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Wisconsin Farmers' Institutes : a hand-book of agriculture. Bulletin No. 8 1894

Wisconsin Farmers' Institutes

Madison, WI: Democrat Printing Co., Printers and Stereotypers,
1894

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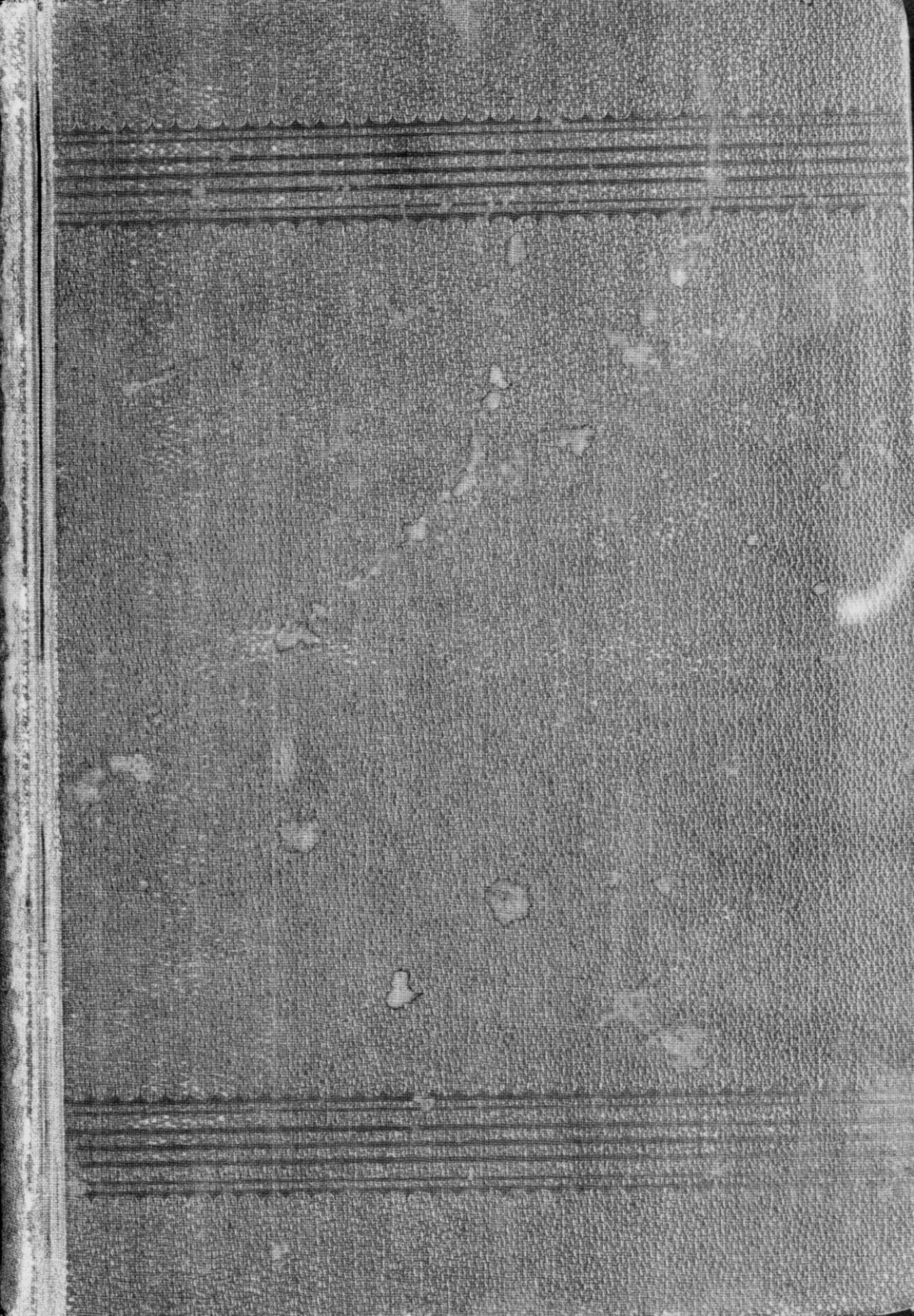
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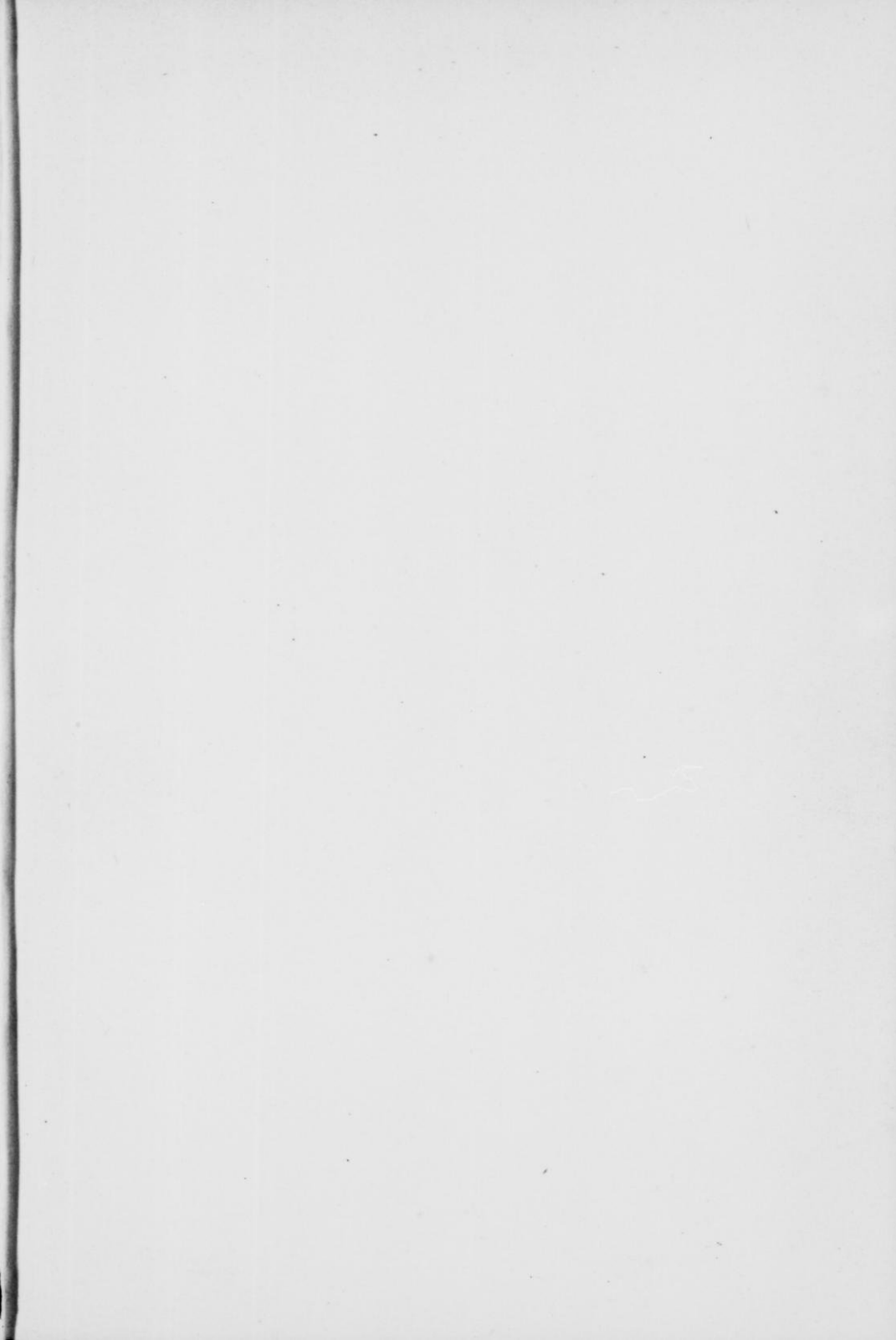
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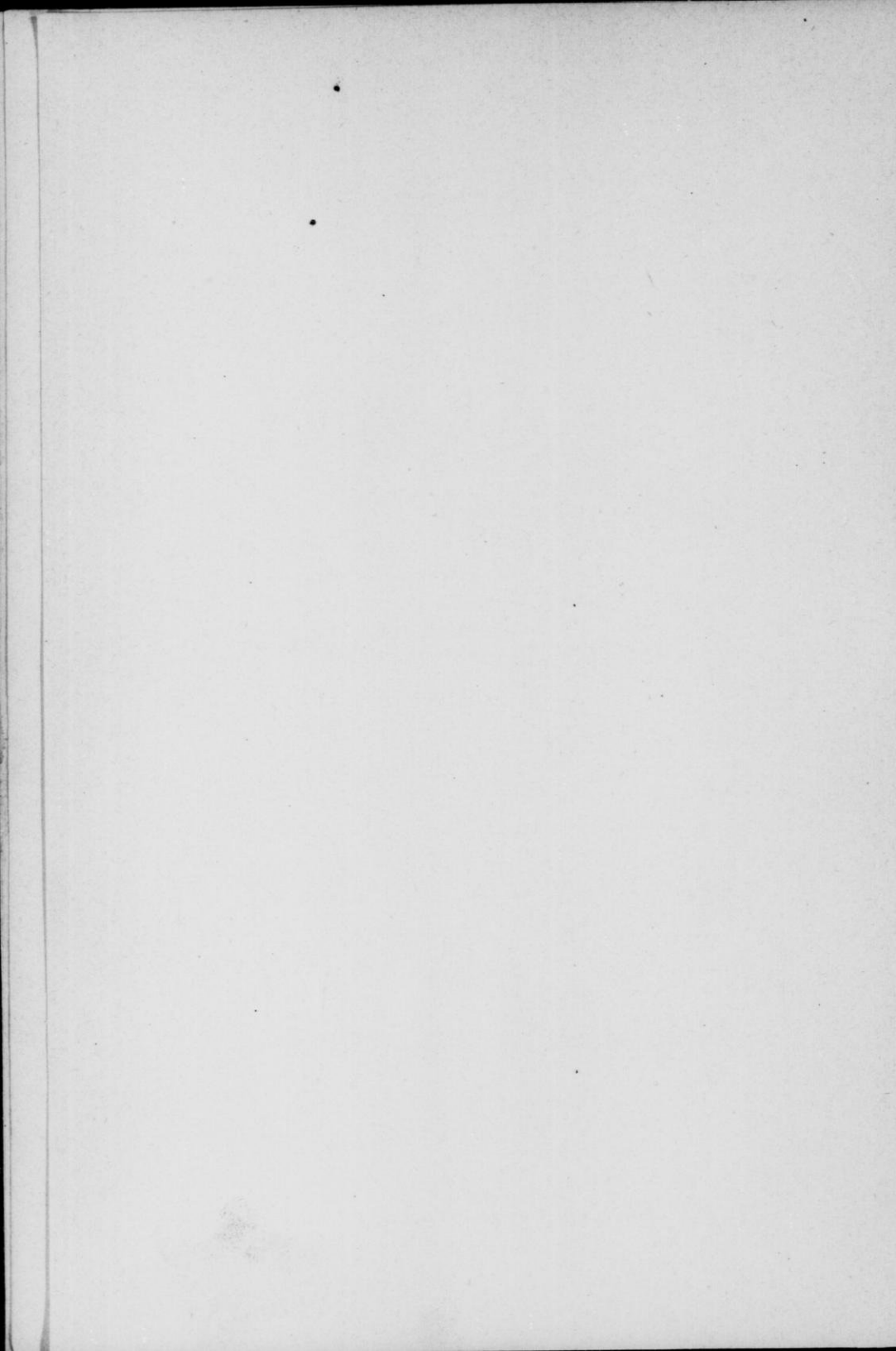
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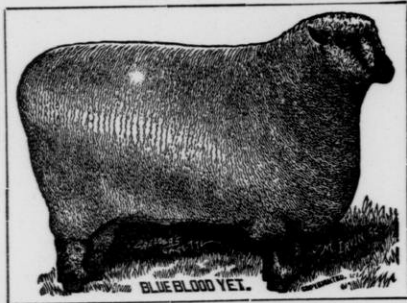


“* * * It is conceded throughout the country, by those in a position to judge, that the State of Wisconsin employs the best class of Institute workers and conducts its Institutes more efficiently than any State in the Union;—and this is largely due to their Superintendent of Institutes, Prof. W. H. Morrison, who has not a peer in this line in the world.

Every year a Bulletin is issued giving the pith of the papers read before the various Institutes, and a summary of the discussions. I have three of these successive annual reports and regard them the most valuable agricultural publications in book form in my possession. * * *

— National Stockman and Farmer, Pittsburg, Pa.

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Has won more First Prizes and Sweepstakes at the Leading Fairs of the Northwest the past Fifteen Years than any other Shropshire Flock in America.

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CHICAGO, 1893.

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—IS THE—

Oldest and Largest Shropshire Flock in Wisconsin, comprising a stock of about 1,000 head.

Woodside Farm CARRIES THE LARGEST NUMBER OF
DOWN MUTTON RAMS
to be found in any American Sheep Breeding Establishment.

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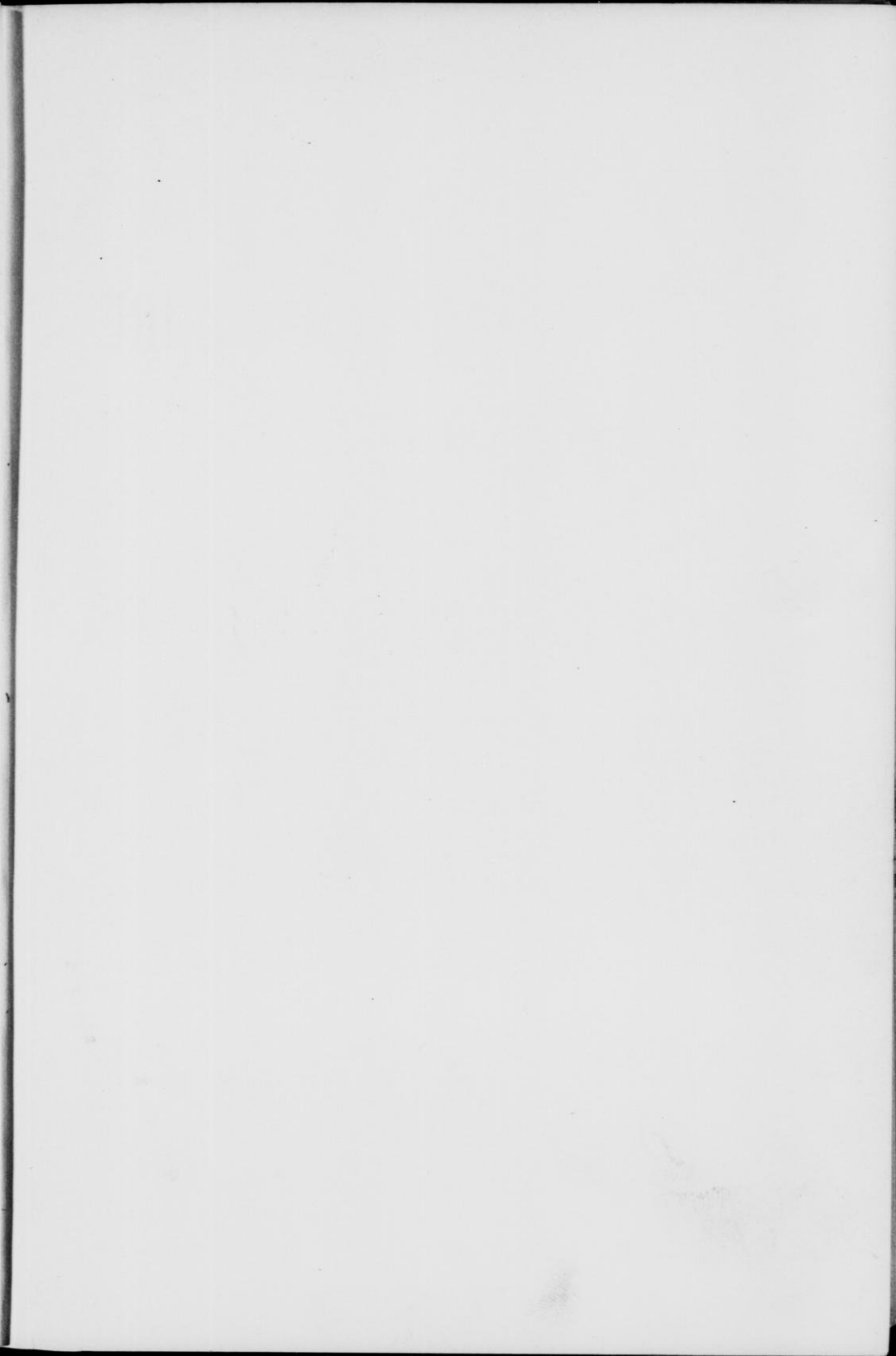
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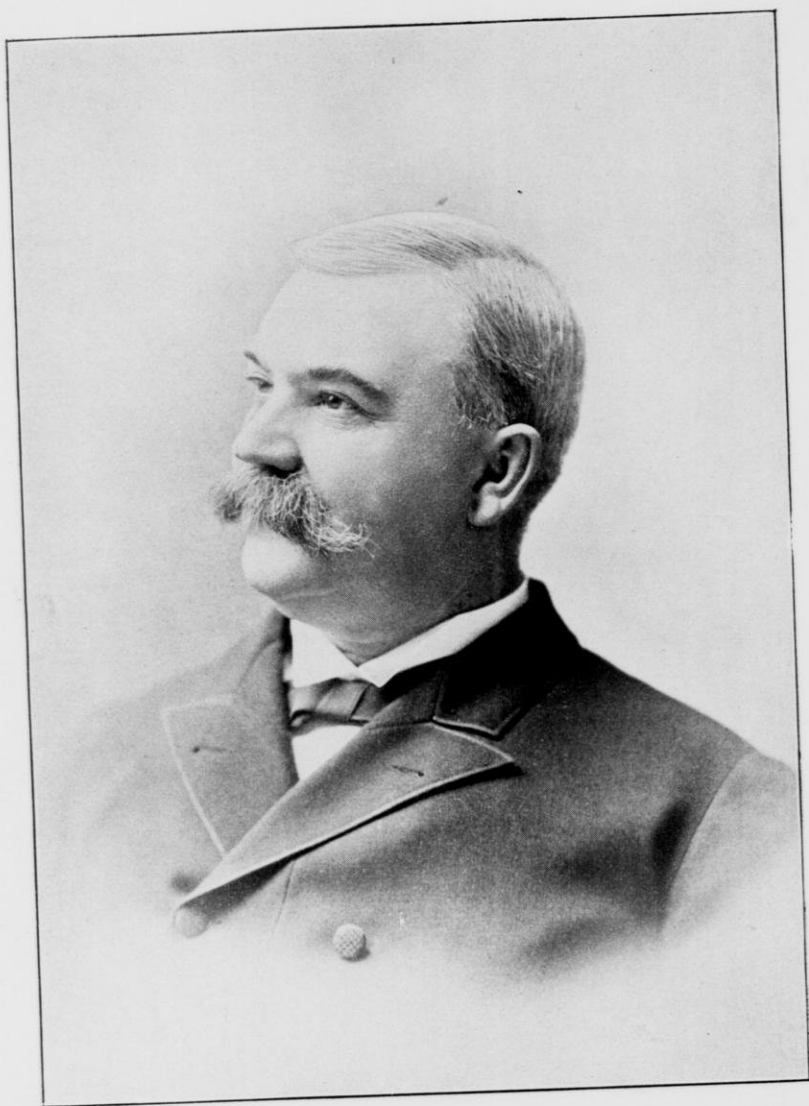
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W. H. MORRISON,
Superintendent Wisconsin Farmers' Institutes from 1885 to 1893.
Died December 13, 1893.

WISCONSIN

FARMERS'
INSTITUTES

A Hand-Book of Agriculture.

BULLETIN NO. 8.

1894.

Farming as a Business.—The life of a farmer has often been called a life of drudgery. There is no occupation that has a larger ratio of inspiring labor to one whose tastes are in harmony with rural life. The weak point in American farming has been the lack of appreciation of the equipment necessary to a successful career. Too many men have been willing to be thieves of the soil's resources that they might swell their bank accounts. To the young man or woman, fairly well educated, who will add some technical knowledge of our special schools of agriculture to their requirements, there is no more promising field of enterprise than farming; but to insure that satisfaction in its prosecution which makes any occupation enjoyable, business spirit must be put into it and toil must be sweetened by an appreciation of the attributes which makes rural life attractive.—Charles W. Garfield in American Cheesemaker.

Edited by Geo. McKerrow, Superintendent.



FORTY THOUSAND COPIES ISSUED.

Illustrated by Binner Engraving Co., Milwaukee, Wis.

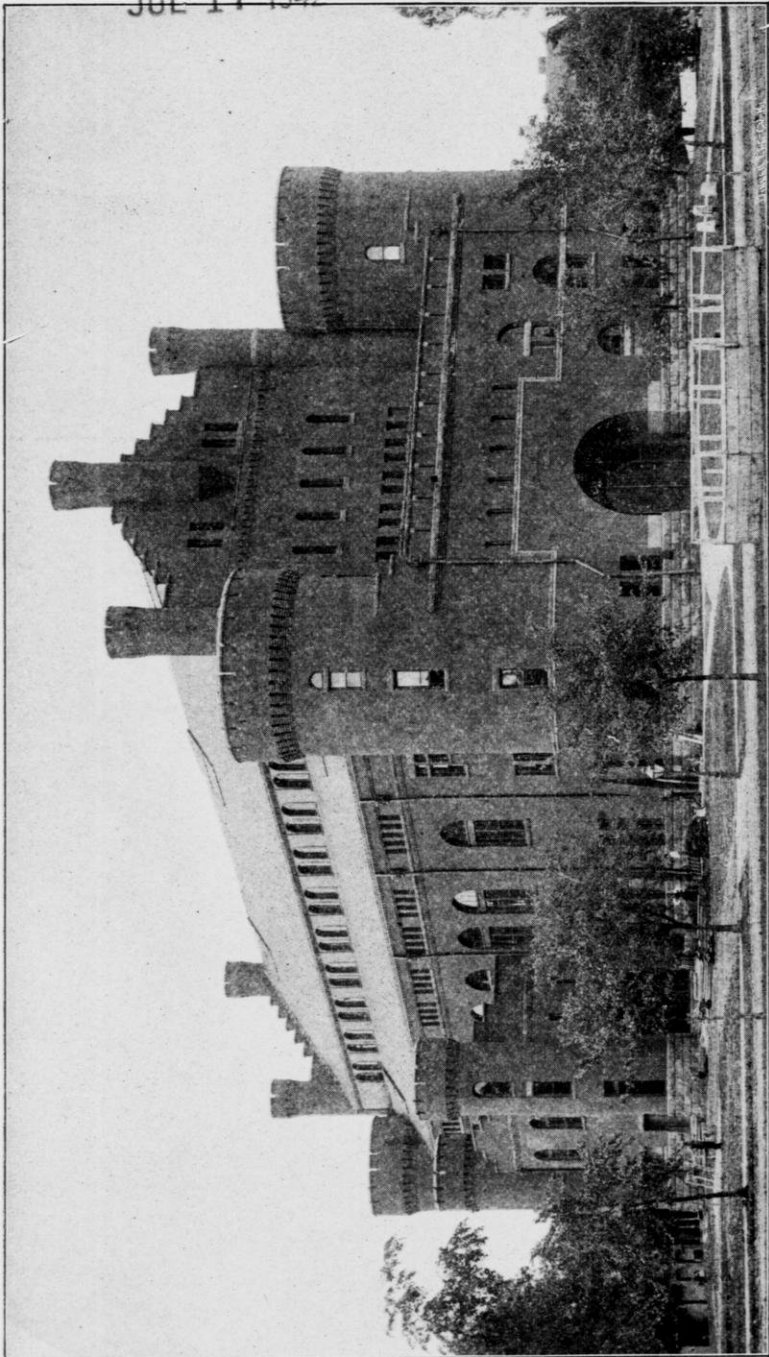
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Armory and Gymnasium Building, University of Wisconsin.

LETTER OF TRANSMITTAL.

HON. WM. P. BARTLETT,

President of Board of Regents, University of Wisconsin:

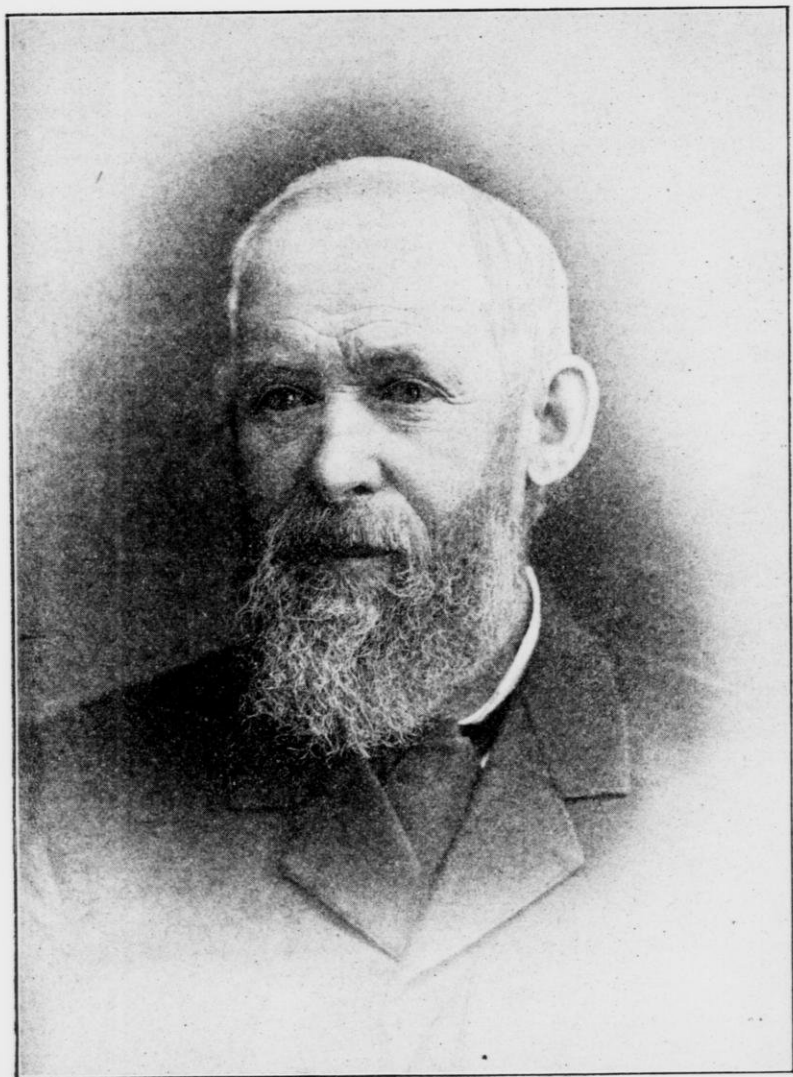
SIR —I have the honor herewith of presenting to you Bulletin
No. 8, of Wisconsin Farmers' Institute,

Most respectfully yours,

GEO. MCKERROW,

MADISON, Wis., Nov. 10, 1894.

Superintendent.



J. M. SMITH,

President Wisconsin State Horticultural Society for fifteen years and
a Prominent Institute worker since their organization.
Died February 20, 1894.

8.

WISCONSIN FARM INSTITUTES FOR 1894-95.

C. P. GOODRICH, Conductor		J. M. TRUE, Conductor.	
Peshtigo.....	Dec. 4-5	Stanley.....	Dec. 4-5
Stiles.....	Dec. 6-7	Spencer.....	Dec. 6-7
Seymour.....	Dec. 11-12	Star Prairie.....	Dec. 11-12
Iola.....	Dec. 13-14	Shell Lake.....	Dec. 13-14
Clintonville.....	Dec. 18-19	Glenwood.....	Dec. 18-19
Wausau.....	Dec. 20-21	Prairie Farm.....	Dec. 20-21
Fennimore.....	Dec. 27-28	Footville.....	Dec. 27-28
THOS. CONVEY, Conductor.		C. H. EVERETT, Conductor.	
Casco.....	Dec. 4-5	Milladore.....	Dec. 4-5
Sturgeon Bay.....	Dec. 6-7	Dorchester.....	Dec. 6-7
Mishicot.....	Dec. 11-12	Beaver Dam.....	Dec. 11-12
Denmark.....	Dec. 13-14	Marke-an.....	Dec. 13-14
Amherst.....	Dec. 18-19	St. Croix Falls.....	Dec. 18-19
New London.....	Dec. 20-21	Clear Lake.....	Dec. 20-21
Calumetville.....	Dec. 27-28	Winneconne.....	Dec. 27-28
C. P. GOODRICH, Conductor.		J. M. TRUE, Conductor.	
Retreat.....	Jan. 3-4	Reedsburg.....	Jan. 3-4
North Bend.....	Jan. 8-9	Osseo.....	Jan. 8-9
Kendall.....	Jan. 10-11	Eau Claire.....	Jan. 10-11
Rock Elm.....	Jan. 15-16	Onalaska.....	Jan. 15-16
River Falls.....	Jan. 17-18	Hixton.....	Jan. 17-18
Almond.....	Jan. 22-23	Greenwood.....	Jan. 22-23
Westfield.....	Jan. 24-25	Medford.....	Jan. 24-25
Pine River.....	Jan. 29-30	Briggsville.....	Jan. 29-30
Rosendale.....	Jan. 31-Feb. 1	Poynette.....	Jan. 31-Feb. 1
THOS. CONVEY, Conductor.		C. H. EVERETT, Conductor.	
Eureka.....	Jan. 3-4	West Bend.....	Jan. 3-4
Excelsior.....	Jan. 8-9	Hudson.....	Jan. 8-9
Spring Green.....	Jan. 10-11	Spring Valley.....	Jan. 10-11
Hillsboro.....	Jan. 15-16	Colfax.....	Jan. 15-16
Bangor.....	Jan. 17-18	Durand.....	Jan. 17-18
Pardeeville.....	Jan. 22-23	Trempealeau.....	Jan. 22-23
Mauston.....	Jan. 24-25	Waumandee.....	Jan. 24-25
New Holstein.....	Jan. 29-30	Friendship.....	Jan. 29-30
Saukville.....	Jan. 31-Feb. 1	Pittsville.....	Jan. 31-Feb. 1
C. P. GOODRICH, Conductor.		J. M. TRUE, Conductor.	
Big Ben 1.....	Feb. 12-13	Elkhart.....	Feb. 12-13
Union Grove.....	Feb. 14-15	Hartland.....	Feb. 14-15
Fayette.....	Feb. 19-20	Geneva.....	Feb. 19-20
South Wayne.....	Feb. 21-22	Bristol.....	Feb. 21-22
Hebron.....	Feb. 26-27	Blue Mounds.....	Feb. 26-27
Sharon.....	Feb. 28-Mch. 1	Blanchardville.....	Feb. 28-Mch. 1
THOS. CONVEY, Conductor.		C. H. EVERETT, Conductor.	
Avoca.....	Feb. 12-13	Afton.....	Feb. 12-13
Black Earth.....	Feb. 14-15	Edgerton.....	Feb. 14-15
Eagle.....	Feb. 19-20	Bell Center.....	Feb. 19-20
Albany.....	Feb. 21-22	Arena.....	Feb. 21-22
Reedsville.....	Feb. 26-27	Alderly.....	Feb. 26-27
Appleton.....	Feb. 28-Mch. 1	Marshall.....	Feb. 28-Mch. 1

CLOSING INSTITUTE. MONROE, MARCH 5, 6 AND 7.

Applications for posters, and all inquiries in reference to the Institutes will be promptly answered.

GEO. MCKERROW, *Superintendent.*



INSTITUTE
CONDUCTORS
OF 1894-5



SINER ENG CO.

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C. H. EVERETT.

C. P. GOODRICH,
THOS. CONVEY.

UNIVERSITY OF WISCONSIN.

COLLEGE OF AGRICULTURE.

Agricultural Committee.

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HON. H. B. DALE	Oshkosh.
HON. CHAS. KEITH	Reedsburg.

Officers and Instructors.

THE PRESIDENT OF THE UNIVERSITY.

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F. H. KING	Physicist.
E. S. GOFF	Horticulturist.
J. A. CRAIG	Animal Husbandry.
H. L. RUSSELL	Bacteriologist.
E. H. FARRINGTON	. . . . .	Asst. Professor of Dairy Husbandry.
J. W. DECKER	. . . . .	Cheese Instructor.
L. H. ADAMS	. . . . .	Farm Superintendent.
MISS WINONA MERRICK	. . . . .	Clerk and Stenographer.

Farmers' Institutes.

GEO. McKERROW	. . . . .	Superintendent.
MISS H. V. STOUT	. . . . .	Clerk and Stenographer.

Courses of instruction covering all profitable lines of agriculture in our commonwealth are offered by the University of Wisconsin. For information concerning these courses, see this bulletin and write for catalogues circulars, etc.

The Agricultural Experiment Station is devoted to a study of problems incident to the agricultural development of our commonwealth. It is supported jointly by the general government and the state of Wisconsin. Each year an annual report of several hundred pages and frequent bulletins are issued and distributed gratuitously among the farmers of the state. Any farmer wishing to receive these reports and bulletins regularly should send his request on a postal card addressed to *Agricultural Experiment Station, Madison, Wis.*



W. D. HOARD.

CHAS. LINSE.

RICHARD GIBSON.

