

not stay, they were *one purpose* breeds and had to wait their time for accumulated wealth to handle them.

This, then, is the present of the Shorthorn, numbered by many thousands, valued at millions, scattered from Maine to Oregon, and from Wisconsin to Florida, between 6,000 and 7,000 of them thrown upon the public markets annually when times are dull with new and promising rivals in the hands of moneyed individuals and corporations, what shall their future be?

Three classes of breeders want cattle, those who look to beef alone, those who look to milk alone, and those who want both.

The Shorthorn has strong rivals in appealing to the first two classes, but is unsurpassed in claims to favor by the third; this third class outnumbers both the others.

The average good farmer in the West wants cattle both for beef and milk, he cannot afford to keep a cow a year simply to raise a calf; he cannot afford to disregard size and form for beef making.

The best specimens of the breed are unsurpassed as beef animals, and naturally the breed has good dairy qualities.

It always has been, and still is, the chief dairy breed of England in practice and at the dairy shows, taking more prizes than all other breeds combined.

There is a great home market among our own farmers not yet supplied, many thousands of pure bred bulls could be used, and nine out of ten have none.

The general farmer's aim is to possess a cow, that at her best will fill the pail, and when dried off will rapidly pad her ribs with meal; for this purpose, no breed has ever been found that affords the requisite better than the improved Shorthorn, they have taken more prizes for beef than all other breeds combined, and many hundreds of cows have records of milk from 50 to 75 lbs per day for long periods; yet a cow that will milk abundantly and fatten heavily at the *same time*, will be broad over the crops and loaded with rounds when in full yield of butter and cheese, remains a desideratum—yet dances "Wil-o'-the-Wisp" like in the distance.

Shrewd speculators have, from time to time, rushed different breeds as they saw their chance, and prices went up in accordance with the demand; but these booms no more last than does the tempest. When the air clears and we come to quiet times again the placid Shorthorn will be found in possession of the deck; we cannot do without her.

But we presume the question of future prospects of the breed means what value will it maintain in the market.

No man can more than guess at the probable prices of Shorthorn in the future; but this, at least, is certain, that it will pay the breeder to increase his efforts and sharpen his attention as regards the material he has to work on.

Give to every family and *breed* fair play, and trust to the good sense of American farmers and breeders. The best will win in the long run and the Shorthorn is in no danger of being last in the race.

We esteem the Shorthorn as the best and *only* animal of general utility, and as the equal of any other at the block, the pail, the churn or the cheese press; but I need not recount the purposes which this breed in its purity, with or without pedigree, and in its crosses so admirably serves.

Look what it is to England, look what it is to Scotland, look what it is to the breeders of our own country.

We know it has a foot-hold here and we cannot look over a fence in the great dairy and grazing districts in our Northwest without seeing evidences of its wide-spread influence. The producers of beef and butter and cheese are the men who must and will have this breed.

Sales may fluctuate, pedigrees may be raised in credit or thrown into disgrace, but the Shorthorn will flourish and the breeders who can give us these cattle in their milk and beef perfection at prices in reach of these producers will deserve well of their country.

Poultry Farming

[By S. L. Porter, Mukwonago, Wis.]

Thanking you for the invitatiion, I will invite your attention for a few moments in stating to you what I know about successful poultry farming.

Five years ago we left the city, came here and engaged in farming on 280 acres of land. We early conceived the idea that we could make money easier and faster in poultry, as my taste ran that way, than I could in carting early potatoes and sweet corn to the Milwaukee market, over twenty-two miles of very stony roads, a vocation the most of the neighboring farmers in this vicinity are engaged in during the summer and fall months. With this idea in mind

we erected a hen house 26x80, two stories high, costing about $900. I know it to be a fact, that some of my neighbors were disposed to make fun of me, chucked each other in the ribs and got off that glorious old adage. "A fool and his money"—you know the rest. I started in with three breeds of fowls, added to them as the trade demanded, until they out grew the $900 hen house, and I was obliged to build more; until now I have three—besides using an old house during the breeding season. I am disposed to be charitable toward my neighbors; but I thank the Giver of all good things that I have made a success of the business, and have proven the fact to some that "he laughs loudest who laughs last."

One of my neighbors said to me one day, "Why! you don't do a good day's work in a month." Says I, "perhaps not, the way you work; but when the year rolls around I can show the most ducats for the season's work."

"But," you say, "suppose we all went into the fancy poultry business?" All do not want to. Its a good thing all do not think alike. If everybody thought as I once did, everybody would have been after my wife as fierce as I was.

In the four years past, poultry has paid us over and above all expenses estimating $100 per year for feed as follow: 1883, $460; 1884, $1,269; 1885, $957; 1886, $945.40. How do we do this? By breeding the best, taking good care of the chicks, and advertising judiciously. Some people are adapted for poultry culture; some are not, To some a common dung hill is as good as a magnificent light Brahma.

The poultry business is one of the neglected industries of this country. As a rule the poultry on a farm is allowed to shift for itself; their quarters are filthy, illy-ventilated and cold. Perhaps they are fed once a day, more generally not at all. If other stock was treated the same way what would be the result? A farmer could not raise enough meat to live on, or sell enough to pay his taxes or buy the children shoes. But where poultry is given attention, it is the best-paying investment on the farm.

By veteran breeders it is estimated one bushel of corn will grow as many pounds of poultry as it will of pork. On an average poultry sells at double price of pork.

One bushel and twelve quarts of corn, or its equivalent in other grain, will keep a fowl a year. An average hen will lay 100 eggs a year, if properly taken care of, which at 15 cents a dozen, an average price, will on an honest calculation bring in $1.25.

If attended to, that hen will raise you as well eight chicks, which at six months old, making allowance for feed, will net you, at the lowest calculation $1.50 more. We now have a total of $2.75 and the original stock on hand.

As a rule farm fowls are not as good as they should be. Now, there is no place where finer fowls can be raised than on the farm. Instead we find a great many poor ones—no pure blood introduced for years. Very often they are allowed to roost in the trees or any place they can find, having no house of their own. Small wonder that so many say that their fowls do not pay. How can such care and breeding be expected to pay? We would not expect to realize very large profits from our other farm stock if handled in that manner.

Which variety shall we keep? is a question often asked. That just depends upon what you keep fowls for, whether for eggs only, or meat, or the two combined. If for eggs the Leghorns or Hondans. The eggs of the Leghorn are smaller than those of the Houdan, but the birds, likewise, are smaller, requiring less to keep them; so that the weight of eggs produced for food consumed will equal, and, I think, surpass the Houdan. As it is always necessary to kill off the older birds to make way for a certain number of pullets yearly, flesh value must also be taken into account.

For a general purpose fowl the Wyandotte, Brahma, or Plymouth Rock are superior to all others. I have tried many varieties, and have found none to compare with them.

As regards the poultry industry of this country, I want to call your attention to a few figures. The report of the Department of Agriculture gives the total cash value of several farm products per annum as follows:

Corn	$480,000,000.
Wheat	394,000,000.
Hay	271,000,000.
Oats	118,000,000.
Potatoes	76,000,000.

It has been clearly shown that the annual value of the poultry and eggs consumed and sold in this country amounts to the respectable sum of $475,000,000, or more than that of any

product in the country, with the exception of corn, and is exceeded by this product only five million dollars.

We occasionally find people embarking in the poultry business, and on investing a small amount expect to realize enormcus profits, even more in the aggregate than from all other sources combined; and at the same time they give other matters nine-tenths of their time and attention. An article in the New York Herald a short time ago expresses my views on the subject.

"He who adopts the poultry business as his principal employment and depends on it for a livelyhood, must not forget what his business is. If before entering into it you sit down and carefully count the cost, as any wise person should do, and decide that on your few acres of worn-out, worthless land you could raise $1500 worth of chickens more easily than you could raise 500 pounds of hay and 20 bushels of potatoes, don't forget the conclusion you have thus carefully arrived at. Don't imagine you are a farmer, for you are not. Don't leave those chicks to shift for themselves while you turn those few spears of hay or hoe those few hills of potatoes. Remember your business is to raise chicks, and fight hawks and weasels, and not to raise potatoes, and fight potato bugs. If you have time to take all necessary care of your chicks, and also time to hoe potatoes, and if it is settled that chickens are more profitable than potatoes, then the obvious conclusion is that you have not enough chicks to employ your time to the best advantage, and you had better set more hens as soon as possible."

Certainly the large profits in poultry raising do not lie with the common barn yard fowls now-a-days. There is occasionally a person so completely fossilized as far as the more useful and valuable qualities of fine bred poultry and other domestic live stock is concerned as to declare that the regular old-fashioned breeds of barn yard fowls are better than the new-fangled ones exhibited at shows and sold at high prices. Such erroneous ideas never find place in the minds of intelligent people. They know better. We know by experience and comparison that there is as much difference between our modern improved fowls aud the dunghill scrubs as there is between the fine grade Poland China pigs and the "prairie roosters," or a Norman horse and the Mustang.

There is no question but the poultry industry is enormous and increasing yearly. Today there are fewer industries in the United States that show a healthier growth or yield so vast a return to the American people, in proportion to the amount of capital required and employed in following it. It is certain fowls have been greatly undervalued in past years, but now-a days the breeding of improved poultry has in a pecuniary point of view come to be one of the most important and remunerative pursuits in this country.

Is the business overdone? I say no. The fact that 350,000 eggs formed a part of the cargo of the steamer Hermdel, which took fire, one day last year, on its way to this country from Copenhagen, suggests some observations regarding a curious class of articles imported into this country, says a Washington dispatch.

It certainly seems a little odd that the United States, with its large agricultural population, should have to go to Copenhagen, or, indeed, to any point outside of this country for eggs! — Yet a statement recently published by Chief Mimmo of the bureau of statistics of the treasury show that there were imported into this country last year no less than 150,000,000 eggs. More than that, the reports show that this is not a spasmodic movement in commerce, but that the egg trade from abroad has been a flourishing industry for some years, having grown so rapidly since its inauguration that the hens of the country ought to be startled by it. In the fiscal year 1883 the number of eggs imported was 110,000,000, in 1884 it was 140,000,000. In 1885, 150,000,000; and in the past year will probably exceed 200,000,000; with a value of $3,000,000.

There is money in raising good poultry. There can be no monopoly in this rural industry. No business is more evenly divided or generally distributed. The average farmer, mechanic, cottager, poulterer and fancier usually keeps a limited number – just as many as they can tend and make profitable; and while our country is increasing in population our poultry stock is becoming more valuable.

It is about time farmers should wake up to their own interests, give poultry culture a fair trial, build suitable ac-

commodations for them, feed and tend them well, keep the best breeds for utility, market the eggs and chicks in season, and my word for it, you will find poultry breeding a profitable business.

Ensilage.

[By Dr. H. S. Weeks, Oconomowoc.]

However, I take it for granted that I am selected to say something about "Ensilage" because I am, to the best of my ability, carrying on the work of my father, the late Dr. L. W. Weeks, who, though taking up dairy farming at an advanced age, was yet progressive enough to adopt the ensilage system when it was comparatively in its infancy, and built, I believe the first silos ever used in this state, becoming an enthusiast on the subject, and urging others to follow his example.

Since then the merits of ensilage have been recognized by progressive farmers everywhere, and silos have multiplied all over the land until they are no longer looked upon as an experiment, but a solid fact, and "have come to stay." Yet I suppose there may be some here to-night who have never investigated the subject and who hardly know what a silo is, but have a general idea that they are a sort of luxury which those only can indulge in who have money to spend in "fancy farming."

To such, if any there be, I will address myself, because there has been so much said and written on the subject, that to the initiated I can hardly hope to offer anything new.

My good father used to say, "Ensilage solves the problem of carrying a large amount of stock on a small amount of land," and when I tell you that I carried last season forty head of cattle, old and young, from Dec. 1st to June 1st on the product of sixteen acres of Southern White corn converted into ensilage, you will I think agree with him; this of course refers to forage, for my objective point being cream, to reach it I feed liberally of grain and mill feed the year round. This year, owing to the great drouth, which, as you all know, extended over the entire growing season, my crop of ensilage corn was light, and I was unable to entirely fill my silos, and have had to supplement my ensilage with other coarse feed. This however, might have been avoided had I adopted the "new departure" which has lately been taken in cultivating and curing ensilage. As at first introduced into this country the practice was to sow the corn in this latitude from the 1st to 10th of June, and cut about September 1st, while it was quite green and juicy. Experience, however, has proven that better ensilage as well as much cheaper, is produced by sowing a month earlier and allowing the corn to become quite mature and the ears partially glazed before cutting. Had I done so this season my corn would have got a start which would have enabled it to stand the drouth, or rather, it would have all germinated and grown, and I should have had a full crop. And here let me give an experience which will apply to cultivating corn whether for ensilage or other purpose, viz.: Never despair of a corn crop, for as they often say of a very sick person, "while there is life there is hope." About the middle of last July, by reason of having been sown in perfectly dry soil and not having been even dampened with rain, my field of ensilage corn looked *sick* indeed, and my friends advised me to look sharp about me for something to feed my cows the coming winter. Advice which I was not slow in heeding, but at the same time, with the energy of despair, I set about doctoring the invalid, or in other words, cultivating the corn. I put all hands at work with hoes and cleared it of every weed, and kept it clear, also stirring the soil with cultivators every few days the balance of the season, and was rewarded by witnessing the most astonishing growth that could be imagined though the hot sun poured down upon the thirsty earth and the simoon from the south parched it day after day, and no alleviating showers came to its relief, yet it continued to grow, and many stalks reached the full height and size that had ever been attained in the best of seasons. The drought had also matured it to a greater degree than usual, and I was enabled to make comparatively *sweet* ensilage, which is a point in the new departure mentioned above, the merits of which can not be doubted.

By the old method it was necessary to have a large force of men to get the crop into the silo, as haste must be used, and this made it expensive. As now practiced, however, the cost of building silos and of filling them is cheapened so that it is within the reach of any farmer. All that is required for the building is lumber, in the form of

an ordinary ice house, with double walls of matched stuff and tarred paper put on the studding between to form dead air spaces, the bottom of cement to make it air and water tight. I am informed that the corn can be cut with a sweep rake reaper, which would be an improvement over doing it by hand, but I have never tried it. When cut, it should lie on the field a day or so to wilt, then haul to silo, cut in one-quarter to one-half inch lengths with a feed cutter, and fill in slowly, letting it heat to about one hundred and forty degrees, then adding more, and so on till filled, taking as much time as is necessary to do the work with ordinary farm help, meantime tramping thoroughly as put in, particularly close to the walls at sides and ends. When the silo is filled level it off and let it stand a day or two, then put on a layer of dry straw or marsh hay four to six inches deep, and cover with planks fitted closely at ends and laid snugly together so as to exclude the air as much as possible. Some put tarred paper under the planks, but I have not found it necessary. In the matter of weighting there there is much diversity of practice, from no weight at to very weight. I have not followed any rule, but this year used sacks of bran of 200 pounds weight each, laid closely togther, which answered all purposes. Stone boulders are used. Wood may be used, or earth, if nothing else is at hand. It is customary to let the ensilage stand a month to six weeks before opening the silo, when it should be thoroughly settled and cured, and come out slightly moist and with little or no acidity, and will be greedily eaten by all kinds of stock on the farm, even including poultry, and to equal advantage and profit, it is claimed, though I can only speak as regards cattle, particularly milch cows, which I have found will, with the proper grain ration, respond liberally to it in milk and cream of the choicest, and if keep in fine condition without other feed. There is, I believe, a vague, unfounded prejudice against ensilage, on the ground that it affects unfavorably the flavor and keeping qualities of butter from cows fed on it, but if the guests of the Plankinton House, Milwaukee, fail to detect it in the butter furnished by Mr. Hiram Smith, or the cream furnished by your humble servant, I think it is safe to chance it with the average consumer.

Other equally unfounded objections have been from time to time raised against feeding ensilage, but "the ball keeps rolling," to the contrary notwithstandindig, and bowls them all down, and it will soon, in my opinion, be a question whether any farmer can afford to be without a silo, some of the following being "the reasons why."

First. Because more stock can be carried on the farm than by any other system of feeding. Second. Because by that means greater fertility of soil is secured, and larger crops can be raised. Third. Because it furnishes the best and cheapest succulent food in winter when dairying is most profitable. Fourth. Because it requires less space to store it, and does away with the necessity of large and expensive barns.

Ringing Hogs.

[By J. L. Rhodes, Salem, Wis.]

The subject in hand seems to be ringing hogs; certainly not a pleasant subject to write on, and not admirable at all except for the reason that farmers *must* sometimes deal with disagreeable things.

Our city friends love to speak of us as sitting under our own vine and fig tree dreamily watching the clouds go by. We thank them for their kindly and poetic ideas, and admit frankly that, though the farmer knows that the clouds will get by without any of his assistance, many times and oft would he be glad to sit under a vine for a few minutes to ease a broken back, even if the vine belonged to someone else. But no; he must go forth to his 16 hours of daily labor, and wrestle with potatoe bugs, pliticious patent-right peddlers and sewing machine agents, all of which pave the way for an essay on ringing hogs.

Why do we ring hogs? In answer, it might be well to first ascertain how we ring them. In the first place we have an assortment of patent rings and pinchers to choose from; and the whole art is brought to such perfection that the advertisements picture the hog as sitting up in one corner of his pen with forefeet folded crosswise, smilingly waiting for the farmer to insert in his proboscis one of Blobbs' patent eliptical, non-corosive, back-action, hog rings.

It is needless to tell a convention of farmers that this is not the usual way

in which the operation is performed. A more accurate description would be something like this:

As the receipt books say, first catch the pig. Well, owing to the fact that he is of the Polled Angus breed or without horns, and that his wool is not of a quality to hold him by, and that his general make-up is deplorably lacking in loops and handles to lay hold of, when a rush is made the work is difficult. But the farmer is a persevering mortal, and after being dragged stone-boatwise three or four times around the pig pen, victory perches on his banner.

Next time the curtain rises, we probably see a burly Englishman astride of the pig with a firm grip upon each ear. Then the balct dance begins, and it is very soon evident that a seat on the American hog is nearly as unstable as a seat on the throne of Bulgaria. The rearing and plunging is accompanied by a baritone solo from the pig, of a quality to set everybody's teeth on edge within half a mile, while the general uproar is liable to be interladen with bits of profane history from the Englishman. In the meantime an assistant is making frantic efforts to insert the necessary jewelry; but somehow, when the ring gets to the point aimed at, the nose is not there, and next time the nose comes around the ring is not there. But a lucky turn of the wrist fixes the ring, and with a bound and horrible yell away goes his porkship leaving John Taurus prone on his back in anything but a bed of roses.

There may be farmers who can do a neater job than this, but there are very few who really take a pleasure in it. Then why do we disturb the public peace by creating such a soul-harrowing uproar? To prevent hogs from rooting is the universal answer. It may be that if farmers spent a little more time to find ont why the animal digs up the ground they would have more patience with the seeming mischief.

In the first place we do not give the hog credit for having delicate tastes and a fondness for a variety of food. This is, nevertheless, a fact.

Some years ago I remember having some pigs in a pasture containing a pond of water. They spent day after day, and week after week wading about busy at work with heads in the water, sometimes over the eyes. Curious to know what they were doing I went down to see, and found that they were in quest of snails, and were grinding up shells and all. Frenchmen have long known snails to be a delicacy; but those pigs did not have to go to France to find it out. They are also fond of fresh vegetables, and in the spring before grass has started, they will dig deep into the ground after the root of the common thistle.

It must be admitted that if a large number of pigs are penned in a small pasture which will not grow grass enough, they will dig up and eat grass roots. But this they will not do if allowed ample range of pasture.

Because hogs sometimes root in a large pasture, do not condemn them for eating grass roots. They are after something else, and that will probably prove to be either the common cut worm, the angle worm, or the white grub, larvæ of the May beetle. Of these things and other insect pests, hogs are inordinately fond and will work long and patiently to get them. Against all of these I know of no better defense than a lot of strong healthy shoots of the strongest rooting propensities obtainable. Don't be alarmed about the grass; it will look rough bottom side up; but it will grow again, and if not plowed up will produce far more grass than if the worms had been left unmolested.

It would be useless to discuss the destructive habits of the cut worm and the white grub; farmers know them too well. They also know that both are propogated largely in grass lands, though the latter may be found quite plenty in manure heaps. Their work upon the first cultivated crop raised on sod land is to be dreaded, and their underground and nocturnal habits render them almost proof against the attack of birds. We have two animals in Wisconsin peculiarly fitted to fight this kind of insect, both having a keen sense of smell, and the ability to dig into the ground. One is the common skunk, which, besides having but little commercial value, has certain duelish *eau de cologne* peculiarities which will always make him unpopular among a Christian people. The other is the much-maligned hog. But in using him to make war upon insects, at any age, good fences are a necessity, and from the age of four weeks to four months, an acre or two within a very close fence is a great convenience. Small shoots in quest of angle worms will not respect the finest lawn or flower garden, and will take just

as much pleasure in digging up a neighbors garden as that of their owner.

However undesirable spine may be in door-yards, gardens, or cultivated crops, close observation will convince reasoning farmers that this opparently wanton and unsightly turning up of pasture soil, is more of a benefit than an injury to the owner.