F. D. COBURN.

H. C. TAYLOR.

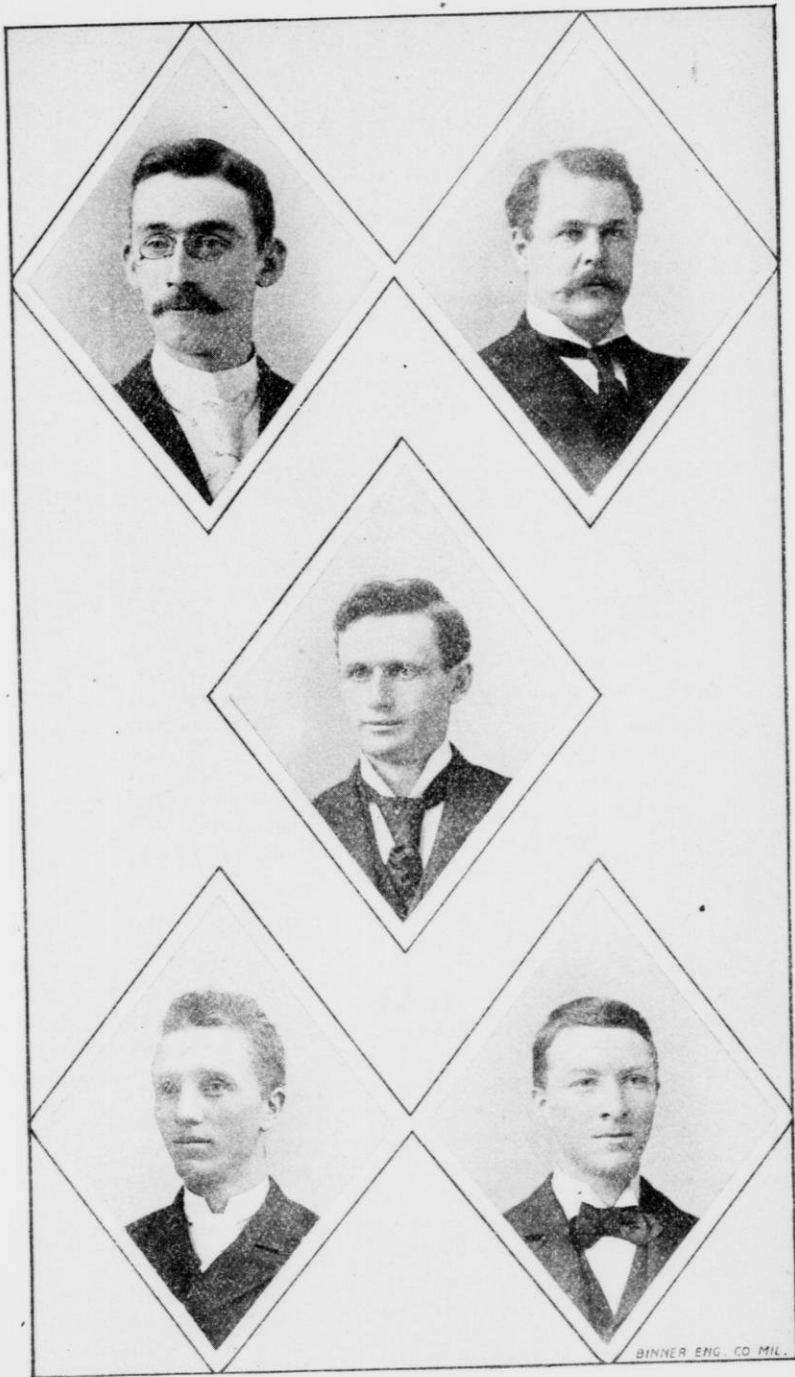
SINNER ENG. CQ. MIL.

FARM INSTITUTES.

The Farmers' Institute is a branch of the College of Agriculture, designed to render helpful aid to farming communities. Each winter from 70 to 100 meetings lasting from one to three days are held at various points in the state under direction of the Superintendent of Institutes. Any farmer wishing to secure an Institute in his neighborhood should send in a request to the Superintendent preferably during the summer months, as these meetings for the coming winter are recommended by the Superintendent to the Farm Committee early in the fall.

At the Closing Institute for the season papers and addresses of unusual interest are given and the discussions taken down in shorthand. The fruits of this meeting are gathered into a report called the FARMERS' INSTITUTE BULLETIN. Forty thousand copies of this bulletin are printed and distributed gratuitously at the Institutes the following season.

Any resident of the state failing to get a bulletin at his Institute can secure one by addressing the Superintendent and inclosing ten cents to pay expenses for mailing. Residents of other states can secure one post paid, in paper covers by sending 25 cents, or in cloth for 40 cents.



PROF. F. W. WOLL.

CHAS. L. HILL.

W. F. STILES.

PROF. H. L. RUSSELL.

GEO. L. HOWARD.

UNIVERSITY OF WISCONSIN.

COLLEGES.

- College of Letters and Science.
- College of Agriculture.
- College of Mechanics and Engineering.
- College of Law.
- School of Pharmacy.
- School of Economics, Political Science and History.
- School of Music.

COURSES.

- Long Agricultural Course.
- Short Agricultural Course.
- Mechanical Engineering Course.
- Civil Engineering Course.
- Electrical Engineering Course.
- Railroad Engineering Course.
- Law Course.
- Pharmacy Course.
- Ancient Classical Course.
- Modern Classical Course.
- General Science Course.
- English Course.
- Civic Historical Course, antecedent to Law and Journalism.
- Courses in Economics and Political Science.
- Special Science Course, antecedent to Medicine.
- Special Courses for Normal School Graduates.

BRANCHES OF STUDY.

The University presents a wide range of study, embracing more than three hundred subjects. Something of the extent and variety of these may be indicated by the following synopsis. Eleven languages are taught, viz.: Greek, Latin, Sanscrit, Hebrew, German, Norse, French, Italian, Spanish, Anglo-Saxon and English. In Mathematics there are twenty-two special courses. Under the Sciences there are a variety of courses in each of the following: Astronomy, Physics, Chemistry, Geology, Mineralogy, Zoology, Botany, Bacteriology. In History there are fifteen courses; in Civics, eight; in Economics, twenty-one; in Mental Sciences there are eighteen, embracing Psychology, Ethics, Aesthetics and Logic. There are eight courses in Pedagogics, and two courses each in Military Drill, Gymnastics and Music.

Physical Culture:—The Armory and Gymnasium, completed in 1894, is the largest building for its purposes connected with any institution of learning in the country. It is provided with rooms for lectures on Physiology and Hygiene, and for class and individual



BINNER ENG. CO. MIL.

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MRS. W. B. MOREHEAD

MRS. J. C. PLUMB.

W. H. ROSE.

A. SELLE.

exercise in all the forms of gymnastic practice. There are also the most abundant and approved facilities for shower, sponge and swimming baths.

In Mechanics and Engineering:—Elementary Mechanics, Mechanics of Material, Mechanics of Machinery, Theory of Construction, Thermodynamics, Elementary Surveying, Railroad and Topographic Surveying, Geodesy, Sanitary, Hydraulic, Railroad, Electrical, Steam Engineering, Hydraulic Motors, Hoisting Machinery, Theory and Construction of Locomotives, Railway Locomotives, Railway Location, Railway Equipment, Construction and Maintenance of Way, Railroad Field Work.

In Electricity:—Electrical Testing, Electrical Plants, Electrical Construction, and various forms of drawing are given; also shop work in wood, iron, brass, both hand work and machine work, machine designing, construction and testing machines.

In Agriculture:—Various courses are given in agriculture. Animal Husbandry, Farm Management, Dairying, Agricultural Chemistry, Veterinary Science, Agricultural Physics, Horticulture and Economic Entomology, etc.

In Law:—Courses in Equity, Jurisprudence, Real Property, Constitutional Laws, Wills, Contracts, Torts, Practice and Pleading, Law of Evidence, Corporations, Domestic Relations, Admiralty, Insurance, Estoppel, Partnership, Taxation, Criminal Laws, Common Carriers, Medical Jurisprudence, etc.

In Pharmacy:—Courses in Practical Pharmacy, Pharmaceutical Chemistry, *Materia Medica*, Pharmaceutical Botany, and Practical Laboratory Work.

General Facilities:—The faculty embraces upward of 120 instructors. The laboratories are new, extensive and well equipped; embracing the Chemical, Physical, Metallurgical, Mineralogical, Geological, Zoological, Botanical, Bacteriological, Civil and Mechanical Engineering, Agricultural and Pharmaceutical Laboratories. *Seminars* are held for advanced study in History, Language, Literature, Mathematics, and other branches.

The libraries accessible to students embrace that of the University, 30,000 volumes; of the State Historical Society, 167,000 volumes; of the State Law Department, 23,000 volumes; of the city, 12,000 volumes, besides special professional and technical libraries, making in all more than 200,000 volumes, thus affording very exceptional opportunities for reading and special research.

For further information send for a catalogue, or address the President or the head of the department concerning which information is desired.

C. K. ADAMS,
President.



BINNER ENG CO MIL

A. J. PHILIPS.

O. C. COOK.

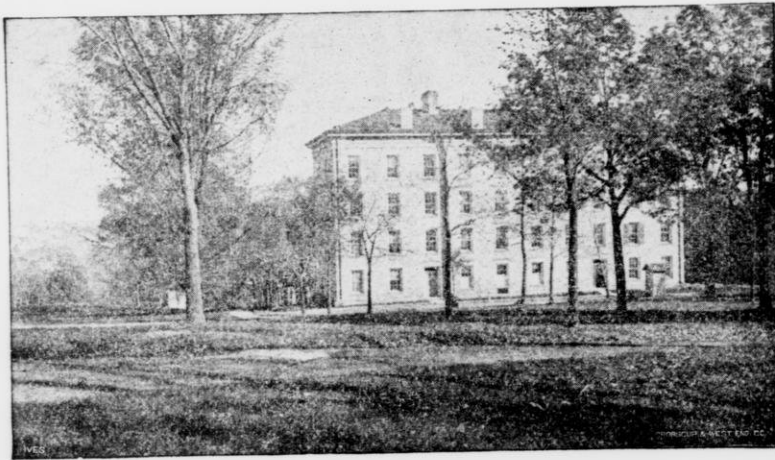
A. L. HATCH.

C. H. HAMILTON.

R. J. COE.

AGRICULTURAL INSTRUCTION AT THE UNIVERSITY OF WISCONSIN.

A Chapter in the Institute Bulletin Dedicated to Young
Farmers.



Agricultural Hall.—The General Recitation Room, several Laboratories and the office of the Dean are located in this building. All students except those taking the Dairy Course should come to this building for registering.

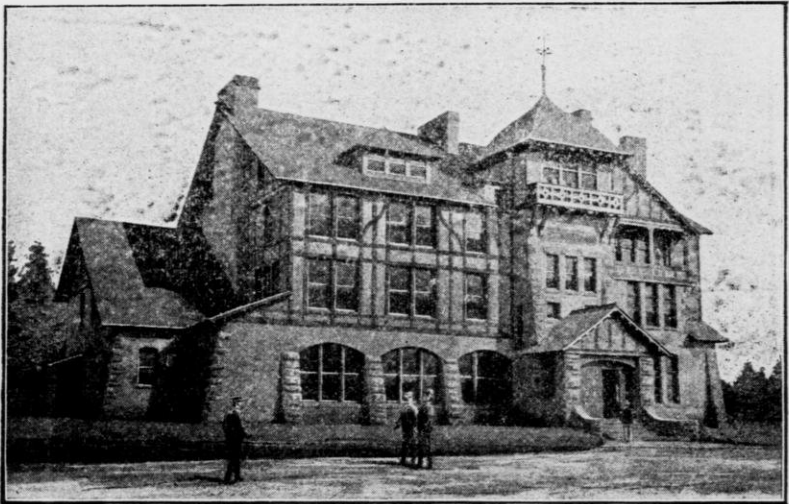
Farmers' Institute Bulletin No. 8 will fall into the hands of many farmers' sons who are undecided whether to strike out from the old homestead and press their way into the city, there to engage in the severe and unending struggle of business life, or to remain upon the farm, choosing agriculture as their vocation. These young men have a liking for the farm and are slow in choosing farming as a calling only because they fear the returns will not be equal to the effort put forth. If the present depression that has swept over the country has brought out one thing more clearly than another, it has shown the uncertainties of business ventures in the cities and the certainty of competence, comfort and the best things of life to those who intelligently pursue farming as a calling. With each passing year it becomes more evident that training and education pay on the farm as

they pay elsewhere in life, and other things being equal, those young men who have the best preliminary training will make the best farmers. There are two points of view in considering the educational question, first as to money making, and second as to securing real enjoyment in life. In regard to the first it is certain that a well-trained mind is more ready to grasp the situation and make the most out of each passing event and opportunity. For the second there is no doubt whatsoever. Farm life has large opportunities for enjoyment and solid comfort to those who know how to make the most of it, and education will show just what the opportunities are and how to improve them.

In its effort to be the central source of education for all classes of people in our commonwealth the University of Wisconsin has devised and arranged courses of instruction ample for the wants of young farmers of every class and ambition. The courses embrace the following: A Graduate Course; a Long Course requiring four years for its completion, and leading to the degree Bachelor of Science in Agriculture; a Dairy Course, which fits young men for conducting a creamery or cheese factory; and lastly, a Short Course in Agriculture which is arranged to meet the wants of young farmers who wish intensely practical instruction and have only a limited time to devote to study.

Circulars and catalogues describing agricultural and other courses in the University will be sent on application to all who request them.

The readers of this bulletin are asked to carefully peruse the following pages describing the facilities and equipment of the Agricultural College with especial reference to the advantages of the Short Course in Agriculture, a course which is becoming very popular with the young farmers of the state.

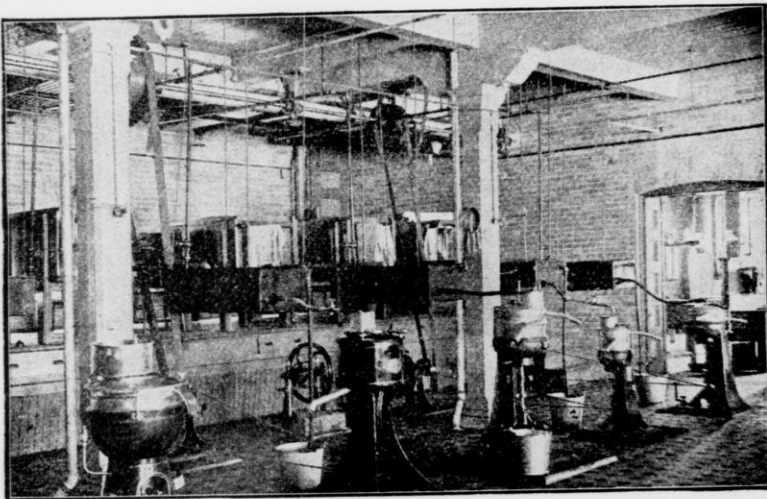


Hiram Smith Hall—The Dairy School Building.

FACILITIES AND EQUIPMENT.

Of the thirteen buildings on the college grounds, three are devoted wholly to agriculture, and our agricultural students make use of many of the others in common with other university students. Agricultural Hall is a stone structure, 42 x 120 feet, four stories in height. In it are found several lecture rooms, the agricultural library, reading room, etc. The agricultural library now contains 4,000 bound volumes, 550 of which are stud books, herd books, and flock registries. The reading room contains seventy-five of the leading agricultural papers of America and forty from Europe and other distant countries. In this building is located the office of the Experiment Station and the Farmers' Institutes. All agricultural students come to this building for registration and assignment to classes, and many of the lectures are given here.

Hiram Smith Hall, the dairy school building, is a three-story structure with lecture room, laboratories, reading room, a large creamery and cheese room, together with curing rooms, storage rooms, etc. Power is furnished by 60 H. P. steel boiler and 25 H. P. Reynolds-Corliss engine. Instruction in creamery and cheese factory operations are given in this building, and it is here that students taking the Short Course in Agriculture receive their dairy instruction. This building represents an outlay of \$40,000.



Hiram Smith Hall.—View in Separator Room.

The latest gift of our state is Horticultural Hall, a three-story building with lecture room, laboratories and green-houses, all arranged with a view to turning winter into summer for the young

farmer and gardener so that practical instruction can be given at a time when he can best be spared from the farm. This building represents an outlay of \$24,000. At the Experiment Station farm are many animals and objects of interest to the young farmer.

THE SHORT COURSE IN AGRICULTURE.

We have not space in this bulletin to give the advantages of all the courses in detail and shall therefore describe only the Short Course at any length, believing that more readers will be interested in this than any other single course.

The Short Course in Agriculture is so called because it requires but a brief time for completion. Our young farmers should understand that it always begins the first week in January of each year, and continues twelve weeks. This time is chosen because then better than any other season can the young farmers be spared from home and the duties of the farm. The prospective student leaves home the first Monday in January, and on reaching Madison easily secures room and board and finds himself comfortably settled by Wednesday morning of the same week, when recitations promptly begin, continuing well into March. On arrival he finds many other young men like himself looking for quarters and choosing a companion, the two room together for the term.

Think of the opportunity our Short Course opens up for the young farmer! Here is a university with more than a hundred teachers and more than 1,300 pupils from everywhere seeking instruction. Our young farmer finds himself in a new world, and, almost from the day of his coming, life takes on a new aspect. He finds at the university that a farmer is as much honored and respected as any other man, no more, no less, all depends upon the man. He associates with scores of others, all of whom are ambitious to make the most out of life on the farm. Many a young man has come to the university doubting whether the farm offered opportunities equal to his abilities; most leave wondering if their abilities are commensurate with the opportunities of farming as a vocation.

LINES OF STUDY.

Nine years' experience has enabled the agricultural faculty to arrange the studies so as to be intensely practical and helpful to the young farmer. Text-books are used in some small measure, but a large part of the instruction is through lectures, conversations and best of all, in stockyard, stable, laboratory, creamery and greenhouse.

ANIMAL HUSBANDRY, BREEDS AND BREEDING.

The rearing of live stock forms the corner-stone of Wisconsin's agriculture, and consequently much attention is paid to this subject. Prof. Craig gives some thirty lectures on the various breeds of live

stock, their characteristics, and general management. Our library contains many books, some of them very costly, devoted to live stock, 550 of which are stud-books, herd-books and flock-books. Much attention is given to a study of pedigrees and tracing the breeding of noted animals. Each afternoon a section of the class visits the Experiment Station farm, some farm in the vicinity of Madison, or some livery stable, where living animals are studied and scored. This work has grown to such an extent that hereafter Prof. Craig will have an assistant, to aid in the instruction. For the winter of 1895 this will be Mr. F. E. Baker, of Whitehall, Ill., the winner of the Ogilvie medal for 1894.



Stock Judging.—Second-Year Short Course Students training for the Ogilvie Medal Contest.

THE OGILVIE GOLD MEDAL.

Through the generosity of Mr. R. B. Ogilvie, proprietor of Blair Gowrie stock farm, Madison, some short course student each spring wins an exquisitely wrought gold medal, worth fully \$75.00, which is given to that student of the second year class who shows the greatest proficiency in judging draft horses and sheep of the mutton breeds. The first medal was won in 1892 by A. L. Hough, Winchester, the second in 1893 by J. J. Tschudy, Monroe, and the third in 1894 by F. E. Baker, Whitehall, Ill. In March, 1895, some fortunate young man will secure the fourth medal. Those who do not win are satisfied in knowing that they have learned much that will be helpful to them all through life.

FEEDS AND FEEDING.

This division of the work falls to Prof. W. A. Henry, who explains the chemical composition and characteristics of the leading feeds. Thorough drill is given in feeding standards laid down by the Germans and the modifications of these best suited to the American conditions. The results of feeding experiments at our experiment stations are studied through the numerous reports found in the library, which not only contains the reports of all stations in America, but hundreds of volumes from the old world.



The Ogilvie Gold Medal.

VETERINARY SCIENCE.

Dr. W. G. Clark, a former Short Course student, since a graduate of the Chicago Veterinary College, will meet the class for daily lectures and demonstration, his aim being to instruct the pupils in locating and detecting the common ailments of our farm animals and help in prevention and cure of diseases. To aid he has many skeletons, models, etc., among them the famous Auzoux life size, dissectible *papier mache* model of the Arab horse, costing the university \$1,000 in Paris. At least one horse is killed and dissected by the class during the term.

FARM DAIRYING.

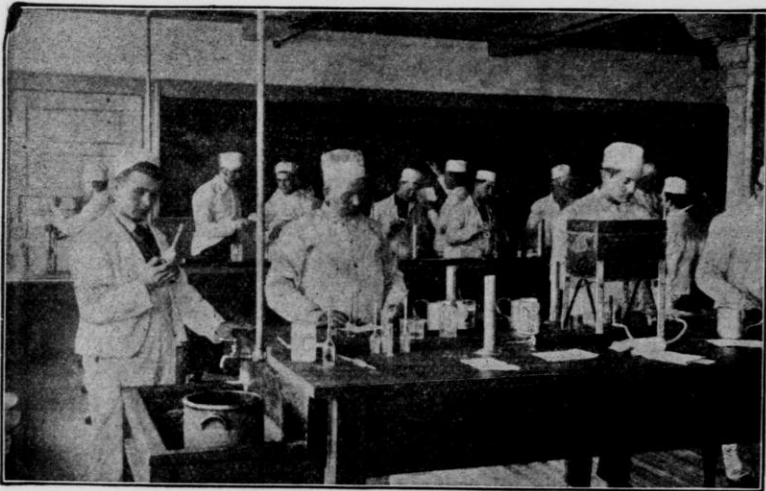
Instruction in this course is given in the dairy building by Dr. S. M. Babcock, inventor of the Babcock milk test, assisted for the season of 1895 by Mr. J. D. Clarke of Milton, Wis., a former Short Course student. The farm dairy room in the dairy school building is equipped with all the latest styles of hand and small power cream

separators. The young farmer is taught to make butter and put it in the most attractive package; for private trade and the commission market. A course of lectures is given on the subject of dairying by



Scene in Hiram Smith Hall—Students Pressing Cheese.

Dr. Babcock, and the Short Course students have thorough arnii in the use of the Babcock milk test. Many a farmer who sells \$500 worth of butter a year loses enough through imperfect separation of the fat, faulty manufacture, and improper packing to pay the whole cost



Scene in Laboratory of Hiram Smith Hall.—Students Testing Milk.

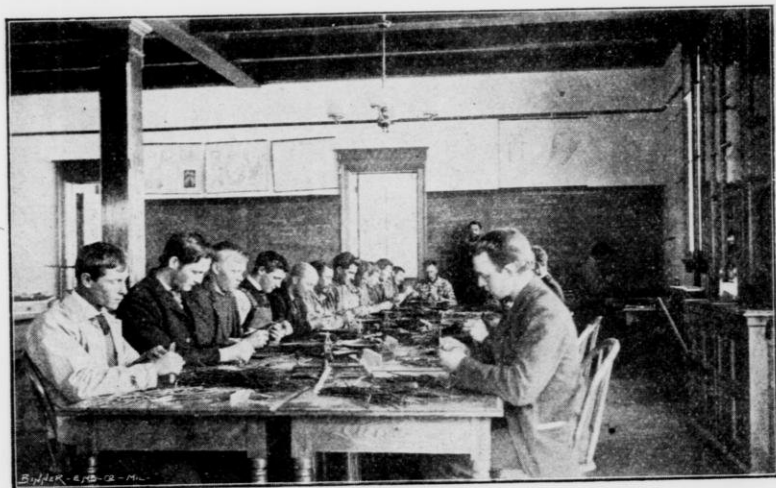
for sending his son to the Short Course. At our last stock fair the first prize for dairy butter was won by a Short Course student. At the last Walworth county fair the first prize for dairy butter was won by a Short Course student against thirty competitors.

AGRICULTURAL CHEMISTRY.

Every young farmer wishes to know more about the composition of the soil, plants and animals. In pursuing the course in agricultural chemistry under Dr. Babcock he will have three lectures a week treating on how the plant grows, feeds and matures and the animal food products it yields; of the composition and fertility of the soil; farm manures, commercial fertilizers, rotation of crops, etc.

AGRICULTURAL PHYSICS AND MECHANICS.

These subjects are taught by Prof. F. H. King, with Mr. C. H. Diener assistant, and covers a most important line for young farmers since it deals with drainage, tillage, the construction of farm buildings, water supply, etc. Not only are there daily lectures but much drill in the laboratory.



Scene in the Laboratory of the Horticultural Department.
Students Root Grafting.

HORTICULTURE AND ENTOMOLOGY.

These branches are taught by Prof. Goff, assisted by Mr. Fred Cranefield. In the laboratory students learn to graft, bud, make spraying mixtures, for the killing of insects, fungi, etc. One of the

green-houses is arranged as a winter garden having an area 22 x 75 feet. Here, while the ground outside is covered with snow, the young farmer makes hot-beds, plants an apple orchard, plants cuttings, potatoes, learns to use garden tools of all kinds, to bury vines, etc., etc., just as he would in the natural season. In another green-house each student has a space at the florists' bench, where with the pots and soil he studies the growth and management of young plants.

BACTERIOLOGY.

All fermentation and decay as well as many diseases are due to minute organisms known as bacteria. Prof. Russell will lecture to second year Short Course students on the relations of bacteria to agriculture and give the class many facts and illustrations which must prove of great value to the young farmer.

THE ECONOMICS OF AGRICULTURE.

Every thoughtful citizen believes that the stability of our American government depends largely upon the position which the American farmer holds to the rest of the community. Prof. Wm. A. Scott, of the School of Economics, gives twelve lectures to second year agricultural students on such topics as the mutual relations of agriculture to the other industries; systems of land tenure; money, its function and varieties; banks, their functions, etc.



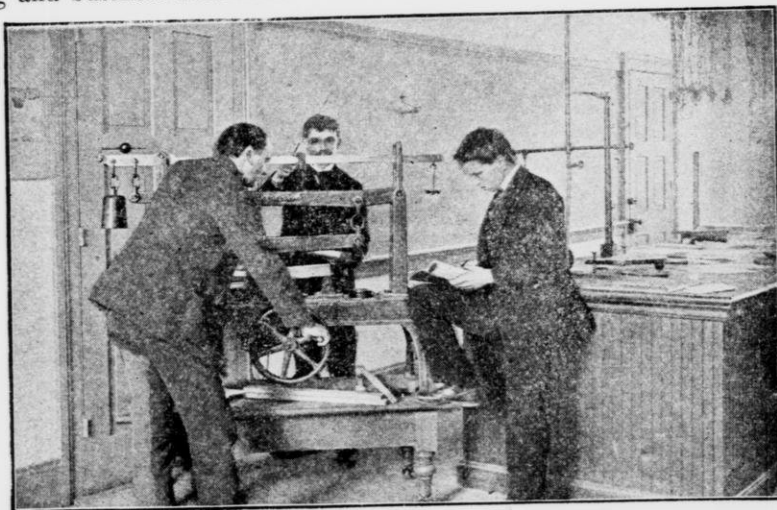
Carpenter Shop.—Instruction in Wood Turning.

CARPENTRY AND BLACKSMITHING.

A successful workman must be deft with the tools he handles. Our young farmers can spend two hours each afternoon in the university carpenter and blacksmith shop. In the former he is assigned to a bench with carpenter's tools and a turning lathe during one part of the term, while later he proceeds to the blacksmith shop for further instruction. This is also a favorite course of study with many of our students, a number of whom since leaving us, have blacksmith shops on their farms where all common blacksmithing is done.

FARM BOOK-KEEPING AND BUSINESS ACCOUNTS.

A farmer should understand business forms, and keep accounts in a business like manner. Recognizing this the Regents of the University have arranged for a course of instruction in farm book-keeping and business accounts.



Physical Laboratory.—Students Testing Strength of Timbers Preliminary to Lectures on Farm Buildings.

THE SHORT COURSE LITERARY SOCIETY.

Every farmer should be able to express himself clearly and forcibly by pen and voice, and should know how to preside properly at public meetings. Each year our Short Course students organize a literary society which is a most pleasant and profitable feature of the course, there being no lack of interest from the very opening of the term until the closing meeting.

REQUIREMENTS.

The student taking the Short Course should be at least 16 years of age. Experience has shown that those young men who are 20 or more years of age and have carried responsibility prove the best students and get the most from the course. We have had many farmers with gray hair in the Short Course and such have almost always been the most pleased with the instruction.

EXPENSES.

This item interests most young farmers, for few that are ambitious to get ahead have much means at command. The expenses of the Short Course are very small considering the opportunities.

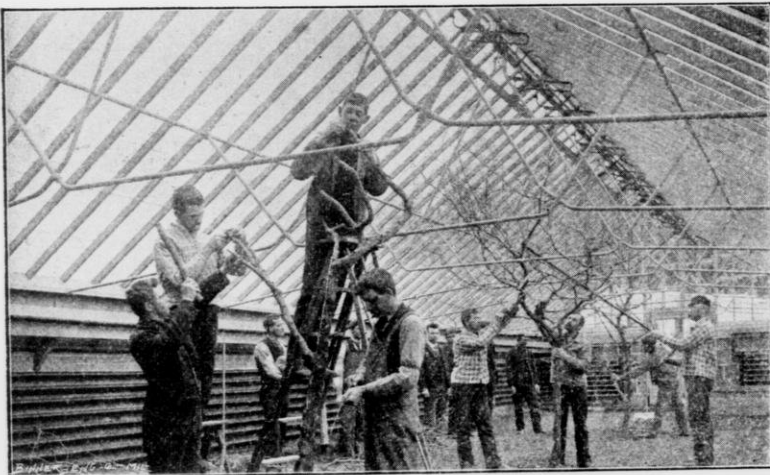
The expenses of a Short Course student may be put down as follows:

Room rent, 12 weeks, at \$1.25.....	\$15 00
Board, 12 weeks, at \$3.....	36 00
Incidental fee.....	5 00
Books.....	7 00
Expense of visiting stock farms.....	3 00

Total \$66 00

Non-residents will pay \$6 in addition to the above sum. If the course in practical mechanics is taken, add \$5 to the above; if dairying, add \$1.

Some of our students spend a smaller sum than is above noted.



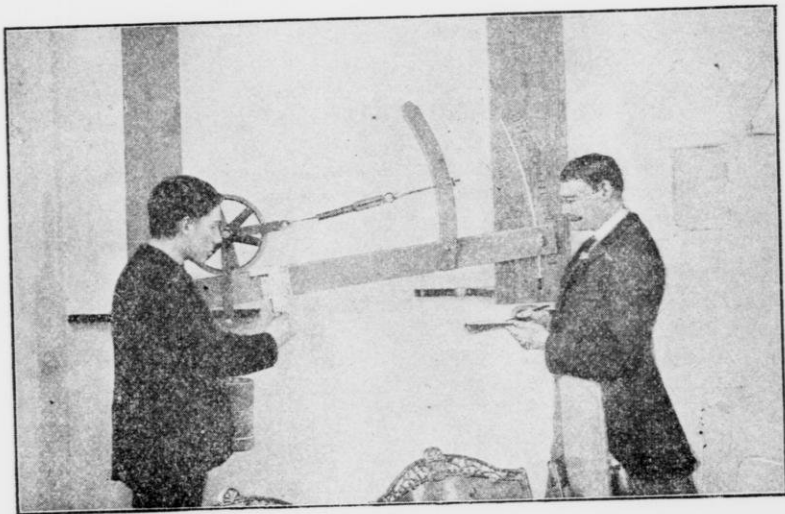
Horticultural Department.—Scene in the Winter Garden. Students
Top Grafting from Trees.

DATE OF OPENING.

Recitations for the next term begin Wednesday, January 2, 1895, the term closing March 22.

In general it may be understood, unless other notice is given, that recitations in the Short Course and the Dairy Course always begin the first Tuesday in January of each year, the terms lasting twelve weeks. Usually a student can leave home Monday and reach Madison in ample time to secure room and board and settle down for work by Wednesday morning.

An illustrated circular describing the Short Course at greater length will be sent on application. All students intending to take the Short Course should send in their names as soon as the decision is made. To all such an additional circular relative to rooms, board, etc., will be sent a couple of weeks before the term opens.



Physical Laboratory. Students Testing the Effect of incline on Draft, Preliminary to Lectures on Road Construction.

THE DAIRY COURSE.

Although farm dairying is taught in the Short Course, another course is devoted wholly to dairying, its aim being to prepare the student to operate a creamery or cheese factory. The students of this course take all their instruction in the Hiram Smith Dairy Hall.

This course begins and closes at the same time as the Short Course. An illustrated circular describing the Dairy Course will be sent on application.

THE LONG COURSE IN AGRICULTURE.

There are young farmers who desire to secure a thorough collegiate training; to meet the wants of these a Long Course in Agriculture has been established which leads to the degree Bachelor of Science in Agriculture. Those interested in this course should write for the university catalogue, which gives in detail an account of the course.

GRADUATE COURSE IN AGRICULTURE.

Each year a number of young men who have graduated at our own or other institutions pursue advanced lines of agricultural study with us. Our facilities in several directions are now ample for most helpful instruction to this class of students.

AGRICULTURAL EDUCATION WITHIN THE REACH OF ALL.

There is not a young man in the state that can not take an agricultural course, long or short, at the university, provided he only makes up his mind to that end. It may take years to accomplish the result, but in this country everything is possible in the way of securing an education. Any bright young farmer can settle the question of how he shall obtain the necessary funds to pay his expenses while at Madison.

ATTENDANCE AT UNIVERSITY 1892-93.

Total students in Short Course.....	66
Total students in College of Agriculture.....	173
Total students in University.....	1279
Total instructors in College of Agriculture.....	20
Total instructors in University.....	117

For illustrated circulars describing the agricultural courses, address Prof. W. A. HENRY, Madison, Wis.

For information regarding all the other university courses, address President C. K. ADAMS, Madison, Wis.

WILLIAM HENRY MORRISON.

William Henry Morrison, whose death has been so widely mourned in Wisconsin, was born in Yorkville, Oneida County, New York, 1837. He came to this state in 1859, and settled in Walworth County. His education was obtained in the common schools and in Milton College. After leaving school he engaged in the business of farming. He was married September 24, 1862, to Julia M. V. Heath, who is now living with her two children, Howard and Bird Morrison, at Madison. While a resident of Walworth County, Mr. Morrison was elected register of deeds three terms, and was secretary of the Walworth Agricultural Society nine years. He was president of the Wisconsin State Dairymen's Association three terms. For several years he was one of the proprietors of the Western Farmer, and was during his life one of the leading members of the State Agricultural Society. Upon the organization of the Wisconsin Farmers' Institutes in 1885, he was made superintendent, a position he held until his death, which occurred at his home in Madison, December 13, 1893. His death, in the prime of life, was the result of a fall upon an icy sidewalk.

Mr. Morrison's public reputation rests mainly upon his work as secretary of the Walworth County Agricultural Society and in the Farmers' Institutes. He had organizing genius. From an unheard of thing he made the Walworth County Fair known all over the United States in agricultural society circles. Built upon his model, it stands today the strongest society of its class in the West. He took the Farmers' Institutes when they embodied nothing but a dream and an appropriation, made them popular fountains of fruitful knowledge, handled the appropriation so wisely that the state was glad to more than double it, and made for his state and himself a reputation in Farm Institute work that reached the agricultural mind of every civilized nation. More important than this, he stirred the farmers of Wisconsin to profitable thought. He made the Institutes the places, not for intellectual display merely but intellectual trades, where practical ideas were the merchandise, and each man brought away more than he gave. Mr. Morrison loved his work. Heart, mind and soul were absorbed in it. In conversation he could hardly drift away from it. He knew the hardships of farm life. His sympathies were with the men who toiled. In the work of agricultural education he could see a lever lifting farm life to better and

happier ways. And so the enthusiasm which filled him was of the best, and was contagious because it was so warm and so honest.

Mr. Morrison's life and work has been worth millions of dollars to this state. Men may do better things than help enrich their fellow men, but not many. Comfort and crime are not akin. Poverty and sorrow go hand in hand, with ignorance in the lead. The Institute work brought a wealth of ideas as well as of dollars. William H. Morrison's monument in this state, and in many other states will be a more profitable agriculture, a broader and deeper farm mind and a happier farm life.

To his personal friends his death comes as one of the hardest things of life to bear. He loved his family, his home and his friends with a tenderness and an intensity which brought back to him that which he gave. Gentle in his ways, strong in his affection, rich in a comprehensive charity, singularly free from the poison of malice and the folly of envy, he represented a rare Christian manhood.

Delicate shades of character, or of feeling, cannot be pictured in right form through the dull machinery of words. The tributes of flowers and of tears are best. But the life of William H. Morrison is worth many tributes, and among the rest shall be the lasting memory and love of those who knew him well. "

H. C. ADAMS

PROCEEDINGS
OF THE
CLOSING FARMERS' INSTITUTE

HELD AT

Menomonie, Wis., February 27-28, and March 1, 1894.

HORTICULTURAL SESSION.

Morning Session—Prof. W. A. Henry in the Chair.

Address of Welcome, By Dr. E. O. Baker,
Mayor of the City.

Ladies and Gentlemen:—It affords me great pleasure to meet you, and I must say as I look over this audience that things have changed mightily since I was a boy. Then the simple-minded were generally selected to run the farm, while those who parted their hair in the middle were selected for the profession that I was put into and the one who could tell the most astute, the cleanest cut lie, was selected for the law. The boy with honesty marked in all his features was for the farm.

I have only to say that we are very glad to meet you, and we tender to you the freedom of the city.

Response,—Prof. W. A. Henry.

Dr. Baker, Mr. Mayor, Citizens of Menomonie and Dunn County:—As a representative of the Farmers' Institutes of Wisconsin organized and conducted by the University of your State, it affords me great pleasure to accept

your welcome and your hospitality which have just been so kindly and freely given us by your mayor. In making up a meeting of this character we have brought to you some of Wisconsin's successful agriculturists, fruit-growers, stock-raisers and farmers generally. These men are not selected because of the size of the stories they can tell, but generally because of their success as farmers. These men live upon their farms and in their gardens and are what we call practical people.

Now, for the next three days that we are to be with you, please remember without fail that this is your meeting; it belongs to the farmers, not as a class but as a profession. I hope that the farmers will not persist in taking the poorest seats; don't take the back seats in this meeting or in any other place. It doesn't pay. Take the front seats as long as they are unoccupied.

I want to call your attention to the fact that this work is part of the work of the State University. The State

University is one of the institutions of this commonwealth which is absolutely and entirely free from politics,—neither party rules in this University, and so this meeting will be conducted absolutely without politics, because it is part of the State University. We have no more right to talk politics in this meeting than we have to discuss religion. We are called here for the specific purpose of learning how to grow crops and how to make more out of farm life. The State University doesn't belong to the few boys who go down to Madison, but it belongs to every one of you, and when you think that this meeting is about the seventy-fifth that has been conducted this winter, you will get some idea of the large work that our State University is doing for the people. These red-covered books that you see here represent the last of 40,000 copies that are being distributed this winter, and we want you all to take home a copy; they are a part of the University instruction and we want you and your friends to have them.

Since our meeting a year ago at Fond du Lac, the Institutes have suffered a severe and overwhelming loss in the death of their conductor, W. H. Morrison. The calamity is one that is strongly felt. It has followed the Institutes all winter, and the farmers of Wisconsin everywhere have realized something of the loss they have sustained. When Mr. Morrison's body was laid beneath the green clod, thousands and tens of thousands of the farmers of Wisconsin said, "We have lost a friend." He died at a time when death seemed far away from him; his health was excellent, and he was more filled with ambition than I ever knew him to be before. Only a few minutes before he was hurt he came into my office to tell me how the farmers over on Lake Michigan had just raised \$45 to help advertise their Institute, and how another set of farmers on the Mississippi River had raised \$100 to push their local Insti-

tute, which was to be held four or five weeks later, and full of enthusiasm he left my office; an hour afterwards I saw him severely injured, and later we followed him to his grave. In his life we had a lesson of patient work well done. We have been taught also something of the magnitude of our Institute work, when it goes right on regardless of one man or a dozen men. This thing is larger than Mr. Morrison, true as he was to the interests of this State; it is larger than all this audience that should be gathered here today, for the 140,000 farmers of Wisconsin are tied up to their State University, and to better farming life, and the work goes on year after year whether you or I pay any attention to it. This being so, let us get all the good we can out of it while it is passing.

Now, let me call your attention to one thing. Whether in farming or whatever occupation you follow, you are in it for the money there is in it, but there are men in farming because they love farming and there are men following this Institute work not for the money they get out of it, but for the love of this high work. There are teachers in the University, not for the money they save, but for their love of research and study, and I want you to come here today not measuring this Institute wholly by the number of dollars you are going to get from it, but the uplifting you are going to get from it. In England when a man gets rich he goes into the country. In this country it has been in the past that when a farmer got \$20,000 he moved into town. That ought not to be. Let us put farm life in such a shape that a man will say, "I want to live on the farm until they carry me to our country graveyard." One more word. Dr. Baker told us that the brighter boys, the boys that could tell the largest stories, went to the cities, the honest boys went on the farm. That is probably an explanation of why we have constantly to go back to the farm to

get our best boys. The city cannot breed the boys that the country can, and the life of our nation depends upon the character and the stamina of the boys that we are raising in the country, and that is one of the reasons that urges the State of Wisconsin to push her Farmers' Institute and to put more life into the country, because

there is where her safety and her strength lies.

Mr. John M. True was called to the chair by Prof. Henry.

On motion of Mr. Phillips, the time allowed for answering questions during the discussions of this meeting was limited to three minutes for each person, and each person to speak only once until all have had a chance.

APPLE GROWING IN NORTH EASTERN WISCONSIN.

O. C. COOK, Oconto, Wis.

The apple is the king of fruits. With the rapidly increasing settlement of the northwestern states, and the universal desire of an intelligent people to cultivate fruits, the subject of varieties adapted to the climate becomes yearly more and more important; although it has been extensively discussed there is much more to learn.

That the apple can be grown, of some varieties, wherever corn is grown, is beyond doubt, yet varieties to command success have thus far been an item of costly expense. But a single variety belonging to the class *Pyrus Malus*, named *Duchess of Oldenburg*, has been most successful; many others have done fairly well, and the planter has to assume a risk in selection which in some cases has been well rewarded, in others a failure. The fact that the failures are much more numerous than the successes has caused many to say that our northwestern states were not adapted to the growth of any but small fruits. Enthusiasm, careful observation and perseverance, however, in this as in all other pursuits, is destined to succeed, and now we can show apples that compare favorably with eastern fruit.

Northeastern Wisconsin.

Northeastern Wisconsin, I should say, started at the head waters of Green Bay, and extended west to the Wolf River, and north to the Menomonee River, including Oconto, Shawano, Marinette, Florence, Langlade and Forest Counties. The last three are not much developed as for fruit growing. Oconto and Marinette are perhaps more congenial to apple culture than farther back from the waters of Green Bay, although fine apples are raised in Shawano County.

If I were to tell all of my experience in apple culture for the last thirty years in Oconto County, it would take more time and space than allowed me; nor is it necessary, for with our swamps drained and orchards under-drained you can now grow varieties that could not be grown twenty or thirty years ago.

Experience in Oconto County.

When I first came to Oconto County, and years after, the cry was that we should raise nothing but crab-apples, but I thought differently, and as fast as I could I planted apple trees, and have kept on doing so until now I have over 1,200 bearing trees. My neighbors used to think I was foolish for

setting out so many trees, but when they came to see the fruit I raised, and the premiums I received wherever exhibited, they changed their minds, began to follow my example, and have been fairly successful. I think you will admit when you remember that thirty years ago no apples were raised, and in 1892 over 27,000 bushels were raised in Oconto County, with Marinette and Shawano not far behind, that northeastern Wisconsin has made good progress.

It would take too long to tell you the different varieties planted and proven no good, but what did survive and prove profitable you have a right to know.

Hardy Varieties.

I have Duchess, Tetofsky, Haas and Fourth of July over twenty-five years old and bearing large crops yet, and they look as though they would last twenty-five years more; Wealthy, McMahan, Utters Red and Fameuse twenty years planted, also in good condition, although the Wealthy and Fameuse were somewhat hurt in the winter of 1884-85, but recovered and are doing well. Later on I planted a good many Russian varieties, some good, some good for nothing.

In going over this section of the country I found some had better success with half hardy varieties than I; I found in all such cases they had a better site, high ground and well drained. I found Twenty-Ounce, Willow Twig, Fameuse and Talman Sweet over thirty years old that were healthy and bearing large crops of apples.

New Varieties.

I have over thirty new varieties on trial from Wisconsin, Iowa, Minnesota and Illinois. From some of these seedlings I am looking for great things, for it is from seedlings that we must look for the coming apple.

Look at the difference now and thirty years ago; then you had no book to go to but Downing's book on fruit and fruit trees, and out of hundreds of varieties I only found four

that are iron-clad, and now look at the grand array of new seedlings to choose from.

Education Needed.

Line upon line, precept upon precept has been given you regarding apple culture, not that there exists a greater diversity of opinion, but because so little heed is given to the plain teaching of nature and common sense. Many new and valuable methods have been described which insure the desired kind and quality of fruit.

The non-progressive orchardist is always complaining that his orchard does not pay. It does pay for the labor he bestows on it, but it will not pay for what it does not receive.

Fertilization and Cultivation.

The apple tree is an enormous feeder if it produces a large amount of fruit. How then, can we expect to raise barrel after barrel of apples from any given tree, year after year, when nothing is fed it. In raising fruit trees for profit the following rules should not be overlooked: 1st. Thorough drainage. 2d. Thorough preparation of the soil. 3d. Liberal fertilization. 4th. Hardy variety. 5th. Good cultivation. 6th. Spraying.

Value of Apples.

Now, with the prospect of a large crop of apples next summer and varieties suitable to the climate better known, and soil better drained, it does seem to me that our future prospects are bright and only a question of time when northeastern Wisconsin will become a commercial point for apples the same as Waupaca is now for potatoes. I will now finish my paper by saying that when it takes four bushels of wheat to buy a bushel of apples that the apple is king.

Discussion.

Mr. Faville—Please tell us the character of your soil, whether it is hilly or otherwise.

Mr. Cook—You might call it undulating, but it is pretty stony. A little

sandy loam on top with a heavy clay subsoil.

Mr. McKerrow—I wish Mr. Cook would enumerate the varieties that, from his experience he has found to be iron-clad for his locality.

Mr. Cook—To those named in my paper I will add there are some Russian varieties,—the Yellow Transparent, (although it blights quite badly), and the Hibernial. I don't think much of that but the tree is all right.

Mr. Faville—Are you working for the wood or for the fruit?

Mr. Cook—For the fruit. The fruit is not very good but it sells very well.

Mr. Plumb—Mr. Cook lives upon that narrow belt of limestone formation which stretches up into northeastern Wisconsin. He is not on the sand. Those of you who have gone up that country between Wausau and New London have discovered another stretch of sand; running clear up to the extreme northeastern part of the State is one, but it is a different kind from the lake shore strip. Mr. Cook is between the two, on the limestone formation and a very fortunate location as regards soil. I think he is on what is called the Maple Ridge soil, and it is a very important factor in Mr. Cook's success. It is a thoroughly watered region; he is not only near to Lake Michigan, but the climate is different entirely to that of northwestern Wisconsin. We must take this into consideration always when listening to Mr. Cook.

Mr. Hoxie—Mr. Cook, you spoke of fertilizing. What would you consider the best method?

Mr. Cook—I would plow it up. If you have a good sod that would be sufficient, if you took the sod all away from around the trees. That is as much as it ought to be fertilized for that one year, the rotted sod around the tree.

Mr. Hoxie—Would you fertilize with barnyard manure or any kind of commercial fertilizers?

Mr. Cook—Ashes are the best if you

can get them. If the tree is doing well let it alone.

Mr. Hoxie—Isn't it true that sometimes a tree will appear to be doing well in its foliage and yet does not bear fruit?

Mr. Cook—In that case I should spread about two bushels of ashes about the tree. If you put too much coarse fertilizer from the barnyard you produce a growth of wood more than of fruit, but the ashes help the fruit crop,—ashes and bone dust.

Mr. Hoxie—Wouldn't two bushels of ashes be pretty strong to a tree?

Mr. Cook—You take a tree thirty or forty feet across and two bushels don't go a great ways around. It should be applied as far out as the limbs extend and not heaped up around the trunk. There are no feeders there.

Mr. McKerrow—Will a mulch of straw, marsh hay, or any coarse material of that kind, save an old tree that appears to be on the decline?

Mr. Cook—Yes, it will help.

Mr. Wilson—Is it a good idea to set a new tree in the same spot where an old one has died down?

Mr. Cook—If I dug a big hole ten feet square and filled it with good rich material I don't know why I would not set it there as well as some other place, but I would not want to unless the place was thoroughly fixed for it.

Mr. Noyes—Would you protect the trunk of your tree from the weather when you set it out?

Mr. Cook—Oh, no, I don't want any babies among my trees; I never use any protection and I never had any trees die for want of it. We don't need it in our country. In some localities it might be needed.

Mr. Boynton—The conditions for apple culture in some other parts of Wisconsin are not as good as some years ago, according to the opinion of many. Mr. Cook does not seem to agree with that.

Mr. Cook—In my locality they are a great deal better now than they were thirty years ago. We have the insect

pest and the fungus disease now that we did not have then, but we can handle these all right. When the country was first settled we had a good deal of fire blight, because there was not circulation and it was too hot in the summer, but since it has been cleared up there has been no trouble of that kind.

Mr. Kellogg—Mr. Cook's particular part of the state, the climatic influences and the soil features will not apply to any other part of the state. I understand Mr. Cook can raise peaches and most any kind of plums, which is not true of many of the rest of us.

Mr. Cole—I would like to know how the gentleman manages the fire blight. What we call fire blight is when the ends of the limbs die out.

Mr. Cook—I am not free from that trouble, but I do not consider it of any great importance. I watch my trees, and as soon as I see the ends of the limbs are not good, I take my pruning knife and cut them back to

where the wood is good. It only happens with young trees; when they get to bearing there is no further trouble.

Mr. Phillips—Don't the Yellow and White Transparent blight with you?

Mr. Cook—Yes, and so does the Wealthy, but I overcome that. I don't know of any remedy, only to cut them right off and burn up the fungus.

Mr. Barnes—Why do you burn up the twigs of these trees?

Mr. Cook—Well, it is thought that this fungus contains spores that will be transferred to the trees. That is what the books say.

Mr. Barnes—Isn't it true that you can transmit that fungus or blight from one tree to another in using your pruning shears?

Mr. Cook—I cut it off, wood and everything; don't touch the fungus with the shears.

Mr. Barnes—Sometimes we don't know how far to reach to get to the sound wood, we have to go to the root.

ORCHARDING IN WESTERN WISCONSIN.

A. J. PHILIPS, West Salem, Wis.

Twenty-three years of actual experience in growing apples in western Wisconsin has led me to the following conclusions:—First, we will be honest and say that this climate is not well suited to apple-growing. It is very cold in all of our winters, and much colder an occasional one. It is often very dry and generally very hot in both spring and summer. We must study and consider not only the probable but the possible degrees of cold that our trees will be called upon to withstand, and be governed by that in our selection of varieties; and to make

the business profitable, pleasant and enjoyable we must make a profound and deep study of adaptation.

Choice of the Best.

A reasonable degree of success will require the hardiest varieties obtainable, the selection of the best sites and locations and the giving of the very best management. We have the hardy varieties in quite a good number, but they still need culling and sifting to choose the very best. Our State Society has come to some quite unanimous conclusions, still our doctors do not all agree upon some points, so for

the purpose of this paper I will give you mainly my own conclusions on this subject, leaving the hearer or reader to compare them with not only his own experience but with that of others in similar locations.

No Counterfeits.

We have not like our brother, the dairyman, been assailed with a counterfeit of our goods, because nature has so excelled in the quality and appearance of our apples that no man can imitate them for market purposes, and for health it is my opinion that no fruit exceeds them,—hence I think that every farmer who is raising a family, or expects his sons or other men's sons to raise families on his old farm, should plant an orchard providing there is any surety that he can succeed on his soil and location, for I know apples are conducive to both health and happiness.

Thirty-Seven new Seedlings.

Looking around in my orchard the present winter for pointers to help in preparing this paper that will go into many thousand farmers' homes, I find that in addition to some half dozen of our old varieties which I have found profitable, I have some thirty-seven of the new and best seedlings on trial, of Iowa, Minnesota and Wisconsin, the value of which for this climate I can report on later, if life is spared, for in quest of knowledge I have visited over one-half of the original trees of these different seedlings, and should I give utterance to a fact or hint that will prove a benefit to one or more Wisconsin apple growers then I shall be well satisfied.

Skill Needed.

Second, let me say that apple growing in western Wisconsin is about as difficult a task as any that a farmer can engage in and none but those who are well informed and have made it a study, or those who will inquire of men capable of giving instructions on the business, can hope to succeed in growing the standard apple, for unlike

anything else grown on the farm the trees cannot be housed and protected but must stand the cold of winter and heat of summer. This is a hard climate on trees; they have to work with all their strength to ripen their fruit in our short, hot seasons, and after bearing a full crop they go into winter exhausted, and should it be very cold and continue so they will very likely be injured.

The only sure plan to grow and keep the orchard is to plant the best and hardiest varieties on the most suitable locations, and then set a few trees each year afterward.

Tree Peddlers.

Have no dealings with the traveling tree-peddler, who tells big stories and shows you over-drawn and handsome pictures of apples. I mean by the tree-peddler the man who sells in a different locality each year. Deal direct with the nurseryman or with a responsible local salesman.

If possible set trees grown as far or farther north than the place where you set them; avoid trees grown too fast on a very rich soil. I prefer a tree three or three and one-half feet high at three years old, to one five or six feet high at the same age, for the growth has been slower and the wood is better ripened. Wash the roots clean before setting and cut off all dried or bruised roots if any. Get trees as near home as you can, so that they will be out of the ground as short a time as possible. Give good cultivation and retain the moisture around the roots by mulching with coarse manure as soon as the planting is done.

Protect.

Before winter comes on be sure and protect each tree from sun, mice, rabbits and other small animals by weaving eight laths together and standing around the tree; this will be the surest and cheapest protection obtainable and will last from six to ten years. In heavy clay soils where the feeding roots run near the surface, seed with

clover as soon as the tree begins to bear, and keep up fertility sufficient to grow good apples and keep down the grass and weeds around the trees by applying plenty of mulch. Head your trees at least four feet high, otherwise they will be unhandy to work around and care for.

Proper Soil.

Clay soil on well elevated land where limestone comes near the surface is the best place for the apple orchard. With such a place combined with a love of the business, and the possession of a fair amount of knowledge and a desire to obtain more,—by purchasing proper varieties and caring for them as I have recommended, planting some each year, I think that in a large part of western Wisconsin the apple crop will pay as well, with the same expense and labor, as any crop on the farm. If you have children do not plant any forbidden fruit nor put any in your cellar; give them a free run of the orchard and free access to the cellar, they will love you more and you will love them better.

Although the apple crop is a difficult one to grow it is more in line with the average farmer's work than the growing of any other fruit, as of all fruit the apple is first in point of usefulness, and the work is with the plow, spade and manure fork.

Horticultural Education.

If you have boys of your own send one to take the short course in agriculture at Madison at least one winter. Have him take for one study horticulture with Prof. Goff. He will learn not only to make root grafts for growing trees but will learn to bud and graft in the tops of young trees (never graft or prune old trees). This will be useful and profitable, for a tree grown from a graft in the ground and never moved is worth twenty-five per cent. more than a transplanted tree, especially if the latter comes from a distant state; and a tree of a number of our hardy varieties can be increased in value at least thirty per cent. by

topgrafting in the limbs of good stock, and for me nothing is harder, freer from blight, more vigorous and better suited for the purpose than the Virginia crab. I have trees of this kind that have been bearing ten years and have one hundred set two years ago for grafting the coming spring, so you see I take my own medicine.

Get Good Varieties.

When you buy trees do not give an order and then allow the seller to substitute other varieties. Study the business for yourself and order what you are satisfied is what you want. I like a man to do this business as Judge Carpenter of Madison did. He wrote me, "I hear you grow hardy trees. Please send me your catalogue. If I can be assured the trees are grown at West Salem, and that they will be true to name I may order some; otherwise I want nothing." You would allow no man when buying any other article on the farm to substitute something different. After my years of experience, failures and successes, I am of the opinion that in order to protect the farmer from being swindled, and to disseminate instruction relating to varieties and locations, we need a fruit commissioner as much as we do a Dairy and Food Commissioner.

Expensive Experience.

A reliable farmer informed me this winter that a few years ago three thousand dollars was taken from his county for worthless trees that never lived to bear fruit, and years ago when I depended upon buying trees and had not posted myself I bought many trees for large standard apples, cared for them the best I knew how, and when they bore fruit it was a small cherry crab.

Patience Needed.

As early maturity and quick returns is the motto nowadays, I find that it requires a great amount of patience to care for and wait from five to eight years for apple trees to begin to bear, and I advise no man with limited means to go into the business on a

large scale, but I advise every man who has a suitable location to raise what he needs for family use, and men with plenty of means and a knowledge of the business by selecting our best fruit lands can make it profitable even in western Wisconsin. I find that with me they are now a satisfactory crop, as for the past ten years I have raised from four to six hundred bushels per year. I also find by carefully picking, packing and throwing out the poor and defective specimens, sending the fruit to market in new, clean packages I receive usually very remunerative prices. I find that in mulching bearing trees the manure should extend as far as the limbs reach to obtain the best results.

Horticultural Societies.

After these years of experience in this business I am of the opinion that the best results in disseminating good varieties can be accomplished by organizing local county and town societies and electing officers who are well posted in the fruit business; then let the members buy what they need through the secretary at wholesale prices, thereby saving money and getting better goods, besides making the business of the nurseryman pleasanter and more profitable.

Buy Direct.

I know of reliable nurserymen who are now making arrangements to sell directly to the planter and I advise all who can to try this plan of doing business. We know that many traveling salesmen have injured the firm or men they were selling for by telling big stories to induce men to buy because they wanted the commission.

I find more inquiry the present winter about apple trees that are adapted than I have known any winter since the Institutes were started, and much of it in the sections where the old trees are beginning to fail and the farmer finds he has no young trees to replace them.

Hardy Varieties.

As to varieties I have found it quite safe on my high location and clay soil underlaid with limestone to set Hibernial, Tetofsky, Longfield, and Brown of the Russians, and McMahan, Newell, Wolf River, Northwestern Greening, Avista, Eureka and Wealthy of the northern grown seedlings and Fameuse, Scott's Winter, and Utters Red topworked on Virginia crab, with the old stand-by Duchess for the main crop,—adding for the four best crabs, Whitney No. 20, Martha, Sweet Russett and Virginia. My experience has taught me that we northwestern apple growers owe much of our present success to such men as Springer, Wilcox, Tuttle, Gideon, the lamented Chas. Gibbs of Canada, and many other of the pioneers in the business; we owe it to them that we do all for its advancement we can, throwing around it all the safeguards possible. Experience in this branch has taught me that we should be honest and not encourage any man to set trees unless he has a proper location and good soil for growing them.

In my experience growing apple trees and looking up hardy varieties I have formed the acquaintance of fruit men and their families the recollection of which forms some of my pleasantest memories.

Wisconsin Trees.

Experience compels me to adopt this motto: "Wisconsin grown trees for Wisconsin Planters." Also that of the varieties we can grow, our apples are second to none in appearance and quality. My experience both past and present convinces me that the apple-growers of western Wisconsin have much to encourage them. Our boys are taught useful lessons on grafting, budding and planting by Prof. Goff in the short course at Madison; on the state farm are many new seedlings which are being tested, and it is but fair to expect that many varieties of value to our state will there be found. The teaching of Horticulture in our

common schools is also agitated. We have three Experimental Stations working in conjunction with our Central Station to help the apple growers.

Summary.

In closing I will recapitulate what experience has taught me. 1st. Select clay soil and a high location. 2d. Buy varieties that are productive and hardy enough for your latitude. 3d. Give good cultivation and care. 4th. Use some kind of protection from sun, mice, rabbits and sheep. 5th. Mulch the first season after planting to insure growth. Mulch after trees begin to bear to keep up fertility. 6th. Buy trees only of reliable dealers. 7th. To increase hardiness set Virginia crabs and topwork in the limbs. 8th. Organize local societies to spread knowledge, buy trees, plant them and compare notes. 9th. Use care and be honest in packing fruit for market. By following the foregoing I think you can grow apples in western Wisconsin profitably.

Discussion.

Mr. Kellogg—Do you know of any varieties that will succeed in the Wisconsin and other river valleys?

Mr. Phillips—I know of none, without it is the Hibernial; that may succeed in the valleys, but I would not recommend planting them in the valleys.

Mr. Plumb—You said to select good varieties. I wish you would name some that you include in that description.

Mr. Phillips—I would have the Hibernial, the Longfield, the Brown and the Transcendent; then I would take our new seedlings, the MacMahan, the Newell and the Northwestern Greening, the Wolf River, the Avista and the Wealthy. For late varieties I would take the Scott's Winter, the Fameuse, and I would topwork them every time. The Duchess is standard.

Mr. Boynton—I understand that you prefer a small tree. I presume your

idea is that you get a tree you can make your own head upon.

Mr. Phillips—No, my idea is to get a tree headed four feet from the ground so that I can use a four-foot lath as a protector. My orchard is on a high ridge. There is scarcely a winter but what I can go into my orchard and dig dirt to carry away. The thermometer don't get as low on that hill by seven or eight degrees as it does in the valley below. I have a limestone soil, and I know I can grow trees on that hill that I cannot a quarter of a mile away in the valley below.

Mr. Barnes—Our friend Phillips must necessarily recommend straight whips for shoots if he advises planting trees three or four feet high, and heading them out that high.

Mr. Phillips—I much prefer that to a tree that is branched out.

Mr. Heath—Will there be any virtue in planting limestone or lime in our clay soil in our valleys? I have known of those who planted limestone with their crop of apple trees and they are alive yet, but our own apple trees die.

Mr. Phillips—I think that limestone will help the trees.

Mr. Hoxie—Wouldn't you mix clay with the limestone?

Mr. Phillips—Yes, it is usually a species of clay that you find under that stone in the quarry and more or less of it gets mixed with it.

Mr. Everett—Can you raise apples on any soil but limestone?

Mr. Phillips—You can, I think, in your part of the State, on elevated land. I never had any experience on prairies. Out in the eastern part of the State where there is limestone on the prairies they grow quite a good many apples.

The Chairman—Perhaps you had better explain this protection that you have here.

Mr. Phillips—This simple little thing is coming into general use in many places. It consists of eight laths bound together with wire. It protects a tree

in a great many ways; it protects it from the hot sun in the spring, from what they call sun scald. It will also protect it from rabbits, sheep, or any small animal, and I have an idea that it is quite a protection against insects. It is put around the tree; you throw in some lime or ashes, or even hen manure, and I have an idea that the insects won't get at the tree as easily as if it was not there. Then that is a fertilizer also. I would not plant trees without it. It is a very cheap protection; the tree will fill it in about seven years after it is put on; if you put nine laths, of course it will last longer; after that they do not need any protection.

Mr. Barnes—With us we have more trouble from sun scald after our trees get larger than when they are small.

Mr. Phillips—If I were located like that I would make the protection large enough to keep it on as long as the tree lasts.

Mr. Barnes—I have found the cheapest and most convenient protection for sun scald to be nailing pieces of boards or cedar strips on the south side of my bearing trees by using two three-penny wire nails. I have used those a great many years. I saw them in Dodge County in use.

Mr. Phillips—I have that on some of my older trees. I have one tree on my farm that has borne me apples for twenty-seven consecutive years. It is of the variety called the Avista.

Mr. Cook—What do you do for the bark louse?

Mr. Phillips—I never have had an acquaintance with him that I know of.

Mr. Plumb—I can answer that question. About thirty years ago the oyster shell bark louse became a great scare-crow in Wisconsin. I spoke to my old father, who was then in his seventies, about it. "Oh," he says, "it comes and goes. It will go." We immediately began to apply a caustic lime wash. We used a drench from the ash box and afterwards we used caustic potash, bought in stores, made

it diluted enough so that it would bite the tongue a little. As the sap began to start in the spring, about the middle to the end of May, those little insects of which the oyster shell is the covering, came out, so obscure as to be hard to see with the naked eye. Wash the tree thoroughly at that time and you will make a complete cure for the time being. I feel interested in what Mr. Phillips has said, because thirty years ago I was traveling all over this country when I came to Mr. Phillips' location; after passing up and down looking for fall apples, Mr. Phillips said, "I will take you to my orchard, I want you to see it." As we commenced going up the hill little by little, I was noticing the soil, and I saw a change in it. I saw the first was sand rock, then lime rock, then the first black oak and finally white oak. I said to Mr. Phillips, "Why, you have a pure limestone clay formation, white oak, clay sub-soil." Wherever that may be found on top of these islands I don't care how pure the sand is, there you can grow fruit successfully, as Mr. Phillips has done. The trouble in the valleys is the tree grows too early in the spring and too late in the fall,—on the hills your tree does not start so early, and the location is certainly the secret of Mr. Phillips' success. I want to say a word in commendation of the apple of Mr. Phillips, which he calls the Avista. He named it after his wife. If Mr. Phillips can give you any of those trees take them, they will stand by you and they will bear you a very fair, good apple.

Mr. Heath—Won't a northern slope do as well as a high top of a hill? In our section we have orchards standing on a ridge running east and west where the south half has all died and the north half bears.

Mr. Phillips—The gentleman is right about that. I had an orchard that was grown on the side of a valley, where there was a northern and southern slope and the trees that were on the slope to the sun all died, while the

others lived. It was also true that the higher up the hill I got the better the trees were, and so I was convinced that if I got up on top of the hill I would be all right.

Prof. Henry—Is that tree protector patented?

Mr. Philips—No, sir, it is not.

The Chairman—In closing this discussion it seems to me it would be very proper for some gentleman from Dunn county to give us his experience.

Mr. Philips—I was going to say a word in reference to this location. At Mondovi at the Institute, a gentleman got up in the audience and said he had been growing apples seventeen years successfully, and when he set those trees out he put into the holes all the old iron he could gather, and he thought that was the reason he had been successful.

Mr. Runyan—I have experimented quite a little in apples. I have growing now about seventy or eighty varieties, and I have tried almost everything that I could get hold of. I had apple trees sent from Excelsior, Minn., and from Fanning's nursery in this State. Now I have four acres set out on a northern slope of quite a large hill and it is very stony, good clay ground, and the trees there have been growing for three years now, and not one of them has died or blackened. They grew right along. Where I live now it is comparatively low ground and the trees blight in summer. The Hyslop and the Transparent are nearly all gone while some crabs are doing nicely, especially one that I forget the name of. I consider it the hardiest tree I have ever had.

Mr. Philips—Is it the Florence?

Mr. Runyan—Yes, that is the name. I consider that the best crab-apple for this locality.

Prof. Henry—We have with us Mr. J. S. Woodward, of Lockport, N. Y. He is in a choice apple section and has a very large apple orchard. I wish he

would give us some points that would be useful to us here.

Mr. Woodward—We grow our trees in New York, usually head them about five feet high, so that we can cultivate up to the trees. The majority of people in western New York cultivate, but some do not, and it is very difficult to tell which have the best success. I have about one hundred acres of apple orchard; some of my orchards I cultivate continuously and some not at all, and I am inclined to think that those that are not cultivated are the best, but I follow this plan,—when I do not cultivate I stock them with sheep, putting on twice as many sheep as I do on pasture. I keep them up with rich feeds, and that is the way I renovate an old orchard. I certainly would not plow it. I put a hundred sheep on ten acres of orchard often, and run them there during the summer. I cannot hire that pasture for less than three dollars a week, and I feed them three dollars' worth a week in rich feed like bran, and whenever I have done that my orchards have been rapidly improved. In regard to the wash of an orchard, I used to use the same as mentioned here, the alkali wash and potash wash. I have abandoned that for the reason that the tree would get more scaly than before. Now I use caustic soda, soda ash. Before I could get that I went to the drug-store and bought common sal soda. I put it over the fire in a kettle and heated it until it burned red, and I used that. That leaves the bark much more green and less liable to be scaly. We have learned one thing, and that is that we cannot grow apples without an eternal fight. The time was when we expected to get apples at least every other year or two years out of three, without any trouble. That time has gone by. Now we have to fight for our apples,—we fight the fungus and the insects. We know it is very necessary for the trees to have perfect leaves, because the strength of the tree comes through its leaves. We

are now fighting the fungus and insects both, by the spraying process. We use for spraying for insects Paris green. We used to use London pur-

ple, but we have abandoned that; for the fungus we are using the Bordeaux mixture.