Most farmers who are feeding grain to cattle during the winter, find it to their interest to keep hogs to sort over the manure heaps, and hogs thus kept form a part of the profits of cattle feeding. Rings in the nose almost entirely unfit hogs for this work.

And in conclusion it is a fact well known among the best stockmen that the more quiet and comfortable domestic animals can be kept, and the more flesh they will put on with a given amount of feed. Hence the pain, worry, and excitement incident to ringing, together with the soreness and ulceration resulting therefrom, is just so much corn taken out of the owner's crib and thrown away.

There is no sentiment in the foregoing remarks. I hate a hog, except in the form of shortening for pie crust. But as we are so often admonished to give the devil his due, it is meet to be equally just to the animal in which he is supposed to dwell.

Horse Breeding.

[By J. L. Hoover, Clinton, Wis.]

There probably is not a question before the American farmer today of so much importance, financially, as that of horse breeding. There certainly is no branch of farming so profitable, needing so little labor, and care, and one in which the farmer can take so much pride, and exhibit as much good judgement, as raising horses. Anybody can milk, anyone can get feed ground for the cattle, a man "just over" can feed hogs, and now the question is, can every one *profitably* raise horses. The horses bringing the most profit to the farmer are the heavy draft and roadsters. One of our prominent editors of a dairy paper, in an address to a Farmers' Institute, intimated that it took no brains to raise draft horses or beef cattle; comparing it to raising and fattening hogs; in fact carrying the idea that anyone with brains enough to shovel corn from a wagon to a hog pen, could successfully raise draft horses and beef cattle. But to raise dairy cattle and trotting horses, a man must have the brains of an editor of a dairy paper, and subscribe for the paper besides.

Now what are *draft* horses? The draft horse that is bringing the most money at the present time, and that promises to be the paying horse for years to come, is the horse that weighs from 1500 to 1700 pounds, of good form, a good brisk walker; high on the withers, a straight, short, well coupled back, good length of hip, without too much "slope," straight, heavy-boned smooth limbs; small head and ear, and above all, or rather underneath all, a good foot. Can we raise horses of this kind, without expending time, money, patience and plenty of good judgement? Judging by the experience of others for the past twenty years, I have come to the conclusion that the raising of *draft* horses is quite a science.

Just run over in your minds the number of such horses as I have described, that have been raised anywhere within the limit of your observation, for the past twenty years, and how many such have been raised by any *one* man? How many such can be found at the present day? The scarcity of them, and the fact that but very few men have raised more than one or two in a life time leads us to think that the few that have been raised were *mere accidents*, and not the result of skilful breeding. Now what is the cause of such a scarcity, and why so many failures to secure the desired result? It certainly is in the selection of our breeding stock. If a farmer wants to increase the weight of his sheep, he don't select a small wrinkly merino, or a half blood Southdown: but selects not only a large individual, but one that has been bred for size and mutton qualities for many generations, and one that he knows will be just what he expects. If he has small scrub cattle, and he wants to increase their size and fattening qualities, he does not select one of his own herd, or even trade scrubs with his neighbor: but chooses a Shorthorn, Hereford or Angus that he is satisfied is of pure breeding, and that will transmit with almost unerring certainty the easy fattening qualities, large size and grand form he has inherited for many generations. Where we have failed in successfully raising *draft* horses is in not following up the same principles in selecting our sires that we do in mutton or beef. A great many think that if a horse weighs

1400 pounds, no matter what his ancestry was, whether his sire was a scrub, or his dam was a trotter, or whether he had any ancestry at all or not; they think his colts must grow into *draft* horses. Others use 1400 to 1600-pound horses that have the necessary qualifications to get them recorded in their respective stud books: these may have the required breeding to back them, but we must look farther. We must have weight. Take for example the Percherons. We find the best of medium weight, ever imported, including the well-known Success, weight about 1600 pounds; Normandy, weighing 1500, and Louis Napoleon weighing about 1600 pounds, left progeny that would not average over 1200 or 1300 pounds. The fact of their good breeding is unquestioned; their individual excellence was unexcelled; and as sires of *their class* of horses they have had few equals: yet as sires *of draft* horses, they were almost failures. We admit that they occasionally got a colt that filled the harness of a draft horse, but so will almost any horse. Why their failure? Because the Percheron of 30 to 50 years ago was not bred for large size. The *use* for which they were bred did not require it; and horses of that size having been bred for a great many years, with the object of *medium* weight in view, could not be expected to sire 1700-pound horses, especially when crossed with the breeding stock of this country; but for the last 25 or 30 years, the demand for heavy horses, for city use, and for exportation to this and other countries, has caused a great change in the breeding of Percherons in France. The color most desired by Frenchmen was the grey; but with the change of market came the change in color and size. They are now selecting their largest horses and those of dark color, for their breeding stock; and the horses that are most desired for exportation from France at the present time, and that are priced the highest, are the blacks, bays or browns, weighing from 1800 to 2100 pounds. The most prominent fairs have commenced classing them as light and heavy draft; those weighing less than 1800 as light: and over 1800 as heavy. If we want to raise lightweight horses and take light weight prices, then the horses weighing from 1500 to 1700 pounds are the ones to use, but if we want to raise the *heavy* draft, and get the heavy money, then the dark colored horse, weighing from 1800 to 2100 pounds is the one to use. Take for example, Brilliant, weight about 2100, a coal black, and whose progeny are nearly all dark color. He has been the most successful horse in the show ring and in the stud, in both France and America. And why? He has proved himself to be just what the times demand. The markets call for size. He transmits size. The taste of the American people today is for dark colored horses: his colts inherit his own beautiful color; and possessing the other qualities of a *draft* horse they are in great demand. If it proves true in the case of "Brilliant," would it not be advisable in selecting our breeders to search for the horse having his characteristics as nearly as possible? The question of size and weight does not apply only to Percherons. Go to the stables of any importer of Shire or Clydesdale horses and you will find the greatest number of the horses weigh from 1500 to 1650 pounds and are sold at prices to suit purchasers: but if you select a horse weighing 2000 pounds or over, whose pedigree will stand inspection, who has proved himself to be a sire of *draft* horses, whose ancestors were successful in the show rings of their native country, their prices range from $500 to $2 500 more than the lighter class. And right here let me remark, you never hear of a 1500 or 1600 pound horse taking first premiums as *draft* horses in Scotland; in fact at almost any fair in Scotland or America, where impartial Scotchmen are acting as awarding committee, the blue ribbon goes almost invariably to the large, heavy, good moving, lofty, stylish appearing horse; for there probably is no nation in the world that takes more pride in their horses, studies the effect of different crosses more carefully, guards the purity of their breeding so well, profits by the experience they gain, that will go farther to breed to the horse of their choice, and make more money out of their horses than the Scotchmen. The greatest mistakes in awarding premiums at our county fairs are made in the *draft* horse class. In choosing a committee, what are termed trotting horse men are generally selected, or in their place a committee of farmers, that don't like heavy horses. Consequently if there is a horse in the ring of medium weight, stylish appearance, and a good stepper, he is the

horse that gets the ribbon. The horse of 2000 pounds weight, however nice and smoothly he may move, in comparison to his weight, no matter how many points he would score as a draft horse, however grandly he may be proportioned, no matter how much more his colts are worth when mature, he stands no show, he is "too big" for this class of men; and really stands no more show in a draft horse ring, than he would in competing for mile heats upon the track.

The managers of the fair may mean well, they class *draft* horses by themselves, and give each breed a class by itself. We enter our large, heavy horses in the draft horse class; lead them into the ring, to compete with draft horses, are confronted by three "light horse men" as awarding committee, and have the ribbons tied on horses that would be far better in the roadster or general purpose class, while we go back to the stable, wondering what kind of an animal a draft horse is. Another thing to be considered in the successful raising of *draft* horses, is the mares to be used as breeders: to get the best results we must have help from the other side of the house. If we are breeding Percherons, we certainly get the best results from dams possessing a large share of Percheron blood, the higher the grade the better the results: but we can look for grand profits from the large, rangy, roomy matrons of common breeding, that are found on most of our farms. In proportion to the quality of our breeders may we look for the amount of profit. Another question constantly arising, is, which is the best *breed* of draft horses? My idea is that either of them is good enough for anyone; and the one we may like best is the best one for us. Between the Shire and Clydesdale, I really think there is not much choice. Between these breeds and the Percherons there may be, but whichever you may choose, select the very best within your reach; take the best care of the mare and foal that you are able to; don't give the foal a chance to get stunted or stop growing a day, until it is well enough developed to sell, *then sell it*; and you can't help but make money.

Next to the heavy draft, in regard to profit comes the quick gaited, nervy roadster. Understand me, I don't mean trotters, as the average breeders kept by farmers, have not got the breeding to warrant the raising of trotters with any degree of certainty. We may *occasionally* get a fast one when using a high bred sire, the same as we may occasionally get a colt that will develop into a 1700-pound horse from a 1400-pound sire; but what the farmer wants is something that pays every time. Now what has been the result of roadster breeding, for the past twenty years. The large majority of our farmers have made a glorious failure of it. They have used spavined, blind, old, weak mares, too poor and played out for any kind of work, then taken the pains to find a horse of about the same characteristics, that is heralded with flaming posters, stuck on every blacksmith shop door, and old board fence, as the celebrated and world renowned horse "*Gewhilikee*," whose great grand sire was a great, great grand son of imported Messenger, and whose dam was the granddaughter of the celebrated grandson of the renowned "Lightning Splitter." All for $5.00. And the thing that results from such a union is invariably a *Hambletonian*, and a cousin of Maud S, generally sells for $50 or $75 as a three year old, and is a curse to whoever buys it. Now friends, does that pay? On the other hand, select your best stock as breeders; young, sound, full of life and vigor, of as good breeding as you can afford Then go to some reliable stable, select a horse whose breeding is unquestioned, that is as near individual perfection as possible, one that is a trotter himself and is backed by trotting ancestors on both sides, don't let 5 or 10 miles or $5 or $10 scare you, and in the produce you will find the "happy medium," the American roadster, that will sell from $200 up. Now friends, will that pay?

Another point in favor of the best is the pride we can take in raising them, showing that when we give them a little good hay or oats that we will get pay for it; then when our friends or neighbors come to borrow a few bags or swap stories, we can take them out to the yard or pasture, get on top of a forkful of straw, swell up with pride as big as our vest will permit, and expound on the good qualities, fine breeding and excellent points; and if it is a roadster, get down from our eminence and chase it around the yard with a corn stalk to show its gait, but if you are unfortunate enough to have one of the other kind, you take care he does not see

it; but if he does, and says anything about it, you will hate to own up that you had anything to do with that sort of stock, so you look as wise as you can under the circumstances, and tell him you traded a corn sheller to Willard Hartshorn for that thing.

Once more I would urge you, whatever class of horses you are raising, use the best you can find. Fix in your mind the kind of animal you want, then find your model.

There never was a question asked on this great problem, so simple and yet so important, as one asked in one of our best journals, a question that applies to both breeds and answers itself. "Will a horse transmit what he does not possess himself?" If a horse does not possess the weight and other qualifications of the draft horse, can he transmit those qualities? If a horse does not possess style, speed, breeding, endurance and the other requirements of a good sire of roadsters, can he transmit those qualities?

Ever keep in mind, when looking up your breeding stock, that question:

"Can a horse transmit what he does not possess himself?"

Potato Culture.

[By A. M. Penney, Waupaca, Wis.]

The first thing to be considered is the land on which the potato is to be planted. Experience has shown that new land which has raised but one crop of grain is by all means the best, providing the land was thoroughly broken and cleared of grubs; if not it would be better to take off two crops before planting to potatoes. In case the farmer must depend upon old land to raise a crop of potatoes, he should turn under a crop of clover in the month of August, ploughing rather deep and endeavoring to turn the clover all under, ploughing again in spring but not deep enough to turn up the rotted clover. This method insures mellow land well fertilized, and with proper cultivation one should get a good crop. Potatoes should not be planted too often on the same piece of land.

Experience has shown that we do not get a large yield and the quality is greatly inferior. At least three years should intervene between crops. Land that is a little rolling in my opinion is preferable to low land, as potatoes planted on low ground do not get sufficient air and in consequence are more liable to blight than those planted on higher ground. Agricultural writers claim that blight is caused by an insect that attacks the tops of the vines and works down to the potato, its ravages being much increased by wet followed by warm sultry weather. Hence the importance of the vines getting the benefit of any air that may be stirring. Next in importance is selecting and preparing the seed. Use good sized and well shaped potatoes, cut so as to leave two to four eyes in each piece; if seed is cut in small pieces it is liable to rot in case of wet, cold weather after planting. A good sized piece is necessary to properly nourish the germ. Farmers should avoid cutting large quantities of seed and putting in bags or piles, for they will heat very quickly and destroy or weaken the germ. If circumstances compel the use of small potatoes for seed, I would recommend planting them whole after clipping the seed end. I would also recommend sprinkling the cut seed with land plaster as it prevents loss of moisture and acts as a fertilizer. Extra care is necessary in selecting seed this year on account of the second growth formed on our last crop. The leading varieties now in the market are the Burbank, Early Rose, Beauty of Hebron, Dunmore and Peerless, I would advise planting the Early Rose and Beauty of Hebron for the fall market, but avoid planting what are called the late Hebron which is a large coarse, deep-eyed potato with a yellow coat inside, they do not cook well and are not wanted in the market. For the winter and spring market plant Burbank, Dunmore, and Peerless. In consequence of the largely increased competition of Michigan, Utah, and Colorado our market at St Louis, Kansas City and other southern points is cut off, the quality of our potatoes this year being inferior to those grown in other states. Unless farmers and dealers take all possible pains to put our potatoes on the market in the best condition. "Waupaca county potatoes" will never again have their former good reputation. Large quantities of land in Michigan from which the timber has been cut, is being broken up and planted to potatoes. This land is a sandy loam and produces large crops of a superior quality. We must expect to meet this competition every year, hence the necessity of improving the quality of our potatoes. Look at the market report in any Chicago paper and you will see Michigan potatoes

quoted several cents higher than ours. It is very important that potatoes should be put in the cellar dry and bright, in order to have them come out with a good color. Farmers should not dig when the ground is wet and weather damp and cloudy; digging in the first half of the day and drawing in the afternoon unless the sun is too hot, is in my opinion the better way. A bright clean appearance aid to sell the potato in all markets. Care should be used to keep cellars dark; strong light injuers the appearance also the quality. Cellars should be aired frequently as possible, and kept as cool as they can be and not chill the potatoes. Avoid bruising or peeling when storing in cellars, a smooth plank with strips on the sides is a good arrangement to slide down baskets or boxes into the cellar—spouting them into the bins is not a good practice. If all farmers would sell a part of their crop in the fall and put the balance on the market during the winter as the demand requires, it would be much better for growers and dealers. Potatoes cannot be stored in Chicago or Milwaukee without going to heavy expense and the tendency in all markets is to buy only as required for immediate use. It is not best to attempt to rush our crop into the market too fast at any time of the year, for heavy shipments break down the price and injures the farmer and dealer. As Michigan can ship her crop to Chicago, Milwaukee, St Louis and all southern points at much less cost for freight, than Waupaca county crop can be moved, the great importance of securing more railroads is readily seen. We can never hope to get as good rates of freight as the Michigan producer with but one railroad leading to our principle markets.

The Draft Horse.

[By Jas. F. Robinson, Leeds Center.]

There never has been a time within this section of the State, when there has been such a general awakening or interest manifested as to the necessity of more intelligent methods in agriculture. Intensified farming, in fact, is fast becoming the order of the day.

The era is past when we can compete successfully with all parts of the world by drawing upon the natural resourses of the soil and return no equivalent therefor.

I have heard early settlers remark that they used to have much more leisure when they raised nothing but grain, than they do now.

Little did they realize that the time would be so soon at hand when our rich lands would refuse to yield any profit at all. The time did come and much sooner than was anticipated. The fertile soil was their capital stock in trade. It was drawn upon by the bushel until circumstances compelled them to look in other directions for means of sustenance.

Stock-raising afforded the best solution of the difficulty Close competition in the open markets of the world soon showed that a better quality of stock—animals that were bred for a special purpose—were needed. The general purpose sheep, cow or horse is *not* a grand succe s and does *not* bring the largest profit to the breeder.

When trouble was brewing among political factions, and industrial classes were in a state of ferment, the farmer was looked to as the anchor of the nation's peace and safety. Yes! the farmer was then, and is the great conservative element. And I think in many things about his business affairs altogether too conservative, especially in regard to adopting the best methods of managing and breeding live stock.

We not only have a few who try to warm very poor sheds and barn yards with their stock as Mr. Gould has seen, but some who endeaver to warm a thousand acre field even when the thermometer is twenty-five degrees below zero.

As a rule, all the different breeds of pure bred stock assimilate their food in the highest degree and respond readily to good care and keeping; but are illy adapted to warming barn yards and ice water, and by neglect degenerate very rapidly.

The draft horse occupies a position in the commercial economy of the world which is as important and distinct as that of any other animal, and there is none that the general farmer can raise with more profit. The reason is plain. He has not the money nor the necessary time to put into the breeding and training of thoroughbred trotters.

To be reasonably certain of producing a trotter of any account, there must be on both the sire's and dam's side pure blood of the most intense type A large portion of the progeny of farm mares, bred even to the high-bred trotting stallions, are quite inferior animals.

"And a trotter without the trot is a poor horse, and more are without it than with it."

Of the horses throughout the country a large majority are of the most complex mixture of blood imaginable, from the Morgan to the Mustang. Some of them possess merit, but afford a poor excuse for the rest, and the common run of them do not even make for their owners a decent general purpose horse.

The market for the draft horse is not on the farm where he can be raised, but in the cities, pineries and mining regions. There he can be reared. Being convenient to these markets we have, right here in Columbia county, one of the best sections in the country for the breeding and raising of the draft horse.

As to the demand there is no probability of any one during the present generation living to see the supply exceed it.

In vicinities where they are numerous enough to make it an object for buyers to come, the demand is better and prices much more satisfactory.

The firm of Bowles & Hadden of Janesville, importers and breeders of Percherons, bought last fall for an Eastern party near Pittsburg, Penn., all the grade colts for sale in their vicinity at prices ranging from $120 to $175 for yearlings, and for colts at weaning time in October from $75 to $125.

There is one fact certain, and that is, a draft horse is a very scarce article on our farms, and parties visiting with a view to purchasing do a great deal of riding without finding any.

I have known of several instances of buyers being limited to 1,400 pounds as the lowest weight of horses they were to purchase, so taking the above as a precedent we might commence with 1,400 pounds as the minimum weight of the draft horse. The extreme weights being about 2 300 pounds, although horses weighing 2,000 pounds or over are not numerous, the most of them fall within 1,500 pounds to 1,800 pounds.

With many there exists a very strong prejudice against the draft horse, often without rhyme or reason, and the greater the ignorance of his sphere of usefulness the stronger the prejudice. Yet if a farmer has a pair of heavy horses he can sell them for double the money that he can generally get for a light team and much more readily.

Good horse sense is ready cash in any market.

The Percheron and Clydesdale are the leading races of the draft horse and are the most extensively imported into this country. The English Shire or cart horse, Suffolk Punch and Boulonnais are breeds possessing considerable merit but not very well known here.

A sketch of the English Shire or cart horse: It is a well established fact in horse history that the region bordering on the western coast of Europe, once known as Normandy and Flanders, is the original home of the various breeds of draft horses. Flanders, especially, was famed even in the middle ages for its noted breed of black horses. This race appears to have been the prevailing one throughout the north of ancient Gaul and Germany from the mouth of the Rhine eastward, and probably inhabited in a wild state, the vast region of marsh and forest which stretched all through Europe eastward to the Euxine sea. It was from this source that the rulers of Great Britian drew in large numbers for the purpose of increasing the size of the horses of the Island. History throws no light as to how or when this breed originated. But as early as the Eleventh century they were largely imported into England, and royal edicts and regulations were repeatedly issued for the purpose of encouraging the use of the large stallions of this breed. King John imported at one time 100 choice stallions from Flanders. Edward II followed in the same course, and it would seem that in the time of Henry VIII these Flemish horses were inseparably associated in the British mind with the idea of immense size, for we are told that when King Henry first saw the Princess Anna of Cleves, a remarkably large, coarsely formed woman, who was to be his fourth spouse, he expressed his opinion of her by the exclamation, "Egad, she is built like unto a great Flanders mare!" From time to time since then there have been importations from Germany, Holland and Flanders, the improvement and development of which have resulted in the formation of what is known as the Shire horse or English cart horse. Their original color was black with sometimes white in forehead and the nose, feet and legs more or less white like their ancestors in Europe. But black, and the various shades of brown, grey, bay, chestnut and roan are common colors.

They were of immense size, with great strength, but were heavy, dull snd sluggish in temperament and slow and awkward in motion.

The Clydesdale.—The home of the Clydesdale breed is Scotland. He originated from the same stock as the Shire horse and by the same course of selection and breeding. Mention is made as early as 1352 of great horses in Lanarkshire, Scotland, the original home of this breed. About 1720 a Mr. Paterson of Lochlyoch, Scotland, went to England and brought from thence a Flemish stallion, which is said to have so greatly improved the breed as to make them noted all over Scotland. It seems that this family of Patersons lay claim to being the founders of the Clydesdale breed of horses. According to Mr. Sanders in his treatise on Horse Breeding, from whence I get considerable of my information, there can be no question as to the fact that there has been almost constant mingling of blood of the Shire or cart horse with that of the Clydesdale of Scotland, and that at the present day the differences between the two breeds are so very slight that many intelligent breeders of England and Scotland have urged and continue to urge that they should be classed as a single breed, and that one stud book be maintained for them. The Clydesdale society and the English cart horse society have each published their stud book which, clearly indicates that the lines are to be more closely drawn hereafter, and that henceforth crossing between the heavy horses of England and Scotland will not be regarded with favor. Hence we may expect to see the draft horses of the two countries each gradually assuming a more distinct type within a few generations of equine life.

It is claimed that the soil and climate of Scotland is admirably adapted and has done very much for the development of the activity and good quality of the Clydesdale; but in a larger measure, no doubt, it is due to the careful selection and intelligent breeding which has been carried on for over half a century. The stylish and prevailin gcolors are bays and browns, quite a number are black and a few grey. White markings on the face, feet and legs are common with all the colors. The Clydesdale, in common with the other draft breeds, is of a mild and docile disposition, easily broken to the harness and performs his tasks willingly and intelligently.

The demand at present is such that they have been imported to nearly all parts of the world, but most extensively to this country.

Suffolk-Punch.—The breed of horses known as Suffolk-Punch, of England, is net in much demand in this country, consequently but little known. In his native home he is chiefly a farm horse. His color is uniformly chestnut or sorrel. He is smaller than the Shire horse or the Clydesdale, but compactly built, round-bodied, short-legged, rather light-boned for his weight, and with the general reputation of being rather defective in the feet.

The Boulonnais, so called, is a heavy horse, of but little notoriety, found north of the river Seine, and near the sea coast in northwestern France, once the home of the old Flemish breed and evidently possessing much of the old Flemish character. They are generally grey, like the Percherons, and are usually larger, coarser and less active.

The Percheron.—The Percheron is an ancient French breed, originally famed for its capacity, for rapid locomotion with a heavy load, and especially adapted to drawing the heavy diligences, or post-coaches used in France before the days of the railway and locomotive.

Tradition has long attributed to the Perchon an oriental origin; but it was not until the researches recently made in the compilation of pedigrees for the first volume of the Percheron Stud book of France that the extent to which the blood of the Orient had entered into the formation of the Percheron race was fully realized. What the Darby Arabian was to the English thoroughbred, the grey Arabian Galipoli has been to the Percheron horse of France. Dilligent and persistent inquiry into the family records and traditions of the best breeders of the Perche has enabled the compiler of the Percheron Stud book of France to trace definitely a large proportion of the most noted Percheron horses of modern times to this Arabian sire, that was imported in 1820. In fact, this Oriental blood, whenever introduced, in all nations and all climates, has been a powerful factor in effecting improvement in the equine race. There is every reason to believe that this breed, like the draft breeds of England and Scotland, derived its size originally

from the large black horse breed of Flanders; but from the fact that grey has for many generations been the prevailing color it is evident that some very powerful agency has been at work, modifying the type until it has but little in common with this old parent stock except size. Aside from the history and traditions of the country the Percheron horse himself furnishes unmistakable evidence, in his form, disposition, color and general characteristics, that he is closely allied to the Arab. These qualities have been somewhat modified, it is true, and the size has been greatly increased; but in the hands of the excellent horsemen of La Perche and under the careful and fostering supervision of the government which exercised a direct control over the selection of sires, he seems to have retained many of the excellent qualities of his Oriental ancestry; and this, added to the greatly increased size which had been attained, made the horses of La Perche, many years ago the wonder of the world for their specialty of rapid draft—their ability to move a heavy load at a rapid gait. It was this acknowledged superiority of the Percheron horse in the post-coaches and omnibuses of France that first caused the attention of the outside world to be directed to them. It was not simply as draft or cart horses that they were distinguished; on the contrary, had they possessed no excellence beyond this they would scarcely have attracted any attention; for other countries possessed horses that, for the purpose of draft alone, were certainly their equals if not their superiors; but it was in that happy combination of size and form, which gave them activity, strength and endurance, that they were found to excel the horses of all other countries. For more than 1,000 years that portion of the plateau between the Seine and Loire rivers known as the Perche, has been noted for the superiority of its horses. In the 13th century, when the vast army was collected for the prosecution of the crusades, the counts of Perche were complimented as having the finest mounted retinue of all that composed that magnificent array. In the early history of the race, the horses of the Perche were bred almost exclusively for saddle purposes, either for the chase or for war, but during the more advanced stages of civilization, the demands of agriculture asserted themselves, and the larger specimens of the breed came into use. Later, when the railroads had displaced the post-coaches, the largest or draft type of Percherons were the most sought after, and the impetus given by foreign demand had centered the energies of the Percheron breeders entirely upon the Percherons of the heaviest class. For many generations, the business of breeding these horses has been handed down from father to son. They never bred or sold any other than pure Percherons. The first importation of any note of these horses was to Ohio in 1851, and they were known there as French horses. Since then extensive importations have been made into the United States, under various names as Percherons, Normans, Percheron-Normans, Norman-Percherons and French horses.

To correct this confusion of names, a movement was instituted to establish a record which should contain a description of all horses imported from France. In carrying out this plan, the deciding upon a name to be used, caused, at once, a clashing of interests of the speculative importers and the breeders. The importers whose object was to establish the race in its purity in this country recognized the well-known superiority of the Percherons, and made their selections in France from this breed. Speculative importers, on the other hand, who found that their interest lay where they could buy the cheapest regardless of breed, applied the name "Norman" to all horses imported by them, and it soon became in the United States a convenient expression to designate horses imported from France whose breeding was unknown; and to this day very many people are of the opinion that there exists a breed of draft horses in France called "Normans," although there is not now, nor has there ever been any breed of draft hores called by that name by the French people themselves. The breeders of pure-bred Percherons in France have united and formed an organization known as the Societe Hippique Percheron, and contains about 300 members, comprising all of the most prominent breeders of the Perche, and receives the sanction and support of the French government. This society has published a stud book containing a record of animals reaching back many generations. The society is managed by able men of high reputation, and under very strict rules, and

will hereafter furnish a directory of blood which few honest importers will care to ignore. A similar society exists in this country known as the Percheron Horse Breeders' Association, comprising men of fine character and great business integrity, representing an ownership of more than 1,000 pure-bred mares and 20,000 horses either natives or grades, that are being improved through the use of Percheron stallions, and the fourth volume of the Percheron Stud Book, soon to be issued, will alone contain a record of over 3,500 pedigreed Percherons. The prevailing color is grey of which there are 65 per cent., the remainder are black with the exception of a few bays. It is the custom in France to commence working moderately colts at the age of two years, until fit for market. (Mr. Hinton, one of our citizens, commences, even earlier, at the age of twenty months with no bad results.)

As regards the crossing of the draft horse with small native stock, experience has demonstrated that there is not the slightest danger on account of size.

It is sometimes the case that grade horses look quite as well as the thorough breds, and persons not well versed in the laws of heredity think that they are equally as good for breeding purposes as those purely bred, or that the difference is so slight as not to be worth regarding.

It is one of the principles of heredity, that when there is a great uniformity in a species divergencies from the usual type in the offspring are slight and rare, but when this uniformity, from no matter what cause has been broken up, divergencies in the offspring are frequent and great, although there is always present a tendency, more or less powerful, to revert to the original type. This tendency is most frequently manifested when breeds or races, widely differing in their present forms, are crossed upon each other. In such cases, or violent crosses, as they are called, it frequently happens that the progeny resembles neither parent, but shows strong marks of the type from which both of its ancesters originally sprung.

This tendency to revision in different breeds of domestic animals when crossed, accounts for many of the disappointments which breeders experience in their efforts to improve their stock, and serves greatly to complicate the breeding problem.

Some Things Which I Learned at the Institute.

Two years ago I was much interested in the passage of the Agricultural College Bill then pending before the Legislature. I was at Madison a part of the time and used my efforts by speech and pen to carry the bill; but it was lost for the time, and instead of an agricultural college the legislature gave the farmers an appropriation of $5,000 annually, to establish a series of Farmers' Institutes in the various counties to encourage better methods in farming. At first I looked upon the whole thing as tantalizing. The farmers had "asked for a fish and they gave us a stone." We had asked for a college to educate our boys and girls in the direction of farming, and we were told to educate ourselves. Afterwards, in looking at the matter calmly, I was glad to take the institutes, not as a substitute for the college but for the real good there was in them in promoting better methods among farmers. I had the pleasure of attending several of these institutes last winter. I had opened a farm in Rock county in the early fifties. Farming had been my only occupation for thirty-five years. I am afraid I had a little conceit and thought I knew something of farming, but I was willing to learn. I would like to take a little of your time to tell of some things which I learned.

I was much interested in observing how each institute brought out the fact that we individual farmers were working out each for himself, in a sort of isolated way, the great problem, how we can make farming pay. Scattered all over the State at a distance more or less from the nearest neighbors, yet what a host we are. We are more than half of the population of the State. We ought to be more than half of the effective power of the State, whether social or political. If we chose we can make our man governor. We can elect the legislature. We can enact any just law. We can control the railroads, for whatever is for our interest is equally for the intesests of the railroads in the long run. There should be rightfully no contests between two interests so entirely alike. As farmers we could, if we willed it, exert this power. But we never have a united front. It seems to me that we are like those little pith balls on an electric machine hung by a thread to a common center, each one

stands as far from every other one as it can. We, isolated on our 40 or 80 or 160 acres, if we do not repel each other, do not draw each other to our confidence—yet no class of men ought to be more united in sympathy, in efforts, in intelligence, in work for the common good. The first effect of the Institute work was to magnify our profession, to make us proud of it instead of feeling thet it is a drudgery, to draw us nearer together, to create an enthusiasm along the line of farming. And then, too, the audiences which greeted the Institutes. Audiences of candid, eager, inquiring listeners, audiences not ashamed to learn, combative audiences, made up of men and women who tried to weigh the words and thoughts of the superintendant's workers and ready to give back a blow for those dealt out so freely by Mr. Morrison's troupe. I had associated with farmers all my life but never before did I see such enthusiasm among them, such willingness to learn, such critical attention to the so-called better methods. Never before did I hear so many questions thrown at the speakers and writers, never such wide-awake alertness to find out the bottom facts of the theories advanced. One thing was sure, that the farmers who attended the institutes were not dead. They were alive to all that was advanced, to question every theory, to look at every fact, only "to hold fast to that which is good." Farmers are said to be "trusting old souls," but they didn't seem near so trusting as that phrase would lead you to believe. They were quick to take a hint when they saw the force of it they were willing to have the way pointed out, but they wanted to do the driving. "Ah, Ellen!" said a young, robust, blue-eyed Irishman who was taking his best girl out for a drive, "Ah, Ellen! if me hands weren't full with the driving, I'd just hug ye up close to my heart." Ellen dropped her eyes blushing, but soon recovered herself, and with one touch of girl nature, replied. "Sure, Teddy, don't you think I could drive?" The farmers were as quick as Ellen to take a hint. They want to do the driving, and they will drive straight, too, as soon as these new methods get a fair warming next to their hearts.

One of the first things and one of the last things which these Institutes impressed upon us, was that our farm was our capital, that no wise man ever run his business so as to eat up his capital, that if we cropped our farms so as to lessen the fertility of the soil year by year, we were to that extent eating up our capital, that our object should be to sell that kind of produce which took away the least possible amount of fertilizers from the soil. All the grains exhaust the soil more or less, and the tendency has been to raise grain continuously until the ground refuses to yield a crop. At the institute in Weyauwega one farmer put it in this fashion, "first wheat, then oats, then rye, then buckwheat, then nothing." To raise grain in this way, and to sell the grain off the farm, was using up so much of our capital. If, on the other hand, we feed out this grain to live stock on the farm, using this stock in the meanwhile as fertilizing machines, then we are parting with the least possible amount of our capital. The great end of good farming was to accomplish this, to prevent any waste of the original elements of the soil, keep our capital intact, in fine, to hand down to those who come after us our farms as fertile as when we received them. But of the waste of manures, one prominent man at Menominee told me that he could take me to see beautiful, green, grassy mounds, sizable mounds, too, on the surrounding farms, and I couldn't even guess how or why they were there, they were simply the manure heaps grown over with grass which were left as they were made, unutilized on the farms. The Institutes will stop such wastes.

Again, if the Institute workers, the Institutes themselves, were unanimous in nothing else, they were unanimous in the cry clover, more clover. As if they were talking about a pretty girl, each vied with the other in saying the prettiest things of the blushing clover. It was what our stock wanted, plenty of it for the hogs, it was what our land wanted. One man at Evansville, Rock County, told us how he took a sandy farm on the Sugar River, which would not raise ten bushels of oats to the acre, his neighbors told him he could not make it do more, yet, in spite of their laugh, by clover alone he made it bring as good crops of oats as any farmer could wish. We were told that the farms in Waupaca County and vicinity were so impoverished by grain raising in a few years (you know that it is sandy up there) that they refused to produce paying crops at all, until some one be-

gan to use clover, and that has made them the garden spot of the state for raising potatoes for the Chicago and western markets. Even our Gen. Morrison had the walls of each institute embellished with his mottoes, in praise of clover, executed by that deft hand of his. This summer I had the pleasure of seeing those vast wheat fields of Minnesota and Dakota, a whole train of us was landed in the middle of one of Dalrimple's wheat fields. Wheat as far as the eye could see, ten self-binders at work, one behind the other, steam threshers running at the same time, I saw at once that we could not compete with farmers there in raising wheat, we had better keep to corn and clover.

And right along with clover came dairying and butter-making. John Gould, D. W. Hoard and Hiram Smith and F. C. Curtis, how they buttered us all over, not with oleomargarine, but with gilt-edged butter. They made us believe that we were getting a fair price for our butter when we grumbled at 8 and 10 cents per pound. If we made 10-cent butter it would be dishonest to ask more than 10 cents for it. Then how our wives were laughed at for using their fingers for thermometers, and for the hap-hazzard way of making butter, and we men, weren't we wrapped over the knuckles for the way we handled our cows, for the way we fed them, for the amount of profit we got from each cow. Why were we such old fogies? Why did we stick to those old ways, to be ten or fifteen years behind hand, when the strife of competition ought to keep us to the front. I dare not tell you about the amount of deposits in the Jefferson County banks to the credit of the dairymen of that county. But after a while my thick skin began to be pierced, every once in a while a blow would take me right between the eyes, although dairying was not my pursuit. I had to plead guilty in the management of the cows, in the product of the milk, and I couldn't say that my wife was a pattern butter-maker. I felt the worst, too, when they declared that we didn't need the new-fangled creamers and butter fixings to make good butter. I had made the want of these newest inventions the excuse for every pound of poor butter we farmers made. But F. C. Curtis and all the rest didn't take any stock in that excuse, it was not the cans and creamers which were at fault, but our clumsy ways of using them, or to put it as they did, it was our want of knowledge of the science of butter-making. There was where the fault lay. Forgive me if I give a little bit of personal experience, will you? I went home and tried to tell my wife and family how to make butter according to Curtis and Gould. The information was diluted I know, but I tried to tell them what these worthy (I am free to confess that I thought them somewhat shaky) men had said. So this summer the daughter at our house was told she could have all the money she could get from the butter if she would take the entire charge of the milk and cream and butter-making, relieving the mother entirely. The daughter had never made a pound of butter in her life. She took the fixings just as they were in the house and went to work. I had to buy a thermometer at once—John Gould owes me 50 cents for that—and worse than that, the daughter made me do the churning. The new dairymaid began to sell butter to our neighbors for 16 cents, but pretty soon she had an application to send a tub to an eastern city, by a friend who had tasted her butter. She received 25 cents per pound, her own price, after paying 6 cents per pound express charges, and word came back from a groceryman in the city that if she would send some more like it, he could sell every pound for 40 cents by the tub and 45 cents by the single pound. Ever since then there has been a proud dairymaid in that house and a very complaisant father to tell the story. I just read this to the mother who sat by me while I wrote and her remark was "I never ate such good butter in my life." But that's a mother's testimony.

As one of the accompaniments of the dairy, came the silo. I had read about the silo, had talked about it, had tried to believe that it was the coming improvement on the farm, but the cost of it, the work in filling it troubled me. Now we were told that these need trouble us no longer. The new ones were described as very easily constructed, easily filled, easily covered, and a great improvement in the storage of fodder. I was thinking to-day, as I was feeding the sheep and calves, throwing out a great mass of woody fiber, the coarse stems of the clover, whether Hiram Smith would tell me that, had I put up a silo as I promised and put my clover into it, that waste would have been saved. Would cattle have eaten

even from a silo those coarse stems? I put the question here for him or John Gould to answer. We were told that 3 tons of ensilage equalled 1 ton of timothy hay; that we could get from 18 to 25 tons of ensilage corn per acre (that means good farming I suspect) equal to 6 or 8 tons of timothy hay, that means that through the silo we can keep a cow one-half cheaper, at least, than we do on good hay. Feeding at straw stacks has already gone by. I make allowance for the bran which is put on the ensilage, but I suspect the cost of the bran is not equal to the worth of the corn we put with the timothy hay. After looking at the matter with consideration these six months past, I am inclined to believe that the silo is the improvement on the farm which we must have, and the sooner we get it the better it will be for us all.

I dare not touch on the dairy cow. That is Mr. Hoard's province. But some of the best things I learned last winter was while that man was talking about his pet Jersey cow, at one time actually in pain with laughter, and then ready to drop tears over some pathetic turn which he made to fix the thougnt in our minds. The advanced thought of all the Institutes was, that the pedigree of our stock was the strong point in animal farming; I wonder if I ought to put it stronger than that, to-day their could be no successful competition in stock raising, except along the line of good pedigree, I guess that's the orthodox idea. One man said to me, "I wouldn't have a thing on my place without a pedigree, not a chicken. In my sales of horses and cattle I count the pedigree as double the seeming worth of the animal. If the colt is worth, to look at say $100, I sell him on his pedigree, at least at $200. That may have been an exaggerated statement for the most of us farmers, but it was really the truth with him; we all of us have a smattering of knowledge of the influence of heredity upon stock, but very few of us have tried to put our little knowledge into practice. We don't think the old stock is good enough, but we stick to it, because we haven't energy, enterprise enough to get into new stock. Do you remember the dilemma of the Irish town committee? The old jail in an Irish town was sadly dilapidated, a new one was demanded, so the town committee met to take the matter into consideration, after talking the whole day the council put the result of their determination in three resolutions: Resolved, 1st, that we build a new jail. Resolved, 2d, that we build the new jail out of the materials of the old jail. Resolved, 3d, that we let the old jail stand until we build the new one." As farmers, we want the new stock, the best breeds, the best forms, the best animals for our particular purpose, and we resolve to have it, but we resolve to keep the old stock until we get the new. But the new don't come. A young fellow, the son of one of my nearest neighbors, started out, say five years ago, with a determination to have better stock than his father had had. In that five years, I think I am below the truth in saying, he has doubled the price of his stock, I mean by actual sales. To me it is only a question of a few years when the great cattle kings of the west will be so hemmed in by the tide of advancing civilization that their great business will be broken up, because their feeding grounds will be taken from them. Then the young man who can put upon the market the best steers, the best stock of any description, will stand the best show in the strife of money making.

Another idea came to me with much force. Growing corn in abundance I had always fed it lavishly, never stopping to ask whether I was feeding economically or not. There were times when my pigs would give out in their hind legs, I called it disease and let them go. But I have no doubt now, that had I fed them less corn, a fat producing food, and given them a food to build up muscle, flesh, given them barley, oats, clover, I should have saved the pigs, and saved some corn too. I have no doubt that we farmers waste bushels of corn in thoughtlessly giving it to young growing animals, when they require not fat, but growth, a little while ago this didn't seem of importance, but now competition forces us to husband every resource. One prominent farmer said that "he could raise pork at 22 cents per pound, and all over that was profit." If he can do so, I think he gets the same profit on his hogs sold at 32 cents, as I do when I sell at 42 cents, for I think it costs me 32 cents to raise a pound of pork. "Think," what right have I to say "I think." Why don't *I know?* And just in that thought lies half of our failures, the shiftless, thoughtless, hap-hazzard way of doing things on the farm.

If our Heavenly Father had not given to the sun, the rain and the air, almost endless resources to keep our farms fertile in spite of bad management, a good many of us would have been closed out by the sheriff long ago. How many of us know how much a pound of pork or beef costs us, we may know how much a pound costs at the experimental station, but how much does it cost us? I think I may say that the Institutes will compel one farmer in Wisconsin so to manage that he will know what a pound of pork will cost him.