APPLE GROWING IN SOUTHERN WISCONSIN.

A. L. HATCH, Ithaca, Wis.

For twenty years I have been growing apples in southern Wisconsin. They have always paid me from the first. I never lost my crop by spring frosts and that is something that cannot be said of any other state east of the Rocky Mountains. South of Chicago both eastward and westward, trees start too soon and their bloom is hurt by frosts. Our trees do not start so early and their bloom escapes. There is no state that can grow apples more surely than we can.

Good Sites.

Of course we must select good sites, our highest ridges in our part of the State. In other parts of the State good sites are found under lake influences, or broad expanse of rolling prairie where untimely spring and fall frosts do not occur. Our deep valleys are poor places for apples. Very rich, mucky soils, or very sandy soils are bad. Limestone clay soils where white oaks are healthy, good winter wheat land, with porous subsoil are best. If there is a shallow soil resting on pure sand or gravel it will be a very poor place for an apple orchard. A great deal is said about slope. I like no slope at all. A southern slope is bad,—that is about all absolutely necessary to consider. There is nothing of any other slope of surpassing value for apples any more than for other crops. A northern slope does not and cannot retard the bloom in spring, nor will winter mulching to keep the roots

frozen. The tree will bloom when the air is warm enough, mulch or no mulch, no matter what the slope.

Quality of Wisconsin Apples

During the last six years I have sold two thousand barrels of apples of my own growing in St. Paul and Chicago, the last three years in Chicago. Very much to my surprise I find that my apples compete successfully with those from elsewhere. I have so often received the very top price of the market I am now satished that for summer and fall apples there is no region tributary to the great market of Chicago that can excel our fruit. Our brilliant colored, smooth, mature fruit goes into market when the great bulk of apples on sale consists of dull colored fruit grown in climates or on soils not capable of giving the beautiful colors ours possess. Besides this the market has to carry windfall, wormy and prematurely fallen stock of winter apples, sold to prevent loss rather than because of their value.

Better Than Eastern Fruit.

In 1892 my apples sold at an average price a little above that of Michigan and eastern fruit. My crop of 1893, fifteen hundred bushels, sold for \$1,400 (or \$1,800 in Chicago) and netted me \$1,200. There are thousands of sites in Wisconsin as good or better than mine, and apple culture is today, one of the most attractive features of farming here.

Mistakes.

Of course we must have the right kinds; we should not make such mistakes as we did in planting Walbridge, Golden Russett, Fall Winesap, etc., when we ought to have planted McMahan, Duchess and Longfield. Our experience in this matter, however, is not much different from that of other places where apples are grown,—the first plantings are more or less of wrong kinds, and it is only after varieties are produced or found adapted to the place that the best success is reached. We now have rugged trees originated in Wisconsin and Russian varieties that stand the test of our climate and will give sure returns on good sites well managed.

The general failure of the apple crop last year in the great apple regions of New York, Missouri, Kansas and Iowa gives added value to our orchards. Some general cause has produced this wide spread failure and doubtless will continue to act more or less in the future. Should a large crop result next season it will doubtless give a much increased product of defective fruit and a further weakening of the trees with more trouble ahead. In September we received a letter from Curran & Co., Commission Merchants, of Cincinnati, Ohio, stating that there was a complete failure of the apple crop in Ohio and adjoining states. Apples were quoted at \$4.50 per barrel.

The apple is the king of fruits and thrives in the northern part of the United States. It does not do as well in the south. With good management we can grow it more surely than it can be grown south of Chicago.

Care Needed.

There is a widespread impression that because apple trees live and bear crops when wholly neglected in some places, it is not a good fruit country where they will not succeed when let alone. Last spring we saw three trees of Northern Spy that bore 35 bushels of apples the previous season. These trees were in blue grass sod. The

owner said he had done nothing to them in fifteen years except to pick the fruit. The largest tree was eleven inches in diameter, and all were quite sound. And this is all in Wisconsin. I have on my farm six acres of orchard in one place, uncultivated for ten years, that has given me fruit every season, sometimes large crops. Now, if there is a farmer who has any kind of stock he can safely neglect for a single season please let him tell what it is. If there is any farm crop, meadows and pastures not excepted, that can stand ten or fifteen years of letting alone and still give better returns please show it up. But I do not wish to boast of success under such circumstances. It is not common sense to expect the best profits from such work. It only proves, however, that Providence is just as kind to us poor shiftless mortals in Wisconsin as it is to those elsewhere.

Proper Management,

We ought and can do far better when we give the right management. For successful apple culture I submit the following propositions:—1st. Apple trees can be so managed that they will not grow up to fruitfulness.

2d. They may be so treated that they will suffer excessively from apple scab.

3d. They can be grown past hardiness.

4th. They can be grown past fruitfulness.

Apple trees do not grow continuously through the whole summer unless they are badly managed. In the orchard every leaf should be grown and the buds appear at the end of all twigs by July 1st. From that time forward the tree should ripen and mature its buds and wood.

When to Cultivate.

All cultivation, pruning and fertilizing should aim to produce a good growth in April, May and June. It cannot safely be made at any other time. If we expect fruit next season we must grow and mature the fruit

buds this season. If we expect our trees to resist the effect of the apple scab we must put on a good reviving growth each season. Trees that do not make this growth at the right time may not only prove unfruitful but may also suffer greatly from the apple scab and winter kill as a result. The loss of the apple crop in New York in 1892 was from this cause and the orchards there are still suffering from the same trouble. The loss of apple trees in this State by winter killing in 1883-4 was from the same cause,—apple scab. My experience has shown me that we can now avoid such losses. If we will so manage our trees as to put a good growth on them each season at the proper time and then spray to protect the leaves from fungus diseases and insect attacks we can carry our trees successfully through our severest winters, provided, of course, we have the right sites and right kinds.

Most farmers now know that a rank growth made late in the season is not a safe growth on apple trees. Many, however, do not understand that fruit buds cannot be produced on late or excessive growth and carried to fruitage the next season. Animal manures should be applied cautiously to fruit trees unless they are fruiting, and always early in the season so the tree can use it when it needs it. To sum up all good management we would say, work in harmony with nature and the philosophy of tree growth.

Can Grow Healthy Orchards.

My experience in Wisconsin in apple culture leads me to say that we can now grow hardy, healthy orchards and produce fruit a little more certainly, in my opinion, than any of our neighboring states can do, and whoever wishes to embark in apple culture can find no better place than can be found right here in our State. With such great apple growing regions as Missouri, Kansas and southern Iowa failing of a crop, with the Wisconsin exhibit at the World's Fair ranking

second to none, with my own orchard smiling with so good a crop despite my own neglect of it, with apples selling now in our cities at a higher price than oranges, there is every incentive to develop what I believe is one of our best resources, Wisconsin apple culture.

Discussion.

Question—What variety or varieties of apples have paid you best in your twenty years' experience?

Mr. Hatch—Tetofsky, Duchess, Switzer, Fameuse, McMahan, Haas, and several Russians. The following have not paid:—Walbridge, Pewaukee, Fall Winesap, and Golden Russet.

Question—Why do trees bloom in spring while the ground is still frozen about the roots.

Mr. Hatch—Because the air is sufficiently warm to cause growth.

Question—How do you select and pack your apples to get such good prices?

Mr. Hatch—We pick only good ones in turn-ball picking baskets, emptying carefully into ventilated barrels. We shake well after each basketful is put in, and fill one or two inches above chime of the barrel, pressing them hard so that the apples are tight,—they must not be loose. Of course the head of the barrel should first be faced with even sized apples.

Question—Will you please explain what you mean by apple scab, and how the novice may know it and avoid its ravages?

Mr. Hatch—It is the common black scurfy spots on the fruit, and can be avoided by good cultivation and spraying.

Question—Will you give us your system of handling the trees the first season after planting?

Mr. Hatch—I cultivate with some hoed crop,—preferably potatoes or beans.

Question—How about the second and third seasons?

Mr. Hatch—I cultivate the same as the first.

Question—How do you cultivate a bearing orchard?

Mr. Hatch—I seed to common red clover and turn under the second crop by plowing as late in the fall as may be,—plowing very shallow near the trees. The next spring I cut up with a disc harrow, using a common harrow or smoothing harrow to finish, except near the trees where the work must be done by hand with the hoe or spade.

Prof. Henry—Mr. Kellogg, give us briefly the varieties of apples you recommend for southern Wisconsin.

Mr. Kellogg—We have a lake shore belt where you can grow Rhode Island Greenings quite successfully. Along the lake shore belt they can grow certain varieties that we cannot grow twenty miles inland, and that is why the Pewaukee, eighteen miles inland, has proved a failure with us when we got it farther inland. The best locations along the southern tier of counties are on high clay ridges. I bought apples in 1853 in Racine County, at \$1.00 per bushel. They will not grow

there now. The Wisconsin climate has changed in some places. In some portions of Rock County on the prairie soil I know of apples trees that produced remarkably well.

Best Varieties.

If I were to name the best variety for the southern part of the State on low ground, it would be the Duchess. By the way, the Duchess has given us better results than all others in the State. The Duchess of Oldenberg, first, then I would have the Yellow Transparent, but later in the season, I would take the Wealthy, the MacMahan and still later the Hibernial, the Longfield, the Newell and Northwestern Greening. Those are not all iron-clad, but they will do in fair localities in southern Wisconsin. The best place for our orchards is on high ridges; prairie soil is not well adapted to fruit. Since those hard winters we have lost many of our best orchards in southern Wisconsin. Phillips Bros. of Lake Mills, shipped 3,000 bushels of apples in 1871, I think; since then their apple orchards have all gone to pieces. We must have the iron-clad varieties.

SUCCESS IN APPLE-GROWING IN CENTRAL WISCONSIN.

A. D. BARNES, Waupaca, Wis.

Success can best be obtained by selecting a well drained, high, thoroughly cultivated site, with a north or northeast slope, well protected by natural or artificial windbreaks on the south and west sides; with a loam surface soil underlined with a firm clay or gravelly subsoil, over a foundation of lime rock, or in soils that contain drift limestone, adjacent to large bodies of water. This I consider the best natural location, but do not fail to

plant fruit trees because you have not these natural sites and soils, for they can be grown in many other sites and soils not so favorable.

Planting.

The ground should be thoroughly plowed and deeply subsoiled before planting. Trees should be set in quincunx form or broken rows fourteen feet apart north and south by twenty-one feet apart east and west. They should be set on a mellow root bed,

the roots pointing down, or at nearly right angles, not crossing or interlacing each other, with surface soil carefully firmed around them. Incline the tree to the southwest with the lowest and heaviest branches on that side, all mangled roots having been cut off and tops pruned to correspond with the roots. Do not expose the roots or the root bed to the sun more than actually necessary. Sprinkle with water while planting so that the earth will adhere readily to the roots when carefully firmed around them. Mulch with coarse litter as soon as planted.

Cultivation.

Plant potatoes, root crops, vegetables or small varieties of corn between the rows and cultivate carefully for four or five years. Always cultivate and fertilize for the benefit of the trees and the crop you expect to grow on the trees and not between them. Stir the earth around the tree each season with a spading fork being careful not to tear out or break the roots with the fork, plow or cultivator. Do not plow deep between the rows, and keep the surface of the land as nearly level as possible except a small mound around the base of the tree.

Fertilizing.

Seed to red clover alone. Harvest but one crop each year and use the most of this for mulching around the trees. Let the second crop grow up and remain on the ground for fertility. Keep the ground at as even a temperature as possible. Use wood ashes plentifully. Force the growth of the tree in the early and middle part of the season and endeavor to grow a healthy foliage. This will produce a good growth of wood which will set and mature a healthy crop of fruit buds every year. Wash them in May with a solution of soft soap, quick lime and cow manure dissolved in rain water. Spray with Bordeaux mixture or Paris green as soon as the fruit is set, and repeat this several times if the season is wet.

Fruiting.

Do not allow young trees to fruit at all. Pinch out the thick clusters of fruit as soon as set and leave but the specimen on a twig. Remember that one-half the number well grown and fully matured and colored will yield as many bushels and bring more money than they all would on an overburdened tree. Besides it requires more energy and vitality to grow and mature the seeds than it does to grow and mature the pulp of the fruit. Besides these overtaxed or overburdened trees will not fruit consecutively or more than one season at a time, while if not overburdened they will make a good growth and bear fruit nearly every year.

Plant different varieties in close proximity, or better still, crab-apple trees occasionally to assist and perfect fertilization of the fruit germs.

Orchards should be carefully pruned each March or just before the sap starts, using sharp, smooth tools, and avoiding cutting large limbs. As soon as trees are large enough to attract the sun nail a strip of a board or cedar slab on the southwest side of the trunk in the fall with two six-penny wire nails; this makes an effectual remedy against sun scald, is easily placed and the cost is nominal.

Varieties.

Plant none but fresh, hardy, adapted, acclimated and western or northern grown trees. I prefer trees three years old, well branched, low topped trees. For commercial purposes in central or upper Wisconsin we should endeavor to have our crop of fruit matured and ready to offer when there is the greatest scarcity of apples in our market. This is between the time of early summer apples from the south and east, and before they begin to ship winter apples, or generally during the last of September to the first or middle of November.

All facts taken into consideration for hardiness, productiveness and profit for a commercial orchard I name the

following list in order as follows:—Hibernal, Duchess, Wealthy, McMahan, White, Haas and Northwestern Greening. Five of these varieties will mature within the above specified time while the others will keep until spring.

Marketing.

To get the highest price as well as for the benefit of the tree, the apples should be picked by hand, going over the tree many times, and selecting none but those that are fully matured and nicely colored. These should be placed in layers in crates made of laths, holding one bushel each. These are convenient to handle and retail readily. Never put but one variety in the same crate, and none but choice fruit. The name of the variety and also the name of the grower should be plainly stamped on each crate, also designated as dessert or cooking apples.

For home use I should materially change this list, and include some of the other standard varieties as well as one or two Russians and especially some of the famous Wisconsin Seedlings and a good Hibernal or crab variety or two.

For nearly all of my lifetime I have been actually engaged in this vocation, in this State, and I know whereof I speak. Therefore heed these points:—A good site well subsoiled; judicious selection of hardy, adapted, western grown trees, well planted in alternate rows, carefully pruned, thoroughly cultivated, properly mulched, washed, sprayed and protected. The fruit should be carefully picked, crated, named and marketed. An observance of these points will guarantee the grower success, pleasure and profit.

Discussion.

Question—Do you advise subsoiling the whole plat of ground or simply the space to be covered by each tree?

Mr. Barnes—I would subsoil the whole plat, but would plow much

deeper in the trench that I planted the trees in to give root drainage.

Question—At what angle would you incline to the southwest?

Mr. Barnes—About 45 degrees. In case the orchard was badly exposed to a southwest wind would incline more.

Question—Why do you keep a small mound at the base of the tree?

Mr. Barnes—To hold the tree steady and firm in the earth; to prevent ice from forming around the trunk; to retard sprouts coming up from below the union of the graft; also to prevent ravages of mice in case the planter should be careless and fail to pack the snow down around the tree,—for they never work on top of a mound.

Question—Do you mow the clover and place it around the trees for a mulch?

Mr. Barnes—Yes; the clover should be cut early in June and placed around under the tree. Then let the second crop remain standing; it will go down of its own accord and mulch the whole ground.

Question—How low topped do you prefer the trees?

Mr. Barnes—Two and a half to three feet.

Question—Will you name a list of hardy apples well suited to the farmers of central Wisconsin to grow for home use?

Mr. Barnes—Hardiness not quality considered, I would name a list in the order given:—Hibernal, Duchess, Tetofsky, Bessie, McMahan, Haas, Wealthy, Walbridge, Prices Sweet, Whitney No. 20, Switzer, Briars Sweet, and N. W. Greening.

Question—Should the three year old trees be large, medium, or small for their age at time of planting, to give the best results later?

Mr. Barnes—Medium sized three year old trees are always best,—large trunks and large tops are always grown to the sacrifice of roots, and small trees are small generally for the want of sufficient root power to make them larger.

STRAWBERRY CULTURE.

R. J. COE, Ft. Atkinson, Wis.

Successful strawberry culture depends almost as much upon what not to do as it does upon what to do. Let us consider then, very briefly, a few of the don'ts.

Don't ever plant strawberries after strawberries; because the first crop has so taken certain elements from the soil that your plants will be small and weak, and such plants cannot produce a heavy crop. In fact you have lost nearly or quite half the crop before you fairly begin.

Plants.

Don't ever take plants from an old bed for even though you may get young plants they lack vitality, and will not be as strong, vigorous plants as those taken from a bed that has never fruited. Don't even take plants from between the rows of a new bed, because these plants are small and immature and cannot possibly make as strong, vigorous fruiting beds as larger, riper plants would do. It is only by having the very best plants that the largest crops can be grown. No man ever succeeded in growing a heavy crop unless he had good plants to do it with. I have laid a good deal of stress upon getting only good plants to start with because to my mind success depends largely upon getting started right.

In order to get this subject before you as I would like to, please allow me to take an imaginary piece of ground and fit, plant and care for it until it has borne its second crop of fruit, and is ready to plow under. This same care will apply to either the small bed in your garden, or the one, two or ten acres that may be planted for market purposes

Preparing Ground.

In preparing ground for strawberries, begin, if possible the year before

planting, by manuring heavily and planting to some hoed crop that can be taken off early, and in the fall as early as the first of September plow and sow to rye, using plenty of seed, say two or two and one-half bushels per acre; this to be plowed under in the spring as soon as the land is in good condition to work. Immediately after plowing harrow very thoroughly five or six times at least, or until you get it perfectly fine and mellow. You cannot get your land in too good condition. A little extra work done right here will more than pay. Fit it as you would for an onion crop is a very good rule to follow. Make the rows three and one-half feet apart and be particular to get them straight; in planting time take pains to get every plant on the line so that in cultivating you can get up close to the row and leave but little to do with the hoe.

Have your plants dug two or three days before you want to use them. Plants dug and placed in a cool cellar with the roots kept moist will throw out little white threadlike rootlets, and when properly planted will not wilt but will start to grow at once, while the plant that is dug and immediately planted will wilt and stand still for several days unless the weather is very favorable at that time.

Planting.

Be very particular to get your plants in the ground firm. Neglect on this point frequently causes serious loss. A good tool for this purpose is the common spade. It is not quite as convenient as a dibble but does just as good work and is to be found on almost every farm. In planting thrust the spade into the soil nearly the full length of the blade, crowding the handle forward so that the top of the hoe is about two inches wide. Have your

plants with the roots well moistened and as you pick up a plant spread the roots out somewhat fan shaped and place it in the hole with the roots down straight and the crown of the plant just even with the surface. Be careful not to get them too deep for if you do it is hard for them to grow up through, or if not planted deep enough they are liable to dry out. Now place your spade about two inches from the hole where the plant is and thrust it down the full length of the blade, giving it such a start that the point of the blade will be very close to the bottom of the hole and crowd it up to the plant firmly. This gets the soil in close contact with the roots their entire length and puts the plant in the best possible condition to grow and thrive from the start.

Cultivation.

These may seem like little matters but it is the little things we are apt to overlook, and upon which success depends so largely. Cultivate and hoe immediately after planting to get the surface fine and mellow, and cultivate once a week to keep it so. If it should rain after cultivating, cultivate again as soon as the ground is in good condition to work, the object being never to let a crust form, but to have the surface always fine and loose. Keep them thoroughly cultivated and hoed until quite late in the fall. If the strawberry bed goes into winter quarters perfectly clean there will be no weeds to trouble before picking time the next season. Keep all blossoms picked off the first season. Treat all runners as weeds the first one or two hoeings so as to let the plants get well established before making any new plants. You will find that they will then send out very strong runners freely.

The ideal strawberry row is eighteen to twenty-four inches wide with the plants not too thick in the row, and when you get it as wide as you want it keep all runners cut off. By so doing all the energy the plant was put-

ting into the growth of new plants will go to the development of strong fruit buds.

Winter Protection.

When the ground freezes hard enough to drive onto, cover with straw or marsh hay, just enough to hide the plants from sight. In the spring go over the bed frequently to see that the mulch is not too thick. If you find the plants getting white and spindling remove a part, working it out between the rows, leaving it thin enough over the row to allow the plants to grow up through, readily. As soon as the berries are picked mow the plants off close to the ground, and if your bed is so situated that you can do so without danger to other crops or buildings, loosen up the mulch, and after two or three days drying burn it off. This destroys all insects and fungus growths if there are any, and leaves the old bed in the best condition to work out and make into a new one. Cultivate as soon as possible after burning, and if the weather is favorable narrow the rows down to about eight or ten inches in width. Keep free from weeds till fall, and cover the same as the year before, and after the crop is harvested plow the whole thing under.

Discussion.

Mr. Kellogg—Which do you consider the best location?

Mr. Coe—That depends a little on circumstances. If we want early berries a good south slope is better than a north slope or level land. I think that larger crops can be grown on the north slope than on the south, although it will ripen a little later.

Mr. Remington—Have you had any experience in shortening up the roots before covering up?

Mr. Coe—Yes. I don't care about making them any shorter. We use a dibble that will get the roots down straight their full length and a common spade will do it as satisfactorily

as a dibble will. If you can't get them down straight, cut them off.

Mr. Wilson—What variety do you consider best for the farmer's use?

Mr. Coe—We know that there are two styles of blossoms, the pistillate, or imperfect blossom, and the perfect flowering blossom. As a rule we find the pistillates are a little more hardy and make more fruit, therefore we try to plant about three to one. I should say plant Haviland and Warfield, fertilized with the Beder Wood. You will find that gives you an early crop. For late I have nothing better than the Eureka, fertilized with the Van Deman.

Mr. Goodrich—Do you think it more profitable to raise two crops from a bed of strawberries before plowing them up?

Mr. Coe—The second crop of berries can be grown much cheaper than the first crop, although the second crop as a rule is quite a good deal smaller than the first,—the berries are also smaller.

Mr. Faville—I want to know if you can give us a recipe that will make the average farmer take care of his strawberry bed, so it will give a crop after it is planted?

Mr. Coe—No, sir. I haven't had any experience in that line.

Mr. Hyatt—I raise a great many roots and I find that the only successful way to do this is to kill the weeds before the seed is sown. Now, why can't we apply that to the strawberries, too? You plow that rye under and if there are weed seeds in the ground you turn up them again from below to bother you.

Mr. Coe—We sow the rye for this reason:—We don't like to leave the ground bare through the winter. I think we lose a great deal of fertility in that way. Another thing:—A crop of rye plowed under early in the season will hold the moisture better than land not so treated. As far as weeds are concerned, if you cultivate the strawberry bed once a week the weeds won't get ahead of you much.

Mr. Cole—Do you use any fertilizers on the second crop?

Mr. Coe—We don't usually, no, sir. In burning of course that makes a little fertilizer.

Mr. Runyan—What variety do you consider best for a distant market?

Mr. Coe—I know of nothing better than the Warfield, fertilized with the Wilson. The Wilson is a good fertilizer; it is not a good cropper; it doesn't make plants enough. It makes a good shipper also.

Mr. Cole—What do you think of the Beder Wood?

Mr. Coe—It is not a very firm berry. I should not think it would ship a very great distance.

Mr. Edwards—Don't you think it is safer to recommend the farmers to transplant their beds each year in order to keep them out of the grass?

Mr. Coe—I should most certainly plant a new bed every year, but that don't prevent using the other crop.

Mr. Edwards—Isn't it true that in an old bed you get strawberries earlier than in a new one?

Mr. Coe—Yes, as a rule.

Mr. Boynton—Practically the farmer has a small bed, and he may move those plants over into his new bed by taking them up without disturbing them at all hardly, instead of digging the plants and putting them away in the cellar, which he is not very likely to do. He will move them over, perhaps, and be more likely to make a new bed in that way. He can do that up to the middle of the summer providing the weather is good, and get very good results the next year.

Mr. Coe—The danger in doing that is that he is liable not to get it in the ground firmly enough. If you have a clay soil, you move a clod of earth with your plant and it becomes dry and it will bake so that it is almost like brick; and no matter how much rain you have after that, the water will run around it and not get near the roots.

Mr. Plumb—Would you advise any

farmer to plant in the fall, September planting?

Mr. Coe—I would not, no, sir, unless you had a great desire for some strawberries next season and did not have any bed at all. Our experience is that the better way is to plant in the spring and get your good wide rows during the summer, and as early in the season as possible.

Mr. Wood—Is it common for Wisconsin farmers to use any commercial fertilizers with their beds?

Mr. Coe—I don't think it is. We don't do it.

Mr. Towne—Why not mulch that soil over the winter in preference to sowing rye, and burn the mulch?

Mr. Coe—I don't think you understand the statement I made. We sowed the rye the year before we planted the berries. I don't think it would work, I don't think you would get your mulch under in good shape.

Mr. Towne—I mean to burn off the mulch.

Mr. Coe—That could be done; at the same time the rye would be a good deal cheaper.

Mr. Edwards—What do you think of the Crescent for the farmer?

Mr. Coe—It is a good berry, but the Haviland is more productive and a larger berry, and the Warfield is a good berry, too.

Mr. Edwards—What variety would you advise the farmer to plant if he wanted but one?

Mr. Coe—I wouldn't tell him any such thing.

Mr. Plumb—That question comes up often. You can't plant one variety. Mr. Coe, what about Smith's Seedling and the Michel's Early?

Mr. Coe—Smiths' Seedling is a good berry, tip-top. The Michel's Early is a grand, good grower, but with us the berries have been small and very few of them. The Jessie is a good berry,—can go it alone, but at least one-half of the years it fails.

Mr. Spalding—Isn't it a fact that some varieties do better in stony soil than upon prairie soil?

Mr. Coe—That may be so, but it is a pretty hard thing to determine. People make statements that such and such varieties will do better on clay soil and others on sandy soil, but I don't take much stock in it.

Mr. Cole—What about the Parker Earl?

Mr. Coe—Last year it was disappointing with us; it did not grow its crop; that is, the berries were very small.

Mr. Edwards—Do you think that the constitution of the Wilson is as strong as it used to be?

Mr. Coe—I don't know about that. If it has been grown with great care it may be.

Mr. Heath—I always use ashes on my strawberries. One of my neighbors says they are worth a dollar a bushel on the strawberry bed. He believes in taking them up as you say; he says that God calculated to give us time to move them from one neighbor to another, and he says that is the reason it is best to put them in the cellar.

Mr. Coe—I know ashes are a splendid good fertilizer for strawberry or other fruit, for that matter. And also it is necessary to put them on the surface to hold moisture.

Mr. Heath—He also says that the seeding and cultivating as you say is of more account than the variety.

Mr. Coe—I agree with him. The ashes can be put on any time after the plants are set.

Mr. Wilson—Have you been troubled with a disease that gets under the leaves and rolls them up?

Mr. Coe—That is what is called the leaf roller, an insect. The burning of the bed will destroy all these little fellows and it is about all the remedy I know. You can't get at them with any poison, because they get in under the leaf.

Mr. Cole—Have you had any experience with keeping the berries back in the spring? Up our way the frost has killed the first blossoms.

Mr. Coe—You can retard the growth

a little, but it is dangerous business. If you hold them back so that your plants are white and spindling, you wilt your crop. You can hold them back a little, two or three days, by leaving the mulch on.

Mr. Cole—What would you do with that winter mulch?

Mr. Coe—If it is too thick over the row we work it in between the rows and leave the mulch on till the berries are picked; then mow the tops and burn them up.

Mr. Barnes—Couldn't the mulch be left on one or two nights without any harm?

Mr. Coe—Yes, but you couldn't get over much ground in one night.

Mr. Thorp—You are talking about sowing by the acre.

Mr. Coe—No, I don't care how small the bed is.

Mr. Thorp—My strawberry bed is probably ten rods long. It is right in my garden, and I don't like to sow rye there. Couldn't I mulch it in the fall and throw it off cheaper than I could sow that rye?

Mr. Coe—Possibly, but I think the rye holds the moisture and helps in that way.

Mr. Thorp—If it will answer the same purpose I think it will do just as well to mulch it and then throw the mulch off in the fall; I could draw it off cheaper than I could sow.

Mr. Noyes—Why do the rye roots retain the moisture?

Mr. Coe—I guess you have got me. If you ask why they retain the fertility that is a different question. Of course any plant that is growing will take up the fertility that is in the soil, whereas, if there is no plant on the ground, the fertility will constantly be getting out of reach.

Mr. Woodward—I had a great deal of trouble in my experience in buying strawberry plants and having them shipped to me by express in the loss in the planting. What Mr. Coe has said to you today in regard to treating the strawberry plant after it is taken

out of the ground and before it is planted again, is worth more to you than this Institute will cost the State of Wisconsin. In regard to fertility. In western New York we never think of planting strawberries without giving them a large amount of commercial fertilizers, potash and bone dust. I know of people who put on at the rate of a ton to the acre, people who grow for the market of New York City and Boston. They all fertilize very highly. We don't think that stable manure is nearly as good for them as commercial fertilizers. I know of people who have taken a piece of worn-out land whose natural fertility was entirely gone, and they have applied commercial fertilizers, consisting of potash and bone dust, nitrate of soda and sulphate of ammonia. In the fall we put on a heavy coat of muriate in the shape of kainite, and bone dust, and we don't put on the nitrate of soda, or the sulphate of ammonia until we are ready to plant in the spring. We don't plant rye at all.

Mr. Boynton—In what proportion do you use the different fertilizers?

Mr. Woodward—Every man has a formula of his own. I don't fertilize as highly as some, my land is more fertile. I should put on, say, at the rate of 400 pounds of muriate of potash and 600 pounds of very fine bone dust, and then about 100 pounds of nitrate of soda and sulphate of ammonia. If you use plenty of fertilizers you can get a much cheaper crop of berries the second year than the first, and they are nearly as good. When we put the fertilizer on, at the time of planting, we plow it in. Ordinarily we take a small one-horse plow and plow two furrows away from the rows and then cultivate that and get them in the best kind of condition, and then, if it is a good growing season, we can throw our plants over and get a good crop of plants on that vacant space and then plow up the old roots. In plowing the fertilizers in, we plow eight to ten inches.

Mr. Hazen—After you have taken up your strawberry plants and stored them away in a big pile, don't they heat?

Mr. Coe—I did not recommend storing them in a big pile. Separate them out a little bit, and keep the roots covered. You will see just little white roots in about three days. Put them on the north side of the fence as Mr. Woodward suggests, though the cellar is a little easier, I think, sometimes; either way will do, but they should be

kept covered from the sun, and in thin layers.

Mr. Kellogg—All this talk has been more to commercial growers than to the farmer. Now, the question is: What can the farmer do best in the preparation and planting of the strawberry who doesn't want them by the acre? One man here says his bed is four rods by ten long. It would be better to make it two rods by twenty.

Mr. Coe—I think my remarks apply quite as much to the small garden as to the commercial grower.

BLACKBERRY CULTURE.

C. H. HAMILTON, Ripon, Wis.

The care and cultivation of small fruit is calculated to awaken the best qualities of the mind. The work is instructive and we can assure you that the blackberry can be successfully and profitably grown in any part of the State by complying with the following suggestions gained by twenty years' experience in cultivating this and other small fruits.

Location.

Select a piece of ground that is not too high or upon a hill side. If convenient have a level piece of ground that has slope enough in some one direction to carry off any surplus of water that might collect in the spring or during the winter, so as to prevent any overflow around your plants. While the blackberry will thrive with plenty of moisture in the time of growth or fruiting season it is liable to winter kill if frozen up with standing water around it.

Preparation of the Soil.

Having selected a piece of ground as suitable as possible draw upon it a liberal coating of manure, that has

been thoroughly composted, or some from the cow stable that has not too much coarse straw or stalks in it, and spread it as evenly as possible. Plow your land a good depth and do not plow too wide a furrow. Plow to loosen and stir the soil. Then apply the pulverizer or harrow and work your land until it is free from hard chunks of dirt and is in good condition, being careful to have the surface as level as possible. The labor bestowed in this preparation is not work thrown away.

Planting.

Having your ground in good condition study the natural drainage of your land and plant your rows as near as you can in the direction the water naturally flows, east or west, north or south,—for in giving them protection which is the watchword of success, you will form ridges which will help hold the water upon the grounds. Mark your ground with a marker or draw a line to plant by. Plant your rows seven feet apart, the plants three feet apart in the row. Procure good plants

and in planting them care should be taken to spread the roots out and fine, moist dirt be pressed around the plant putting them in at least two inches deeper than they formerly were in the ground. If planted in the fall it is well to mound them up with dirt around each hill or put a fork full of coarse manure over each hill for protection in the winter, and to act as a mulch the following season.

Care.

Cultivate the ground between the rows and hoe around the plants to keep down the weeds and to keep the ground well stirred, thereby helping to produce more moisture. The rows being so far apart and your plants so small for the first year you can plant some low-growing garden truck between the rows. Having given frequent and thorough cultivation until about the middle of August we stop cultivation that the plants may ripen and mature their growth. About the first or middle of October we are reminded of the cold winter which will soon be upon us, and we must exert ourselves to make our enterprise which we have entered upon a success, and our only safe way out is to protect them. This may be accomplished by removing the earth from the side to which you wish to lay your plant and then press your plant over lengthwise with the row and put dirt enough upon it to cover it. It is well to lay them the same way every year. The second year your plants will be larger and being planted three feet apart in the row one will lay partly beside the other so that you will partly cover the two hills in covering the one.

Work for Second Year.

This closes the work of the first year and as we enter upon the second year the first thing to be done is to remove the dirt and raise up the plants which you covered in the fall. This is done with a common spading fork, along

with the cultivation and hoeing which are necessary the first year and none the less necessary this year. There are other things that are also necessary; the idea of protection goes side by side with any endeavor to raise fruit. It is necessary to put wires on each side of your trees to protect the fruit from getting in the dirt, and your plants from being broken by the winds. This is done by driving one large post at each end of the row and then placing smaller ones along the row at a distance of twenty feet. By drawing the wire as tightly as possible and securing it to the posts by driving a nail in the same, your wire is supported and your plants are protected from being broken and blown down by the wind.