One thing more, even that chairman calls "time." We men have always arrogated to ourselves the right to run the farms. That may be, and probably is all right, so far as the planning and work is concerned. That home, that house, the center of the farm, is a field broad enough for the wife and mother to cultivate, but she has a right to cultivate that field with all the appliances which the farm can yield her, with all the tools, all the conveniences, all the help which her own mind, not her husband's, tells her she needs. These women in times past, have been little heard of out of their own households. But those of us who attended the Institutes soon found out that they had thoughts of their own, and could express them just as clearly and forcibly, and with the same good commonsense as the men. And while they expressed their views freely, they pictured to us woman in her best state, as far removed on the one hand from the poetic ideal woman, the dear creature who only lives to be petted—an imaginary being to be sure—as she is from the coarse, masculine, strong-minded woman, equally imaginary, on the other. We found out that they could write as men would have their mothers, wives and daughters write, nay, as the men would write themselves if they only could. We learned that they, too, wanted better methods, better methods in the house, they claimed that men had planned for them in building houses, in contriving parlors and kitchens, in digging wells and fixing wood piles from a man's standpoint, now they would like to see this done from a woman's standpoint; that it was about as wise for a man to arrange all these things for a woman's comfort, as it would be to arrange her dress. A woman of necessity knows better what she wants for her own comfort and convenience than any man can. They asked for better methods in the surroundings of the house, the door-yard, the garden, better methods in everything which tended to improve the looks of the place, giving it a light, a brightness, they plead for everything which would add one ray of joy to the family within doors, which would lighten the burdens of the household, books, papers, not the things which would directly bring in the dollars, but for the things which would bring in lighter hearts, joyous intercouse with each other, those thousand unnameable things, beautiful things which go to make a happy home. Well, the women are on the right track, as they always are, and I think some of our ears will burn, and our heads ache, if we do not give them what they ask. An Irishman was telling one of his countrymen what a phrenologist was. "Indade, he is one of them fellows who can tell what sort of a man ye are, by feelin' the bumps on your head." "Arrah, Pat, I don't belave that same, but I belave he could tell what sort of a man my wife is by feelin' the bumps on my head." I am afraid the heads of some farmers may indicate in the not distant future, the near approach of their wive's hands if their demands are not granted.

The Young Man on the Farm.

I have chosen this theme to trespass a little upon your time, because the object of these Institutes is to encourage better methods in farming. I have chosen to talk to young men, because we old farmers are too old, too stiff, too rigid to take pleasantly to new methods, even when we believe they are better than the old.

To begin at the beginning, the question comes to me, if you were young again. with full power to choose a profession for life, knowing what you do of a farmer's life after thirty-five years work on a farm, what profession would you choose? Hold your breath young men, wnile I say I would choose farming every time. What, with all its drudgery, its continued, constant application, its slow way of making money, its want of society, its lack of political distinction? Yes, with all these, I would choose farming, not that I think that these things are necessary concomitants of farming, but that with them farming is a higher profession, a happier profession, a healthier, a more independent, a broader profession, a profession with

more spare time to cultivate the mind. And if there are any other adjectives you may add them. Do you tell me to halt, I think I know what I say. I know a gentleman who began a business, no matter where or what, thirty-five years ago. Of necessity he saw more of the world than one on a thousand farms can. He retired from business say ten years ago, reputed to be worth $75,000. He has a brother who had farmed about the same time, but worth say $8,000 to $10,000. As I look at the two, so far as grinding care, narrow views, a cramped life, harrassing fears of loss of money, unimproved intellect, commend me to the farmer, and save me from the business man. And these are not extreme cases either—I don't mean to say that all farmers are good men, or free from care, or intelligent men, any more than other business men. But there is something in the independence of a farmer's life, something in his intercourse with God's earth, and sun, and rain, and free air which tends to make him a better man, a safer man, a man surer of a fair competency than the average man of other business. Mind you I say "the average man." You may look into your nearest city, if you will, you will find the store keepers, the merchants, the mechanics more showy, more talkative, with more push about them, but ask them about books, about the principles which underlay politics, or theology, about the last political crisis in England, about any subject outside of their business or city, and you will not find them one bit ahead of the average farmer. It is the show part, the external which gives the glitter, and cause you young men to lay for city life. But when you find out the shams of cities, the endless and oftentimes fruitless efforts to keep above water, the unceasing application to business (and they don't get off with ten hours a day either), the competition between the different stores. When you see all this and more too, I think you will say that the farm is a haven of rest. A merchant in Janesville, on Thanksgiving Day, when I told him I was spending the day in the city, broke out with "that's just the way with you farmers, you have a day whenever you want it. but we can never leave our store." Don't understand that I mean to disparage these people in cities and large towns. The battle of life is for everyone, you as well as others, only I prefer the farm as the place on which to fight my battle.

But having the farm what next: First you ought to find out very soon that hard "bone labor," that buckling yourself to unceasing drudgery is at a discount now. Such are the appliances of farm machinery that almost every department of the farm calls for thoughtful, skilled labor. I wish you young men could follow McCormick's reaper for twelve hours as we cut and harvested our wheat in the '50's and '60's. If you ever raked greenish grain, or tangled grain off that reaper a single day, you would know what "bone labor" meant. The farm machinery then didn't save hard work, but enabled us, by hard work, to gather our harvests. To-day farm machinery means you may ride when you plow, ride when you plant, ride when you till, you may ride when you cut your hay, ride when you rake it, ride when you stir it, and they say ride when you load it. Altho' I have not tried that yet. But we have all stood by while the horse has carried the hay up into the barn, and switched it away on the mow where it is wanted. A single man goes into the harvest field, and riding, cuts and binds your grain, and you scarcely trouble yourself about it. Your labor is but little more than the work of the factory, with variety enough to take off the edge of weariness. But you need more skill in your work now, and a good deal more brain in making that work pay. Look, a little while ago McCormick's reaper took one man to drive, one to rake off, and five to bind. To-day a single man takes a self-binder, and does the work of these seven, but do you remember that the machine is almost an intelligent creature, and has to be handled with care, with skill. Your five binders might have been dull plodders, and no loss, but now you cannot be dull, you cannot be careless or unskilled with that self-binder, or the loss may be great. A little while ago the farms of Wisconsin yielded crops with their virgin bounty, now the highest skill and intelligence is needed in the use of manures, the rotation of crops, the handling of your live stock as machines for fertilizing, to plan for years ahead to keep the fertility of the soil up to the best standards. Do you see why the young farmer ought to be educated in this contest of skill, for the skillful will win every time. Don't understand

me that you need not work, you have got to work if you would accomplish anything in this world. Surely you have got to work if you reach that other world in triumph. There is no great hardship in work, the hardship is in making work a drudgery.

Another thing, I think we have come to the point in farming when a young man can say truthfully, that he has done a good day's work when he shall have worked ten hours. In other days the story was from sun to sun for a farmer's day's work. I remember once of boasting, with a kind of pride, that I had made seventeen faithful hours in harvest in six days of the week, and closed up Saturday night with binding timothy until 9 o'clock. I don't mean the hired help. I wouldn't like to call myself a fool (although I had rather do that than have Pres. Chamberlain say it). But the whole operation was exceedingly foolish. I am ashamed of myself for encouraging such dissipation. Such work is a draught upon the vital energy, upon the reserved forces of the body, which ought never to be made unless under an emergency. Man as well as beast can do so much work in the course of his life. You can do it all in ten years, and then take your rest a broken old man or you can distribute the work evenly and healthfully during twenty-five years, and have a happy peaceful age. From something which was said last winter on the subject at one of the institutes, we thought we would test the matter on the farm this summer. My two sons, young men in the vigor of life, have carried on the farm themselves, hiring, up to husking time, not over two months' work of a single man. They have put in and tilled 69 acres of corn, 58 acres of small grain, 2 acres of onions and potatoes, cut and taken care of 61 acres of heavy hay, 180 acres in all. The average work done was scarcely ten hours a day. Ten hours was the rule. It is fair to say that I helped along more than I wanted to in cutting and raking the hay. I believe there is no need of grinding out fifteen hours a day in those hot days of summer you lose in the long run. I know that for the sake of hurrying up matters in summer, we wish to push, to accomplish the most we can in a day. But my experience is that so many hours a day of good work are enough, don't look for more. A young girl engaged to a young fellow with a good deal of work in him, but little money in his pocket, made up her mind to put off the marriage until Jack could secure a competence. She told him they had better wait until they had saved say $10,000. Jack made a wry face (I would anyhow) but submitted as best he could. He laid by every penny he could earn. After three or four months of waiting, it was about four years to Jack, I'll leave it to the girls how long it seemed to the sweet heart. After three or four months, his lady love asked him how he succeeded. "Oh, first rate. I have laid up $18.72." "How long," with a pang, "will it take Jack?" "Say forty or fifty years." "Don't you think $18 is near enough?" The point is, if you don,t see it, that ten hours is enough for me. I remember an incident in a harvest field twenty-five years ago, seven young fellows were binding and stocking grain. They had been at it for weeks. It was Thursday night and the harvesting wanted to be finished that week. The grain was over-ripe. The hands began to grumble; they said it could not be finished by that time. But by a little gift of gab, wisely expended, they agreed to try. That night a nice shower came so that they could not work until Friday noon. The half day was lost, but that half day's rest so refreshed the wearied hands that they closed up the work without special effort, early Saturday afternoon. I do believe in ten hours a day, but with Mr. Beecher, I do not believe in ten hour men, who demand fifteen hour wives.

Nor do I believe in that farmer's success, who cannot, in an emergency, work twelve or fourteen or even fifteen hours a day, if his work calls for it.

I think I need throw out no hints as to the carrying out of a grain farm. Animal farming as real object, and raising grain only as it promotes that object, seems to be the Wisconsin farmer's hope. In the first place, the freight on all bulky produce like grain, in moving it to Eastern cities, takes from the profits of the crop to such an extent that little profit is left for the farmer. In the next place when these bulky crops are sold, you have kept back no part of them to replenish your fields exhausted by their growth. It is a well known fact that the growth of a field of grain up to the point when it begins to form its seed vessels, and produce the seeds, has drawn but little, if any, upon

the fertility of the soil. It is the formation, growth and perfection of the seed which exhausts the farm, and it is this seed, containing these fertilizing elements, which you sell. By concentration of these grains in the growth of your animals, you save a large amount of freight and you give back to the soil, through the manures, a good portion of the elements of which you have robbed it. There are two crops, corn and clover which are essential to animal farmings, and which, strange to say, form a large part in fertilizing the land. It is highly probable, perhaps not to be demonstrated, that corn with its large broad leaves draws from the air a large part of the elements which go to make up its growth. Corn has been grown nearly 100 years on the Miami flats in Ohio, with scarcely a diminuation of product, you can account for this surprising continuation of good crops only on the theory that a good share of the elements of growth is absorbed by the leaves from the air and given to the soil—clover, equally essential in animal farming, certainly draws largely from sources other than the soil the fertilizing qualities of this crop, we might rightly name it the farmers' friend. Here then are the three crops which go to make up good farming and tend to make good farming profitable. Good corn makes good stock, good stock makes your fields rich for clover. Clover makes good corn, and around you go again.

Again what kind of animals do you want on the farm? Every young man ought to make up his mind what branch of farming he will undertake. After he shall have made up his mind what stock he needs, he needs of the best. If he needs a cow, let the cow be of good pedigree. Ah, but such a cow costs, yes and brings in money too. One or two good cows with good pedigrees, and with care and judicious selections, will stock your farm in a few years with cattle of which you may be proud. You have not the same excuse which we old stayers had when we began farming. Then a short horn with a fair pedigree was scarcely ever under $1,000. Now you can get them reasonably cheap. I shall never forget a reply a Walworth County stock raiser made to me twenty-five years ago, when I asked him if he was not afraid his notes, taken for such high priced stock, would not be paid. "Men who buy such stock always pay their notes," he said. What is true of cattle, is true of other stock. What you want is the best you can get. Let me drop here a word on the debt question. It may not be orthodox but I shall venture. A debt contracted for good stock which is improving all the time more than enough to pay the interest, is not a debt to be feared, not a debt such as store debts, or other debts made for articles consumed. "There, I have gone and went and said it."

Another point, the young man on the farm ought to experiment on the costs of his different products. How much will your beef and pork cost, 22, 23 or 32 cents per pound. If by careful experiment, by skillful handling and feeding you can reduce the cost of raising your beef or pork one cent a pound, it amounts to the same thing as though you sold it for an advance of one cent. So of crops, if by careful manipulation, by early seeding, by a wise rotation you can secure a little increase or a surer result, you have gained so much. On my own farm we have found out by years of experience, that corn on good clover and timothy sod, plowed under in the fall is a sure crop, so sure that we have never had a bad failure. This year is probably as poor as any, yet the average is a good one-half crop, fifty bushels of ears to the acre.

There are several points which I would like to talk to you about, but your chairman would forbid. One thing which we do not often think of, the wish for cleaning up land in our state, in all new states, is a thoughtless one. Thousands of acres have been cleared off, denuded of timber growing on them, which ought never to have been touched. I don't mean in the pinery either, but on our own farms. We have had the idea that tillable land is worth so much, and that timber does not bring us anything. There are parts of almost every farm where timber is of great advantage, on slopes, in ravines, on broken land where the ground washes bad and no remedy for it. In all these places timber ought to grow, and where it has been cut off it ought to be replaced. I hail arbor day as a beginning of better times. The denuding of such vast tracts of land of timber, may not cause a smaller rainfall, though this is likely to be true. But it seems almost certain that the sudden storms, the quick descent of heavy rainfalls, the cylones, are, in part, if not in great part, due to this.

The surface of the land exposed to the fierce effects of the summer sun must of necessity dry up the moisture quickly, and the atmosphere, charged with so much moisture, must give it back to the earth as quickly, and hence the ravages of our storms in late years. And here comes in the admonition to young farmers, begin to put out forest trees and keep putting them out. There are a plenty of trees which will do well in Wisconsin, and which in time will pay a good dividend. The walnuts, the ash, the hard maple for profit, the elm for beauty. The time will come, and is now, when a grove of black walnuts will pay more than anything on the farm. I knew of a black walnut in New Jersey which was sold ten years ago for $196 to be used in finishing a house. So that the money question comes in as well as your safety. The Legislature ought to be appealed to to begin the good work.

One other matter, what relation are you going to bear to the public? As a matter of course you will belong to some party. What part will you take in that party? Will you lead, will you follow? Will you obey the commands of the machine or will you with your fellow farmers issue the commands and have the machine do your bidding? It makes all the difference in the world from which end of the party the commands come. When the people issue the commands it is because of some high, moral purpose; a loyal demand that the government shall be carried on for the good of the people. When the machine governs, it is for the benefit of the machine, for the boodle. Young men, you and your fellows ought to govern, and you can if you will. To do this, activity in the caucus, activity in politics in general, intelligence, being posted in matters of state and the general government. A high moral purpose are what you need. The tendency of the farm is to keep you isolated, but you must not allow it. No voice can be heard farther than the voice of the farmer when he tries, only let his voice be uttered with an honest purpose, intelligent good sense, and a determination to be heard.

I wanted to say something about the household, your own household, about the sunshine that you, and that girl of yours should bring into it. You may have a thirty days, a honey moon of sunshine if you will, or you may have a lifetime of sunshine. I cannot go into this now. Only in regard to getting a girl, I would give you the same advise which a crazy woman in the New York asylum used to give. She would walk to and fro always preaching this sermon. 'That every man should go and hang himself, and that right speedily, and prove it too, by the Bible in his hands.' She would turn to one passage and read "Judas went out and hanged himself," then turn to another and read "go thou and do likewise," and then to a third, "what thou doest do quickly." I don't want you to hang yourselves though some folks do say that getting married is like it. But get you a girl, honest, simple, with good sense, not afraid of saving, who will give you her love for like traits in you, go you and do this; and do it quickly. Are these hints worth your thoughts, young men? If so think of them, weigh them, and make up your minds whether they are worth carrying out into practice. Quite a sharp Yankee batchelor, very bashful, made up his mind that it was time for him to get married, but how should he address a girl. He knew the one he wanted, but one look of her eyes made him choke over every word he wanted to say. Again and again the poor bashful, blundering fellow determined to speak and know the worst, till one day walking by her side, he saw a man tying a horse to a hitching post. The inspiration came. "Sally, let's hitch." If these few ideas of mine are in harmony with yours, young man, "let's hitch" and try and make farming such a success that we may be proud of it.

Clover.

[D. G. Cheever, Clinton.]

In my short talk about clover I shall confine myself mainly to the one leading variety "Red Clover," and let others look after the other fifty eight varieties. In doing this I will condense my thoughts in the good old orthodox way under three heads, mainly: How to grow it, how to harvest, how to use.

To get the best possible result in growth it should be sown early in a rich mellow seed bed. As it is a biennial plant with perennial qualities a year's time is saved by sowing it with any of the cereal crops. Clover lands intended for meadows should not be fed in the spring, as it seldom regains its full vigor during the after part of the season; neither should they be fed or mowed

very late in the fall, as it is then liable to winter kill for want of mulch-like protection. About twelve pounds of seed evenly distributed with some good grass seed is sufficient seeding for most soils. In our latitude to grow the seed successfully, the first or hay crop should be cut about the 20th of June. A warm autumn, and not too wet, is the best for getting a good seed crop. Let the seed crop lie in the field if practicable until ready to hull and then haul direct to the machine. Never try to thresh it when at all damp as you will not get near all of your seed. Plaster or gypsum as a top dressing in the month of May is of great value in securing an abundant crop often increasing the yield by one-third. Clover grown on rich land and in a dry season is much more nutritious than that grown on poor land or in a wet season. Low and wet or light sandy soils give the poorest results in clover culture. A generous top dressing immediately after cutting the first crop will give large returns when the second crop is ready for the mower.

Clover to be the most valuable for forage should be cut when its most valuable constituents as sugar, starch, albumen, etc., are in the greatest abundance in the stalks and leaves, and in the highest perfection which is at the time of flowering for as soon as it has gone to seed the woody matter predominates which is insoluble and largely indigestible.

Clover should never be cut when wet either from dew or rain, it should be exposed to the sun only enough to thoroughly wilt it, after which it should be formed into small cocks and thus sufficiently cured to place in the barn, or stack. In this way the tender and succulent leaves and blossoms are secured in a form most nearly resembling the green plant. In catching weather hay caps made of good firm cotton cloth can be used to great advantage, and many times will more than pay their cost in one season.

Clover and other grasses thus cut and thoroughly wilted can be put in a close or tight barn with much less drying than most people imagine, and the rich flavor aroma and nutriment retained .In handling clover when green the less compression the better as the succulent stalks are easily broken and the sap rapidly exudes, taking with it much of these valuable properties.

In speaking of the harvesting of clover I have purposely left out the silo, leav- its merits to be discussed by more familiar pens.

In speaking of the uses of this invaluble plant we will first call attention to its value as a fertilizer. Few plants gather more nourishment from the atmosphere, or subsoil deeper into the earth for plant food, and when flowed into the land and decomposed augments the carbon of the soil and gives it greater capacity to absorb heat and retain the valuable properties of manure as well as furnish plant food of itself.

Used as a fertilizer we are told it makes land to become "clover sick" which under some circumstances is undoubtedly true, but do not lands become wheat sick, barley sick, potato sick and sick generally; this condition of things only exists in the absence of a proper succession of crops and the necessary element of fertility. A well rotted thouroughly pulverized clover sod makes a seed bed that any farm crop takes delight in feasting upon.

As a forage plant whether in the pasture, the meadow, the soiling manger, the hay mow or the silo, clover has few equals and perhaps no superior. Plenty of good clover means fat cattle, horses, sheep and hogs. Its great yielding capacities under favorable circumstances, and its rich and abundant and nourishing and fattening qualities place it in the front ranks and makes it king of the grasses. For the purposes of nourishment it is a perfect food of itself. As an accessory food in fattening animals it has perhaps no superior.

An acre of good clover will, when used as a pasture for hogs, make from six to eight hundred pounds of pork between the 15th of May and the 1st of October, or it will pasture a cow or a horse. An acre in meadow properly managed will furnish forage to winter two cows or a pair of horses provided the usual amount of grain is supplied. Brother farmers there is great profit in raising clover. Try it.

The Guernsey a Dairy Cow.

[By I. J. Clapp, Kenosha.]