Fertilize.

Mulch your plants with any coarse manure, or with green clover each year for the purpose of retaining the moisture and keeping up the fertility of the soil. The latter cannot well be neglected because the blackberry requires an abundance of moisture and fertilizers to help it to accomplish the desired end,—a large crop of well matured fruit.

Trimming.

Do not neglect to trim your blackberries or to nip off the top of the new shoot when it gets to the height of twenty inches to two feet at the most. This checking of the new growth will cause branches, several of them, to grow upon the same cane, and to become a low tree-shaped plant, while if the trimming is neglected it will grow a long spindling cane without any branches. Remove all the old wood as soon as the fruit is gathered and burn it. While our agriculturists are rejoicing in the changes which have been made along the line of farming can not we, as horticulturists, see great possibilities yet to be obtained in our line?

Discussion.

Mr. McKerrow—What varieties would you recommend to the farmer?

Mr. Hamilton—I think I can safely recommend the Ancient Briton and the Snyder. The Snyder is earlier than the other. They are both about equal bearers.

Mr. Hazen—Hasn't the soil anything to do with it?

Mr. Hamilton—I rather think that the Snyder is a little more adapted to the sandy soil.

Mr. Hoxie—Haven't you any other varieties that are a better flavor and will succeed just as well as the two you mention?

Mr. Hamilton—There may be other varieties that are just as good in quality and just as good growers, but there are not many varieties that are better for Wisconsin in all respects on account of the protection that we have to give them; some will not lay down as nicely as others.

Mr. Runyan—Have you had any experience with the Agawa?

Mr. Hamilton—Yes, I planted it down in my prairie soil and really it proved a failure.

Mr. Boynton—You speak of the plant forming the habit of lying down one way, every year alike. Wouldn't it be better in planting to plant the horizontal shoot across the line of the row? Wouldn't the plant bend down better? Do you practically do so in planting?

Mr. Hamilton—I don't know as I have ever taken any particular pains in that direction.

Mr. Hoxie—Why couldn't we use some of the more tender varieties, the Erie, for instance, which seems to be a better quality? We are obliged to take care of them anyway.

Mr. Hamilton—I have not tried the Erie to any great extent. I do not say that the two I mentioned are the only ones that will do well in Wisconsin, but a great many of the plants that I have tried have been killed under protection even.

Mr. Barnes—How long is it practicable to run a blackberry plantation?

Mr. Hamilton—I hardly think it is worth while to run a plantation over twenty years. I have fruit on my ground at present that I have picked fifteen crops off of, and I do not think there is any gentleman in this audience that can pick them out from some four-year olds that I have.

Mr. Woodward—Do you have any trouble with the red rust?

Mr. Hamilton—We are troubled a little with yellow rust, but a very little.

Mr. Boynton—Do you give the old plantation the same cultivation as the young plantations?

Mr. Hamilton—Yes, sir. I will say we have been more afraid of the yellow rust or fungus than we have of the common brown rust. It seems to be an enemy of the blackberry and I have thought it was something that followed in the line of the ripening of the fruit.

Mr. Mason—How many shoots do you allow to grow up in an old hill?

Mr. Hamilton—I have practiced pretty much to let all the shoots grow that will and I have nipped them back when they got to a height of two feet. My trimming or thinning out which brings it down to the number of canes that I will leave in the hill, is done in the spring, as they raise them up because some will be broken in the process no matter how careful you are. I do my trimming in the spring by cutting out the old canes and leaving the best of them. I leave from four to five canes.

Mr. Woodward—Do you let the shoots grow all over the plantation or simply in the row?

Mr. Hamilton—We keep them out between the rows and between the hills. We don't mean to let a solitary sprout grow on our blackberry rows, yet they do get the start of us sometimes under the mulch.

Mr. Barnes—You never intend to

take up your plants from your bearing plantation?

Mr. Hamilton—We prefer not. Where there is one taken up there is a liability of from five to ten starting.

Mr. Goodrich—I have tried to raise blackberries and I have made an utter failure of it, and I would like to know the cause. I planted some blackberries that I got of Mr. Coe and we carefully followed out his directions, laid them down according to his directions, and the next year there was a nice crop started. Just as they began to ripen they dried up and were good for nothing. Mr. Coe looked at them and he said he thought it was the drought. The next year I mulched the ground so that it was moist and there was no drought that year, but they did the same way. I know of a great many others who have failed in the same way. We who have made failures would like to know the reason. I think if there is anything that a horticulturist could tell, Mr. Coe could tell it, but he said he didn't know in this case.

The Chairman—Have you learned anything since then in this particular, Mr. Coe?

Mr. Coe—I must correct one statement of Mr. Goodrich. They were not laid down according to my instructions. Then you will remember, perhaps, that three and four years ago each year we had a peculiar wind storm which came from the southwest, and it seemed as if it came from an oven. I noticed that two or three days after that storm the leaves began to curl up and nearly all of them dropped off from the bearing canes, and of course, if they haven't any leaves they couldn't ripen the fruit.

Mr. Hyatt—There are hundreds of people who have tried to follow Mr. Goodrich's directions in dairying who certify that they have followed them exactly and yet have failed. They have proved that they were not born dairymen. Mr. Goodrich is a born dairymen, but he isn't a born fruit-raiser.

Mr. Hazen—Have you ever received any damage from blackberries smothering, where they were fully covered?

Mr. Hamilton—Never, except along the fence, where the snow covered them up very heavily, drifted there.

Mr. Hazen—Have you had any experience where plants have been tipped, just weighted with earth on top sufficient to hold them down, and then after you have taken them up in the spring, after the buds have begun to start, that it looked as if you were going to have a splendid leaf, and yet they died off in three or four days?

Mr. Hamilton—I don't know that I ever had that experience, exactly, but they have died before blossoming time and by examining them I have found that leaning the bush over and fastening the tips I have fastened the bush perfectly stationary in that one position and the side that the sun acted upon I found was getting yellow, while the under side of the cane was still green.

Mr. Remington—Have you had any effects from laying plants down too early?

Mr. Hamilton—I have laid them down the 20th of September, but I have not covered them, only laid them down preparatory to covering them, just dirt enough on top to hold them. They are laid down a great deal easier if you take them in the fall,—earlier than later.

Mr. Woodward—Have you had any experience with the dewberry?

Mr. Hamilton—Yes, a little, on my soil it does not prove a success, while on sandy or clay soil near me a neighbor has had fine success in growing the dewberry. A great many make a mistake in laying down blackberry vines. When you wish to lay a plant in this direction, you remove the dirt on this side; after you have done that step to the opposite side, put your fork through the tops of the cane, brace lightly with your fork and with your foot push your plant at the base, and

a little push at the top of the fork will cause your plant to go over into the place where you have removed the dirt. If you have taken a bush as high as my head and pushed it over here, four feet of that length will be not over three inches above the surface of the ground. You will have the rest here not to exceed four to six inches on the very biggest hill. In doing that there will be some canes upon that hill that you may have injured more or less.

Mr. Plumb—Don't you break some of the roots in doing that?

Mr. Hamilton—Not very often; there are some of the side shoots broken off, perhaps. A great many advise taking a little stiff fork made on purpose, putting on the opposite side and prying. I don't believe in prying a plant loose; move it very carefully, move the dirt from the side and push it as carefully as you can.

Recess was taken till 1:30 o'clock.



POULTRY SESSION.

Afternoon Session—C. H. Everett in the chair.

HATCHING AND EARLY MANAGEMENT OF CHICKENS.

W. H. ROSE, Fennimore, Wis.

The great difficulty poultry culture is compelled to overcome until it is admitted into full fellowship with other branches of farming is prejudice. It is difficult to divest a person of prejudice by argument or by facts and figures, until others realize the results of more faith in figures, more energy and self-reliance. The business must be admitted to the same opportunities that are extended to agriculture, horticulture and the raising of all other stock. No man or woman can expect to succeed in a business for which they are unprepared and of which they are ashamed.

The production of eggs depends largely upon the person managing the flock. In my boy days it was no uncommon occurrence for a hen to steal her nest away, lay eleven or thirteen eggs, become broody, and finally come back with a little brood of chicks. These same chicks would follow this same hen until snow fell the next fall. Yes, then eggs were fertile and then chicks were hardy because the eleven or thirteen were the first and very often the only eggs the hen laid that year. Now, to the point. If we could have had access to that nest, and taken the eggs away as they were laid, the hen would have laid more eggs there or become disgusted by the disappearance of her eggs, and hunted a new nest and repeated the number. The common blue-jay lays four speck-

led eggs, becomes broody and is ready to begin the act of reproduction. Suppose you quietly remove one of her eggs, do you think she will go on with the incubating process? No. Nature tells her to lay one more egg, which she will do or she will desert the nest entirely, build a new one and produce four more eggs.

Increase Egg Product

Thus you see that the common hen or the wild bird may be made to double the number of eggs they naturally lay, and when we say our hens are capable of laying two hundred eggs in a single year we mean they will have been brought to it by this simple process. Why this is so we are unable to tell, except that it is Nature's effort at reproduction.

Every hen in a flock does not necessarily become broody when she has laid out her litter of eggs, but she does necessarily quit for a while, but Nature soon supplies her with new desires to bring out a brood of chicks, and in a short time you will notice the hen looking fine in appearance, and ere long she will be contributing her share toward filling your egg-basket.

Improvement.

Following this thought, we find by removing all the eggs from the nests, introducing new blood of the better varieties, feeding the right kind of feed, etc., we have brought our fowls out of the jungles of India, where they

laid nine eggs in a year, to a state of civilization, where some of them have been known to lay over two hundred and fifty eggs in a single year. I once owned a flock of twenty-two S. C. Brown Leghorns which laid fifty-six eggs in three days during the coldest part of January. Again, I have had nine Light Brahmas which produced nine eggs every day for a week. This winter I had five Leghorn pullets that quite often gave me four eggs per day. I cite these instances simply to show you what may be done.

Some varieties become broody sooner than others. Broodiness, as is well understood, is a disease over which the hen has no power. She becomes constipated and has an abundance of internal heat. How often we have taken the old sitters and thrown them off the nest with vengeance in our eyes, tied old rags to their tails, ducked them into pails of cold water, shut them up in boxes where they could sit down comfortably, pull a piece of an ear of corn under them and go on their way rejoicing. A little thought and study on the subject has taught us to make a light lath box, swing it up overhead in the poultry house, introduce the old biddy and let her swing where the fresh air can strike her from all sides, and where she cannot sit down, and generate 103 degrees of heat in a few minutes. Feed and water well and in a few days she will be ready to go to work in the business of egg-production.

There has been much written lately against any so-called formula of preserving and keeping eggs; parties contending none of the plans will succeed in keeping them fresh for any considerable length of time. However, we think differently.

How to Keep Eggs.

By actual tests with the incubator, we have found that an egg fertilized and subjected to heat will show the transforming influence of the vital

germ in a very few hours, while an egg not fertilized may be placed in an incubator and be subjected to 103 degrees of heat for ten or fifteen days, and then look, smell, taste and digest perfectly pure. These are sufficient tests, we think, and prove that infertile eggs will keep perfectly as against heat. Persons who have raised chickens all their lives, ask seriously, How long does it take the incubator to hatch a brood of chicks,—and if we are in earnest when we say that the male bird has no influence in the ovulation of the hen. Pardon the plain assertion, but it appears necessary for the majority of amateurs—if you wish to try my plan and desire to hold your eggs for the fall trade and prices, kill or remove every male bird on the place. Two weeks afterward begin to gather your eggs fresh every day. Take them directly to the cellar where you have previously placed some clean boxes or barrels, and a barrel of salt. Cover the bottom of one of your boxes about an inch deep with salt. Now take your eggs, one at a time, and gently press them big end down, into the salt. When you have covered the surface with eggs nearly touching each other, thoroughly cover again with salt, and so on until full. In November your eggs will be in very good condition. All the trouble there will be is to carefully wash all the salt off, and let them dry nicely, when they are ready for market or home consumption. There is one extra precaution,—be sure all the eggs are fresh and no cracked shells.

While we come to the conclusion that infertile eggs keep much the best, we should bear in mind that well fertilized ones are what we want to place in our incubators or under our biddies when we start out for young chicks.

Breeding Pens.

It would be impossible for me to state for a certainty how many of any of the varieties to place with a single male bird to constitute a good breed-

ing pen, from the fact that eggs from over-fat hens, or hens that are confined in small quarters and not furnished with plenty of meat and green food do not hatch well. This is a subject that each one having the management of fowls should solve for himself, taking into consideration the vigor of the male bird and the condition of the flock. In some cases twenty or even more would not be too many, while in others ten might be too many. We find that the eggs grow in the ovary to full size of the yolk, then break loose and pass down the egg oviduct. In this oviduct there are usually five at a time, and while there they receive the vital spark, the white, the lining and the shell, and are laid usually one each day. Thus you may observe Nature's plan, for the absence of the male bird several days in succession in mating a flock, therefore if you will use the sixth egg the hen lays it will hatch true to the mating. My experience is that the first fifteen to thirty eggs the hen lays will hatch much the best and produce chicks with very much more vigor; also that the earlier hatches will run largely to cockerels while the later ones will contain more pullets.

Hatching.

If you wish to use hens to do the incubating it is a good plan to have a room separate from the main house with not too much light. Make an effort to sit as many hens at a time as possible. It will require but little more time and care to look after six hens than it will one. Two or three days is none too long for the hen to sit on china or nest eggs before giving the ones you wish her to hatch. She will have become accustomed to the place, will have shaped the nest to her notion, and will have it nice and warm. Give each hen as many eggs as she can conveniently cover. Watch them carefully for two or three days to see that there are no eggs left to get cold. During the first forty-eight hours the hen should sit perfectly quiet, as it

takes just that time to start the embryo chick on its life voyage. We notice the hen seldom leaves the nest or turns the egg during this time. After they have sat quietly for four or five days, prepare yourself with more fresh eggs, and go in the evening with a good light and tester and test each egg. A little practice will soon enable you to pick out the infertile ones. When you have completed your work, give each hen the number you wish her to cover. Fair sized hens should have eleven, never more than fifteen. On the average, hens will hatch more vigorous chicks from eleven eggs than any higher number.

We might go on through the twenty-one days and describe the eggs as we have broken them and seen the spider-like little animal, and noticed the pulsation of the heart, etc., but we will leave this for the incubator people. Finally on the twentieth day the imprisoned chick has drawn its last nutrition from the egg, its vital heat and circulating blood have absorbed every particle of the substance of the egg, and there remains only the vigorous little animal anxious to get out. Its prison cell is punctured by thousands of pores that always break first at the bigger end of the egg, because it is always less moist and more brittle at that end. There too, the head of the little chick is turned for air, and the beak breaks through the rotten wall, finds more fresh air, presses hard in that direction and soon breaks away from all feeble resistance, and thus ends the period of its incubation.

Care of Young Chicks.

When first hatched the chicks will occupy more space and look much larger than when three or four days old. The yolk, though all absorbed, is yet within the chick, undigested, and affords food for at least thirty-six hours; therefore it should not be fed during that time. We will notice that all of these first hours the hen sits quietly brooding her chicks, never once offering them food or leading them

where they can drink. The first necessity therefore, for the young chicks is not food, but warmth, and a good dry, warm place for the hen and her brood will be a step in the right direction. Bear in mind their little gizzards were given them to grind their food, and if you keep their little crops full of soft food you are apt to derange the system and invite disease. In my opinion young chicks should never be fed raw corn meal dough. If you must and will feed corn meal, take boiling water to mix it with, and don't forget to add a little salt and pepper, but you will find a well baked piece of corn bread very much better than any sloppy food. They tell us the best possible food for the first week is hard boiled eggs, chopped fine, shell and all, and fed to them in small quantities. This appears perfectly natural and we have practiced it for a number of years with very good results.

Later Feeding.

After the chick is a week or ten days old I prefer to feed whole grain, such as shrunk wheat, foxtail seed, sugar cane seed, cracked corn, etc.,—things that Nature designed for them and that they will be healthy and grow muscle on. It appears very natural for them to want a variety of food and to be all day collecting a cropful. You may feed liberally of anything they like in the morning, repeat it at noon, and again at night, and they will not do nearly as well as when fed little and often.

Before the insects appear in the spring it is a good plan to provide lean meat for them in liberal quantities. Beef livers are cheap and if well cooked and chopped fine make a first rate ration to feed them three or four times a week. As the weather warms up in the spring the coops containing the old hen and her brood should be moved in or near the garden where the little fellows can have free access to all the insects that infest all growing plants. They will keep them pretty

well picked off, and will not molest any of the plants until they become pretty good sized birds.

Now, as my allotted time is up, I must quit, and I'll just leave all the little chickens in the garden for Mrs. Morehead to attend to.

Discussion.

Mr. True—I wish Mr. Rose would tell us why in packing those eggs in salt he puts the large end of the egg downward?

Mr. Rose—The large end of the egg contains the air chamber. That being down it holds the yolk of the egg up in that shape. When you come to break an egg and turn it out into a dish if the egg has started to spoil it will flatten right out, and the egg epicure don't like that sort of an egg.

Mr. Cole—What are the best breeds for the case and the best for the table?

Mr. Rose—That is a pretty hard question to answer. I find for the farm the Plymouth Rock fills the place very well, for eggs I like the Single Comb Brown Leghorn.

Master Willie Miller—What feed do you feed for eggs?

Mr. Rose—More particularly shrunk wheat. The egg is composed particularly of albumen. When we get shrunk wheat we get that near the outer part. I like shrunk spring wheat the best.

Mr. Miller—This boy is in the chicken business and he wants to get what information he can today.

Mr. Cole—In keeping the eggs a few days have you ever tried the plan of filling the case and then turning it over three or four times?

Mr. Rose—I never did, from the fact that I don't try very many times to ship eggs. I run more particularly to fancy poultry and the eggs I have for sale come particularly in the summer season. Of course fresh eggs in the fall and winter go quickly.

Mr. Faville—Do you sell those that

you put down in the way you describe for fresh eggs?

Mr. Rose—I sell them on their merits. The first year I tried that. I put down quite a good many, it came to something like \$25. I offered them to our home dealer and he asked me what I wanted for them. I told him I thought I ought to have about 19 cents for them, it was in November. He says, "I couldn't pay that price for them; they will know they are salted eggs." I says, "I don't think you could tell." And he says, "Certainly I could." I gave him an opportunity that evening to taste two of them. I practiced a little chicanery on him. I picked out an egg that was laid that day that had a little roughness of shell and one that was packed in June and he broke them both and couldn't see the difference. I got 19 cents in Milwaukee for them.

Mrs. Carter—Have you any remedy for hens eating their own eggs besides the hatchet?

Mr. Rose—The best plan I have tried is to make what we term a hidden nest. The hens will go into the dark to lay an egg, but not to hunt one. Especially you want to feed a little shell; oyster shell is a good thing, and cheap.

Mr. Edwards—Do you feed meat or scraps of any kind?

Mr. Rose—I always feed a certain portion of lean meat of some kind. With Plymouth Rocks it is very necessary that their meat is lean, because they take on fat too fast otherwise.

Mrs. Langdell—Isn't there a question of doubt about salting eggs? I don't

think you can make a nice frosting from eggs that have been salted. I have had experience with taking fresh eggs and wrapping each nicely in paper and packing them end down, keeping them in a cool place, and they will keep perfectly fresh. We have kept them a year or a year and a half. It has been proved to my satisfaction to be better than salting, as that is sure to taste.

Mr. Rose—I have tested them and used them right along for weeks, and I can't see a particle of difference in the flavor.

Mr. Colburn—Are not the Plymouth Rocks more liable to disease than any other breed?

Mr. Rose—I think not. There are other breeds that get diseases much more easily with me.

Dr. Baker—What has been your experience with greasing the egg with tallow or anything of that kind, to prevent the admission of air through the shell?

Mr. Rose—I have never had any experience in that line excepting that I noticed in handling the eggs, if I got grease on them it would stop up the pores and the chicks would not hatch. It would exclude the air, of course.

Mr. Thompson—What is the cause of hens' crops turning black and their dying?

Mr. Rose—My dear sir, you have got me, I couldn't tell you. I never saw such a thing.

Mr. Thompson—I lost about twenty-four Brown Leghorns with that disease.

RAISING SPRING CHICKENS.

Mrs. W. B. MOREHEAD, Belleville, Wis.

If there is any one thing I could mention to the farmer or to the poultry raiser, of more interest than another, to increase his profits, it is to induce the raising of early chicks for market. This taken in connection with other farm work, or separately, is very profitable. I do not mean by this that it need necessarily be done on a large scale. If those who have incubators at hand ready to use when the season arrives for hatching the breeding stock, or those who contemplate buying, would buy early and fill them up in the early part of January, run through at least two hatches, if they had not room or brooding facilities for more, would find a nice profit over and above cost. As labor is really the more costly adjunct, everything must be arranged to economize that, which inevitably must be attended to ourselves if we expect to meet with success, even if the original cost for this convenience should be a little more.

These chicks arriving in midwinter must be well cared for and pushed from the start to be in readiness for the early market and high prices. If the brooding house is ample these machines may be kept full through the hatching season, disposing of them as fast as they average two pounds apiece, that is, if the market is satisfactory; if not they can be held over and sold late in the winter as roasters.

Markets.

To give you some idea as to how the markets run, I have copied from my salesbook a portion of the sales made after the broiler season:

June 3, 4 doz. little chicks, 94 lbs. at 20 cts. per lb.

June 9, one hatch little chicks, 4

days old, (sold to a neighbor), 172 lbs. at 12 cts. per lb.

June 11, 40 little chicks, 110 lbs. at 14 cts. per lb.

June 30, 48 little chicks, 84 lbs. at 22 cts. per lb.

July 15, 39 little chicks, 79 lbs. at 17 cts. per lb.

July 30, 34 little chicks, 64 lbs. at 13 cts. per lb.

It will be noticed that the best price obtained during these months was June 30th, being shipped for the Fourth of July trade. I have found it quite remunerative to hold the later hatches until February. Last season in holding until that time I realized on an average \$1.00 apiece for cockerels which were shipped to the Chicago market Feb. 15th, netting 12 cts. per pound, dressed. This year the market is not quite so flattering.

The raising of winter chicks will necessitate an extra flock for the purpose, year old hens, or early hatched pullets; something that we can depend upon for winter eggs, and right here lies the success of our hatches.

Selection of Eggs.

If we expect to get satisfactory results not only in numbers, but in strong healthy chicks, buying the eggs here and there from various flocks of large and small varieties, some maturing early and others late, will give very unsatisfactory returns. There will be no uniformity, either in size or color of chicks, while on the other hand, if we have our own flock under our own supervision, where they can be fed and mated properly, with a view to good, fertile eggs, our success becomes much more apparent, not only do we sustain the loss of the eggs, but at that time in the season when we expect the best returns. By commencing

In January, these chicks can be marketed alive at from \$9 to \$10 per doz. Beginning earlier or in the fall would necessitate the dressing of them, which is a very delicate matter and means much more work.

These prices are no myth, or speculative, although they did not reach these figures last season. A year ago last spring I filled my incubator January 12th and February 6th, and shipped these chicks to the Chicago market May 3d. They were Light Brahmas, and weighed from two to three pounds apiece, and marketed at \$9 per doz.

May 10th I received circulars quoting them at \$10 per doz., for even less weights. I then shipped those weighing a pound and a half, receiving \$8 per doz. for them. The highest quotations that came under my notice last spring were \$8 per dozen for two lb. chicks. These quotations were given about the last of April.

Breeds.

My experience with any other breed than this is limited. I find them a very desirable fowl, excellent for the market and one of the best for winter eggs. They are heavily feathered and having small combs they withstand the excessive cold and fill our egg basket continuously, when prices are way up and eggs are at their best.

If one were to go into the broiler business on a large scale, I presume he would prefer some of the crosses, to the thoroughbred. In any of the heavy breeds if they are raised in large numbers, we can pick out the poorer marked specimens, saving those for our broiler flock and cross them with whatever is best for the breed. All sorts of crosses have been tried. The latest tests are given by the Rhode Island Experiment Station. For the first season's experiment they mated eleven yards, most of which contained two varieties of hens or pullets; of the results of these crosses, after being exhibited alive and dressed, the preference was given to the Indian Game,

Light Brahma Cross, and second or third to it was the White Wyandotte, Light Brahma Cross, although there were other good crosses which produced good results.

As I have already stated we must have something upon which to depend for winter eggs, but the production of "winter eggs" is an art. Fearing of trespassing upon the topic which is to follow, I leave this part of the subject, knowing it will be fully and ably treated later.

Care of Eggs.

The fresher the eggs the better, but while we are saving them they should be kept in a dry, cool place, at a temperature of 45 to 50 degrees, as even as possible, placed on end and turned two or three times a week. I have kept eggs four weeks and had them hatch.

There is an independence in raising poultry for market, as we know exactly where we can dispose of our products, however large quantities, and at remunerative prices; whereas in the "fancy" part we are dependent upon public patronage. I think that this branch of the poultry industry is especially adapted to the ladies, they being endowed with more patience, and that never-ceasing watchfulness, which is essential and I might say absolutely necessary to insure success.

Discussion.

Prof. Henry—What induced you to go into the poultry business, why did you take that up in preference to dairying or some other vocation?

Mrs. Morehead—My health being poor, I thought out-of-door exercise would be beneficial, and for that reason I took it up.

Prof. Henry—How many years since you embarked in the business?

Mrs. Morehead—About five.

Mr. McGilton—Do you hatch entirely by the incubator?

Mrs. Morehead—No, sir, I use both the hens and the incubator.

Mr. McGilton—Do you turn the eggs in the incubator with your naked hand?

Mrs. Morehead—I was talking about turning them in the coop for hatching.

Mr. McGilton—I tried turning the eggs by hand and I lost considerable, it seemed to close some of the pores.

Mrs. Morehead—I am always careful to have clean hands in turning or handling eggs at any time, but gloves are recommended.

Mr. Boynton—Is it practicable to hatch these early broilers by any other method than the incubator?

Mrs. Morehead—I don't think you could for the reason that the numbers would be so small that it would hardly pay you unless you had a hen market where you could take in a very few at a time.

Mr. True—Does the incubator raise as large a percentage of the young chicks as in the old way?

Mrs. Morehead—I think so.

The Chairman—About what is the per cent. of eggs that hatch?

Mrs. Morehead—I think that half is called a good percentage taking it the season through.

Mrs. Snell—What is the first food that you recommend?

Mrs. Morehead—I give what they term pinhead oatmeal. It is simply oats ground; they pick out the little white particles of it. I feed it dry. As a rule I prefer soft food at first, but not sloppy food.

Mr. Barnes—How often do you feed your chicks?

Mrs. Morehead—About five times a day.

Mr. Sherburne—What incubator do you recommend?

Mrs. Morehead—I have used two, the Excelsior, made at Clinton, Ill., and the Monitor, made at Bristol, Conn. The first cost \$24, the second \$38, two hundred eggs capacity.

Mr. Repine—Do you ship your chickens to Chicago?

Mrs. Morehead—Yes.

Mr. Faville—Have you had fair dealing from the commission men?

Mrs. Morehead—With some I have, and some not.

Mr. Faville—You say you went into business for your health. Are you pursuing it now for your health or for the money there is in it.

Mrs. Morehead—Well, perhaps for the money there is in it now. I got to that point where I could not quit very well.

Mr. Hyatt—What do you give them to drink?

Mrs. Morehead—Water; I prefer clear water, though I know there are many give them sour milk and other drinks.

Mr. Faville—Don't you think that boiled turnips would be good for them?

Mrs. Morehead—Yes, when they are older.

Mr. Hyatt—I assure you they would be, I have tried it.

Mrs. Sherburne—Have you had any experience raising turkeys with the incubator?

Mrs. Morehead—I never had. There are ladies here who have, I think.

Mr. Kellogg—What proportion of the chickens that hatch get up to two pounds,—what is the loss in brooding?

Mrs. Morehead—There are very few lost.

Mr. Kellogg—Is the incubator adapted to the use of ladies at home?

Mrs. Morehead—Yes, if they have the time necessary to devote to it.

Mr. Cole—When your chicks are hatched in the early season do you get up and feed them by candle-light?

Mrs. Morehead—I have done so. It is necessary in the very long nights.

Prof. Henry—You have told us how you feed the very young chickens. What do you feed the broilers when they get older?

Mrs. Morehead—Next to the dry feed that I give them perhaps when they are three days old, I prepare a johnny cake, as I term it, made with three parts corn meal and one part wheat bran, a cup of chopped meat, it should

be lean meat, a double spoonful of soda, three double spoonfuls of vinegar, the mass moistened with milk—just enough to make it the right consistency to bake. I bake it three hours, and when it is cold I crumble it and give it to the chickens.

Mr. Gould—What has been your experience of raising chicks in the brooder?

Mrs. Morehead—I think they grow very much faster, being raised in the brooder, until two or three pounds are reached.

Mr. Barnes—Do you change the food of your chicks, or do you change the ration?

Mrs. Morehead—After about ten days old I prepare the food differently, giving them corn, wheat and oats ground together, in equal quantities by weight. I take five parts of this mixture to one part of wheat bran and thoroughly scald the mass with boiling water, adding chopped meat as before. I feed the chicks oyster shells from the start.

Mr. Wilson—Are you troubled with vermin?

Mrs. Morehead—Not if they are kept from running with the old fowls, or from runs in which the old fowls have been. If they get them, I powder them with insect powder.

Mr. Mitchell—How long can you keep your incubator going without attention?

Mrs. Morehead—It depends upon the make. My last incubator did not require more than two or three times a day. The one I had first I used to look at about every hour. I keep it in the cellar.

Prof. Henry—Is it important to watch the surroundings of the incubator?

Mrs. Morehead—I think the air should be fresh and pure, and pretty even.

Mr. Boynton—What is the weight of the broilers?

Mrs. Morehead—From a pound and a half to three pounds, and it takes from eight to ten weeks to reach two pounds.

Prof. Henry—What per cent. of your old friends who have seen your success in the poultry business have started into it through your example and have succeeded.

Mrs. Morehead—Well, I know several who have succeeded, probably more successes than failures.

Mr. Cole—Mrs. Morehead's example has gone all over the state so it is pretty hard for her to answer that question.

WINTER PRODUCTION OF EGGS.

Mrs. IDA E. TILSON, West Salem, Wis.

Can hens be made to lay in cold weather? Yes, because the state of their owner's mind is a more important factor than the state of the weather. Let us see what natural conditions surround biddy during summer when laying is easy, then if we can duplicate these conditions in winter, we should repeat the results, and, as a

matter of fact, I have not had a day without eggs for several years. In summer insect life, green food, grit, warmth, sunshine, dusting and exercising places, are all as free as pure air.

Winter Feeding.

You have seen biddy trudge behind a plow, Micawber-like, waiting for

something "to turn up,"—white grubs, in her case. During winter all such supplies are replaced mainly by pork or beef scraps, bought at some packing house, for from one and one-half to two cents per pound. These have been subjected to great pressure, and are not as greasy as may be feared. Soaked, re-cooked, well thickened with shorts, and fed warm every third day, they bring me a noticeable increase of egg production. Raw meat is more laxative still, and requires closer watching. Livers, tongues, hearts, etc., when obtained at reasonable rates, then boiled and chopped, are best of all. Milk and linseed meal are good substitutes for meat, but the latter when not laxative, is very fattening. Rather than watch the effects of sour milk, I add a little soda, or better yet, make curd and feed it warm. Sweet milk can hardly be overdone, though if it should form her exclusive diet, biddy's eggs would have pale and clouded interiors. Be "mejum" in everything, as Josiah Allen's wife says.

Every third day, vegetables are boiled and fed warm. My usual combination is potatoes with a few carrots and onions, a pepper pod and slice of salt pork. My flock think they are getting their beloved onions, but I know they are also eating carrots to help secure those golden yolks, just as popular and beautiful as golden butter, or even gold bullion. When cooked the vegetables are skimmed out, mashed, have their liquor added, and the whole is thickened with shorts or mixed meals. Beets, turnips, or cabbages are chopped raw almost daily. Clover chaff is fed dry, or placed in a pail on top of my mixed meals, where it gets first benefit of my scalding water, then the whole is stirred together and allowed to steam a few minutes. It is surprising how green the chaff particles become, and what a strong odor of hay tea even such simple treatment yields, without any trouble of boiling. When barn floor sweepings do not yield enough

chaff, my father, with a flail, threshes out a quantity free from its cumbersome stems. We no longer need to lay down eggs, but formerly we did so, and their yolks when used, were richer colored than those of fresh-laid winter eggs, which shows how much effect the summer's rich vegetable supply has.

She Needs Grit.

Biddy needs grit as much as human beings do, only a hen's is of a different kind. Last fall, for three dollars, a man and team drew me a large load of sharp gravel from a bank about seven miles away. This load filled seven large barrels and will last two years. A nice chunk of mortar, made purposely, reposes under each hen house shed, and can be broken with a hammer if it becomes too hard. Sandstone, marble chips, and old crockery may be pounded, but under a paper as protection for the eyes. Coal ashes with their clinkers rapidly disappear before my hens. Some scientists claim that the soluble salts of lime, found in vegetables, etc., mainly form egg shells, but after repeated trials without and with crushed oyster or beach shells or ground bone, I find my hens put better coverings on their eggs when supplied. Crushed shell has, at least, a gritty and digestive value, and charcoal, though constipating, belongs in the same category. Since we must needs secure appetites for meals, as well as meals for the appetite, many substances not directly valuable may become indirectly so, by creating a desire for something that is more essential.

Warm Food.

So much food goes to create and maintain animal heat, that it is cheaper to provide some heat instead of all aliment, which I do by warming in the oven or under the stove, whatever grain fed. As a first step to digestion, cold grain is warmed in biddy's crop, and thus some heat already accumulated is wasted. A soft, warm, easily digested mess is given as

early as practicable every morning, meat being the basis one day, vegetables the next, and meal with clover chaff and table scraps, every third day. Oats, corn, barley and wheat ground together, can be highly recommended as pudding material. Beans are very valuable, and if raised, can probably be ground at your regular milling place. I know of a man, rather well-to-do, but not posted on hens, who lost many one winter. Being asked what he fed, he replied "corn." "Do you warm it?" "No." "Do you give them warm water to drink?" continued his questioner. "No, but I shovel in lots of snow to them." My houses are double-walled, with shingled roofs and fresh coats of red paint outside.