The subject assigned me, "The Guernsey a Dairy Cow," is one I feel a deep interest in; having been identified with this breed of cattle since 1881,

during which time I have made a thorough study of their characteristics and history. It will hardly be possible for me in a short essay to tell all about my favorite breed of a dairy cow, I will endeavor not to say anything I do not conscienciously believe. The island of Guernsey, from which their name is dederived, is one of the channel islands, and is situated in a deep bay on the northwest coast of France. It is about one-third the size of the island Jersey. Guernsey contains 24 square miles, 16 000 acres population 25,000. The annual export of cattle from the island does not exceed 1,000 head. The origin of the breed is a subject of controversy, many persons now in the prime of life can remember the time when a journey to the channel island on an old sailing craft occupied several days and occasionally as many weeks. The approach to their rocky shores in those days was neither safe nor easy, now the daily running of steamers from South Hampton has facilitated the introduction of these cattle in America & England. Says an American traveller "full of interest are these rock-bound islands; orange trees grow and sometimes bloom; fuchsias, Heliotrope, Geraniums and some tropical plants run wild. There is no extreme cold, nor dry burning heat." Farming is conducted on very small scale, few farms containing 20 acres. The average number is from 8 to 12 acres. These small farmes are principally used for grazing and market gardening, producing two or three crops a year. Land rents from $35 to $40 per acre, At this enormous rental, the farmer as a natural consequence, cannot afford to keep any but the best of cows. Their surroundings will not admit of any inferior animal being kept. No large herds can be found, three or four cows form an average herd. They must be selected from the very best, the most productive and such only can be bred from, to perpetuate a race of cattle that will pay a husbandman to keep. After long continued care of watching and breeding is it surprising that a marvel of a "dairy cow" has been produced? These cows are reared with care, and identified in a measure with the family. Little children herd and tether them, women milk and tend them, they know of nothing but gentle and kind treatment. (Nearly three years after I purchased my herd the original owner from Guernsey visited me and he fancied that some of the cattle recognized his voice.) The Guernseymen nearly a century ago becoming convinced of the superiority of their cow (and in all probability finding plenty of men who for the sake of a nickel would use a low dreed bull) prohibited the importation of any foreign blood to the island under a severe penalty. It is about 45 or 46 years since a few gentlemen of Philadelphia, desirous of obtaining the best family cow of any country, were induced to investigate the merits of the Guernsey. They were little known beyond the channel islands. A few had been brought to this country Nicholas Biddle, president of the U. S. Bank, has the credit of purchasing the first cow known to be a pure bred Guernsey, that landed in America. She was purchased from the consignee of Schooner Pilot, Capt. Berlin, from Guernsey and cost $500, the largest price ever paid for a cow, Biddle became an ardent admirer of the breed (as we learn from correspondence lately published) and has since imported more. He never wearied of speaking of their merits. He retained his herd until his death. His son, Judge Craig Biddle has with some new infusions, continued the early blood of his fathers' herd, and like him is a believer in the Guernsey as a dairy cow. Other men near Philadelphia have had them on their farms for more than 20 years, and from these cattle came the celebrated one dollar per pound butter sold in Philadelphia for a term of years called "Chester Co. Butter." At a later date the Massachusetts society, for the advancement of agricultural interests introduced the Guernsey to the farmers of that state. In 1874 and 1875 the Fowlers brought a few Guernseys with their large importation of Jerseys and they were purchased by parties near Philadelphia and Boston, where they were well and favorably known. The Guernsey had had but little advertising up to this date, and the few that were imported were kept on the farms by their original owners. Very rarely have owners parted with their entire herd.

Since the formation of the Guernsey cattle club in 1877, large importations have been made and new herds founded but few have found their way to this western country, where I believe they are most needed, and naturally best adapted for. By comparison with other breeds, we find their numbers are small in

this country. The last proof sheets give us only 2,826 cows, 1,212 bulls, registered; about the same number of cows registered in the U. S. as are on the island. My experience with the Guernseys began in 1881, when I purchased for myself and N. K. Fairbanks of Chicago, 22 head of cows, heifers and bulls. Mr. Fairbanks had two heifer calves and a bull, sent him from Massachusetts shortly before this time. The cattle arrived at my farm Dec. 2d; the weather was severely cold. The change did not effect them detrimentally but improved while they were becoming accustomed to their new quarters. I think they had been satiated with travel by ocean and rail, to say nothing of being quarantined three months. Three were in milk, having dropped their calves in quarantine. They milked well during the winter, I had at that time a small herd of Jerseys. My men never took kindly to them, my manager on the farm became interested at once in the Guernseys, the first he had ever seen, although an Englishman and it was not long before he informed me that they were the best cows I had ever owned. One year later I disposed of my herd of Jerseys, since which time I have kept Guernseys and Guernsey grades, and I find them to possess the requirements of a dairy cow.

They furnished a liberal supply of milk, rich in quality, affording abundance of cream; butter golden yellow the entire year relieving one from the necessity of using any artificial coloring matter, freeing your own conscience from practicing any fraud on the commonwealth, and most important of all, keeping pure your home influence, where the little ones are ever imbibing impressions, which they carry all their lives. I refer to the practice of coloring butter, to me an abominable one. To a class who have heretofore so richly earned the title of "honest farmers" I was reared among a community of Quakers, where deceptions were denounced, and I have felt this wholesome influence all my life. The superiority of the Guernsey as a butter cow is vindicated in many respects, not only by chemical analysis, as is shown in butter fats, their average per cent. is equal, if not better than other breeds. I will give you a chemical test of Select 2,205 on the Island of Guernsey:

Specific gravity	1.021
Total solids	1.85
Fatty substance	9.96
Fat	8.59
Ash	0.788

A later test since her arrival on this shore gives her 9.01 butter fat. Two tests have been made of eastern herds containing over twenty head, the cows having their usual feed. A single milking of the twenty cows was sent to the creamery to be made into butter. In order to determine the price which the manager ought to pay for it, he reported 1 pound to every 5¼ quarts of milk. The price fixed was 6 cents per quart for butterr-making.

It is too early in the history of the Geurnseys in this country, to judge them by their published yield. Those that have been able to compare them with other breeds are more than satisfied with the quantity and quality of milk they produce. I have made a few butter tests with the following results: Rosebud 4th, 17 pounds, 10 ounces; Queenie of 2 years, 15 pounds, 4 ounces, grass fed with 3 quarts of meal, oats and bran, additional night and morning; "Lily of Prospect," in winter and severe cold weather, 12¼ pounds, fed as rest of herd, 4 quarts night and morning equal parts cornmeal, bran and oats; "Dew Drop," 12¼ pounds, under same conditions. Both cows were 9 years old, fresh, and of Fowlers' early importation. Coraline on grass only 18 pounds. "Moss-rose" after her second calf, 14 pounds, 12 ounces on grass and 6 quarts of feed. Pancha, first calf, in two days 4 pounds, 9 ounces. Margaret B., four days, with her first calf, 8 pounds, 7 ounces.

Fairbank milk record:

Bonnie, '85 and '86—347 days	8,303.02 lbs.
Average per day, still milking	23.15 "
Duchess, 298 days	7,152 "
Average per day	24 "
1886, Materna, 245 days	6,707.15 "
Average per day, still milking	27.4 "
Wild Rose, 304 days	6,607.7 "
Average per day	21.07 "
Narissa, 252 days	6,919 "
Average per day	27.4 "

The most remarkable color points are found in this breed of cows. The horn, particularly at its base, is full of color. The hoofs are like tortoise shell. The skin is soft and mellow, and of a golden yellow tint. The inside of the ear and the end of the tail is of a still deeper golden shade, while the bag and teats seem to glow with this same orange tint. In the matured animal both hand and eye find evidence that all secretions are rich in butter fat, and a careful examination prepares one to understand why the butter made from the Guernsey possesses qualities not found in any other breed. Their disposition is re-

markably affectionate and mild. Even the bulls are quite easily handled. I have never heard of but one unmanageable bull. The cows have good-sized teats and are free and easy milkers, a fact I have not found in other breeds. While they are not so beautiful to the general observer on a gentleman's lawn as a Jersey, but to an educated eye in cattle breeding they command attention by their stately form, good bone and muscle, well-developed, firm, strong horns, wide hips, deep flanks, wedge-shaped, slim necks, long face and soft, intelligent eye. They can safely be called the farmer's dairy cow. Their color varies from lemon yellow to a light brick red flecked with white, forming a pleasing contrast to the green lawn upon which they graze. The calves are large, and the grades are particularly sought after for veal in sections where they are known. From their strong characteristics and long breeding in their line, they stamp their individual merits on all classes or breeds of cattle, even to color. A large per cent. of the grades I have bred show strong mark of the Guernsey, and quite often look like "thoroughbreds." We have but few grade cows in our state, but all I know of are highly prized by their owners. They are much sought after in and about Philadelphia, where they are well known. They are persistent as well as large milkers; if regularly and well fed, not infrequently one often finds it difficult to dry them off in time for the good of the cow and the calf she carries.

In closing, permit me to quote from the New York Tribune: "The family cow is one to be petted. She must be gentle, good-looking, and have such qualities that the wife and every member of the family shall be proud of her. Her flow of milk must be generous; the cream thick, abundant, high-colored and quick in rising. The skim milk may not be too blue, for notwithstanding all our wise board of health say to the contrary, skim milk will be the milk of the family. Such a cow must be a good feeder—always hungry, not inclined to take on flesh while in milk, and, as a result, will convert all her feed into milk and cream. The butter should be golden, should hold its color well into or through the whole winter, and this product should be so abundant that there shall be no occasion to buy butter so long as the cow is in milk. Besides, she should be an easy milker. The teats should be large enough to be gathered by the whole hand, for, otherwise, more patience and faithfulness will be required in the milker than common family servants, either men or women, rarely possess. Then I have described a good Guernsey cow, or a half-bred one, and I very much doubt if such cows can be found in any other breed."

Care and Management of Merino Sheep

[H. J. Wilkinson, Whitewater.]

Two things are necessary to the greatest success in any industrial pursuit. First, that the person undertaking it should have a liking for, and carry some enthusiasm into the work. Second, that the conditions favorable to its full development should be controlled and made use of to as great an extent as possible.

From remote ages sheep husbandry has been a favorite occupation with a large class of men; and those who become accustomed to caring for them, and come to understand their full value and usefulness in farm economy, seldom lose their partiality for them. There are some good and substantial reasons for this. Among them might be mentioned the comparatively small amount of hard labor involved in caring for them; the limited amount of hired help necessitated; their adaptation to enriching the soil instead of impoverishing it; and their capacity for supplying so many of the wants of those who keep them, and of the world at large.

The industry, like all others, has its "ups and downs," as we call them. But changes made to whatever, seems to promise best at the time, are often disappointing in their results. The possible profits in the different kinds of farming, and especially of stock farming are not so unevenly divided as some may think. The most successful dairymen, sheep breeders and wool growers, swine breeders, and so on, are among the last to change their business. Each carries on his business systematically, making use of the most approved methods whether new or old, and finds in it annually, an amount of profit, that he does not see his way clear to duplicate in another kind of business; and the man engaged in any of these leading lines of stock farming, who finds himself considering a change of business because of unsatisfactory profits when summed up for a series of years, may generally conclude that he is not mak-

ing use of all the favoring conditions and advantages within his reach.

Sheep respond as generously and as promptly to good keeping as any kind of stock we can keep; and are nowhere to be found in greater perfection, both as to carcass and fleece than upon some of the best farms in the state. They are especially adapted to utilizing rough, uneven lands, not cultivatable or easily kept in cultivation; but the number kept on such lands in proportion to number of acres will necessarily be fewer, and profits diminished accordingly.

It is doubtful if a man farming such land can do better than to keep sheep as a large part of the stock; with the fields seeded to clover and the grasses, washing is prevented in a great measure, and the original fertility is retained and increased. On low, wet ground, not fit for cultivation, the soil saturated with water after every rain, sheep will not do well, nor in fact, will any stock do as well as on higher ground. No better course can be adopted with a farm that has been, by injudicious management, robbed of its fertility, than to stock it with sheep. Sheep and clover go together. Grow clover to feed the sheep. Draw the manure back to the fields to grow other crops. Reseed to clover and turn the sheep on to eat it, and leave the droppings scattered over the ground. Such a course, or a similar one, will surely put the land in good condition and keep it so. Few farms in the older states are run exclusively to sheep; but where they are the principal stock, the farm should be devided up with reference to summer management, and production of food for winter. Sheep like frequent change. Their pasture may, and should be kept shorter than would be close for cattle. They do not care for, or thrive well on rank pasture. They are wonderful adepts at selecting the latest and tenderest herbage, and will look a fresh pasture over pretty thoroughly about the first thing they do. They are passionately fond of green food, and will roam the fields late in the fall and early in the spring searching for it if allowed to do so.

There is very good reason for believing that ensilage may be used with great advantage in supplementing dry food, or short pasture in fall or spring. Those who have tried it speak very much in its favor; as the supply of green food diminishes, a small grain ration will, for a time, make it good, then a little hay may be added, and both increased as may be needed, until full rations for winter are reached. After the first taste of green food in the spring, sheep are not satisfied without it, and dry feed is eaten reluctantly. The better way is to keep them up until grass is fairly started. A little grain may be fed with profit for a while, after sheep are turned to grass, but is generally soon discontinued. Ewes with lambs are best turned to grass as soon as it can be had.

The need of shelter from storms is not questioned. The fleece of the sheep should not be soaked with water after cool weather commences in the fall. It hurts the sheep and injures the quality of the wool at any time. Sheds and yards should be so arranged that they may go out at their pleasure in dry weather. Sheep like to feed from the ground, and when the ground is dry and hard they may be fed hay, straw, or corn fodder on the ground with little waste. To winter, separate in as small flocks as practicable. Put lambs, breeding ewes, fattening wethers, old or weekly ones, if you have them, each class by themselves. They will winter enough better to pay for the trouble. The gentleness of the lamb, and the timidity of the sheep are proverbial, but the stronger ones,went hesitate all the same to rob the weaker ones if they can. Clover should be cut early for sheep, before it comes fully into bloom. Sow seed enough to have it grow thick and not too course.

Fodder corn makes excellent feed for sheep, but it should be fed in dry weather. There should be no trouble on sheep farms about growing good crops of either; and the number of acres required to produce the winter forage, and grain for that matter, may be greatly reduced from old time practice. It leaves more ground for pasture and increases the number of sheep that may be kept on a given number of acres. It is essential to have good hay; grain won't take the place of it. Don't feed too early in the morning in cold weather, or too much at a time. Water of the temperature of ordinary well water, should be supplied in the yards if possible. Keep them quiet. Don't scare them by boisterous ways or allow others to do so. Accustom them to your presence so that they will make little effort to avoid you when among them. Keep them supplied with clean dry bedding.

No animal better appreciates a dry comfortable sleeping place. Supply salt summer and winter, either often in small quantities, or when they can help themselves.

A good way in winter is to brine hay or straw on the litters in the rack. Oats generally form a large part of the grain ration for the sheep. Oats and corn in varying proportions, according to the kind of sheep it is fed to, would probably best suit the most of flock masters. Corn for fat wethers is a standard food. To breeding ewes little corn is generally given. Sheep are fond of corn, and it would surprise many men to see how much they will eat and how fat they will get, and what fleeces they will sheer if fed well on it. But they must be accustomed to it gradually.

Raise as many lambs as possible, but keep the flock sold down to the average number that can be well kept. Feed the wethers and undesirable or surplus breeding ewes for the butcher, before they get old. Farmers seem averse to feeding sheep for the shambles, but it pays to do so.

As a rule it is a mistake to sell lean stock of any kind from the farm. Insufficient feeding beats the sheep farmer just as surely as it does the dairyman. Owners of thoroughbred flocks shear them without washing, and about a month earlier than wool growers generally shear. They believe their flocks benefited by such a course as the washing, is a disagreeable job, and injurious many times to the sheep. After turning to grass they need but little attention, but that little should not be neglected. Go among them often, and if any are not doing well, remedy if possible.

Four months is long enough to allow lambs to run with the dams. They will soon learn to eat a little grain, and will do better frequently than with the ewes. The ewes will have a chance to recuperate before cold weather. Keep improving the flock. Four pounds of washed wool was a big average for a flock of Merinos forty years ago. Double that number of pounds may be looked for now, and the end is not yet. Use thoroughbred sires every time. Let no mistaken sense of economy influence otherwise.

Don't be discouraged by a season of low prices. Other farm products have their ups and downs, and oftener than wool. Take it for a series of years and see if the sheep don't pay as well as other things and more easily.

Few attempts have been made, so far as known to the writer, to put on paper the cost of producing wool. The business is seldom made a specialty, the greater part of it is in the older states being produced on farms where are kept other stock in part, and it is hardly possible to particularize the exact cost of each. But it is not impossible to arrive at conclusions that approximate the actual cost near enough for practical, or at least present purposes.

The writer has wintered, as others can, and have, 150 sheep on the first crop of clover from 15 acres, with a small amount of corn fodder and straw, and 1½ bushels of oats to a sheep. Clover is not often saleable for cash, but estimated at $6.00 per acre, the stalks and straw at $15.00, and oats at 30 cents a bushel; the cost of winter subsistance amounts to $172.00. The Merino paid well for labor actually expended. If summer keep be reckoned at 50 cents each, which is not far out of the way as sheep are generally kept, the total cost of keeping the sheep one year, reaches $272. The flock yielded 1,415 pounds of wool, costing by this computation not far from 17 cents per pound. A lesser yield of wool would have cost more per pound and a greater yield a less sum.

A man should not be satisfied with a flock of grade Merinos averaging less than 8 pounds per head, and a flock of pure bred Merinos should do better. Little has been done to determine the number of sheep that may be profitably kept on a given number of acres; and any estimate must be understood to mean a good farm and good farming. That 100 cows may be subsisted summer and winter on 200 acres is no longer seriously questioned. The modern ration for a milch cow, including as it does, from 12 to 15 pounds of milk stuff daily, will undoubtedly suffice for six sheep (the old estimate was 10 sheep to one cow) and accordingly, 200 acres would subsist 600 sheep.

That flock masters will yet find this entirely practicable, with the aid of the silo and other improved methods, there is little doubt. Comparatively few of those who grow wool, pursue the business in a systematic way. The flock is left to take care of itself in the summer time, and forage in the open fields and around the cattle yards in the winter.

Little pains is taken to improve the flock, either fleece or carcass. If a fat sheep is found in the flock, it comes about by accident, and is a surprise to the owner.

Sheep were made to grow wool and mutton, and they will do both with profit to the owner if they are given a chance. But if they are neglected, or badly managed and half starved, but little profit may be looked for. The day has gone by when we could live by careless and wasteful farming. Ordinary living expenses have increased wonderfully within the last twenty-five years, but the prices of what we have to sell have not advanced in proportion. We have got to make the farm and stock yield all there is in them, to meet the demands of our modern civilization. Where improved methods will help they must be adopted. Dairymen have been obliged to give up old methods and practices in a great measure and adopt new ones, and wool growers may profit by their example.

How Shall We Increase Both the Quantity and Quality of Our Crops.

[By J. M. Smith.]

When the great Father of all placed man upon earth, with authority to cultivate and improve it, he gave him not only hands to work with, but brains to think with, and to so direct his hands, that he might not only work intelligently in the present, but go on improving himself and his conditions both morally and physically.

Probably the most important element in connection with this problem at the present time, is the improvement of the farms of our State. We are just here met with a fact that of late years has become a far more important factor in this question than was the case some years since. It is this, we are by means of railway and steam navigation compelled, whether we choose it or not, to compete with the markets of the world. How can we do this successfully? I know of but one way, and that is to increase both the quantity and quality of our crops. We know that the average yield of wheat in this state, does not exceed 13 or 14 bushels per acre, that of oats and corn do not exceed 32 or 33 bushels, potatoes not more than 100 bushels. Our meadows only one ton of hay per acre. Our cows do not average 100 lbs. of butter each per year. Our beef cattle do not average over 400 lbs. dressed beef each when two years old, and thus we might go on through the entire list of our farm productions. Now, gentlemen, we know that at the average prices of the last few years, these yields do not pay even a moderately fair price for the capital invested upon the farms and the labor necessary to produce the crops, most of us know that to double the yields of our farm produce, is not only one of the possibilities, but one of the absolute necessities to those who propose to make farming a success in the future.

This brings us directly to the question of the increased yield of our field, and how they shall be obtained. In my opinion, which is based upon many years of both observation and experience, a more thorough system of drainage of our lands, is one of the absolute necessities, if any permanent improvement is to be made. It is not enough that swamps and absolutely worthless acres should be drained, but many tens of thousands of acres of the farming lands of the state could be made exceedingly valuable that are now almost worthless. If any farmer does not feel able to bear the expense of thoroughly underdraining his land, he can surely adopt and carry out a system of surface drainage that will be of great value, and often be the means of giving him a good crop which otherwise would be nearly worthless.

Some years ago I visited some friends who are the owners and cultivators of one of the best farms in the portion of the state in which they reside, and in some respects these men are far beyond the average farmer in intelligence, and the peers of any in upright and honorable dealings. The season was just at the close of the harvest. There had been a number of heavy rains and they, as well as others had suffered severely in consequence of them, I walked out with them to what had been a magnificent field of barley, of about 20 acres. It was completely ruined and would not in reality pay for harvesting. In the preparation of the land, not a moment's attention had been given to any drainage either upon the surface of the soil or beneath it, although the land lay in such shape that it would have been very easy to drain it into a small revine that passed very near the lowest part of the field. I said to them: "How could you be so thoughtless as to cultivate this beautiful field year after year, without

giving an hour's work of any kind to prevent just such a misfortune as has now taken place? If you had laid off the field into lands, say two rods wide, and backfurrowed them until they were somewhat raised in the middle, and sloaping gradually to the middle furrows, and then kept the furrows well opened to one main ditch, and led it into that ravine, you would have saved not only your crop of barley, but also your meadow below, which is badly damaged." They replied substantially as follows: "We have never given the subject of drainage much thought, and in fact know very little about it, although we can readily see that if we had adopted such a plan (and it would have cost but very little), it would have saved a crop of barley that we supposed two weeks ago would have brought us from 700 to 800 dollars. Since that time there has been no day during which the team could get across the field with the reaper, nor can they for some days to come, even if we have no more rain."