Ventilate.

Each house has a hollow wooden tube, 4x6 inches, running perpendicularly from within two inches of the bottom, and extending about two feet above the roof. This tube acts as a chimney, changing the air without throwing draughts on fowls. I remember that a Hamburg rooster froze his big, ornamental comb, when I had a ventilator open overhead, and if any of you should sit under such a one, a little while, you could be convinced of its danger, but should first have some croup or grippe medicine handy. If paths are shovelled in the snow, throw the latter away from your houses, so when thawed, it will not run toward or into them, causing dampness.

With the same outside temperature, a hen-house shows an increase of from 6 to 12 degrees, according as the wind blows or not, when the sun shines. Each building of mine has an open shed attached, which, spread with straw to warm and employ biddy's feet, secures her a better sunshine than that filtered through a dirty window or burning through clear glass. One of my sheds, 12x12 feet, cost \$10, the other cost \$3, and is 10x10. But I have also, fair-sized windows, which I try to keep clean, and laugh yet when I recall the astonishment a neighbor's

lad showed, who asked, "What do you wash hen-house windows for, anyhow?" "Let in the light," were those memorable last words of Goethe.

Cleanliness.

My movable nests on movable platforms can be taken out doors, and the walls then swept down better. Hot whitewash, kept hot and thin enough by repeated additions of boiling water, is well sloshed on in a yearly coat that gives both sweetness and light. Roosts are painted with kerosene, or rubbed with onions, and air-slacked lime thrown on them between times. Dust or plaster is scattered over droppings, which are often removed, and sulphur occasionally tossed into the nests. Nothing pungent comes amiss for scattering red mites. When biddy surveys a vermin-infested house we may imagine her saying "Give me liberty or give me death," a request which must and will be answered, one way or the other soon. As she has a special faculty of gathering into herself microbes of a very large size, she should frequently pass her examinations and be treated to a general application of pyrethrum. Every fall and sometimes spring, too, a fresh load of dry sand is placed within each house, as I prefer earth to floors, because it forms one great dusting box, where hens can roll in battalions. Dry road-dust, timely saved, containing a little sulphur, replenishes a box that offers a kind of extra bath. Many times I have labored over this problem of keeping poultry and their quarters clean, till my mind and both arms ached.

Exercise.

Such is the close connection of organs, that activity of one helps activity of all. A hen scratching around at night, till "the last beam fadeth," is the one that will drop an egg in the nest next day. An eastern poultry writer who gave chopped straw as the main secret of winter egg production, drew out some discussion on how he fed it, till he explained the straw merely covered his scattered grain and made

biddy scratch for a living. When I conceal my grain by hay or straw, the hungriest fowls find most, and if such get more than their share, they cease to be lean and hungry, and the next liveliest will then outstrip them in the hunt. I have seen unexercised hens so fat, their only use could be to show lazy pullets what any of them might become.

Leghorns closest resemble those wild hens still found in Java, and yield, by unanimous assent, most eggs in a year, but, at this latitude, are apt to do their best work in summer, when prices are lowest. Good care is much, but a five or six months winter is hard, and for me Wyandottes or Plymouth Rocks endure cold weather with better results on less attention. If you can stand the wear and tear of properly raising early pullets, they are the best layer but a choice hen in her second year succeeds far better than a poor pullet.

Average Egg Production.

I sometimes wonder how people make up their averages of egg production. One person giving me his, said that was what his flock would have averaged had each hen done her duty and none been sitting. I make monthly averages, then add those monthly ones for the year, deducting nothing for sitters or mothers, because other hens, not allowed to sit, will still take some time off for rest and recuperation. If the yearly total of eggs is divided by only the number of hens left at the close of the year, after reductions through selling and eating, too large a showing will be made.

I have twice averaged 139 eggs apiece, and other years done nearly as well. My best January average was 12, but has more often been 10.

As Uncle 'Rastus observes "De singin' ob birds am sweet, but de cacklin' ob hens on yer own roos' has a heap mo' expression."

Discussion.

The Chairman—It is probably good for some of us men that these ladies are not managing our business. The probability is they would make us ashamed.

Mr. McDougal—Do you allow your laying hens to eat snow or drink ice water?

Mrs. Tilson—We have a heater and they have warm water. At first they don't care for it, but in a few days they learn to like it as well as old ladies like their tea.

Mr. McDougal—Then I understand you don't give them liberty to run about the barn yard?

Mrs. Tilson—I give them liberty, but why should they choose any injurious thing when I provide them with everything that hen heart can wish for.

Mr. Faville—Do you warm your hen houses artificially in any way?

Mrs. Tilson—I do not, for the reason that I am not quite ready to turn into a night watchman, and I should want the heat at night if I had it at all.

Mr. Hoxie—How old do you keep hens for layers?

Mrs. Tilson—Very seldom beyond the second year. I prefer pullets if I have time to grow them.

Mr. Faville—What do you mean when you speak of doing justice by the pullet?

Mrs. Tilson—Train her up when she is young and when she is old she will not depart from it.

Mr. True—Is there any danger to your laying hens in feeding ground bones or oyster shell?

Mrs. Tilson—Ground bones have rather more lime. I prefer them in moulting time and in times of rearing young chickens. I depend very much for the limy elements of the egg upon green feeds.

Mr. Hyatt—Do you think you would do as well if you did not have a broad vegetable diet?

Mrs. Tilson—I have tried that and it did not work well.

Mr. Hyatt—What do you say in re-

gard to the exercise? Suppose there is a week of very cold weather, how do they get their exercise?

Mrs. Tilson—I laid down this general principle. Always if you can, get ahead of the hens, and exercise them instead of letting them exercise you. I lay away barrels of autumn leaves every fall and hide away the food under them.

Mr. Faville—How many is it profitable to keep in a flock?

Mrs. Tilson—About forty.

Mr. Hyatt—What would you suggest for those who have not got so far along but what the hens will eat the eggs sometimes?

Mrs. Tilson—I would suggest several remedies for that. The difficulty principally lies in the lack of lime elements in their food. I would recommend a vegetable diet and some shell, and above all else they should eat meat and salt. Then if the eggs are gathered often, every two hours, I think you will break it up.

Mrs. Langdell—What space do you give your forty hens?

Mrs. Tilson—I have one room and an open shed attached to the house. The open shed is a sort of promenade. Then there is the lodging room and laying room. I allow from four to five feet of space for each hen. Some very cold days they don't go out, but nearly every sunshiny day they prefer to be out there.

Mr. McGilton—What about salt?

Mrs. Tilson—I always mix dry salt through the dry meal before the water is applied. It can then be given in the proportion of a teaspoonful to a quart, but it is dangerous to give them anything in the shape of brine. I give it even to young chicks in that way.

Mr. McGilton—I think it is a good plan to leave a lump in the house; it is hard and they won't pick off more than is good for them.

Mr. Woodward—What kind of feed do you prefer for the hen?

Mrs. Tilson—I think clover chaff, if I must put one thing above all others.

I think I prefer turnips in the way of roots. I give a good many beets, but they are a little more fattening than I like.

Mr. Stiles—How can you tell how old a chicken is?

Mrs. Tilson—My chickens are oftentimes named. I am intimately acquainted with them, I know their little peculiarities and ways, and I love them all. I know of no infallible indication of age. If an old hen's eyes are bright, and her comb is tremulous and red and her movements quick, then she is not past her usefulness.

Mrs. Langdell—I think I can tell by their feet, the color of them. In Plymouth Rocks, at any rate.

Mrs. Tilson—I think it would not be an infallible test. I have threatened to get one of these markers and mark the feet of my chickens, but as a rule I know every one of them.

Mr. Craig—About how many eggs will a hen lay during her natural life?

Mrs. Tilson—I don't know myself. I have read that it is about six hundred. I would like to ask a question myself. It has occurred to me that the cold storage business is making quite a difference with this question. In my own vicinity the cold storage business offers quite a steady market in the summer, so that the last few years summer prices have been considerably higher than heretofore. As all of you know so many cold storage eggs are put upon the market that they have pulled down the fresh eggs, and I can't make my hens go to sleep in the winter. If this thing keeps on it looks to me as if summer eggs would answer just as well as winter eggs for the cold storage business.

Mr. True—What age should a hen be to be of the most profit?

Mrs. Tilson—I prefer an early raised pullet. The first year is the most profitable, but if I can raise her well, I prefer a hen of the second year. The Plymouth Rocks do not grow old gracefully, they get so fat; I can't retain them as long as the Leghorns.

Mr. Hyatt—Do you keep the broods distinct?

Mrs. Tilson—I do not because I make no business of selling eggs or poultry for the fancy trade.

Mr. Hyatt—What is the best month to pack cold storage eggs?

Mrs. Tilson—I think they begin in our vicinity about April. In April, May and June I think they do the most of their gathering.

Mr. Cole—My wife finds there are a great many in the cities that are afraid of storage eggs and she furnishes them the year round and gets a good price that way. It cuts down the prices, this cold storage, just the same as the oleo cuts down the price of butter, but there are certain customers who are looking for the best article, and are willing to pay for it.

Mr. McKerrow—How cheap can you raise eggs in the winter to come into competition with these cold storage eggs?

Mrs. Tilson—I don't know that I ever made any figuring of that kind. I have kept account so that I know what it cost me to keep a hen during the year. Seventy-five cents is the very outside limit. I figure on the basis of getting about \$1.50 a hen, and I have many years cleared \$1.00 a hen.

Mr. Woodward—Perhaps I can give Mrs. Tilson a point with regard to exercising chickens. A friend of mine takes the large mangles and he has got some cords fastened to the top of the hen's quarters with a hook in the lower end, and he fixes it so that it hangs about two feet and a half from the floor and they will stand there by the hour and try to get at it.

Mrs. Tilson—I never could make that work with vegetables. Perhaps it is because I give them so much clover. I have made a success of it with a sheep's head.

Mr. Woodward—There is another point in regard to making hens lay. If you give a hen the proper kind of food and enough of it and keep her in the right kind of quarters, she has

got to lay or bust; that is all there is of it.

Mrs. Tilson—There is a story told about a little boy who heard a hen making a fuss over laying an egg, and he says, "Biddy, you needn't make such a fuss over that egg. God Almighty made it, and you couldn't help but lay it."

The Chairman—I heard something the other day that was instructive. I have spent some time lately in putting a wire fence around my garden to keep the hens out. A friend of mine says that he takes a little piece of wire and winds it round one of the legs of the hen, and it drags behind her, so that when she goes into the garden to scratch the wire catches and pushes her ahead and walks her right out of the garden.

Mrs. Tilson—I can't help but be a little easy on the hen that go into the garden. If she hasn't anything to eat outside she is like a hungry boy, and has got to go where she can find something.

Mr. Barnes—I know of farmers who depend upon the hens to cultivate their gardens.

Mr. Stiles—Is it beneficial for the hens to eat hay?

Mrs. Tilson—I am a little afraid of hay stems, because they might cause a crop bound condition, although I often give them clover hay and let them eat the leaves, but I prefer giving them the chaff.

Mr. Raphager—Would you recommend corn stalks?

Mrs. Tilson—They would not make bad covering for the corn to make biddy scratch.

Mr. Cole—How is ensilage for the chickens?

Mrs. Tilson—I never have tried it but I have heard it recommended. I once asked Mr. Hiram Smith whether it wouldn't be a good plan for me to have a little silo for my hens. He thought my system was all right but that I had better not go to the expense.

Mr. Woodward—We feed our hens ensilage just as regularly as any other stock on the farm. There is one thing a hen is good for that hasn't been spoken of here. I always put a flock of hens in with my sheep to pick the ticks off.

Mr. Edwards—Did you ever try cutting short grass and packing it into barrels and weighting it, to feed it to the chickens in the winter?

Mrs. Tilson—I have not weighted it, but I have preserved it to feed them

with. I should think it would practically be a little silo.

Mrs. Langdell—Do you think that men generally appreciate this hen question as they ought to? They say it is woman's business, and they make sport of it although it is all they allow us for our income.

Mrs. Tilson—I was very much delighted in a late paper to notice that the Grand Old Man has spoken. Mr. Gladstone recommends poultry raising as the best possible solution of the problem of hard times in England.

HANDLING PURE BRED POULTRY.

Mrs. J. C. PLUMB, Milton, Wis.

The question of breeds in practical poultry farming cannot be set aside with the old saw, "more in the feed than in the breed," for both lines run side by side, different breeds requiring diverse feeding, and no single rule of feeding will do for all breeds at all times.

We have in this country ten distinct classes of the hen, as follows:—

	Breeds.	Varieties.
American	5	11
Asiatic	3	8
Mediterranean	4	11
Polish	1	8
Hamburg	2	7
French	3	3
English	1	3
Games	3	11
Bantams	7	15
Russians, black,		
Sultans and		
Silkie white,	3	3
Total	32	79

There are also several newer varieties not in the Standard of 1888, but may be adopted in the present revision.

As my limit will not admit of any extended description of varieties, I will only give general characteristics of such as are of most practical interest to the farmers of Wisconsin.

Best American Breed.

Of the American breeds the Plymouth Rock stands at the head, giving us the best combination for a farm fowl of all the list. They give us good winter layers, faithful sitters and good mothers. In egg production they rank high, eggs of good size, color and quality, with strong shells for shipping. As a meat fowl they are of the best, with yellow skin, and plump bodies, which, when well fattened, sell well in the market. For broilers and early market the chicks are not excelled by any other breed. They are hardy and vigorous while young, feather early, and at two months old will weigh two pounds, and are ready for the summer market at 25 cts. to 40 cts. each, at a net gain of 15 per cent. to 20 per cent. on the cost of raising. The above remarks refer to the old Barred Rock, but apply substantially to the Pea Comb and White,

all of which should weigh when full grown, nine and one-half for the cock and seven and one half for the hen.

Of the Wyandotte family, we have the Silver, the White and the Golden, eight and one-half and six and one-half in weight, with most of the good qualities of the Rock, but not so hardy while young, nor as active and vigorous as a farm fowl, also being of later origin are not so easily bred to the standard feather.

The Java family compete with the Rock for utility in every way. They are one-half pound heavier all around, and somewhat better feathered for a cold climate. There are of these, the Black, White and Mottled. All have clean, dark or pink shanks, and yellow skin. The Black Java will give more eggs in winter than any other breed we know, with similar and common treatment. They will also give more breast meat when dressed than any other of the same weight. The Old Dominiques are of only medium weight, eight and one-half and six and one-half, but have been the base of several of our modern breeds, as well as our common dunghills for the last fifty years. The Jersey Blues are a new variety resembling the Java, except in color.

Large Foreigners.

The Asiatic class have three breeds,—Brahma, Cochin and Langshan, all of large size and heavily feathered with more or less of leg and toe feathering. Of this class the Light Brahma is the general favorite, weight twelve and nine and one-half. Their small pea combs are not easily frosted; they are good layers, and sitters, but too sluggish for rearing young chicks to the best advantage. It has been said that a well fattened Brahma is the beef of the poultry yard, and their capons food for kings. Prof. Henry says they are—"The Downs of the hen-yard." The Dark Brahma is one pound less in weight. The Black, White, Buff and Partridge Cochins have similar characteristics, and of

the same weight as the Dark Brahma. They are good winter layers and their bountiful meat, fine appearance and general hardihood make them valuable for the wide range of the farm. An ordinary four foot picket fence will yard them, or will protect the garden from them during the summer. The beautiful penciling of the Partridge Cochin and rich golden plumage of the Buff, give these a high place in all fancy yards and the show room. The Black Langshan, nine and one-half and seven, with an abundance of glossy plumage, is a good breed for a cold climate, being a good winter layer. The White is a new production not well tested. The Asiatics all have feathered legs, which is not in their favor as a barn-yard fowl.

Non-Sitters.

The Mediterranean class of breeds and varieties are all non-sitters and produce large eggs for their size. The best known of them are the Leghorns, in seven varieties, Brown, Rose and Single Comb, White the same, Black, Buff, and Dominique. In general character these are all much alike, weight three to five pounds, their chief merit being in their excessive egg production during mild weather, and their great activity at all times. They bear confinement better than the larger breeds, and so are better fitted for small runs of the city, where fresh eggs are wanted every morning, and where they can be entirely enclosed with poultry wire fencing. The Leghorn is the Jersey Cow of the poultry yard, and by cross breeding is invading every farm, thereby adding wonderfully to the total egg supply of our country. The Minorcas are of the same general character as the Leghorn, but nearly twice as heavy, eight and six and one-half pounds. The Black is in every way worthy of a trial on the farm, both for cross breeding and pure, and much more hardy than the white. The Black Spanish is an old variety which is too tender for the farm. These non-sitting breeds being

natives of a warmer climate than ours, require here more comfortable quarters than the average farm now has, to make them of most advantage on the farm.

The Polish in eight varieties of color, are all furnished with small combs and large crests; very beautiful as pets, good layers and non-sitters, but not advised for the farm.

The Hamburgs, in two breeds and seven varieties, of beautiful colors, are less in size than the Leghorns, are non-sitters, and prolific layers of a small sized egg, which some think richer than those of the larger breeds. They are used mostly for city pets. The Red Caps are a sub-variety of the Spanish, of full medium size.

French and English.

Of the French class the Crested Houdan is an old breed, Black and White, of only medium weight, very quiet, but active and hardy; very prolific in large eggs.

The old English Dorking has given place to more vigorous new breeds. The old games are great rustlers and good layers, but not recommended for the farm, except to give firmness to the meat and pluck to larger birds.

The new Cornish Indian Games are hard to raise in this climate, and too cross to other more useful breeds to be tolerated on the farm.

The Bantam class of seven breeds and fifteen varieties are useful as pets only. Being produced from the large breeds by inbreeding, late breeding and starving, they retain most of the characteristics of their ancestry. They are good layers and mothers, and some of them very beautiful. Twenty to twenty-six ounces is their range of weights, the Black-breasted Red Game being the smallest (20 and 22 oz.).

To complete the list of classes we have the Russian, (black), the Sultan and Silkies, (white), of which little is known by us.

Popularity.

Our experience with the following twenty varieties in the past year's

sales, shows the public demand to be about as follows:

For the year 1893, for birds and eggs.
 Barred Plymouth Rocks, 20 per cent.
 White Plymouth Rocks, 5 per cent.
 Laced Wyandottes, 7 per cent.
 White Wyandottes, 1 per cent.
 Golden Wyandottes, 7 per cent.
 Black Java, 1 per cent.
 Light Brahma, 10 per cent.
 Dark Brahma, 3 per cent.
 Langshan, 5 per cent.
 Partridge Cochins, 3 per cent.
 Buff, 2 per cent.
 S. C. B. Leghorn, 6 per cent.
 R. C. B. Leghorn, 6 per cent.
 S. C. White Leghorn, 2 per cent.
 R. C. White Leghorn, 3 per cent.
 Black Minorca, 5 per cent.
 Hamburg, 5 per cent.
 Black Spanish, 4 per cent.
 Houdan, 5 per cent.
 Indian Games, 1-2 per cent.

The Thanksgiving Bird,

In turkeys we have six varieties, of which the Bronze are the largest and most popular. They show the vigor and hardiness of the native wild turkey, from which they sprang, and with generous care and regular feeding they can be depended upon to come home to feed and roost. Their standard weight is thirty-two and twenty-two pounds.

The Narragansett comes next in size and resembles the Bronze, but has less of the Bronze and more of the gray or buff in plumage. The buff, black and slate colored are about five pounds less weight and the white still smaller, twenty-six to sixteen pounds.

In ducks we find ten varieties, only three of which can claim special merit for the farmer. They are the Pekin, Aylesbury White, and the Rouen Brown. The first named should weigh eight and seven pounds, the last two ten and nine pounds. While these are all worthy varieties and each a special favorite, we find the Pekin the general favorite.

Of the six classes of geese in domestication the Toulouse gray, and the

Embden white stand for all the farmer's needs in this bird. Their standard weight is twenty-five and twenty-three pounds. The Toulouse is the best feeder and most prolific, often laying 35 eggs in a season and at five months old weighing fifteen pounds.

The Guineas, white and gray, can hardly be recommended for a general purpose fowl, yet they are great peace-makers with the other fowls, also vigilant watch-dogs against all strange birds and beasts. Their meat resembles the wild pheasant more than any other of our domestic fowls.

To the above short description of breeds I will add some notes on Handling Pure-bred Fowls.

Care of Pure Breeds.

The utility of pure bred poultry can no more be questioned than that of other live-stock on the farm. The common practice of mixing up all breeds on the farm is not a good one. If the farmer wishes to grade up on one line let him choose the breed he would run into and use only pure bred males of the variety he prefers. If he chooses not to buy all fresh males from breeders of that variety, let him have a small breeding pen of his own, where with a trio of pure breeds he may, at small cost, secure all the males needed for each year for the farm flock and some for his neighbors also.

Any careful farmer can in this way grade up to a good working standard his common hens, and sell pure bred males to his less enterprising neighbors to pay all extra cost of his breeding pen. This is now being done by hundreds of farmers. These separate breeding pens should be made up about a week before the eggs can be depended upon as pure.

Best results in raising, in feeding and in marketing can be secured with thoroughbreds. Extensive development on this line has made some of them quite tender, hence they need extra care and keep.

The delicate French and Mediterranean classes should not be raised with

the coarse Asiatics, for the latter will run over the former when crowding for feed. These two extreme classes also require different winter housing, different summer runs and different feed during the laying season. The large breeds must be made to trot around and dig for their living and be fed less concentrated food than the smaller breeds. If kept in same pens and runs and fed on the same food, the larger breeds will become too fat to be of any good except for the pot, or the smaller breeds will be starved out. Egg production like that of milk, is an act of the reproductive forces, and only under a liberal feed can it be a success, but overfeed often prevents the fertility of the egg.

Uniformity Profitable.

Poultry raised on this pure bred plan will be of uniform appearance when put on the market, both dressed and in feather, and will bring enough more for that reason to pay for all the trouble to secure it. Increase of size as well as quality will often come from the use of pure bred males.

Bronze Turkey Toms, Toulouse Ganders, Pekin Drakes, Brahmas and Cochin Cocks will add to the size of the young that year in a flock of common birds from 20 per cent. to 50 per cent., without much additional cost.

Here would come in many points in breeding and rearing, but as my limit is already over-run I will close with a few hints.

Summary of Experience.

1st. Other things equal, the white feathered varieties are not so hardy as the dark feathered of the same breed.

2d. With the best of blood, only by careful rearing and thorough culling can the standard of superior excellence be maintained.

3d. Don't expect eggs from a thousand miles away to hatch as well as from the home flock.

4th. Don't buy a pure bred male bird and turn him out to take his

chances with the cocks of the old flock, unless you are willing to lose your investment.

5th. Don't expect the pure breed to make up for your own lack of care and feed.

6th. Don't cross-breed a year or two and then change off; but once started follow on the chosen line to perfection.

7th. Don't in-breed, but use males from different strains of the same family.

Discussion.

Mr. Plumb—I want to add a word on my own account. I have said it a good many times during the last six months that the cw and the hen were the salvation of the state of Wisconsin, financially, this year. I want to speak of this silo business also. Some eight or ten years ago Father Hiram Smith was advocating the silo, and I put the question to him whether we could utilize the barrel silo in our poultry raising. He says, "A silo must have a certain degree of heat. Are you going to get that degree of heat in a barrel? I think not. Now, what will you have? You will simply have rotten grass."

Mr. Woodward—Is it not a fact that there is an objection to all dark breeds of poultry in the pin feathers when you come to kill them for the market? The coloring matter gets between the outer and inner coats of the skin and makes the meat look as if it had been bruised.

Mrs. Plumb—There have been some objections on that ground, but I don't think it is so with the Plymouth Rocks. Of course the pin feathers will leave dark spots, but I know they bring enough more in the market than some others that are of light color.

Mr. Woodward—This last year we sent a consignment of poultry to New York, part of them white Plymouth Rocks and part of them dark. They were all grown together, and all dressed the same time, by the same

parties, but when they got to New York the white ones sold from five cents up more than the dark ones; they said the dark ones were bruised.

Mrs. Langdell—Was it proper to sell those fowls when they were in their pin feathers.

Mrs. Plumb—I think so. Any fowl will dress nicely that has a nice skin. We always get more for Plymouth Rocks than any other variety. We consider the Plymouth Rocks choice for broilers. I think any dark fowl is harder than the white. I know it is so with us.

Mr. Woodward—Don't you think that the white Plymouth Rock is the better layer of the two?

Mrs. Plumb—No, I don't think it is. The white Plymouth Rock is not as old a breed as the Barred. The first year you may send off and get some that are very large. The next year they are a good deal like Leghorns; they have undoubtedly got Leghorn blood in them, and probably in a few years they will be larger and like all the rest of these cross breeds they will be picked out better.

Mr. McDougal—What is your objection to the feather-legged Brahma for the farmer?

Mrs. Plumb—Farmers claim that around among their hogs and cattle in wet weather the Brahmas and Cochins, on account of the feathers on their legs, get muddy; it makes them slow to get out of the way, while the Plymouth Rocks and the Wyandottes and the Javas are clean bred. They get out of the way of hogs and cattle or anything else that is apt to step on them.

Mr. Woodward—Don't clean-legged fowls, when they get into the market, sell for the most money per pound?

Mrs. Plumb—I don't know about that.

Mr. True—Of the small varieties do you consider that the Hamburgs are entitled to consideration equal to the Leghorns?

Mrs. Plumb—No, I do not. I think the Hamburgs show very little to kill

and eat, and the eggs are so very small that there is really no money in them.

Mr. Woodward—Is there any fowl that will lay as many eggs as the Leghorn?

Mrs. Plumb—With us the Java has laid more eggs than the Leghorn or the Minorca, or anything else. Last fall when all the other hens had stopped laying the Javas kept on until the coldest weather in December, and also the Plymouth Rocks. You take a flock of early hatched Plymouth Rocks and they will lay through the fall and begin laying again in February, and they don't require as warm a place as the Leghorn. The Leghorn has such a large comb and large wattles, that if they don't have a good warm place they are sure to get frost-bitten; then you will have no more eggs through the winter.

Mr. McKerrow—This lady's paper is the only one that has touched on the turkey. How do you care for your turkeys to get the best success in raising them?

Mrs. Plumb—Our place is small. I let the farmers have our eggs to raise, and then I buy them at the market price; that is the way we do it. There is one lady near us who raised 175 turkeys from 12 hens. She had a yard eight feet high. She put nests on the outside of this yard all along the fence that were regular boxes. The turkey went in there to lay and the first eggs that were laid she put under the hens. The next litter she let the turkeys hatch. It was in March. She kept these turkeys in the yard until they were two weeks old, and then she let them out and she raised nearly all of them. I never saw finer turkeys in the month of October. The Toms averaged 17 pounds and they were three-quarters bronzed. She had a flock of the common small turkeys and she came to us two years, I think, and got a Tom. We have a yard about eight feet high to keep our turkeys in to get the eggs and to keep them from bothering the hens. She expected to clear \$200 on those turkeys. They took care

of themselves after they were two weeks old. She fed them bread crumbs and cracked wheat and cracked corn until that time. Then every night the turkeys came home and she fed them, but after that she didn't do anything for them.

Mr. Hennessey—Will a pure bred fowl do equally as well as crosses on the same care?

Mrs. Plumb—I think the pure bred are better and no harder to raise. You take a flock of pure breeds and they are all of a size, but if you have a flock, some of them large and some small, the heavier ones will run over the smaller ones, and you will have a good many losses. We never have dealt in crosses.

Mr. Cole—Don't you pay particular attention to the introduction of fresh blood?

Mrs. Plumb—Yes, sir.

Mr. Hyatt—I think it is a fact that after turkeys are about three weeks old that the turkey will take them and go out into the open lots where there is nothing to disturb them, and it is very rarely that they lose any young turkeys after they are about three weeks old. They seem to have plenty of good common sense.

Mrs. Plumb—I think that turkeys that take care of themselves in that way, do far better than those that are handled at home.

Mr. W. P. Bartlett, of Eau Claire, President of the Board of Regents of the State University, was introduced to the Institute and spoke as follows:—

Ladies and Gentlemen—I was pleased this morning when Professor Henry urged the fathers and mothers to go home and send their sons here. It was a good thought, and he only left out one thing, and I come before you to plead for the daughters. I say let the farmers go home and send their daughters here as well as their sons, for whoever knew an old bachelor to make a good farmer, and yet I have known

many a maiden lady to be excellent in raising chickens.

One word in regard to our university. I find in traveling around that a great many, even those who attend our Farmers' Institutes, look upon the University of this State as a great college to which young men go down to be educated to become lawyers, some to become ministers and others literary men. I wish to inform you that they are not the only men who are educated in our University. We have every department there. We have a mechanical department to which a young man can go and learn a trade; we have the engineering department, to which a young man can go and come out an experienced engineer, ready to take a position at from two to three thousand dollars a year.

University for the Farmer.

We have an agricultural department in which we educate men as farmers; we go further than that: If the farmer's son cannot go to the University we come to you, and the Farmers' Institute is a part of the University sent out to meet the demands of the people who cannot attend the University, one of the branches thereof; one of the arms of the University sent out to meet the demands of the people who cannot attend the University. Nine years ago it was started, and every year throughout every part of the State these Institutes have been held, and we want the farmers to attend them, not so much to hear Professor Henry and other men who come as teachers perhaps, but that you may come and compare notes among yourselves; that is the true and the best education, because while theoretically there may be much in farming there is still more in the practical knowledge that you impart one to another.

Farmers' Institutes.

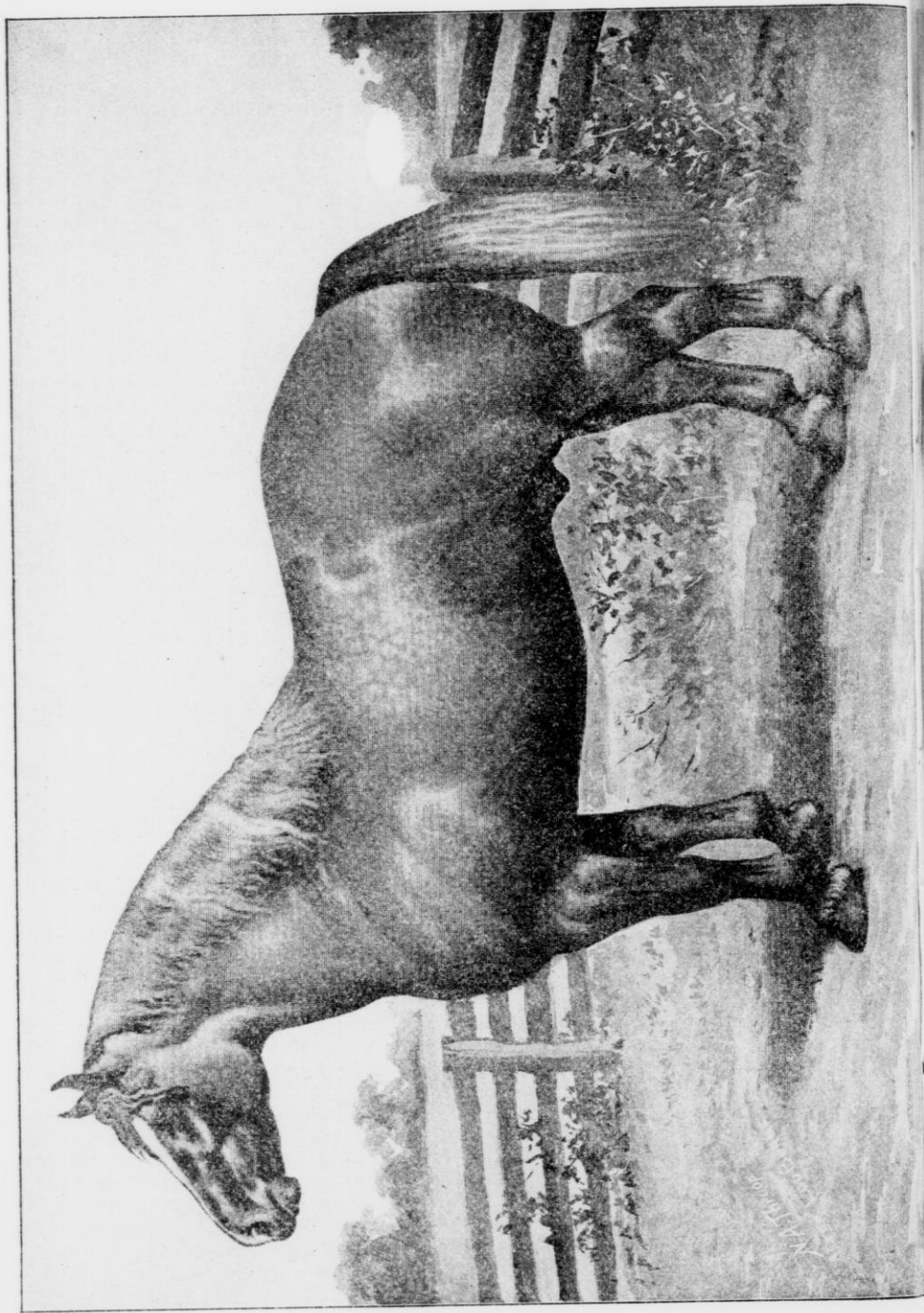
For the past several years it has been my fortune to travel much in the west, each year beyond the Rocky Mountains, and in these trips there

has not been a single time but what I have met with some farmer away beyond the Rocky Mountains either engaged in raising fruit or something else, who dates back his success to the Farmers' Institutes and the agricultural knowledge that this State has sent forth, either by its Institutes or by the bulletins sent out from our agricultural department. Our Farmers' Institutes have not only reached beyond the Rocky Mountains, but they have crossed the ocean, and even in the old country have awakened an interest in agriculture, throughout the realms of European countries. We are just passing through a series of years of financial depression; men who were rich yesterday are poor today. Where is there a man in any business that is better off than the farmer who is out of debt? He has his home, he has his living, and you go into your cities today and you will find nine cases out of ten of the working men who are really suffering for the want of food. Not so with the farmer. In the last three or four weeks I have been into several counties in this State and talked with farmers and there is no class that I meet with that today is so well off as the farmers. I wish that every farmer in this State could send his son to at least one term in our University, even the short term of one winter, twelve weeks. It would arouse an enthusiasm that he would bring home to his brothers and sisters that would be felt throughout the length and breadth of this land.