You may say that this was an extreme case, and so it was. There was a loss in a single season, of much more value than would have been necessary to have both surface and underdrained the entire field, and done the work so thoroughly, that the crop could not have been injured by the storms that destroyed it.

Please allow me for a few minutes to refer to the system of drainage practiced upon my own grounds which is about as perfect as I know how to make it. The garden contains 40 acres, and has a slight sloap towards the south. Nearly the whole of it is laid off in beds, a lands, as farmers would call them, running due north and south, and two and one-half rods in width. The middle of the beds (or lands) are kept from 6 to 10 inches higher than the edges next the alleys. This readily carries off the surface water into the alleys, which are two feet wide, and are so arranged that the water runs off at once. Under each of these alleys is, or will be when the work is finished, an underdrain which carries off the surplus water in the soil, and thus enables the growing crops to get the entire benefit of soil, climate and manure. During the month of October last, we had one very heavy rain. I went out during the rain to examine some drains that had been put in a short time before the storm came on. Upon my return, wife said: "What are you doing out in this storm? I replied that I could well afford one thorough soaking for the pleasure it gave me to see the new drains carrying off such a quantity of water and not a barrel in sight on top of the ground. Another necessity is plenty of manure. The question naturally arrises, where is it to come from.

Every farmer might, and ought to have his compost heap in addition to his barnyard manure, and both should be saved with as much care as if it were cash in the bank. Next to these there is, I think, no doubt that clover is the cheapest and best fertilizer known to the farmers of our state, much might be said as to the best methods of getting the greatest benefit from its use, but my time will not allow me to discuss the question in this paper. There is no doubt but that different crops require the manure to be applied in different ways and different amounts to get the greatest benefit from it. Whatever may be the best way of using it, the poorest way, in my estimation, is to plow it under from 8 to 10 inches deep. But with the land well prepared, and plenty of manure on hand, we are ready to go to work with a feeling that success is in the near future. If the land is well drained, it is in good condition for the plow from one to two weeks earlier than it would otherwise be. Do not plow until the land is in good condition, but if you deem it best, all things considered, to continue to depend upon the small grains for the main crops, and your land has not been fall plowed, do not wait a day after it is in good condition to work. If such crops as corn, potatoes, beans, etc., that need cultivation are to be grown, let the cultivation be the most complete and thorough character. None but those who have tried it are aware of the vast difference between crops so cultivated, and those but half cared for, I have assumed that your land was at least reasonably good to begin with. Such being the case, we have as necessities, first, the fairly good land; second, the drainage; third, manures; and fourth, good plowing and thorough after culture. What are the practical result of adopting and carrying out this system?

Please allow me to refer again to its results upon land that I have either owned, or held under lease. A number of years ago I leased a piece of land

that I knew had been badly mismanaged for several years. In fact the year previous to my lease it had been sown with wheat, and owing to its bad condition and worse cultivation, the grain was not worth the cost of gathering, and was left on the ground. I surface drained it, and manured it heavily and planted the most of it with corn and potatoes and then cultivated it well. When grown, I measured off 1¼ acres of the potatoes, and from the plot we dug and sold 590 bushels of first-class potatoes. The measured portion was some better than the rest, but all gave a large yield. In an ordinary season we are not satisfied with less than 300 bushels per acre, unless they are dug for market before the entire crop is fully grown. Two or three years ago a gentleman was looking over a piece of growing cabbage and asked me how many it contained. I answered about 54,000. "Well," said he, "then there must be about 54,000 heads, for I cannot see one missing." Of course there were some missing, but the piece was very good. But it is during a very dry season that the system I am advocating shows to the greatest advantage. Last season was, in Northeastern Wisconsin, the dryest one ever known in the history of the state. We had 3½ acres of strawberry vines in full bearing. A small portion of them were partially watered artificially, but the most of them had no water except from the clouds, and that was only two light showers from the time they came into bloom until the picking season was over. Yet the yield, counting only the actual sales and excluding all that were used in my own large family, and given away, was a little over 250 bushels per acre. The yield, with plenty of rain, would have been much larger, but when compared with many others that I might name, it was a very large crop. Last June I planted a piece of land with fodder corn. A fine crop of peas was growing upon the ground, and the corn was planted between the rows. As soon as the peas were ripe they were taken off and the land kept well cultivated until the corn was too thick to get through comfortably. It was somewhat damaged by drouth, though all of it was good, and part of it very large.

Gentlemen, the fact is that if this system is adopted and carried out, it is not difficult to make large crops the rule, and not the exception. In my own case, we not only expect them, but base all our estimates in the spring upon them, and, as a general rule, the actual yields for the season will exceed the estimates oftener than fall short of them. But perhaps some of my hearers are saying to themselves: "I am not engaged in grain growing, but in dairying, or in growing and fattening stock for market." Gentlemen, the same rules and the same principles are involved in both cases. To be really successful, you must have not only good land, but it must be well cared for. If you are growing clover for dairy cows, it should yield from 4 to 5 tons per acre during the year, instead of from 1 to 2 tons. Your fodder corn should yield 30 or 40 tons per acre, instead of from 8 to 10 tons. This ratio of increase should hold good through the entire list of crops. Then, when they are grown, to what will you feed them? To some of our scrub cows that do not or cannot be made to manufacture a fair proportion of their food into milk and cream, or to some of the improved dairy breeds that have been bred and trained for this particular purpose? It is useless to any longer claim that the average native cows will return as much milk and cream for their feed as the average cow of some of the improved breeds.

A few years ago I owned three cows that came in during the month of November. They were nearly the same age, and all of them about in their prime. One was a native, or, as often termed, a scrub; one a high grade shorthorn, and the other a full-blooded Ayrshire. The stable was warm and comfortable, and they were feed as nearly alike as possible without weighing their feed, it being measured out to them, and consisting of carrots, beets, parsnips, bran middlings, and a very small amount of good hay, though they would eat but very little hay, owing to the quantity of other feed. A number of times during the winter my wife kept the milk and cream of the Ayrshire by itself for a week at a time, and weighed each lot of butter, and every time the butter from the Ayrshire weighed a fraction more than that from the other two. The cows were very nearly of a size, though I believe the Ayrshire to have been the lightest of the three. You may ask what the others did with their feed. I do not know. I only know the very practical fact that they returned to *me* very little for their feed and care,

while the Ayrshire paid well for both both feed and care.

Right here, in my opinion, is the great and decisive point in the question of dairy breeds. The one that will manufacture the largest amount of first-class milk and cream from a given amount of food, will be the breed to which the practical dairyman will look for his most profitable cows. The same rule holds good with regard to beef. It is very possible that it will not be the *largest* breed of cattle that will eventually prove to be the most profitable for the farmer to feed; but the breed that will, with a given amount of feed, make the largest amount of first-class beef at from two to three years old. Gentlemen, many of you have tried the old stereotyped system, or rather want of system, and you have demonstrated to your own dissatisfaction that it has not paid in the past, is not paying in the present, and that there is no prospect of its paying any better in the future. What then shall you do?

While I am firmly convinced that dairy farming, well conducted, is the most profitable branch of husbandry in which the farmers of our state can engage, I still recognize the fact that many are so situated that, all things considered, it is best for them to continue in a system of general farming. Where such is the case, why not adopt the new and the better way?

I am sure you will believe me when I tell you that I know something of the capabilities of the soil of Wisconsin; and I have no hesitation in saying to you that it is capable of growing 30 bushels of spring wheat or 35 to 40 bushels of winter wheat per acre, instead of 12 or 15 bushels as is often the case at present. It is capable of growing 60 to 75 bushels of oats or corn per acre, 200 or 300 bushels of potatoes, or 2 to 3 tons of hay per acre, and other crops in the same proportion. If you are engaged or intending to engage in dairying, instead of keeping twenty or twenty-five scrub cows on 100 acres, you should have fifty to seventy-five, and let them be of some of the best of the dairy breeds, and then let them have the best of care. Instead of getting 100 or 150 pounds of 12 to 15-cent butter each per year, the yield should be 200 or 300 pounds each per year, and of a quality to bring 25 to 30 cents and upwards per pound. Do you consider these statements extravagant? I could count farms by the hundreds and thousands in this state capable of doing this and some much better, and doing it within a very short time if a correct system of improvement is adopted and carried out. Suppose these suggestions should be carried out by our farmers, how long would the cry of hard times be heard among them, even thoughthe prices are low? Not long.

Gentlemen, we are entering upon an era of farm improvement such as our farmers have not yet seen. He who puts himself in line with the march that needs no prophet to see in the near future, will reap the benefits of an agricultural development such as has never been seen in our state. It means a progress that will result in better drained and better manured farms, and better cultivated fields. It means larger and better crops of grain, better butter and cheese, and more of both; and also better beef, pork and mutton. It means better and happier homes, where the farmer is the conductor and manager of a well improved and paying farm, instead of being its slave and being driven by it. It means a place where the wife is the queen and the guardian angel of a happy home, instead of the weary, worn-out drudge too often seen in the farmer's home. Homes to which the children, though they may roam in far distant lands, will ever turn with tender memories and loving affection—the home of their childhood upon the farm. The farmer who refuses to join in this forward march will be left very far in the rear. His crops will grow more and more scant, and the quality only indifferent at the best. His dairy of scrub cows will produce little in summer and nothing in winter. His beef cattle will be of poor quality and light in weight; and his razor-backed hogs will be a perpetual torment to himself, as well as an ever-increasing temptation to his neighbors to violate the third commandment. He is a slave to his farm, unable to hire help because it does not pay. His wife, weary and worn out with care and toil, can look back to but few happy days in the years gone by of her married life, and to fewer still in the years to come, until she reaches the far away land, where she fondly hopes and trusts that there is rest for the weary. Children leave because they can find but little happiness in the present, and no prospect of either happiness or prosperity in the future.

Gentlemen, which of these roads seem the more desirable? I know your answer. But you may say that it will cost money to make these improvements, and so it will; but do not be afraid to trust your farms, or to spend money upon them. If done with care and good judgment, it is better than money in the bank or a mortgage upon your neighbors' farms. I dare not tell you how much I have buried upon my now beautiful place, but it has come back with more than interest added and never once failed.

Gentlemen, I have neither the authority nor the desire to dictate to you, but I speak from experience and know what I say to be true. Then let us go forward manfully, steadily striving not only to make the best of our farms, but of ourselves and our families. We cannot perform a better or nobler service to our state, or one more far-reaching in its results for good, nor better serve both our God and our country, than by following in this the better way.

Feeding Cows for Profit.

[By C. R. Beach, Whitewater.]

In feeding for profit four things are necessary: the right kind of cows, the right kind of surroundings, the right kind of feed, fed in the right way. I shall not here present the claims of any particular breed, though I think the Jerseys preferable as butter makers; but keep what we will we need to weed out the old, the unthrifty, the hard milker and the vicious. The most of us keep too many old cows. If the cow has been as highly fed as she ought to be, and milked each year as long as she probably will be, she has exhausted her vitality sooner than we are apt to think. From 5 to 8 is the golden age.

Aside from her age I will mention a few characters I deem desirable in a cow kept for profit. She should not be above the medium size, under rather than over. I would have her spirited and at the same time docile and intelligent. I would have her thoroughly feminine in her organization, yet I would have characterized by that robustness of constitution which is indicated by the word hardy. All other qualities, however good in themselves, lose much of their value unless united with a good constitution. The difference between a dairy or carefully selected young cow and one in which reference is had only to numbers will often amount to the difference between loss and profit.

As to the surroundings in which a cow should be kept for profit they may be indicated by the word comfortable—dry, warm, well-ventilated stables admitting as much sunlight as possible, in which cows should be kept nights as soon as frost begins to show itself, and at all times in the winter when the weather is uncomfortably cold, except when out for water. A cow will bear a good deal of confinement if the stables be light, dry, warm and well-ventilated. My idea of comfort is not to let the cow stand out-of-doors from 8 o'clock in the morning until 5 at night when the mercury is below zero and drink ice water to keep up the circulation. To you who think such care all right let me suggest that on such days, as soon as you have let out your cows, you take your easy chair round to the northwest corner of the house and sit there until it is time to do chores at night. In the mean time let your wife bring you a dinner of ice cream, follow this up for a week and then weigh yourself and see how many pounds you have gained and how much milk of human kindness you have left in you. To keep the heat of the body at 98 degrees is the first use that every living animal makes of the food consumed, and if that be not enough, it burns the fat accumulated in its own body. Warmth then is but another name for food saved, and keeping cows comfortable will constitute a large factor in the question of profit.

Next to comfortable quarters the cow must have an unlimited supply of pure water, easy of access. Let me emphasize that word pure. A cow will live longer without food than without water; nor will we wonder at the fact, when we remember that three-fourths of her live weight and 85 per cent. of her milk is water. The man who has made money from a lot of cows whose supply of water was a stagnant pond hole, into which the cows waded in summer and drank through a hole cut in the ice in winter, has wrought a miracle, besides producing a lot of unhealty milk at the same time. Much has been said and written upon the benefit of warming water for cows. In a late number of Hoard's Dairymen, there is a statement that at an agricultural school in France, the milk of a cow was increased one-third, by warming water up to 113 degrees. Boyd, of Chicago, and others

claim similar results. The heat evolved by warming a pound of butter will raise the temperature of 12,000 pounds of water one degree. If a cow drinks forty pounds of water at 32 degrees in order to raise that water to the temperature of her body, 98 degrees, it will require 2,640 degrees of heat, equal to that contained in a fifth of a pound of butter. While it does not necessarily follow that by warming the water up to 98 negrees, the cow will make a fifth of a pound more butter, it goes to confirm the opinion that warming water is a benefit, and it also goes to prove that it would be for our profit to keep our drinking water from freezing, which can be done by keeping our water tanks covered, and by building houses over and around them, and stuffing them with horse manure or straw. Pure water free from ice will make another large item in the question of feeding for profit. Regularity in milking, and feeding is also important and uniformity in amount, not lavishly to-day, because we have plenty, and shrimpingly to-morrow, because we are short. And the rations should be in proportion to what the cow has to do. A dry cow, or one nearly so will not need the same feed as the cow in full flush of mill. And the cow should be taught to eat what is given her clean, said a dairyman who found a large amount of hay in the mangers after the cow was through eating. "I think my man will starve my cows to death by feeding them too much." There is philosophy in what he said. Cows, children and men, should be taught to eat what is set before them without turning up their noses.

But having selected our cows with care, and having provided amply for their warmth and comfort, and supplied them with pure water free from ice, what and how much shall we feed them that we may realize the largest profits? What ensilage may do, or what science may discover I shall not now discuss.

But with our present knowledge and surrounding good pasture grass in summer and good, early-cut hay in winter are the basis of all profitable feeding for either milk or meat. Grass is said to be the lazy man's crop, it is also the wise dairyman's chief dependence. Do not let me be understood of saying his only dependence; for it should not be. But I do claim it is the foundation of all good as well as profitable feeding. It is a safe crop, requiring but little labor, and labor you know means cost. Scientists tell us that all nourishing food is mainly (not entirely) composed of two elements, nitrogenious or muscle-forming and carbonaceous, used in producing heat and fat; also that these elements must have a certain ratio to each other or else the food will not be properly assimilated and a part will be lost. That a well balanced ration for a cow giving milk should be one in which the digestable nitrogenious and carbonaceous elements in the food should have the ratio to each other of one of the former to five or six of the latter. Grass grown upon old well-seeded pastures contains these elements in almost exactly these proportions in a digestable form, and if to be fed alone stand at the head of the list of all our feeding crops, not only for cheapness, but for quality. And here let me say that pastures that have never been plowed are much superior, not only in the quality of the grass furnished, but in their ability to stand drouth and in furnishing a uniform supply of fine, soft feed through the whole season. The only possible objection to pasture grass alone is that it contains too much water. This defect may be remedied by feeding daily a small ration of it to cows in three or four pounds of wheat bran. If the cows were fresh milkers in the spring I would always feed the bran all summer, increasing it as the grass began to fail before corn fodder was ready. But for cows that had been giving milk through the winter, and due to come in the fall, the grass feed is ample.

To get the greatest profit from pastures (and profit is what we are after) they should be so stocked that the best of the grass is eaten by the time fodder comes in tossle and don't be afraid of beginning to feed too soon, and be sure you have onough to give your cows a full feed at least once a day until they are well into winter quarters, and if you have considerable left over it will not be lost. The amount of corn fodder raised should not be less than an acre to four cows, and the land should be rich. The cows due to come in in the fall are by this time dry, and for them the fodder corn will be feed enough. But for those that come in in the spring, and as fast as the winter milkers come in, I would add to the corn fodder ration six or seven pounds of wheat bran, for the

reason that the fodder is largely carbonaceous, and to make a well-balanced ration, needs the nitrogenious elements contained in the bran. This feed will keep the cows up to their best until they go into winter quarters, which should be not later than the first of November.

If our best dairymen fail in one particular more than another it is in not putting their cows into winter quarters soon enough in the fall. If grass grows upon the pastures after this it will be worth more for winter protection than for feed. So much for summer feeding.

The German formula for a daily winter ration for a cow giving milk is twenty-four pounds of dry organic food, of which fifteen pounds should be digestable, containing of nitrogenious two and one-half pounds and carbonaceous twelve and one-half pounds, or the nitrogenious to the carbonaceous as one to five. They tell us that we may feed with profit hay, fodder corn, cornstalks, straw, corn, oats, barley, wheat bran, shorts, beets, carrots, potatoes, in fact everything that grows on the farm, but they should be so combined in feeding as to contain the regarded amount of digestable nutriment in nearly the proportion named. Thirty pounds of timothy hay, which is about the amount that a cow is supposed to eat when fed alone, contains eleven to twelve pounds of digestable food, of which one and one-fourth pounds will be nitrogenious and ten pounds carbonaceous. So hay alone will not furnish a full milk ration.

It is claimed by a newspaper correspondent, who visited the Darlington farm, where 250 cows are kept for butter, that their daily rations were eight pounds corn meal, eight pounds bran and eight pounds of cut hay mixed and fed together. This would very nearly correspond to the German ration. But a cheaper ration, and one equally well balanced, is one used by Prof. Henry in some experiments with winter, sixteen pounds hay, seven pounds wheat bran and five pounds of corn meal.

The best dairymen of Wisconsin, while they have no fixed rule by which they feed their cows, yet the most of them use corn meal and bran for their grain feed and the most of those who are engaged in winter dairying feed it in rations very similar to those I last named. I will use them as the basis of a few figures to see if they will yield as a profit. That the figures may be few and simple I will use but one cow and have her come in in the middle of September. By the plan I have previously outlined up to December 1st, her daily feed will be seven pounds bran and what fodder corn she will eat. From December 1st to the middle of May we will feed daily sixteen pounds hay, seven pounds bran and five pounds corn meal. From the middle of May till her year expires pasture grass, the account will stand:

	Days.	Pounds.	Per ton.	
7 lbs bran daily	240	1,680	$12 00	$10 80
5 lbs corn meal daily	165	825	16 00	6 60
16 lbs hay daily	165	2,640	6 00	7 92
¼ acre fodder corn daily				3 00
Pasture				6 00
Cost of feed for year				$34 32
To which we will add interest on cow				$15 00
Makes the whole cost				$49 32

Upon this feed she will for 200 days give 20 pounds of milk per day and for 100 days she will give 15 pounds per day, making 5,500 pounds of milk. Sixty-five days she may go dry. As she has given the most of this milk in the winter, 23 pounds will make a pound of butter, or 240 pounds from the 5,500 pounds of milk. The price at which good Wisconsin creamery-butter sold in the open market at Chicago, the past year, did not vary much from 24 cents net. But as the 240 pounds which one cow has made is mostly winter butter it will bring 25 cents net, makes $60. The skim milk at 20 cents per hundred will be worth $10 and the calf $1, making an income from the cow of $22 for an outlay of $49.32 or $22.68 above cost.

Have I not shown you how a cow can be fed to profit these hard times? But lest you think my figures fanciful and not attainable let me verify them, and I have taken some pains to do so. James Bouks, my next neighbor, told me that his dairy of sixteen common cows had yielded him 5,900 pounds in a year. Ebin Cook, another neighbor, that his dairy of twelve common cows gave 7,000 pounds. Both men sent to a cheese factory. David Flack, of Elkhorn, in answer to a letter said that his annual income from a dairy of thirty cows had for several years been from $62 to $84 per cow. Roswell Gage, of Richmond, told me, last week, that for the year ending April 1, 1885, his dairy of fourteen cows averaged 335 pounds of butter, and that he should beat that the present year. So my figures are not beyond the bound of possibility.

But I weary you with this long article. In conclusion let me say that feeding cows for profit is a chain of many links all of which must be equally strong or else the chain is worthless. And if any of you are inclined to keep a dairy I would say don't, unless you are willing to fulfill all of the conditions. But to you who love cows and are willing to give them your personal supervision, if you will seed down your land, stock it fully with good cows, care for them and feed them as I have outlined, make butter and send it to the market every week, you cannot fail of having a yearly income equal to the interest on all the capital invested and money expended for labor and necessary expenses, and, some to spare, which will enable you to pay your hired help and taxes, educate your children, provide marriage portions for your daughters, keep your wife in silk dresses, pay the minister, the doctor and the editor, and at the same time increase the fertility of your farm and so add to your own wealth and to the wealth of the state; so that you will have the satisfaction of leaving the world better than you found it.