Prof. Henry—President Bartlett, the man for whom I work as a professor of agriculture, and the man to whom my reports must all go for consideration, has put before you something of the facts about our State University. We have come together not only to have a good time here, but a profitable time, I hope, and to acquire some of the enthusiasm which we ought to all feel in connection with our University, and to take it home to help us make a greater success in our work.

The meeting adjourned to 7:30 p. m.

OTHELLO 16708, (37313)
At two years six months old. Prize winner at World's Fair, 1893. Imported and owned, by H. A. Briggs, Elkhorn, Wis



EVENING SESSION.

The Institute met at 7 p. m. Pres. Bartlett in the Chair. Music by Grac Church Choir.

FUN ON THE FARM.

J. F. MOYLE, Yorkville, Wis.

About twenty years ago it was our good fortune to become acquainted with the late lamented Superintendent of Farmers' Institute work in this State, Hon. W. H. Morrison. At that time he was living in the ancestral home in Walworth County and managing the many aced farm formerly owned by his father. We spent some weeks with himself and family, and during that time had ample opportunity to study some of the peculiar characteristics of the man, who was later to become the famous Secretary of the Walworth County Fair, (better known in southern Wisconsin as the Elkhorn Fair), and still later the pioneer of Farm Institute work in Wisconsin. I need not remind you how faithfully he discharged the duties of that position; with what untiring zeal and energy he prosecuted the work of bringing the farmers to the front; nor is it at all probable that we shall ever know how great were the difficulties that met him in the way, and the discouragements with which he had to contend, before the strong and liberal foundation on which we build today was laid.

His Work Well Done.

Let it suffice for us to know that the work has been done and well done; the superstructure, however, remains for us and our children to complete. Let us see well to it how we build thereon.

But this is not the subject we are

booked for tonight, and perhaps the easiest way to introduce it will be to take a prominent characteristic of the man of whom we have been speaking and consider it briefly by way of introduction to "Fun on the Farm." He was a genial man, and full of fun, that is, he had a keen sense of the humorous side of life, and preferred it to the cynical. Walking on the farm one day he called our attention to a large and nicely finished hop-house. "There," he said, "is a monument of Morrison's folly. I had a bad attack of the hop-craze, and could see nothing short of a bonanza in it. I figured it out by every known rule of arithmetic and the sum, remainder, product and quotient, in every operation produced the same result, affluence. I launched fearlessly upon the tide, put two thousand dollars into the enterprise, and when I was ready to pick my first hops the business had already become a blooming fizzle; my flight had been high, and somewhat noisy, but like the traditional gander, I had lit in a mud-hole."

Causes Acidity.

Such experiences are very apt to sour men, and especially farmers who work so long and hard for what they possess. To see their gains so suddenly dissipated, their confidence in their own sagacity and shrewdness so ignominiously eclipsed, and themselves made the butt of ridicule for their neighbors, is certainly at the best not

a situation to be desired. Indeed, I doubt if any of us would be very anxious to pass through the ordeal, even though it afforded us a brilliant opportunity of putting our philosophic ideas into practice. Therefore, if in what follows we may say things that are not very complimentary to the grangers as a class along a certain line, still we wish to remind them that we do not forget the thousand and one things that tend to worry and fret and put in a bad humor, those whose occupation throws them so much of the time upon their own resources for anything like recreation, or relief from the treadmill like routine of farm life.

I know that many claim our dispositions are largely, if not entirely, the result of heredity, and that the man who is of an open, genial temperament was born-with just such a disposition, and is entitled to no credit for it and vice versa; and there is without doubt much truth in the argument.

Happiness Discarded.

But our own observations have proved to us conclusively, over and over again, that the farmer with all the inducements around him to make him the happiest creature in creation, may become the most miserable, and unlike Midias turn everything he touches into swill. It was undoubtedly to correct this tendency that Orange Judd headed one column of his paper with this couplet:—

"A little nonsense now and then
Is relished by the best of men,
To rest 'em."

Four of the prime factors among the many that go to make up the sum total of human existence, are work, food, sleep and fun. Of the first there is never any lack on the average farm. Of the second the generous response to the appeal for aid for our less fortunate workers, the miners, made by the farmers of this State during this winter, proves they have enough and some to spare. As for sleep, when we consider that one-third of our entire existence is cheerfully devoted to

that one item alone, and no grumbling, its claim will certainly be admitted without question.

Fun.

But for the last of the quartette, fun, and especially when it is fun on the farm, we are not so certain we shall be able to establish the right of way as clearly, or gain for it the recognition we desire. Not that we expect any one will arraign this exclusive and peculiar propensity of humanity as an evil per se, but in as much as it consumes some time, and any time on the farm that is not devoted to working, eating or sleeping is apt to be counted only as so much valuable time wasted, it would be very natural to expect the husbandman to frown upon it, and declare it could not be considered an adjunct to successful farming, (especially if indulged in by the hired help).

The Laughing Animal.

Now, just why among the many and diversified works of creation, man and man alone, is gifted with the desire and ability to laugh, and thus give audible expression to the tickle within him, is one of the mysteries we hand over to those who care to investigate. It is sufficient for our purpose, however, that he can and may, sometimes even does indulge in the pastime. But we do not wish to be understood as claiming that fun simply consists in laughing, or that persons who are always laughing are the only ones who gather any nectar or rejoice in any sunshine in this typical vale of tears. The narrowness of such a construction would evidently take all the wind out of our sails and leave us with scarcely a rag of argument to flutter in the breeze. It is in the broader and more comprehensive sense which conveys to our minds the idea of pleasure, enjoyment, satisfaction, contentment and kindred terms that tends to express a desirable state of mind and body, and that makes the business of living worth the effort.

We are frequently confronted with

this question: Why do farmers' sons so frequently take a dislike to the farm and want to go into some other business, especially if that business will take them into some of our cities? Farmers don't seem to understand it when the farm stands so much in need of their assistance and care, and offers them so many inducements to remain thereon and develop its resources and make themselves independent. The "need" part of this is very cogent and hundreds of farmers deserted by their sons, bear testimony to the fact. Many reasons might be adduced to account for this state of things, but no simple reason will explain as much of it as a lack of fun on the farm.

But the inducements to remain on the farm, what are they. Often they are such as this: "Come, now, Johnnie, hustle out of bed, its 5 o'clock, and you know there are twenty cows to milk, and all the stock to feed, and the horses, sheep and pigs to attend to, and the road to the factory will be bad this morning because of the drifts, and you'll be late if you don't look out. Come, now, move lively." And Johnnie rears up on his elbow and through his half opened eyes looks at the frost covered windows and laughs and laughs, and says heaven bless farming. Don't he? Or change the scene to the other end of the day and listen to this bit of homespun conversation and see how much inducement to stay on the farm you can extract from it. It is a simple clipping that is now making the rounds of the newspapers, and is intended to be funny, but there is such an evident twitting on facts in it that it puts it in the minor key at any rate.

Couldn't Understand it.

"Farmer Hardfist—What under the sun is the reason that boys are such no account creatures nowadays? Here is our son Jasper pretty nigh crazy to leave the old farm and try to get a job in town.

Mrs. Hardfist (meekly)—Perhaps he thinks the work won't be quite so hard.

Farmer Hardfist—Work? Why, shucks, Polly, he don't skurcelly know what work it. He hain't done a thing since supper but milk the cows, feed the horses, slop the pigs, split and carry in the wood and kindlins, shell a little corn, ketch the colt and turn the grindstone for me about half an hour. He's had all the rest of the time to himself, except a few minutes it took him to mend the bridle I broke this morning. What in the name o' Tunkett makes all the boys crazy to leave the old farm?—Life."

Now both of these illustrations may be a little overdrawn, but they contain much that is too true, nevertheless, and ought to afford us considerable room for reflection. How much pleasure, or enjoyment, or contentment, to say nothing about fun can you imagine for young people with such environments as these, and yet we are forced to believe though much against our inclination, that the tendencies of farm life are too often in this direction.

Spice the Details.

But you tell me that if a farmer will make a success of his business he has to attend to it in all of its details. Very true, but isn't it just possible to have a few too many details? And isn't this just where the grind comes in that makes the boy discontented with his lot in life, and prompts him often on very slight provocation to fly from the seeming slavery. There is a large sprinkling of truth in the old proverb "All work and no play makes Jack a dull boy." I know with many farmers it seems to be a prime necessity to keep every worker on the farm on the jump from the time they jump out of bed in the morning until they jump in again at night; and then they claim that nothing more has been done than was absolutely necessary to keep things up and running smoothly, and the query will very naturally arise in such a person's mind, What else can I do? If I allow things to go by default for waat of energy and push on my part how can I expect to pay accruing

bills or keep the farm up to the standard that will yield the best results? True again. We admire the farmer who has push and energy and tact and vim, but simply claim that it should not all be applied along the line of raking in the almighty dollar for the sole purpose of buying more land, on which to raise more corn, with which to fat more hogs, in order to buy more land, on which to raise more corn, with which, etc. Such a course pursued with no higher object in view than that we have stated, must, it appears to me, eventually act as a blight on any home, and it is at least one of the causes why boys leave the farm. No, no, gentlemen, it is not less push or energy we want but more of it applied along the line of making our homes what they ought to be, the best place this side of heaven.

How shall this be done? Every farmer can probably answer that question best for himself. But at the same time we would like to make a few general observations.

Pleasant Homes.

In the first place avoid the harsh, rasping, dictatorial manners, indulged in by so many farmers in their own homes; this is a product of their enforced isolation from society because of their calling, I am inclined to think. But it should be discouraged and can be. The result would be speedily seen in the home, and they will very likely think you are going crazy, or getting ready to die. But stick to it, it will make fun on the farm, and that is what we are after.

Again, try to bear this in mind. Boys are only men in miniature and ideas and predictions are as natural to them as they are to the full grown animal and are put forth, not for the purpose of being ruthlessly destroyed on sight, or frozen out by scorn or neglect, but to be sampled and tested, and in most cases to be encouraged and directed.

Gratify Tastes.

Do your young people manifest a taste for music or painting, or any of the fine arts, encourage them in these things and assist them as far as you are able. There is no law against it and you may be sure the drill of active life when they are engaged in it for themselves will be prosy enough at the best. Why deny them these accomplishments if it is in your power to bestow them?

Have they a taste for horticulture, it doesn't take much ground, to make a boy supremely happy along this line. How well we remember a little garden over which we exercised a sort of sovereignty; it was a strange commingling of hollyhocks and onions, of forest trees and ribbon grass, but we never felt like leaving it even in the most discontented moods.

Have they a fancy for live stock, make them limited partners with yourselves in the business, and live up to your part of the contract.

Are they poultry fanciers, let them prove for themselves that pleasure and profit along this line is the legitimate result of strict attention to business, and that less than this is bound to produce disappointment and loss. In fact, the farm is fairly alive with entertainment and instruction, with incentive and reward for persons of every age and rank in life.

But I imagine I hear a farmer saying, when it takes our supremest effort and strictest economy on the farm to pay every day expenses and provide the bare necessities of living, how much will there be left to invest just for the fun of the thing.

Comes Cheap.

Not very much we are willing to admit, and especially these tight times. But we are happy to inform you that it does not take much, neither is the cost very great, if the money is only judiciously expended, to make lots of fun on the farm. How many of the farmers who listen to me tonight are taking a first class agricultural paper,

costing you perhaps a dollar a year, and coming into your homes once a week. How many of you get the agricultural and horticultural reports published by the State of Wisconsin, or Bulletins of the Farmers' Institutes which cost only an expressed wish to have them. These things are not expensive, but their power to produce sunshine and lighten what often is termed the drudgery of farm life is immense, and not easily over-estimated.

When the speaker was a boy the object of every enterprising farmer was a farm apiece for his boys and a wide-awake farmer's son for his daughters, and with the country sparsely settled in comparison to what it is now, and the mighty impulse given to money making by the civil war, it was often possible to gain the object, (we refer to the farmers now) and the boys readily became infested with the idea, and were easily held to the task.

Smaller Farms.

But this order of things is changed

and these opportunities are passed or rapidly passing away forever, at least from southern Wisconsin. What were called just respectable farms thirty years ago, are now doing duty for two, three and in some cases even four farms, and the end is not yet. But best of all there are living on them as well as hundreds of other farms in our state, families, happy and contented surrounded by books and music and flowers, with tastes as refined and intellects as keen and knowledge as practical as the best in the land. It is from just such homes as these that our best men and women, both state and national are continually coming, and I know of no better means of developing the State's resources than the Farmers' Institutes.

I earnestly hope you will not forget that there are things of more value than houses and lands that we may bequeath to our children if we will, and not least among them is a genial, sunny disposition which is a direct product of fun on the farm.

"JEST HOGS."

F. D. COBURN, Secretary Department of Agriculture, Topeka, Kansas.

At \$2.75 per hundred pounds the hog is a prosaic plebeian; a quite disreputable fellow; of indifferent breeding, debased morals and unclean habits, whose relationship we deny and to whom many of us often do not speak when we meet him in the road or at the station. At \$7.25 per hundred, however, this is all reversed. He is then an interesting gentleman, if not a scholar; entitled to be called Honorable, and to all that deference which most of us make haste to show a distinguished relative of large financial consequence. He is given the right

of way by pedestrians, vehicles, and railway trains, and it is with our cheerful consent that he comes about as near representing and possessing the fat of the land as any one we know. Under these circumstances he soon ceases to associate with country people, the friends and benefactors of his youth, and becomes a plutocrat; early falling absolutely under the baleful influence of such throat-cutters as the Fowlers, the Swifts, and the Armours, only, as we might expect, to get it in the neck and eventually to be bled to death.

Lo-renzo Dow, who early in the century travelled widely in the region west of the Alleghanies and made many notes of careful observation, summed up his conclusions as to the settlers in this wise:

More Land.

"The average Western farmer toils hard, early and late, often depriving himself of needed rest and sleep—for what? To feed hogs. For what? To get money with which to buy more land. For what? To raise more corn. For what? To feed more hogs. For what? To buy more land. And what does he want with more land? Why, he wishes to raise more corn, to feed more hogs—to buy more land—to raise more corn—to feed more hogs—to buy more land—and in this circle he moves until the Almighty stops his hoggish proceedings.

The advances in the swine industry within the past third of a century have been wonderful, but perhaps not greater than the advances in its literature.

Youthful Sentiment.

It has not been more than a third of a century since your speaker himself did not hesitate to say in a wholly original paper on Beasts, Birds and Insects, read before Mud Creek University (of which he is a graduate) one black Friday afternoon, at the somewhat pressing invitation of the Chancellor, that "The hog is a beautiful insect of the genus chromo, that gives us milk and hog fat and backbones and bladders. Her plumage is made of bristles which is different and not flowered like bristles carpet. He roams from flower to flower gathering sausage by the wayside. She will sometimes make a raid on the hens and chickens but Solomon in all his glory was not a raid like one of these, for the lion roareth and the whang-doodle whangeth his first-born worlds without end." Many other descriptions have been attempted since then, intended to be more scientific, but I am told that this one of mine has never

been surpassed in comprehensive brevity.

The hog is a true cosmopolite—a citizen of the world. Truly he is the product of Nature's most economical thought. There is no part that cannot be utilized. His flesh, fat, bristles, hair, viscera, blood, hoofs and bones are all turned to account. He is the staff of life, the arch enemy of famine, the poor man's best friends. In adult piggood he is omniverous and self-reliant, bold and expeditious; breeds faster, grows faster, and keeps cheaper than any other domestic animal.

America is pre-eminently the home of the hog; he is a logical deduction from Indian corn. He was introduced into Virginia in 1609, and there he multiplied so rapidly that the colonists were obliged to palisade Jamestown high to keep out the Indians, and close to keep out the hogs.

A National Emblem.

One enthusiastic and eloquent writer has made the claim that the pig is a much better emblem of our nationality than the eagle, and that, though not a thing of beauty in the strict artistic sense he is far more handsome than the eagle, and when opportunity offers is far more cleanly and dainty in his personal habits. "If not ornamental, he is certainly useful; while the eagle is neither useful nor ornamental. The pig is a quiet, inoffensive, Christian sort of animal, symbolizing to a greater extent the peaceful virtues for which our nation is so conspicuous, than does the roving, piratical eagle, a rapacious robber among birds, and the cruel, relentless, oppressive tyrant of all his kind. The snout turning the soil is a symbol of peace and industry, while the beak and talons signify nothing but war and violence. The pig is a thrifty animal, turning to some good account everything that comes in his way, a far better representative of the American character than the roving robber bird, perpetually on the wing, and accumulating neither flesh nor feathers." The pig has shown himself

amenable to the influence of civilization, and quietly takes his place—and fills it none can gainsay—which civilization assigns him; while the eagle is a wild, untamable, individual that under no circumstances can be brought under Christian influences. Our people, too, are largely agricultural, and the pig would represent in large degree our agricultural interests; while the eagle symbolizes nothing with which America has interest or concern.

Brings Prosperity.

It is susceptible of proof, says this writer, "that to the pig more than to all other causes we are indebted for the wonderful expansion and remarkable prosperity which have marked our history, as well as for the permanence and development of those institutions that form our chief pride and have attracted to us the eyes of the world."

He is found to yield a pound of produce from less food than either cattle or sheep, and is, therefore, the most economical machine to manufacture our corn crop into marketable meat. Our people are becoming wiser every year, and exporting less proportionately of the raw material, and more of condensed product. If it takes seven pounds of corn on an average to make a pound of pork, as is no doubt the case, the farmer begins to see the great economy of exporting one pound of pork, bacon or lard instead of seven pounds of corn. The difference in the cost of freight makes a fine profit of itself; besides, the pound of meat is usually worth more than the seven pounds of corn in the foreign market.

Saves Fertility.

Pork carries off less of the valuable constituents of the soil than beef. The fat pig contains only three-fourths as much mineral matter per hundred weight as the steer, and only one-fifth as much nitrogen per hundred weight; and therefore the production of a ton of pork on the farm will carry off only a little more than half the fertility car-

ried off by a ton of beef; besides, a ton of beef will require nearly fifty per centum more to produce it. This gives in round numbers the comparative effect of producing pork and beef. It is thus evident that the pig should be fostered in every way; his capabilities studied and pushed, his diseases carefully noted and prevented.

Great Increase.

Fifty years ago the number of hogs in the United States was slightly in excess of 14,000,000, Kentucky leading all the others and having at that early day as many as 2,300,000, with Ohio a close second. Iowa had less than 105,000, while Kansas, Nebraska, and Minnesota were yet a part of the primeval, hogless wilderness, ranging ground for the Indian and the bison. Thirty years later Illinois occupied first place with 3,363,000, and Iowa with almost as many had 50 per cent. more than Kentucky. Ten states had more than one million each, and the grand total was 23,134,569. The last year's figures show 52,398,019 (35,000,000 in twelve states), and seventeen states have each more than one million. Iowa with its 7,105,320 has more than Kentucky, Ohio and New York, the then three foremost states, had in 1840; and Kansas and Nebraska, with 3,175,767, and 2,586,952 respectively, have more than the most pretentious commonwealth then had. The state of Missouri alone has now several hundred more swine than the official figures show to be in the United Kingdom of Great Britain, including England, Ireland, Scotland, Wales, and the Channel Islands. In the United States the number has been more than doubled since 1876.

Great Market.

Not less remarkable than the increase in the swine growing industry has been the building up beyond all others of at least two vast central livestock markets, where transactions of such aggregate magnitude are annually carried on that the like is not approached elsewhere in the world. These markets at Chicago, Ill., and

Kansas City, Mo., afford not only central and readily accessible points of meeting between the seller with his stock and the buyer with his cash, for a large percentage of the surplus hogs in the chief corn and hog producing states, but every facility for their slaughtering, manipulation, and conversion into innumerable articles of food and commerce that lure from all quarters of the earth its gold to the pockets of our own farmers. The growth and greatness of the receipts of live hogs at their two chief markets within the different periods since the thoroughly systematic organization of their business under the stock-yards corporation at each place, is readily comprehended from the official statement of arrivals which as long ago as 1891, were in Kansas City, 2,599,109, and at Chicago, 8,600,805.

In the year ending March, 1891, Chicago alone packed 6,071,659, or nearly twelve times as many as Cincinnati, and Kansas City, the aforesaid unknown, (which packed none at all prior to 1867-68), took care of 2,398,764, or a fraction less than five times as many as Cincinnati. In fact Chicago and Kansas City houses have for some years handled but little less than half of all the hogs being packed in the United States. An interesting phase of more modern conditions attending the packing business is found in the fact that comparatively a few years ago the packing was all done in the winter season, beginning with settled cold weather and ending with the break-up in spring; while now the perfect appliances for artificial cooling and refrigeration in buildings and railroad cars, enable the doing of the work at whatever season other varying circumstances may suggest as preferable, and we see a greater proportion of the hogs packed in summer than in winter, more in warm weather than in cold.

Notable among the many improvements nearly or remotely related to swine husbandry should be mentioned the means of transporting them to

chosen markets, which has undoubtedly had much to do in changing some of their characteristics in conformity to the new conditions.

Better Transportation.

Formerly their having to be drawn long journeys, sometimes hundreds of miles over rough or muddy roads to reach a market, made strong limbs and plenty of activity, even when fattest, a foremost requisite; for such as were not so endowed and "broke down" or "gave out" on the tedious journey, perhaps far from its beginning or end, were causes of much vexation, sulphurous language and outright loss. Now, when they can by a short walk or ride be loaded at dusk into a comfortable car and by daylight find themselves at their destination, perhaps hundreds of miles hence, the qualities of speed and endurance so essential in a hound, race horse or a politician are far from taking precedence in the modern hog matured up to the most profitable age, and are little cultivated—perhaps too little.

Most marvelous in all advances in connection with the swine interest has been the growth in our export trade in hog products. In the five years ending with 1840 we sold abroad hogs and their products an annual average of \$1,533,522 worth,—or the equivalent of 92,154 hogs at about \$16.65 per head. Forty years later we exported in a single year the equivalent of 7,045,805 hogs for \$104,660,065, or about \$14.85 per head. In twenty years from 1840 those hog product exports had increased nearly 700 per cent., and in forty years from 1840 had increased nearly 7,000 per cent. The number of swine and their value exported (counting 175 pounds of product as equal to one hog) in the year 1891 was 6,735,696 head worth \$85,000,000. Comparing this with other exports the reports for the year ending June 30, 1892, show that if we count all the cattle, and all the horses, all the sheep, the mules, the fresh and salt beef, the butter, the hair, tallow, hides, the glue,

and horn combs, sent to alleviate the hunger and other wants of people in foreign lands, they foot up less by considerable than we realized from the surplus shoats and their products which we sent abroad. Great Britain and Ireland alone take more than half our exports of bacon, hams, pork and lard.

Variations in the price of pork and lard during the period of which I speak have been wide and are not without interest to observers and students of such subjects.

Average Prices.

From the figures of thirty-five years kept by the "Cincinnati Price Current" it appears that, taking the Cincinnati market as the criterion, the highest yearly average price of pork per barrel was in 1864 when it was \$32.95; its range being between \$20.25 and \$43.35. It was in the next year, however, when lard reached high water mark, fluctuating between \$17.18 and \$23.28 per hundred pounds, and averaging \$20.55; although there was a brief time in 1866 when it was three cents per hundred higher, but the yearly average was only \$17.50. The lowest figures on pork were in 1878, when the variations were from \$11.20 per barrel down to \$7.55, averaging the shameful price of \$9.40. Lard fared worst in 1890 when it varied by months from \$5.55 to \$6.05 per hundred pounds, averaging but \$5.85 for the year; while once it was five cents lower in 1891, but averaged for the twelve months twenty cents higher than in 1890. In Chicago the average price per hundred during fourteen years for heavy packing hogs of 250 to 350 pounds weight has been exactly \$5.00, ranging from \$3.65 in 1878 to \$7.65 four years later. Light bacon hogs weighing 150 to 190 pounds during the same period averaged \$4.80. The extreme top price in those fourteen years was \$9.35, in September, 1882. In 1878 the highest notch that anything reached was \$4.80, for some extra fancy stock sold in August. In

1865 mess pork averaged for a month \$41.10 per barrel, and for the year 1891 the average was \$10.50 per barrel,—the lowest in thirty-five years.

A Scavenger.

It is the opinion of a good many tolerably sensible people that one of the most valuable peculiarities of a hog's nature is his ability to utilize and convert into valuable, merchantable product a great deal that would otherwise go to waste or become a nuisance. This, instead of being discreditable to him or his master is one of the very qualities that makes him a useful member of society, and enables him to fill so well the sphere in which he was intended to peregrinate. So far as what he eats is concerned he is no less dainty than most fowls; he simply knows what he likes better than the professors can tell him, and with half a chance he will go directly to it. As a case in point, he cannot be induced at any time to eat so much mush and sweet milk that he will not then, even with considerable discomfort to himself, travel a goodly distance to hold a post mortem on a mule or cow deceased any time subsequent to the first of the current month.

Hogs have for many months brought good prices and the tendency and temptation will be to rush pell-mell into pig raising, and likewise to be forgetful of quality in obtaining quantity. It always works that way and probably always will. In two or three years those who now have very few hogs and little corn will be loaded up with one if not both, while prices will be in the neighborhood of half what they are now, and the ne'er-do-well farmer whose plans are as variable as the Kansas winds, will be swearing "There ain't no money in hogs."

Too Changeable.

Sure enough, for such people there seldom is a steady profit in any branch of their business, for when a year or two of depression comes—as it does in every branch of every business—they lose their interest in that particular

line, letting it run down at the heel while they go "projikin" with something else.

Those who have animals of known value for breeding purposes should stand guard against the strong temptation to sell them at the present high prices, but aim to maintain a high class of stock with which to meet the drop in prices that, in the fluctuation of business is bound to come; and those who have been content with the lower grades should now grasp the importance of improvement and take advantage of the occasion to get rid of stocks or strains such as experience may have shown to be from any cause unsatisfactory.

Bacon Hogs.

While in recent years patient care and skill in breeding have produced an animal that can in a short time be converted into an animated, walking lard-tub,—and in that respect a stupendous improvement upon any other hog of their size the world has ever seen, the artist is yet to appear who can produce at will such as have in happy unison those layers of fatty and muscular tissue known to connoisseurs as marbled meat, and to our plain spoken farmers as a streak of lean with a streak of fat, or "streaky bacon." At the present time the breed of hogs a person has is pretty sure to be claimed by him as of those having the greatest percentage of lean meat, whether that breed be the Chester, Essex, Suffolk, Poland-China, Tamworth, Jersey Red or Berkshire; while I doubt if any man on the face of the earth has definite, reliable data that would enable him to decide satisfactorily even as between two breeds, which excels in that direction. As lean meat is muscle, and activity tends more to the development of muscle than fat, and the Berkshires are claimed by their friends as being reasonably active, and by their opponents as entirely too much so, I am of the opinion a thorough test would show their meat as well or better marbled than that of any other of our

improved swine, though I do not know that it is, nor do I believe any one else does.

While Indian corn is the most easily produced and convenient single article of hog-feed we have, all things considered, the victims of it solid, in the porcine family, like the victims of it liquefied, in the human family, are each year numbered by tens of thousands, among whom are always the finest specimens,—the brightest and the best.

Variety in Rations.

Corn sustains somewhat the same relation to hogs that beans do to men; notwithstanding the fact that beans are considered one of the most wholesome single rations known for soldiers, my observations as a soldier led to the conclusion that more men fell in the late war victims to poorly cooked beans than to well-aimed bullets. The time is past when lard is to be considered the sole end of the hog; it has ceased to have exceptional value, and the desideratum is, and will continue to be in our generation the production of flesh rather than fat; rather a carcass in which both are blended in palatable proportions. I would surrender no jot or tittle of any of the vast improvements we have already made, and only plead for others still, that we can and should and will attain. In this particularly important feature it cannot be said that there has been any material improvement in all our history, and that is the use almost exclusively of Indian corn, raw and whole, for rearing and fattening pork, although all of the brightest men who have ever studied the subject concede that alone corn falls short of being a complete or well balanced ration for either growth or health.

Use More Grass.

In spite of their abundance and the undisputed value of such adjuncts as the grasses and clovers in the economy of pork making they are not utilized a millionth part as much as they might be for the betterment of all concerned. The folly of such persistent violation

of nature's laws in this way has been repeatedly demonstrated by the destruction almost annually of whole herds on thousands of farms by various maladies, generally called "cholera," the losses by which were many years ago estimated by the Commissioner of Agriculture to reach the annual total of \$15,000,000. While many of our people are too poor to fence extensive pastures, most of us can enclose ground for a goodly plat of artichokes, oats, rye, alfalfa—(and my friend Prof. Shelton, says one acre of alfalfa will yield as much pig feed as five acres of artichokes)—or at all events can plant sweet corn to cut up and feed green, as a part of the summer rations, insuring better health and better growth for the porker, and a fatter pocket book, better health, a better coat and a cleaner conscience to the owner.

Before proceeding farther it is proper to say that my experience has been wholly in what are called the Western States; but I have always endeavored to learn as much as possible of the way hogs are handled in other States, although I have never been there and have to rely wholly on what I can hear and read.

Room for all Breeds.

When a man asserts that Berkshires are superior to all other hogs for Americans, I do not believe him; if another tells me that Poland-Chinas are the best hogs for Americans, I do not believe him; if a third tells me the Essex, the Chester White, the Suffolk or Jersey Red is the best, I do not believe him, though the breed he admires may be and probably is, the one he should handle, for believing in a variety of stock is one of the secrets of succeeding with it. The truth, as I interpret, is that there is a place for each of these different sorts, and I no more expect to see one of them adopted to the exclusion of all others than I expect to see all men profess one religion, or all belong to the same political party—at one time.

Breeds for Localities.

The animals that in a certain locality and under certain surroundings and systems of management prove eminently satisfactory, may in other circumstances and in other hands prove little less than an antidote for both peace and prosperity. The fact that four-fifths of the hogs sold in our great market centers are black, or nearly so, shows plainer than words that white hogs are under a ban, if not in process of rapid extinction. The wherefore of this is a problem that I, as an early breeder and champion of whites in the West, and in my maturer years of the blacks, can only account for on the theory of the survival of the fittest.

For many years I have earnestly urged the cultivation for swine of a variety of crops other than corn, and in my experience taking cost into consideration, have found nothing that I fed in connection with grain that offered so much satisfaction as some good variety of field pumpkin. With one seed planted in every eighth hill of every eighth row of corn they are raised without appreciable expense, yield enormous quantities of succulent food that hogs of all ages, even after gorging themselves with corn, eat largely with amazing relish. Making something of a specialty of pumpkins for the purpose indicated, I never yet succeeded in raising too many, and never knew any one else to have enough.

I do not wish to be understood, however, as advocating the substitution of any such watery food, in lieu of grain, for fattening hogs, but would use it simply as an adjunct, helpful somewhat as a nutrient, and more as making a variety, distending the stomach and promoting digestion.

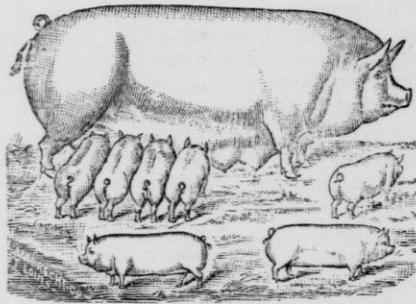
Fairs as Educators.

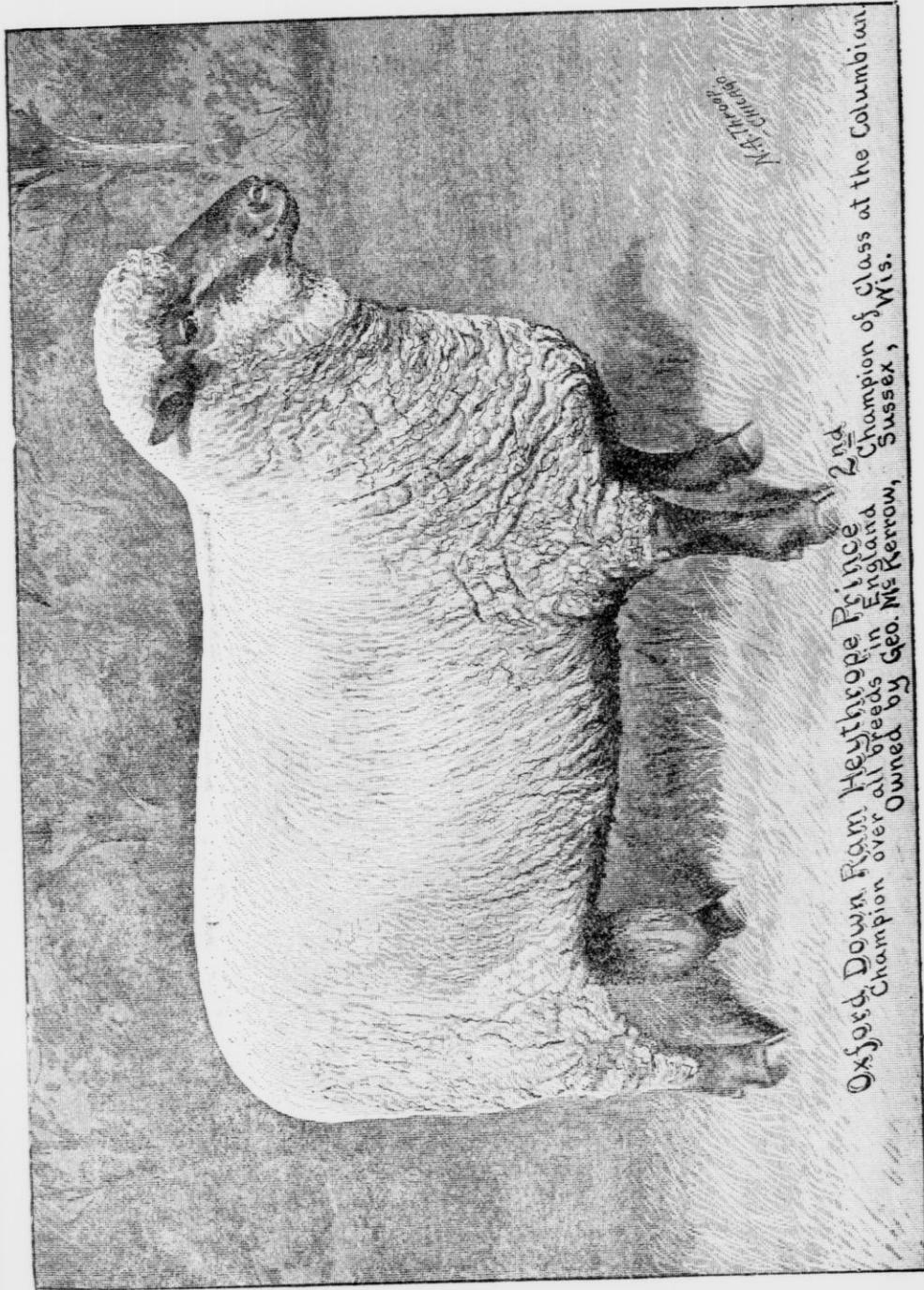
As a public-spirited citizen, I have always, by precept and example, encouraged my neighbors to attend and exhibit at our county and state fairs, as these afford opportunities for observation, comparison, and the glean-

ing of information, equalled by no other meetings that the rural population are persuaded to attend. Really, in these days the farmer who does not attend one or more fairs each year is hardly abreast of his age in reference to the progress and improvements so rapidly being made on every hand. The fair is one of America's favorite institutions. The fair premium, the fair deal, the fair count, and the fair women; we are all wedded to them, or ought to be.