A Plea For Fodder Corn.

[By John Gould, Ohio.]

Nature made a special contribution to the prospective American farmer when she selected America as the home of the maize plant; a plant for either forage or grain, has no equal in the world. It is a plant for medium and high latitude, a plant that has unapproachable pushing powers, and in good seasons, and poor, no other plant makes a grand growth or brave struggle, and in either case, gives double the amount of fodder per acre that can be obtained from a grass crop, and more than twice the feed value in grain than any other cereal, and this double advantage comes at the same cost for land and labor. So far as authentic history goes, corn is native of this country, and so far as this lecture goes, the corn is here and we propose to make the most of it, and the most is 1,600,000,000 bushels, enough to load 3,200,000 cars with 500 bushels each or five solid freight trains from San Francisco to Boston, and its fodder if all saved, would be ample to winter every animal in this country. Its adaption to all soils and sections, when there is an average rain fall gives it wonderful value, and gives us a leverage that we scarcely comprehend. As a grain plant, it needs no commendation; corn is not an exhaustive crop, and yet it pays to keep land in good heart, for which we may get good crops year after year from the same field, still corn feels the invigorating effect of a stimulant.

Corn is a standard ration, either fed as grain, or in fodder. In the East the farmer saves every blade and stock placing the forage in value with the best hay, but as we go West, its abundance causes its value to be underated, and it is fed if at all, in the most lavish manner, and with the most wasteful methods. But with a change in the value of our crops, lower prices means yet cheaper production, and cheaper production means a yet more abundant and cheaper produced ration. We have it in corn, and the moment that we fully appreciate its true value, that it is not only a standard but an almost sure crop, and more sure than any other, then it is we should put our faith most and more in fodder corn, and prize it in the future as we have neglected it in the past.

Sixty million acres of corn were raised in the United States last year, an acre and a half for every head of horned live stock we have, and yet we feed millions of tons of hay, when if it had been saved and equally distributed, the necessity of the Western ranch cattle industry would not be as conspicuous as now. It is in this very corn plant that we have such an immense advantage over Europe in pork and beef, and why should we not use our maize fodder to give us other leverage in cheap butter and cheese now that we are protected from hog and bull butter.

One of the chief reasons why we have neglected this valuable crop comes from the poor success in handling it, and the great waste in preserving it to get its full feeding value. Forty per cent. of the usual fodder crop is lost between cutting and the manger and the balance has been considered more than paid for in labor and bother with the refuse. Now the farmer is slowly finding out that his hay crop is the most expensive and costly ration that he feeds. The meadows do not and will not one year with another produce as they once did, and one year with another, one ton per acre is above the annual products of hay of the best sorts. To acres of meadow are needed to winter one cow. A Wisconsin man whose name I cannot now recall, puts

the price of hay in the barn at $8 per ton. Is that too high? Now, with better understood methods of caring for corn fodder, will it longer pay to devote two acres of meadow land to winter a cow when that same land put into fodder corn, and well taken care of, will better winter six. Can you longer afford to feed a cow $16 worth of hay in the winter, when you can winter her quite as well on fodder corn, that at the most will cost you $5.

Now, let us go back a little and look into this matter, we all know that certain kinds of fodder corn will produce on good land a remarkable growth. It is a persistant grower, and the same influences that stimulate the growth of hay, forces forward the fodder while the drouth that burns up the meadow effects the corn less, and its broad leaves catch all the dew, each few drops of passing rain, and one is sure of half a crop of fodder, when the hay crop will scarcely be worth cutting. This year was as dry as Kansas in Northern Ohio for thirty years. My hay crop was a failure, but the corn crop grew and matured 65 bushels of corn to the acre, and on an acre of ensilage corn that I did not have room for in the silo, I cut 120 big stalks of corn that had, despite the weather, grown ten feet in height. Those of my neighbors who planted this fodder corn for forage, tell me that with all their discouragements they this year got from over a half to three-fourths of a full crop, and many a man who invested in two bushels of ensilage corn whether or not he had a silo thanks his lucky stars for the forethought.

Now, before we go further, let us plant a crop and get it ready to harvest in some way. Plant early. Don't put it off to the last moment when the season has begun to change, and the old sages begin to prophesy dry weather, put it in just as well as you know how. Plant on sod ground if possible and put on some manure. The old saying is: "Corn will bear a great deal of manure and manure will bear a great deal of corn." Put on the manure early and let the rains wash the solvable manure down into the soil. Make the land as fine as you can. The same rule applies to this as any crop. The largest half of the cultivation of corn can be given before the corn is up. Make the soil fine so that the roots may have something to anchor to at once. How to plant. In Ohio we have three ways: A grain drill closing up all the holes in the rows but one, making the rows as near 3½ feet apart as possible, a regular corn drill for the purpose. I notice a White Water firm advertise a good one in Hoard's paper, and another way is to mark out with a shovel-plow, scatter the seeds by hand, turn the drag bottum up and go crossways of the furrows, or use a plank granger, fastening short to it, so the front side, or end will not dig into the soil, simply cover, these are all rapid ways. How much, not over twelve to fourteen quarts per acre. Have the kernels three and four inches apart in the rows. Have the rows three and one-half feet so to get space for cultivation, and make the labor of cultivating all horse-power. If you put a scant one-half bushel per acre, you will get a greater growth than where a bushel is used, and far more than where two is drilled in, with fourteen quarts you secure two great results, maturity of fodder and grain, where corn is sown thickly it never becomes to possess full nutritious powers. The development of the corn plant is to make grain, and if you deprive it of that function, it has nothing to live for, and never puts its powers to work to store up starch, sugar and gums to make an ear of corn. Grown in drills the sun and air gets in around it, thrives and grows, and throws out its broad green leaves, and when it tassles out, the silk also appears, and instead of a crowded, little spindling stalk of sickly green, look a look that tells it is destitute of stores of nourishment. We have a forest of fodder that analysis shows to be almost as fully charged with nutriment as the stalk of field corn. Dr. Gosseman of Massachusetts, found that a stalk of crowded corn that was forming no ear, had only from twelve to fifteen parts of dry matter and as high as eighty-two per cent. of water, while a stalk developing an ear had twenty-eight parts of dry matter and seventy-two parts water, or, twice as much vegetable matter per ton as the first, and while the first only had traces, the latter was rich in starch, sugar and nitrogenious matter.

How shall we cultivate? Use a stand tooth before the corn is up, and at least twice afterwards, this not only keeps the soil fine, does fast cultivation, but kills millions of little weeds. Nature can sprout a new weed cheaper than she can repair a broken one, and every weed killed is one less, when the corn gets too

large to drag, use a cultivator, what do we cultivate for, to benefit the crop, or rip things up from the bottom, and of what use is the latter, only to cut off, tear up and destroy corn roots, the very thing you want to let alone to make your corn plant put forth growth. Every root you cut off, nature has to stop and repair damage, and does it by sending out new and more roots, and these take up elements that the plant needs; all we need to do is to scarify the soil, use a cultivator with many, but fine, short tongues, and keep the surface free from weeds. The old idea that a deeply-stirred soil, and that often attracts moisture and holds moisture, is not found out by the facts. Land that is disturbed as little as possible holds its moisture best. With fodder corn, the broad branching leaves will soon drive out the cultivator, and probably twice will be as many times as one will run through it. It will soon so shade the ground that no weeds or grass will do it damage, and the many needed workings of field corn will not be wanted in fodder corn. When the ears begin to glaze a little, then is the time to cut it to get the greatest feed value, and this brings us to another inquiry.

How shall we cut up this big crop? With us it is almost wholly done with a sweep rake reaper, one that uses rakes instead of a reed. The machine is driven along a row and the reaper lays it down in big graves. It can't be done with such big corn fodder that will go thirty tons per acre, and that the crop you want to go for, get a crop that will pay you better than hay. The largest growth of fodder corn was cut with a reaper, and was the best job I ever saw done.

Well, you have got the crop down, now what will you do? I should draw it as fast as possible and put it in a silo, but we will have to shock it up. If I did not have a silo I think the reaper yet the best way to cut it. The Hurd brothers who join farms with me, have a 400 ton silo, and on another farm of like size, put in large quantities of fodder corn and shock it, and running it through the cutters in the winter, but all is cut with a reaper, this year they shocked their fodder corn by reaping it, and letting it lay three or four days in the yard to wilt, they then tied it up with tarred strings, and set it up in shocks of about 125 bundles each. The welting prevented the liability to sour and rot in such large shocks, and they soon settle so solid together that they are storm-proof. After standing a couple of weeks, they take a few of the outside bundles, cross two of them on top of the shock and then lay eight more bundles on top, two in each angle of the cross. They tell me, and they hire all labor, that it cost them as much to cut and tie up and shock this fodder as it did to put the other crop acre for acre into the silo. Now they have all this fodder to draw and run through the cutters, and lose the waste of storms, litter or rejection. The crop in the silo is ready for use, while the other has yet to be drawn and made ready. Another way is to set up three stakes with poles fastened to them, and the fodder is drawn out of the field and leaned up on both sides of these poles and fed out as wanted. I have known a few who stacked fodder in little round stacks about a pole set in the ground, but this, by any method, takes as much or more back-aching work to do, first and last, as it does to cut it into a silo with twice handling the stalks. Then it is done for all winter, no waste or bother and every pound of it made in presentable shape to the animal, and eaten without rejection and with as little loss in feed as can be devised. Every farmer places, first and last, the loss of fodder at 40 per cent., and Sir John B. Lawes, who seems to have started out to not like ensilage, is at last forced to admit that 10 per cent. is all the loss he can detect in ensilage as compared with the stalks when cut into the pit. But this does not quite express it either, for you see at the start there is a gain of 30 per cent. in the saving of fodder, and the other gain, that is yet not explained, only by the cow herself, that three tons of ensilage is worth the same as one ton of the best hay or fodder, and yet the three tons of ensilage dried weighs not quite half a ton. Without discussing the silo question in this talk beyond this, that so far as I can glean, the Ohio farmers this season have put their crop of ensilage into the pits for less than 40 cents per ton, all labor counted, which makes ensilage as cheap as hay at $2.00 per ton.

Let us go back a little and bring this talk to a close by looking over the field a little and see just where we stand in this matter. We as dairymen want a cheap and abundant food for our dairies so that we can yet make a profit for our

labor, and have the cows not only consume all the farm produces, but large quantities of purchased grain besides. Without this cheap and abundant ration we are working on a pretty small margin. Now if by a little new blood in our methods we can make a larger cultivation of corn and better methods of preserving it, we can secure this coveted advantage, why don't we throw ourselves over the fence by our boot straps into new fields and put ourselves into contact with a method that will enable us to not only produce greater and more certain crops, and thus make milk at one-half the cost that we now do? If we had a more sure crop we could, with our other advantages, lay down butter and cheese in Liverpool cheaper than the English or Danish farmer can, and that's what we want, even if more fodder corn will only keep up our average it is yet cheaper to rely upon it than on grass, for corn fodder is a surer crop than grass, and a fodder crop is safer than a field of hill corn. We may talk of millet as a safe and sure crop, it is not always so. Millet failed with us this season in that it did not mature more than one-third of a crop. Fodder corn raised as I have said will produce a large growth of corn ears and almost enough to balance the ration. A little ship stuff will do it and you will get 88 per cent. of the latter back in the fertilizing value of the manure, so that you will get double pay in return for the mill feed. So with large fields of cheaply raised and secured fodder corn, the dairyman can not only keep more cows, but better, he will be more largely independent of seasons, storm or drouth, where he is now too largely at the mercy of Providence and the grain and feed sellers, and instead of bemoaning his lack of stock feed, and the high price of all that he is forced to buy, and the low price of that which he has to sell, he will, while not neglecting his meadows and his seeding to clover nor failing to keep his weather-eye towards a well-ordered system of farming, he will order yet another bag of fodder corn seed and put in yet another "patch" to fodder and in the winter when there is a cry, "Let us go down to Egypt and buy corn," he will laugh, and, taking his wife and boys, will go to the Farmers Institute, and there will lift up his voice and testify to the truth of these things among the wise men and elders who sit within the gates.

Pasturage and Grasses.

[By C. R. Beach, Whitewater.]

All grass-growing countries grow rich, while those that grow grain exclusively grow poor. I need not attempt to prove the truth of this asserton to a Wisconsin audience. But while we are slowly learning the value of grass as a farm crop. Many of us look upon it as chiefly valuable as a means of renovating the soil, and thus preparing it for the growth of corn and small grains, making its production of secondary, rather than of primary importance.

While I am ready to admit that the prosperity of a state is best secured by a diversity of farm products, and also that diversity of soil and surroundings indicate the wisdom of cultivating the different crops in different proportions, yet where lands are naturally adapted to the growth of grass, I am fully convinced of the wisdon of making it the chief, if not the only crop. In the best farming sections of Europe a much larger per cent. of arable lands are devoted to grass than with us. In Great Britian sixty-two acres out of every hundred are devoted to pasture alone.

I shall confine myself in what I have to say, simply to the production of pasture and meadow grasses.

Even with our present imperfect and hap-hazard methods of handling our grass lands if we would carefully analyze our business, and determine precisely the true sources of our profits, we shall find almost invariably that much the largest share comes from our grass lands.

And first a few words on pastures and their treatment.

I am in favor of permanent pastures, and much prefer those that have never been plowed. Plowing never improves the mechanical condition of the soil. In proof of this you dig a ditch and then fill it with the dirt taken out, and in a short time it will have settled below the undisturbed soil, thus showing that it has become more compact. The native turf being largely composed of vegetable mould furnishes the best possible preparation for the healthy development of grass roots. It also acts as a mulch-giving protection against drought by holding the rain water that falls near to the grass roots, so that they not only absorb the moisture, but also the nitrogen brought down by the rain, the amount

of nitrogen thus furnished, amounts from four to eight and ten pounds per acre annually. Upon plowed fields this and more is carried off by the washing of the rain. You break up one of these natural formed pastures, how many years before you have another such turf? Not in ten years, and I doubt if twenty years will produce it.

In my own experience I have never plowed a pasture but once, and that was more than thirty years ago. And that field has not yet attained to its original fertility. As to the value of such pastures, Prof. Henry, at the University farm, found that an acre of permanent pasture produced 102 pounds of butter, in a season. Does any one doubt that this acre produced a handsome profit above the average of farm lands. Prof. Brown, of the Ontario Experimental Farm, found that an acre of newly seeded timothy and clover pastured gave 1,300 pounds of milk, while on an acre of permanent pasture he kept two cows, five and a half months, they were not taken from the field during the time, and received no extra food, yet they produced 7,500 pounds of milk—enough to make 300 pounds of butter. You will say that was an extraordinary case. I admit it, but it shows what an acre of pasture grass may be made to produce.

How shall we maintain and increase the productiveness of our pastures?

They may be harrowed and seed sown. They may be top dressed with manure, and they should not be turned upon until they are well started in the spring. Neither should they be pastured late in the fall. But the best and cheapest method of improving them is by feeding a part grain ration to cattle running upon them.

Let us suppose then that upon a given pasture it will require two acres to summer a cow, by feeding daily five or six pounds of bran and supplementing it with fodder corn as soon as grown. You can keep three cows where you would have kept only two, but more, the manurial value of the bran after being fed will be more than equal to that of the solids carried off in the milk. This added to that made by the consumption of the grass grown on the field, will more than maintain the fertility of the pasture; and it will be growing rich.

I would like to tell of a pasture that had been used for the last ten years in maturing steers in connection with summer grain-feeding, but my limits will not admit of it.

This idea of improving pastures by feeding grain in summer by which prosess you more than get your money back at once in increased production. And then after that getting more than the first cost of the feed in the value of the manure is worthy of your careful attention.

Take it home, act upon it, and see if your experience will not confirm my assertion.

So much for pastures. A few words as to the treatment of meadows.

While I shall not maintain with equal tenacity the wisdom of permanent meadows, yet I do claim that we often plow them when we had better let them alone. If you have a meadow that is yielding a fair crop and you are tempted to plow it I would simply say don't. But I would say keep your cattle off both spring and fall, sure. A meadow will often be much benefited by harrowing and top-dressing, or top-dressing without harrowing. In an experiment at Rothamstead, England, upon meadows that had been in grass for several centuries, they yielded annually without manure for the whole twenty years during which the experiment was carried on 2,383 tons of hay; while upon precisely the same kinds of lands upon which, for the first eight years of the twenty an annual top dressing of fourteen tons of barn-yard manure and 200 pounds of amonial salts, was applied, yielded for the whole twenty years 4,824 pounds of hay annually; while with a top-dressing of a combination of various commercial fertilizers the same kind of land yielded 6,993 pounds of hay or three and one-half tons annually for the whole twenty years. Surely those manured meadows yielded good paying crops.

I am well aware that our dry climate may require somewhat different treatment than that of England; but we do well to see what may be done in this direction in maintaining the fertility of our meadows without plowing.

We all know that the fine soft grass grown upon old meadows is worth much more per ton than the dry, coarse, harsh growth of our new seeding.

Let me in closing give you the experience of a Connecticut man by the name of A. T. Lilly, whose hobby was

the production of hay. Perhaps we may learn something from his success. He says:

"In July, 1887, I purchased a piece of land known as the Mundee lot. There was at the time some four acres under cultivation on said lot and in grass which yielded, on cutting, five tons of hay, which I sold delivered from the field for twenty dollars per ton, realizing one hundred dollars for the crop. There was attached to this four acres, eight acres, about three-fourth of the same being swamp of a muck soil, and covered with surface water. The other one-fourth, was composed of a rising, gravelly soil, and perfectly sterile. My first work, by way of improvement, was to cut off the wood, which something more than paid for cutting. I then ditched and underdrained the wet portion of the lot. The stumps and snags were cleared off, and a fair surface given to the whole.

"In the spring of sixty-nine. I cultivated and moderately fertilized and sowed the same with oats and hay seed. The upland was planted in the spring of sixty-eight with potatoes, being quite thoroughly fertilized with a muck compost, and sown with oats and hay seed in the spring of sixty-nine, the whole eight acres yielding a fair crop. In the spring of 1870, my whole field was faced and in grass. On surveying the lot. I found it to contain twelve acres. I secured this season twenty-five tons of rowen for the second crop. My highest ideal of a grass crop was realized, and still as I walked over the field, I discovered that many portions of it came far short of the average yield. Hence I commenced fertilizing by top dressing the poorer portions of the lot, and in the season of seventy-one, my first crop increased to two and one-half tons per acre, and one and one-half tons per acre for second crop. The lot as a whole was and is at present time very uneven as to quality of soil. I pursued my course of stimulating with extra fertilizing the poorer portions, and my crops continued to show a steady increase, yielding from three and one-half tons to four tons to the acre, first crop, and one and one-half to two tons, second crop. In the season of eight-one, I seemed to reach the climax, cutting three crops and enjoying a yield of seventy-two tons on the twelve acres. This season was unusually favored by climate, giving quite a uniform crop on the whole lot, whilst usually all of the upland portion is affected by drouth—either the first or second crop suffering severely. From 1870 to 1884, the crops have all been sold, with slight exceptions delivered from the field in good condition, at the current rates. The lowest price and but for one season was fourteen dollars per ton, and the highest rate for two seasons was thirty dollars per ton. The smallest amount received any one year, was eight hundred and forty dollars, and the largest amount was ten hundred and fifty dollars.

Time and space prevent my going into the detail which has attended the sixteen years of my farming upon this twelve acre lot; suffice it to say that my hobby has been to raise grass simply by top dressing without preparing the ground with previous crops and cultivation, avoiding, even if I could, plowing and sowing upon the sod. For myself, the experiment is complete, and my practice in the future will be, if the land is not prepared by culture and raising other crops, which method I approve—to plow once in four or five years and sow upon the sod. I have plowed and sowed upon the sod twice in the sixteen years past, the last being in the fall of eighty-three.

You ask, if I would favor more attention being paid by farmers in raising grass? I answer most decidedly, yes. The farmer should make it his leading object to raise grass. It should be the guiding star of his existence. Secure the grass crop and all other things shall unto it. With judicious farming a good paying per cent. attends the grass crop. With slight exceptions grass may be grown upon any land—but when you come to our Connecticut River Valley land, every inducement is presented to the farmer favoring the cultivation of grass. It is lamentable to see the most fertile land on earth, in broad fields, producing not to exceed one and one-half tons to the acre, and all the more so when the home consumption of hay in the valley calls for hundreds of tons more than the production. You ask if I would legislate in favor of agriculture? Yes, in this one particular at least, I would have a law made at the present session of the legislature, that every acre of the Connecticut River land within the borders of our Commonwealth, which was found in grass in the year 1888, and not producing at least three tons to the

acre should be confiscated by the state for the benefit of the inebriate asylum."

May we not have a lesson from this man's experienced. If six tons of hay can be grown on an acre in Connecticut, why not in Wisconsin?

Comparative Value of Lands.

[By C. V. Guy.]

We meet here to discuss, as best we may, the condition of the farming interests in the St. Croix Valley, in which we are interested, directly and indirectly. Some there are here to-day, who will recollect a meeting held in Brackett Hall a little more than three years ago, the first time Prof. Henry came here. Then we had, the first half day, I think, less than twenty, and at no time over one hundred persons present. I can but think the increase of numbers represents the measure of the increase of interest among farmers in the improved methods of husbandry.

When we first broke up the soil of the prairies, not only in our own valley, but all through that vast region known as the West, the crop at first was wheat, for these reasons: There was, and is now, always a cash market for it. Then it was a sure crop, more sure than corn and potatoes. Grass we had none but the wild prairie grasses of the country. Raising wheat occupied about three weeks in the spring, and from about August 1st till the ground froze, the remainder of the year there was little on the farm to do, besides caring for a few cattle and horses, and getting the year's supply of wood, and this was often not done, as many a housewife recalls to her sorrow. This farming was easy, and profitable if one does not value the impoverishment of the soil. After a score or more of years the richest soils refused to respond to this "take and not give" process—and to those who failed to save the thrift of these years of plenty, the years of scant crops brought disappointment, and sometimes distress. In the older part of the state of Wisconsin the land became so entirely exhausted of such food as the wheat plant requires, that, in places, there was sbsolutely no wheat grains formed, and where by chance there was plant food, the chintz bugs gathered the harvest before the farmer. I hope we have the forethought to turn our attention to other crops before our lands become so entirely exhausted as to give us no returns whatever. Such farming is like driving the exhausted horse till he falls dead in the road, when rest and food in the proper season would have saved perhaps to the owner years of valuable service.

We, as a farming community, are now nearly where the southern and eastern counties of Wisconsin were twenty years or so ago—with this advantage, we may profit if we will by their experience. We can see what they did in like circumstances, and it becomes us to learn of them. This is just where the value of the Institute work comes in. A few Eastern farmers come among us and give us the results of their experience in changing from wheat raising to other pursuits that we may learn how they have become wealthy, or at least independent.

"There is now a marked depression in business in and around this city," said a prominent business man of the city to me the other day in discussing the erection of a building for a creamery. "We must do something. There are nine business tenements empty on this street (not one of them was a saloon) and about twenty residences to let within the city limits." It goes without saying that the prosperity of the farmer is the foundation of the prosperity of the business man, be he merchant, manufacturer or laborer. The period of low prices has come to stay, probably. The difference between raising at a profit or a loss is very small indeed. It is by very close economy one can make enough off a farm to support and educate a family, and earn any satisfactory income from the value of the investment. The condition of the exclusive grain farmer is bad enough to, I hope, set him to seeking a more excellent way. The first idea is to raise larger crops. To do this, the soil must be enriched and better cultivated. It is the excess of a large crop over a small one that gives a profit. But when from overproduction or exhaustion of soils for one particular crop it no longer pays to raise such crop, it is the part of prudence to change to some other, that gives promise of paying better. Wheat is but one of the many products of the soil necessary or desirable to supply the many demands of the Nineteenth century. But to show what farmers in other parts of the state have done, and are doing now, I will refer you to the Wisconsin census report of 1885.

First let us compare the price of the land in the county of Pierce with that of some of the older counties of the state. The figures from the census reports are very greatly reduced that they may be more easily remembered. St. Croix produces more wheat than any other county, and Pierce County is a very good second. Sheboygan, Fond du Lac, Jefferson, Grant and Walworth are the largest cheese-producing counties. Grant excels in hogs, except Dane and Rock; and in cows and corn, except Dane. Winnebago is the sixth in sheep industry, and next to Milwaukee, the third in manufactories. Walworth excels in butter, and except Waukesha, in wool.

COUNTIES.	VAL. LAND PER ACRE		LBS. PER ACRE.		BUTTER PER LB.	No. OF LBS.	
	Improv'd	All lands	Butter.....	Cheese....		Butter.....	Cheese....
St. Croix...	$34	$22	2½	¾	19	509.101	159,662
Pierce.....	38	19	3½	⅝	16	471 612	74,975
F'd du Lac	59	40	4¼	8½	15	1,205,345	2,437,360
Sheboygan	84	55	3	38	16	558,022	7.393,513
Jefferson...	74	46	6	16	18	1,105,679	3,014.196
Grant.....	35	17	5½	⅜	17	2,047,751	137,165
Winnebage	5	44	5	5	17	880,961	879,404
Walworth..	60	47	6½	10	19	1,432,523	2,218,000

It is not practicable to enter into the exact proportion of improved and unimproved lands. Such accuracy is for the statistician, not the farmer. Fractions of a cent are divided on the five-tenth pound which is sufficient for a fair comparison. This fact is very apparent, that the price of land is lowest in the wheat raising and highest in the dairying counties. In the census report lands are divided into improved, wood, and unimproved lands, and the result will vary, of course, according to whether you take the improved alone or the aggregate of the the three classes. In estimating the value per acre both are given. In the yield per acre the improved are alone used in each county alike, thus giving, I think an exhibit sufficiently accurate for practical purposes.

In this comparison I have selected some of the oldest settled counties of the state and some represented in the institute work by the ablest men. The farming lands of the dairy counties are worth, as shown by the sensus of '85, from $45 to $55 per acre unimproved, while the present cash value of farming land per acre is worth from $34 in St. Croix, to $84 in Sheboygan. In St. Croix, that produces more wheat than any other county of the state, the lands are valued less than one-half of that of the dairy counties; and in Pierce County, engaged in the same business nearly as largely as St. Croix, the lands are of nearly the same value. These are facts for farmers to think of. Wheat raising has cost us largely in the most valuable elements of fertility of the soil. Mill stuffs are lower in price here than in any other county of the state as far as I can learn. The dairymen East and South of us buy feed stuffs largely of Minneapolis, and the price is about the same with us with from two to four dollars per ton, freight added. We can thus, as I hope, compete successfully with the older settled counties of the state in she race for wealth, if we will. For the furtherance of this object, this institute was projected. Let us at any rate have a full and free discussion of of any and all topics connected with farming in the broadest sense, and take heart by mutual counsel.

Stock Feeding for Profit.

[By Dr. R. J. Wilcox.]

That the raising and feeding of stock is one of the necessary factors in successful farming, will be admitted by all. But many things at once occur to the mind of the thoughtful farmer which quickly dissipate all dreams of large profits, if indeed any profits at all commensurate with the labor and risks, can be found when he is ready to send his animals to market. Much outlay is necessary before he can meet the severity of the cold season by adequate protection. Full granaries must be provided for the hungry mouths through the long months of winter. Constant care and attention by one interested to provide drink, to preserve cleanliness and secure health, will make the labor an important item of expense. When ready for market he finds the prices he is to receive gauged by the value and abundance of the supplies from the broad ranches of the West and Southwest, where abundance of capital eliminating the many small expenses of the individual farmer, and reducing all costs to the least, enables it to furnish meat for the million, and realize a fair profit at prices which will often tax the wisdom of the best farmers to pay the mere

expense of feed. The experience of the present time in marketing stock is conclusive evidence that only the most judicious management will leave any recompense for handling.

The problem then before us is, how can we best use our own productions and the various feeds readily accessible to us, and from them realize the most benefit to our farms and incomes? Grass, clover, rye, oats, barley and corn are some of our best crops. Wheat is now an exception, experience tells us. For sheep, clover, straw, and cornstalks, if seasonably cured and properly cared for, will carry them through our winters in good order without any grain. Prof. Henry tells us how we can most cheaply make pork from shorts and corn; but it may not be so clear how we can best use some of our productions. Prof. Armsby has given us many valuable suggestions in his papers contained in the Third Annual Report of the Experiment Station, but how far they may become of practical value to the average farmer, will depend somewhat upon how much diligent study he gives them, and how he uses or fails to use them.

We have valuable tables given us on the average composition of feeding stuffs, and also the percentage of digestible matter contained therein. From them we learn that rye contains almost 50 per cent. less of the flesh-forming elements of food than bran. The market price of rye the past fall would enable the farmer to buy almost two tons of bran for one ton of rye. Of course his interest would direct the sale of the rye and the purchase of bran. A similar comparison with oats, barley and corn, might suggest the advantage of exchange or combinations which would give more economical and profitable results than any of these grains used as feed separately. But are these tables just what they might seem to be, to the average farmer? They tell us that of clover hay 45 per cent. and of timothy hay 47 per cent. is digestible; that of oats 62 per cent. and of corn over 80 per cent. is digestible material; that of wheat bran 59 per cent. is digestible; that of buckwheat bran 67 per cent. is digestible, and it is the richest feed of all the brans. Without further comparison an important question occurs here. Are these feeds digestible to the extent herein named under the ordinary conditions in which they are used? If they are not, can they be made more digestible for feeding to stock, and how?

In December last, at this place, Prof. Armsby, if we understood him correctly, stated that these foods were digestible to the extent named in these tables under the ordinary conditions of use. But he failed to explain to us, how in feeding bran, for example 59 per cent. could be appropriated by the animal, and at the same time 75 per cent. of the fertilizing material be left in the manure. These tables are valuable because from them we can learn where to find the cheapest supply of proteine, which is the material into which we should put our money when buying feed. For the most of us, our hay, stalks and straw will furnish an abundance of carbonate hydrates. We are told that by grinding feed and mixing it with cut hay and straw, moistened, it will become better digested by the horses and cattle. This subject of animal digestion is one worthy of much study and experiment. We all know that the richer the food the richer will be the manure, and the wise farmer will see it returned to the soil.

The variety of natural growth in our pastures will suggest to the thoughtful farmer the value of a variety of food in the most successful feeding of stock. Variety of food is the key to health and physical thrift in our families. Is it less so among our domestic animals? Shall we not secure the most profit, by wisdom in selection and variety in combination, and use for the most part, of our productions, and thus insure health, thrift, and growth to our animals? This subject opens a wide field, in which our Experimental Stations may labor with profit to the farmer—one in which they are already laboring and giving us many suggestions worthy of our examination and trial.

While discussing this matter of providing for our stock not the least important item of care and provision is its drink. All admit that a sufficient supply of pure water for all stock is a necessity if we would regard their health, but there is a variety of opinion and practice among our best farmers as to the definition of "a sufficient supply." We know of a farmer whose horses are always a model of beauty and health who says he never allows a horse to take at a time more than one pail of water, nor will he

repeat it more than three times a day. Another says give them all they will drink. One of our most successful sheep growers states that he and his father before him, never allowed his sheep access to standing or running water. His sheep have always been peculiarly free from disease, and always fat and thrifty without grain. This is an important item to those farmers whose pastures are not provided with water. On the other hand, as far as our observation has gone, hogs to thrive need a bountiful supply of good water which they can sup many times a day.

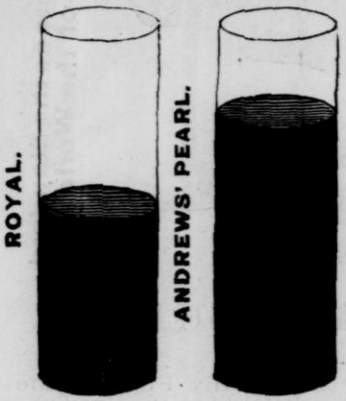
But returning to feeding stuffs, the scientific study of the composition of cheap rations for stock, designed to be adapted to the varied use we make of the stock, whether for horses or for dairy stock or fattening animals, is one which demands and is recieving much attention. It can only be directed wisely when based upon scientific analysis and experiment. For this we need our Experimental Stations, They will ultimatly give us the composition of the best rations, whose value may be illustrated in the experience of the Paris Omnibus Company who wanted to find a cheaper ration than they had been using for their horses, of which they had several thousand. They applied to a chemist to analyze their feeds, receiving from him a new and cheaper combination of food whereby they saved several thousand dollars annually. All honor to our efficient workers in this direction.

The silo is rapidly coming to the front as an important factor in the solution of this question. But to the most of us, it comes as a servant with excellent recommendations, but whose merits are by us untested.

Baking Powder Figures That DON'T LIE.

The Royal Baking Powder Co. try to give the inference that their powder contains more **Cream Tartar** and that its **Leavening Power** is greater than any other made, as stated in their advertisement on the "Comparative Worth of Baking Powders," exhibited by black lines. Our name was mentioned in connection with one of our cheaper brands, made of different materials as the trade might demand. Our **Cream Tartar** brand of **Andrews' Pearl** was omitted, evidently for a very good reason, judging from the **relative merits** of ANDREWS' "PEARL," and the Royal, as clearly demonstrated by the Government Chemist, Dr. PETER COLLIER, of the Department of Agriculture, at Washington, from samples received by him from dealers who furnished the samples from their stocks on hand in open market.

Showing excess of Cream Tartar in Andrews' Pearl over Royal, ascertained by Government Chemist Collier.



DR. COLLIER'S ANALYSIS.

U. S. DEPT. of AGRICULTURE,
WASHINGTON, D. C., March 10, 1883.

C. E. ANDREWS & CO.—*Gentlemen:* I received by express from Thos. Lydon and J. P. Harkins & Co., Grand Ave., Milwaukee, and Harper Bros., Chicago, Ill., samples of Andrews' Pearl and Royal Baking Powders. The cans were in good condition when received and the seals unbroken. I find upon analysis that Andrews' Pearl Baking Powder contains about four and a half (4½) per cent. ***more cream tartar*** *than the Royal* Baking Powder, and a ***proportionately larger percentage of carbonic acid gas, and I find it to be free from alum, and any injurious substances.***

Sincerely yours,
PETER COLLIER,
U. S. Chemist Dept. of Agriculture.

Government Chemist Collier's Analysis as to the Leavening Qualities.

ANDREWS' PEARL .....

ROYAL .....

No wonder the Royal Co. omitted Andrews' Pearl from their "Comparative List," as Government Chemist Collier's analysis shows conclusively two things; 1st, That Andrews' Pearl contains **more Cream Tartar** than the Royal, as shown by the cuts above; 2nd, That the **Leavennig Power** of Andrews' Pearl is **greater** than the Royal, as shown by the two black lines above.

CHALLENGE.

We will give the Royal Co. or any one else $1,000 or $5,000 if they can prove by any fair mutual test that Andrews' Pearl Baking Powder does, or ever did, contain alum, or any injurious substances, and this challenge is open forever. Andrews' Pearl Baking Powder is sustained by a testimonial as to its **purity and strength** by the only genuine commissioned Government chemist, such as the Royal Co. **never** have published. TRY IT.

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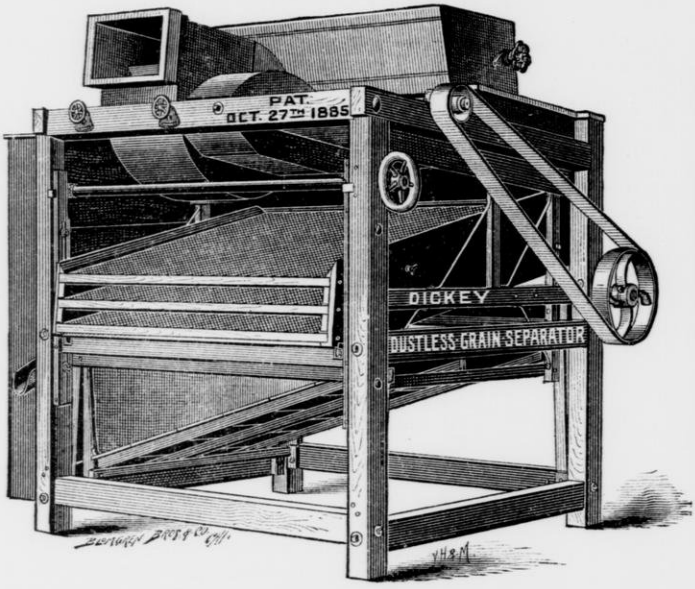

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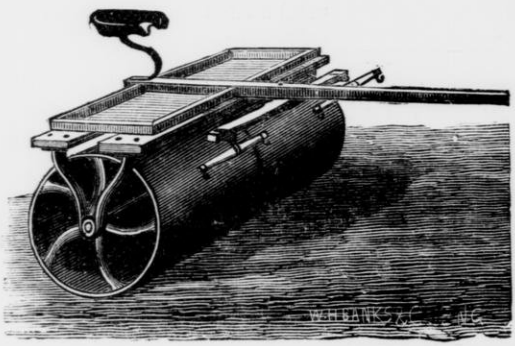

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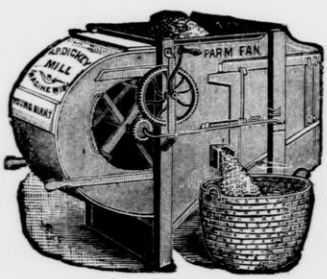

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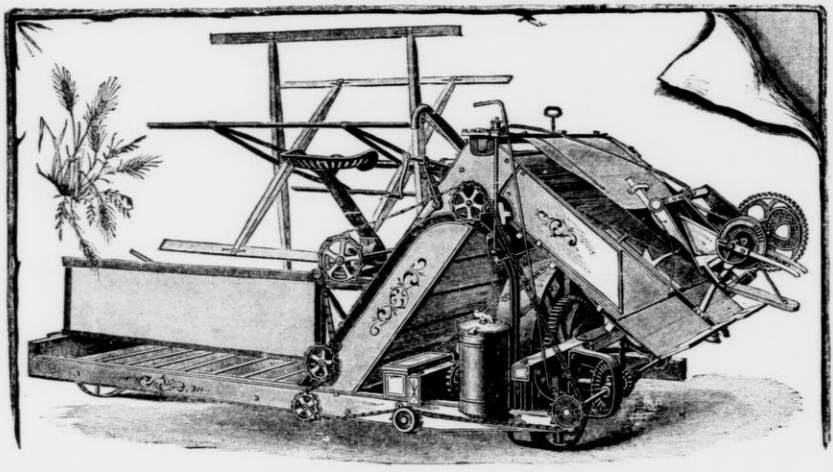

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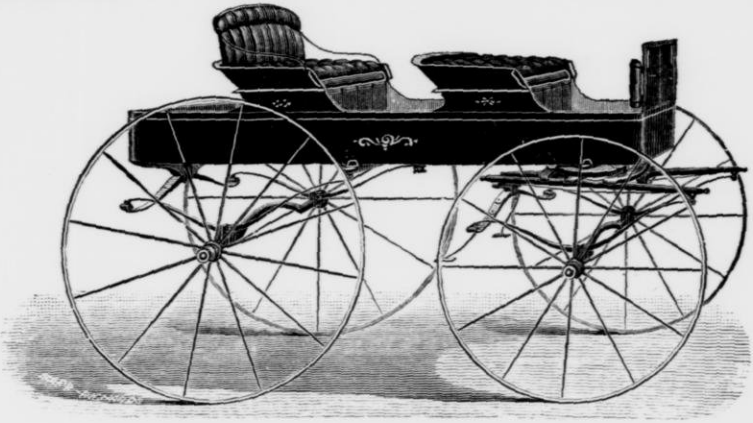

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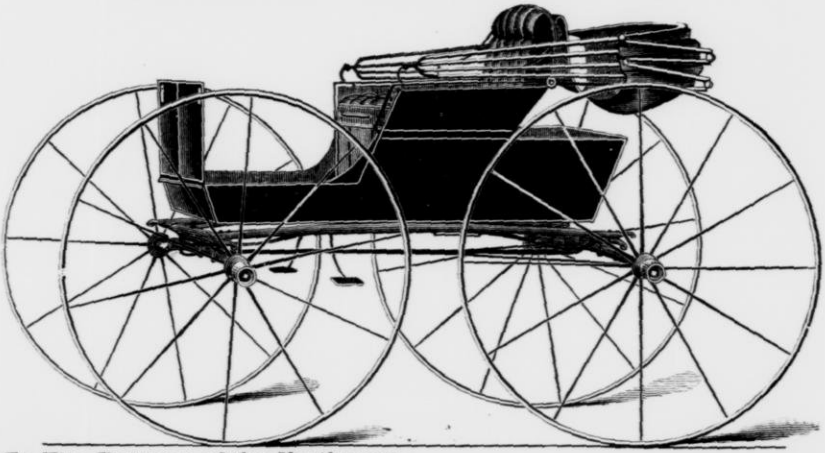

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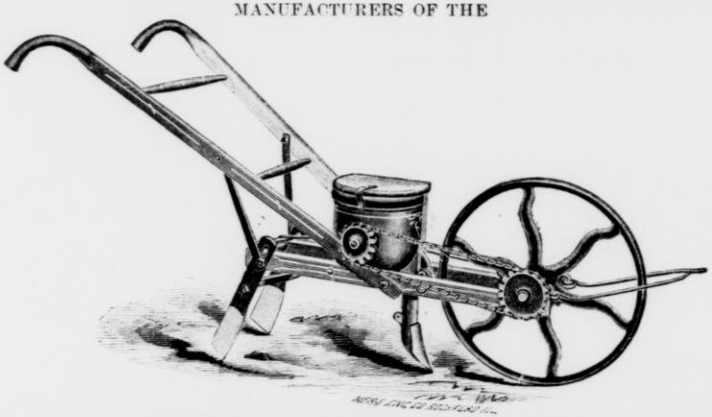

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