Having been for twenty-seven or

twenty-eight years in immediate contact with or sharply observant of the hog and pork making business in its common-place everyday workings, my experience and observations have year by year confirmed me in the belief that there is no branch of farming or stock-husbandry which, conducted with a reasonable amount of fair, horse sense and systematically stayed by, one year with another, will do better by its proprietor and more successfully keep the wolf and the sheriff from his door, than the rearing of swine.





W. T. Wood
Chicago

Oxford Down Ram Heythorpe Prince
Champion over all breeds in England
Owned by Geo. Mc Kerrow,
Sussex, Wis.
2nd
Champion of Class at the Columbian

SHEEP SESSION.

The Institute met at 9 o'clock a. m. Feb. 28, 1894.

Prof. Henry—With wool from almost every part of the earth coming into competition with Wisconsin wool-growers, it becomes us to study the question of sheep raising and wool growing with great care. The gentlemen who have come here to talk to you about sheep have been so fortunate or unfortunate, as to know considerable about them at different times in their lives. I will call to the chair this morning a gentleman who has taken over five hundred prizes upon sheep in the past four years at our different ex-

positions. He took six first prizes and four sweep-stakes at the World's Columbian Exposition, and he has enough silverware on his sideboard to stock a jewelry shop, taken in prizes on sheep. I refer to Mr. George McKerrow, one of the Farmers' Institute conductors.

Mr. McKerrow—I notice in looking over the program that we have represented here on this subject, Wisconsin, New York, and Canada, and each one of these sections represented by a noted sheep-breeder.

MUTTON SHEEP FOR WISCONSIN FARMS.

J. C. PAYNE, Prairie du Sac, Wis.

It is not necessary for me to name the different breeds of improved mutton sheep our state is adapted to. It is for each to choose from the different breeds the class that suits him best. After the selection has been made stick to it and do not change from one breed to the other. With the arable lands of our State I see no reason why it should not rank with one of the first States in the Union for producing the highest quality of mutton. It is hardly possible that the larger mutton breeds can be maintained on the same area as the smaller all woolled varieties. It is a fact that it no longer pays to raise sheep for wool only.

Wisconsin Adapted to Sheep.

You might say, "Why is it that our State is so well adapted to the mutton breeds of sheep?" In the first place we have the natural surroundings, plenty of pure water, high rolling and

table lands which furnish the richest of grazing; second, we produce all varieties of food stuffs which should be manufactured into a commercial article before they leave our farms. I know of no one class of livestock for capital invested that will do this and leave our farms all with us, equal to the mutton sheep. Now if we are to produce mutton of the highest quality we must breed and feed with that point in view. With improved methods of farming comes improved livestock. So with our sheep of today without the improved mutton breeds we would have to abandon the sheep business.

In selecting a breeding flock of ewes great care should be exercised in selecting those of uniform size and as near the mutton type as possible. By the aid of a pure sire their mutton qualities can be maintained. There is not a farm in the State that could not maintain a flock of mutton sheep with

profit. Their foot is golden. What is more delicious than a nice fat lamb chop on a farmer's table. The profits are derived in more than one way. Not simply by the amount of mutton or wool they produce. They restore the most barren fields to productivity by scattering evenly over the more elevated parts the richest of fertilizers. The appearance of a farm devoted to sheep is made attractive by its cleanliness.

Shelter the Sheep.

Ample provisions should be provided for shelter, but not necessarily expensive. The nature of the sheep is to seek high elevation, so in selecting the site for a sheep shed, select one as high and dry as possible on which to build. If convenient it should face the south with an opening 10 or 12 feet wide and provided with a rolling door that can be closed up tight if necessary. Sunlight encourages the growth of the lambs so it can be further aided by having a few windows in the shed.

Pure air a Necessity.

Second to this is ventilation. Avoid all drafts; a box or shoot going through the roof is preferable. See to it that the sheep are in and not allowed to become drenched with a cold wet storm. The success with a breeding flock depends largely upon their condition. It could hardly be expected that a poor, ill-fed flock would produce a flock of strong, vigorous lambs. By giving the ewes the run of the different stubble fields they soon regain lost flesh and are in fine breeding condition. Maintain this condition by the aid of a few turnips, shocked corn, or a few bundles of sheaf oats. They are taken with great relish.

Selection and Care of Sire.

In selecting a sire, select one of true mutton type. A ram to get good lambs must have a strong, vigorous constitution, broad between the eyes, short, thick neck, head well up, deep chested, with well sprung ribs, standing square on his feet, well covered

with a close compact fleece, and capable of transmitting to his off-spring his like. The ram should not be permitted to run with the flock. He should be provided with a room in the shed with a small grass paddock that he can go to at will. Feed him on the most stimulating foods, such as oats, bran, oil meal and turnips to retain his strong vigorous constitution. Turn him out with the flock as needed.

Care of Lambs.

The time to have a lamb dropped depends largely upon facilities with good comfortable quarters; I prefer a March lamb to any other. At this season of the year the flock master has ample time to look after their wants. Be on hand at lambing time and see to it that each lamb is on his feet and partakes of a good square meal before leaving it. A lambing room is very important, one that is provided with movable partitions so that each ewe with her lambs can be separated from the rest of the flock. It is surprising how quickly lambs will acquire the habit of eating grain. Everything for their welfare should be provided. Partition off one end of their shed with slat work so they can go in and out at pleasure. Place in the enclosed space a small trough. There is nothing relished by the youngsters so well as a mixture of ground oats, bran and oil meal with a little salt. Keep the trough clean from day to day by removing all feed not eaten and supplying it with fresh feed.

We should not lose sight of providing the ewes with the most nourishing and milk forming foods. For a grain ration I prefer a mixture of oats and bran, with a feed of turnips, at least once a day, with all the bright clover hay and fodder corn that they will eat up clean with a constant supply of pure fresh water before them. With this feeding I see no reason why they will not provide an ample supply of milk to rear a strong vigorous lamb.

Keep the Sheds Clean.

It is a great mistake to allow the ac-

cumulations of a flock of sheep to remain in their sheds all winter. It should be removed at least once a month and the floor sprinkled over with air slacked lime or land plaster for an absorbent before it is relittered. Conducive to thrift is dryness. Keep the sheds well bedded with clean dry straw.

Parasites.

Every class of livestock has its insect pest,—so with the sheep. The tick is the most troublesome in our State and claims a share of the flock and in some instances they get it. They are easily overcome by the use of commercial or home made dips, and should be dipped at least once a year. A flock cannot do their best if ticks are allowed to remain on it.

Weaning the Lambs.

The time for weaning the lambs depends upon their age. A March lamb is ready to be weaned from the first to the tenth of July. By that time the clover aftermath has well started and they will take to their new quarters with delight. A grain fed lamb will hardly mind the change. Their feed troughs should be moved with them and the grain ration kept up. The past season I obtained good results by feeding wheat and bran on clover,—three measures of bran to one of wheat with a constant supply of fresh water, and I never had lambs do better. The ewes should be moved as far away from their lambs as possible and placed on the most barren fields for a few days until the flow of milk has ceased. They should be looked after from day to day until all danger of caked udders has passed, when they can be returned to a more bounteous feed lot to fit themselves for winter again.

Keep only the Best.

Now is the time to assort your flock, picking out all ewes, and ewes with bad udders, only retaining those that have proved the most prolific breeders. Place the rejected ones in a feed lot by themselves to be fed for the early

winter market. There is no better feed for this class of sheep than pumpkins, green corn, and small potatoes; with the run of their pasture it is surprising the amount of flesh they will attain in a very short time.

Change the Pastures.

There is no class of stock that like a change so well as sheep. It matters not how large the pasture is or how small the flock is. After spending a few weeks on the hillsides they like to return to the level fields and vice versa. As soon as the haying season is over the flock can be removed to the tender aftermath of clover and timothy. I usually seed all grain fields to clover and timothy. After the grain is removed and the plants well started the flock can be removed to this to spend a few weeks to pick up all loose heads of grain and a short, sweet bite of young clover. In feeding and breeding sheep the flock master ought to like his business by giving it his personal attention. It is not often that you can secure the assistance of competent help that understands the way a flock should be handled to obtain the best results.

Proper Manner of Feeding.

Feed regularly all they will consume without waste. Allow no man to feed hay or straw over their backs. The seeds and the chaff become matted in their fleeces and depreciates its value. By providing the doorways with light movable gates this can be avoided, as the sheep can be held in their yards until all racks are filled before they are allowed to enter.

Do not think of abandoning the sheep business thinking you can enrich your now fertile acres with the plow, by devoting your sheep pasture to the production of wheat. The decline in the price of sheep has been considerable in the past year, notwithstanding the decided decrease in numbers, which according to the United States February report is 5 per cent., but there is every appearance of rapid recovery.

The Political Press says, "Leave wool alone and the sheep business will prosper."

Discussion.

The Chairman—Let us take up first the breeding up, the formation of the flock, then we will take up the feeding, shelter and growth of the flock and general discussion.

Mr. Wilson—At what time do you consider a breeding ewe past her usefulness?

Mr. Payne—Well, I have had them breed well until they were thirteen or fourteen years old, and raise good, strong lambs. I do not recommend keeping them to that age.

Mr. Hoxie—What do you consider the best breed of mutton sheep for Wisconsin farmers?

Mr. Payne—That is rather a difficult question to answer. The breed that I use is Shropshire.

Mr. Fox—At what age do you consider it best to get rid of the ewes from your flock?

Mr. Payne—The ewes are past their usefulness, I think, as a general thing, at from six to eight years old.

The Chairman—If you had an excellent good breeding ewe and she was vigorous and strong at five or six years old wouldn't you keep her longer?

Mr. Payne—I would retain her in the flock as long as she did well for me.

Mr. True—Wouldn't you be governed somewhat by the condition of the mouth of the sheep?

Mr. Payne—Yes, there is quite a difference in sheep. Some will hold their teeth until they are eight or nine years old, while others will lose them at five.

Mr. Coe—If a young man wanted to get him a breeding flock of sheep and was not able to buy the best, wouldn't you advise him to take some of those old sheep out of a large flock rather than to take the middle-age culls?

Mr. Payne—I would.

Mr. Kellogg—What will a farmer do who has nothing but Merinos?

Mr. Payne—He will either have to sell them off or grade them up.

Gov. Hoard—Can you describe, sir, in selecting your sire, what points, general characteristics, would you look for to determine his potency? Would you select a sire in all animals for their breeding power? Many well bred animals faultless in contour are failures in breeding power.

Mr. Payne—That is a good question, but I don't know that I can answer it satisfactorily. In selecting my sires, I try to get those that show the points that I want, and that is particularly the constitution, and then I test him. That is the only way to determine it.

Mr. Strand—What time do you consider it best for a ewe to drop her first lamb?

Mr. Payne—At two years old.

Mr. Dickson—Isn't there a great deal of difference in the time that lambs are dropped, whether early or late, as to improving the flock?

Mr. Payne—I think that an early lamb has more of a chance for maturing than a late lamb.

Mr. Hyatt—Do you seek to get as many twins as possible?

Mr. Payne—I would rather have but one lamb.

Mr. Briggs—If a farmer isn't able to buy what he wants to, and he has a flock of Merinos, how is he going to get a flock of mutton sheep?

Mr. True—In that connection I want to ask this question, whether at the present price of high grade mutton sheep, a man can afford to attempt to breed up from a merino basis?

The Chairman—We might put in another question. Rather than not to do anything at all, had we not better start with Merinos?

Mr. Payne—I have had no experience in grading up from Merinos, but I have talked with men who have had, and they claim that they had good success in grading, but after the first cross or even the second, they claimed when they continued it, the success was not so good. They gave me to un-

derstand that they considered that a man had better sell the Merinos and buy high grades.

Mr. Fox—I don't think it ought to be a matter of doubt as to whether Down crosses upon the Merino can be successfully made. It can be successfully made and is successfully made throughout the Northwest. That is what the flock masters of Dakota, Nevada and Wyoming are now relying upon.

Mr. True—I am convinced from actual observation that good results can be obtained in crossing with the Merino as a basis, but with the present price at which grade mutton sheep can be sold, it seems to me to preclude the practicability of taking time to take a basis that is not desirable in order to produce a sheep that may entitle it to our consideration.

Mr. Trigg—Two years ago I bought a few of the blood Cotswold lambs. These I crossed onto Merinos; that was my start. Of course I don't know what is the average weight of Shropshire Down, but on the second cross, (my lambs came in early), I wasn't provided very well and I lost a great many. In the beginning of June my ewes got pretty fat and I disposed of quite a number of them to the butcher, and a good many of them weighed over a hundred pounds,—that was the second cross; they were three-quarters Cotswold from two to three years old.

Mr. Fox—I think I can say with safety that with a flock of Merino ewes averaging in weight, say ninety pounds, from three to five years of age, that the first Shropshire cross will average a hundred pounds, the yearlings. The second cross will average 115 pounds, and that is about the ratio. Of course that is modified according to the class of ewes you start with and the class of sire, and the man who is feeding. Perhaps the last item ought to be mentioned first.

Mr. Masseur—Could you tell me why a flock of sheep of about 100 raises a large amount of twins and then the next year with the same flock and the same sire there are no twins at all?

Mr. Payne—I could not. You would be the gainer by it, when you got to the single lambs, I mean.

Gov. Hoard—Who knows how twins come anyway?

Mr. Hennessey—It seems to be accepted here that it pays better to buy full bloods than to grade up Merinos. Now, I think we can well afford to grade up Merinos. We can get about fifteen ewes with Merino blood in them for the same price it will cost for one full blood, and we will have a better chance than if we put all our eggs in one basket. I believe we can well afford, in the northern part of the State where they don't look so critically, to the quality in the market, to grade up.

Mr. True—I don't understand that anyone has advocated full blooded ewes for the farmer's flock, but I do contend that when you can buy half or three-quarter bred Shropshire or Down ewes at a price but a little advanced on what the Merinos will bring upon the same market, it is not good policy to take time to manufacture these sheep.

The Chairman—I believe these gentlemen are all right, every farmer should get the best that his circumstances will permit of, but don't be satisfied with that, grade on, breed on, until you get something better. We will now switch off onto the feed.

Mr. Meyrick—The gentleman who read the paper recommends turnips. I would like to know what is the matter with mangle-wurzels for sheep feed, or lamb feed, after they are three or four weeks old.

Mr. Payne—I should rather leave them out of the ration of a flock of breeding ewes. I have lost several by feeding in that way; there is too much sugar in them.

Gov. Hoard—It caused derangement of the urinary system.

Mr. Payne—Yes.

Mr. Meyrick—I have made a practice for the last five years of feeding mangle-wurzels to all breeding ewes after they have dropped their lambs, and likewise to the lambs until they

are turned out to pasture, all they will eat, and I have had no bad results. I do not feed my ewes either grain or roots before they lamb.

Mr. Gibson—It is generally recognized in England that the mangle is not a proper food for rams, but for ewes we have no better feed, for causing a flow of milk, and they are invariably fed to them on the pasture;—they are sunned. We consider they are worth twice as much for feeding after they have been left out in the sun two or three days. It is like ripening them. You take winter fruit in the fall, and it is not fit to eat; but after a while it is sweet and palatable. I believe the mangle-wurzel ought not to be fed in this country where it is so cold until the spring of the year. We feed about a bushel to ten or twelve ewes.

Mr. Barnes—Can you compile a ration that will add length and strength to the wool fibre?

Mr. Payne—I don't know of anything unless it is liberal feeding.

Mr. Spalding—What is the best ration to fatten an old sheep?

Mr. Payne—You couldn't get anything better than turnips and potatoes.

Mr. Hyatt—Does the cotted-fleece come from irregular feeding?

The Chairman—It comes from some mismanagement of the sheep.

Gov. Hoard—Are mutton breeds much troubled with cotted-fleece?

Mr. Payne—No, sir.

The Chairman—We will go now to the shelter. I notice that the gentleman spoke of using air slacked lime.

Gov. Hoard—The action of air-slacked lime is to set the ammonia free and you would be the loser in the manure.

Mr. Payne—Well, we want to lose it in the sheep shed.

Gov. Hoard—Oh, no, it costs you 19 cents a pound where you buy it.

Mr. Payne—Sometimes it costs more than that where it is allowed to stay in the shed.

Gov. Hoard—But that is the fault of

the owner. I am talking about the use of it.

Mr. Payne—You understand I merely suggested the use of the lime before the floor was relittered. I use none of this after the bedding is put in, simply put that lime on to sweeten the shed after it is cleaned out.

Gov. Hoard—Lime is not at all like land plaster.

Mr. Payne—The lime will sweeten it and the land plaster will dry it if there is any moisture there.

Gov. Hoard—The action of land plaster is to absorb ammoniac gases, which are very valuable on the manurial question.

Mr. Trigg—Do you think it right to have your sheep shed so warm that it won't freeze in there, and if it would freeze, what would be the object of cleaning it out?

Mr. Payne—My sheds are not that way. It is cold enough to freeze if the weather is cold enough.

Mr. Noyes—How do you ventilate?

Mr. Payne—Through the roof; don't let in any drafts.

Mr. Noyes—How near to the ground is the lower opening?

Mr. Payne—My sheds are built about seven feet to the ties and they come between.

Mr. Miller—I would like to have you give us the style of a building for a sheep house. I want to build one this summer, one to hold about a hundred sheep.

Mr. Payne—I would build two buildings, or one long enough to divide into flocks; my sheds are 18x20, and 18x15. These six-and-a-half-foot posts are two inch, that give you seven feet to the eaves; there are racks around the outside, giving the whole centre to the sheep; they are very cheap buildings, simply boarded tight, with the exception of the part we use for lambing; those are papered and sheeted inside, so we can shut them up warm, if we want to.

Mr. Miller—I understand you have a single roof.

Mr. Payne—Yes, open to the south, but the doorway should be not less than ten to twelve feet wide. We hardly ever keep over fifty sheep in a bunch. A flock of fifty sheep will get through a door that width without crowding.

Mr. Wilson—Don't you think it would be a good plan under the same roof to have your clover or feed above, and have a good convenient place to drop it down?

Mr. Payne—If a man wanted to put in that expense.

Gov. Hoard—Would not the effluvia go through the hay and poison it?

Mr. Payne—It would, unless it was tight.

Mr. Wilson—I have had sheep for twelve years in a shed, and the hay loft is above, and I never found any bad effects. I never clean out the building from fall to spring. It is littered every day.

Mr. Noyes—How often do you clean out, Mr. Payne?

Mr. Payne—Once a month.

Mr. Cole—How would you clear a flock of ticks in the winter time?

Mr. Payne—I don't have ticks to clear. It is rather dangerous to dip if it is very cold.

Mr. Arnold—Isn't it safe to feed them sulphur?

Mr. Payne—That won't drive them off.

Mr. Noyes—What time of the year do you kill the ticks?

Mr. Payne—In the spring I dip all stock after shearing.

Mr. Wilson—What do you dip them for if you don't have the ticks?

Mr. Payne—To keep them from them. If the sheep are dipped they will never get near them even if they are in the buildings, as they often are.

Mr. Kellogg—What kind of dip do you use?

Mr. Payne—I have used several kinds of dips. For the last four or five years I have used the McDougal dip.

Mr. Miller—Do you have to dip the second time the same season?

Mr. Payne—No, sir; I dip them about a week after shearing.

Mr. Arnold—If you dip the lambs immediately after the shearing, wouldn't that be sufficient, as soon as the ticks can get off the ewes onto the lambs?

Mr. Payne—If you didn't dip your flock you would find that your old flock would have some ticks on. There would be very few left on the ewes, but if there were any scattering ticks around they would go to the flock of ewes and they would soon multiply in the flock.

Mr. Hennessey—Sheep are sometimes caught out in a wet snow storm and live through it. Is dipping them in the winter time and putting them in a warm place any worse than that? You speak of it as dangerous.

Mr. Payne—A sheep caught out in the wet snow or a rain storm, hardly ever gets wet through to the body, but you put them in a vat and they have got to wet through; if they don't we hold them there until they do.

Mr. Miller—Is there a remedy for scab?

Mr. Payne—I think these dips will cure it. I never had it in my flock.

Mr. Cole—I saw a flock effectually cured of the scab by using a solution of tobacco water in which there was put sulphur every time after we had put in three or four sheep. The water was kept warm, as hot as we could hold our hands in. The flock was cured by once handling. I know of another man who tried the same remedy and dipped his sheep time after time and didn't cure them. The difference was in the thoroughness of the work.

Mr. Heath—How strong do you make this tobacco water.

Mr. Cole—We used tobacco stems. There wasn't any danger of making it too strong, I don't think.

Mr. Birch—What causes the cotted-wool?

Mr. Cole—You take a sheep in the fall of the year that is in good healthy condition, fleshy,—you bring him up

into winter quarters and you confine him to short rations and he grows poor from that time until you turn him out again; then you turn him out to a good grass pasture and there is a change of conditions that causes the fleece to separate from the body of the sheep. It carries the gum with the fleece and in a short time you have cotted fleece.

Mr. Birch—As a wool buyer and handler I have found out that there are other things that will cause that. I believe that letting sheep get wet in the winter and spring and letting them have a little fever and then turning them out again will cause that.

Mr. Cole—Also letting them run under the straw stacks where the chaff

runs down into the wool, that causes an unthrifty condition of the sheep.

The Chairman—The next speaker, I understand, had the honor of selecting and getting together for a man in New York State the herd of Shorthorns that later sold for the longest price ever commanded by any sale of Shorthorns in America, if not in the world, some of them being sold at in the neighborhood of \$40,000 each, for exportation to England. This same gentleman selected the cattle that were shown from Canada at the World's Fair last summer. He also judged the greater part of the mutton sheep exhibited at Jackson Park last October, and it gives me great pleasure to introduce to this audience, Mr. Richard Gibson.

SHEEP AS A FACTOR IN ADVANCED AGRICULTURE.

RICHARD GIBSON, London, Ont., Can.

The Spanish philosopher of old who declared that "Sheep had a golden hoof" was no doubt wise in his generation, and if this assertion was true as regards the primitive state of agriculture at that period, how much more so must it be at the present time, when we know that without the aid of sheep vast regions of what are now productive and profitable farming lands would go out of cultivation.

Thousands of acres of what were originally barren wastes have in England been redeemed and brought into a high state of cultivation by encouraging the growth of clover and other green crops and consuming them on the land, by sheep. This was attained not alone by returning to the soil what it had produced but also by the mechanical action of the hoof in consolidating and making firm these light blow-away soils.

Sheep as Fertilizer.

Take my own county of Lincoln for instance. Within the last century over a million acres have been subjugated and made profitable farming lands, about one-half by banking out the sea and drainage and the other by a system of cultivation in which sheep have been used as the main factor. On the high table-lands called the wolds, stretching nearly across the county from east to west, are farms that years ago rented for fifty cents or a couple of rabbits an acre, and which now are about the largest and best cultivated in all Britain, renting at from \$6 to \$10 per acre, and ranging in extent to over 1,000 acres. I recall one at Withcall of 3,000 acres, the tenant of which paid out for a great number of years at least \$7,500 per year for artificial manure alone, besides purchasing and feeding great quantities of linseed

cake. His breeding flock consisted of 1,500 ewes. Another district in the neighborhood of Lincoln called "The Heath" was such a barren and desolate waste that a column was erected and lighted up at night so as to guide any belated traveler, a land light house, in fact. Where this column or pillar once stood is now one of the most celebrated farms in the district, and many a noted Royal winner has been sent from its folds as well as specimens of the flock to all parts of the world, and some of the Columbian winners were from this very farm.

Intensive Farming.

How has this change been effected? After the tenants had secured leases and a satisfactory tenant right, they were encouraged to farm well and liberally. So by the use of large quantities of artificial manures, mostly bone dust, clovers and other green crops were induced to grow, then turnips which were all consumed by sheep, supplemented liberally by the addition of linseed cake, the soil gradually became firm enough and rich enough to grow grain; and what was once nothing but huge rabbit warrens and the home of vermin has now been so changed that great rows of grain and clover stacks are to be seen, resembling little towns with streets and avenues.

The rotation, turnips, both white and Swedes fed to sheep hurdled on the fields, with the addition of cake and grain, followed by barley seeded down with clovers and a little rye grass, parsley, etc., and this succeeded by wheat, the ordinary four course.

Again take the county of Norfolk which has often been called the poorest in England and as generally admitted to be as well farmed. The same system has been adopted in Lincolnshire, viz., sheep and grain crops, and so successfully that the naturally poor and barren soil has here not only been brought into cultivation, but worked into full competition with soils naturally fertile. The system of cropping in the

south of England on the chalk formation is different but the means are the same, growing green crops and feeding sheep.

Systematic Fertilization.

In Wiltshire there are large Downs on which the sheep are partially pastured and always folded on the cultivated portion at night. In Hampshire and Berkshire some pasturing is attempted, an old sainfoin meadow being used for that purpose. In these counties a greater variety of green crops are grown and sheep are used to distribute that crop equally over a portion to be sown to grain (animal manure carts, in fact). For instance, after the wheat crop is removed the stubbles are harrowed and trifolium incarnatum sown (the scarlet clover now being boomed). This is eaten off early enough to be succeeded by oats and tares and these are followed by turnips (speaking of turnips I refer to the various varieties white, yellow and Swedish), so that here are three green crops in one season, all eaten where grown, putting that field in prime condition for a crop of barley; moreover at night these manure manufacturers are folded thickly on the bare fallow for a succeeding grain crop. The system adopted differs from that of the north inasmuch as the sheep, or as we may say the rent payers, the enrichers of the soil, are moved twice a day and folded very close, being penned so close as to eat up everything in twelve hours, and then at night moved to equally close quarters on the bare and generally newly plowed fallows. Of course this requires careful watching and skill on the part of the shepherd to hurdle off just enough to be eaten up clean so that nothing be wasted, and I would here digress to say that within their sphere, these often uneducated, illiterate men, show as much talent in their line as can be found in any walk of life.

I know many large farms of say 1,200 to 1,500 acres, that with the ex-

ception of water meadows have no permanent grass, except a few acres immediately surrounding the dwelling house, and where the only cattle, except working oxen are one or two cows, just sufficient to supply the household with the required milk and cream.

How to Improve Light Soils.

I have not gone into minute details as to the management of a sheep farm, the crops to grow, or the varieties of sheep best adapted to folding. Neither have I thought it necessary to prove that without sheep, agriculture would retrograde, and much of the now most prosperous farm lands in England would go out of cultivation. It is admitted by all who are conversant with the facts that such would be the case. My object more especially in writing this letter was to call the attention of our American farmers who have poor, light soils, to what has been accomplished elsewhere and whether the system that has proved so eminently successful in other parts might not be so modified and adapted to our climate, soils and crops, that we might indeed say and feel that the "Sheep has a golden hoof" and with the prophet of old exclaim "The wilderness and the solitary place shall be glad for them, and the desert shall rejoice and blossom as the rose." (Isaiah xxxv,—1.) What the English tenant farmer has achieved may not in a degree the American landowner? We are reading all the time of abandoned New England farms. Are the farms as poor naturally? Are they as wild and desolate as the heaths of Lincolnshire or the sands of Norfolk? No lighthouses are needed there except on the coast.

Room for an Intelligent System.

Within reach of good markets it does seem that an intelligent system of sheep husbandry would be possible and remunerative, and I would say not in New England alone, but all over our continent it is the same, our sheep industry might be indefinitely in-

creased and when the time comes that we are compelled to farm better than will sheep occupy that place in the economy of advanced agriculture that they do in other countries.

As regards Canada most of our farmers keep a few sheep, more as scavengers than as enrichers of the soil. They help to clean up the fence corners, they keep down weeds by cropping them when young, they seem to cost next to nothing during the summer, eating what the horses and cattle have no relish for. I am speaking now of the Downs, or dark-faced sheep, who prefer to be up and gathering their own breakfast, in distinction to the heavier, phlegmatic long wool brethren who prefer taking things easy until breakfast is announced and served to them in a trough. Our smaller friends, however, prefer to be up in the morning, picking out here a choice morsel, there a delicacy in the shape of a little twig that might afterwards grow into an eyesore, culling here and there, and as there is nothing gross in their appetites so there is nothing gross in their flesh. To me it is quite evident that the State of Wisconsin is eminently fitted for successful sheep husbandry, and the one that will prove most profitable on a great portion of the northern part, but the idea that because the duty is removed off wool sheep cannot successfully be grown here must be scouted.

Mutton For Profit.

What did the farmers of England do when the duty was removed? They said "We will devote our attention to growing mutton sheep, not for wool alone, our Australian children can produce it so much cheaper than we can we will let them do it, but they cannot compete with us in growing mutton nor can any people unless they employ the same means as we do, that is produce mutton breeds and then feed them on rich succulent food." Americans do not care about the labor of growing roots, and corn will not produce the article we are afraid of, so we

need look for no competition there. Now, how can we successfully grow sheep here, I have been asked, if we have free wool? I would say by growing mutton, and looking upon the wool as a product, certainly worth something, and ever to be kept in view, but make mutton growing the main object. You may ask, Where is the market? I reply all over this continent, I find it is almost impossible to get a good chop. Dining at the Railway eating house coming up I asked for a lamb chop. I looked at it but did not venture to taste, being satisfied if I did so I could not address you on sheep here today. Now, just as long as such a miserable apology for what is the most toothsome, healthy, and nutritious meat produced on the farm, is allowed to masquerade around as mutton it is no wonder that the taste for mutton is not more general.

As to our management. Select your ewes according to your soil, the crops that can best be grown, and your market. Then select the ram to suit the ewes, ever having in mind that as the ram is half the flock especial care should be taken in his selection.

Mature Lambs Early.

If you want to sell your lambs early it is necessary that they should be lambed early, say February. With us they go off at about twelve weeks to four months at about \$4 each. If kept until September it is doubtful if they will make as much, though if the lambs are not intended to be sold until next year it is just as well to let them lamb at grass in May. When lambing in February or March it will of course be necessary to provide warm pens. It should be seen to that the lamb can provide itself with milk; after it has once got an appetite no more trouble need be anticipated.

When a few weeks old fix up a pen with a creep for the lambs as I believe no feed can ever be given that will pay as well at any period of the life of the sheep.

After the lamb is dropped, of course

you know it is necessary to see that it provides itself with milk, and after it has once milked it will take care of itself. Be sure and keep your lamb pens very clean, especially at the lambing season. I have known fatal epidemics go through a whole flock which could be traced directly to having a filthy lambing pen. One of the most important things about the lamb is to induce it to eat as early as you can. Fix up a little pen in the corner of the barn, put it where the sun will shine in, fix it so the ewes cannot get to the pen and make trouble, and give them some oil cake, bran and oats. You will find that there is no time in the life of the sheep when a little feed will pay as well as it will before they are turned out to grass and it is an educator for them. If you continue the same system when you turn your sheep out to pasture and build a little crib in some part of the field, so that the lambs can get in, and have a little trifle of food given to them twice a day, when the weaning time comes, those lambs will never think about the mother as long as the trough is there, and you will get more pounds of mutton from the lamb by the little feed that is given to them early than you can ever make up afterwards.

Have Ewes in Thrifty Condition.

I always think it is wise to feed the ewes about a pound of oats and bran a day, for a month before lambing. I feed the ewes no grain except then and when they are first turned out with the lambs, but during the summer they get no grain, nor in the winter. I feed roots in the winter, hay and straw, and about a month before bran to make them strong and hearty. In shearing we have to wash with us. They dock us one-half the value of our wool if we do not, so that we are compelled to wash. If we were not I would not advise washing. About ten days after washing we shear, and about a week after that we dip. Most any of the commercial dips are good enough to kill ticks. I use a prep-

aration of my own, which is just as satisfactory as any of the imported ones. We feed oats, clover, all kinds of roots.

Roots Needed.

We are great believers in roots and I think that is one reason why our mutton sheep is regarded in New York as well as it is. I don't like rye, and corn is very little used. I don't think it is fed by a sheep breeder that I know of in Canada.

Shelter and Buildings.

I have never had my sheep do as well as when they had an open shed to run under. Have it tight about six feet from the ground, so there is no draft; as long as you keep out the snow and rain, it can be open above that. You will have far more trouble if you try to shut them up. I once had a very fine lot of imported ewes, I took extra fine care of them. Neither rain, nor snow came on them, and I had the poorest, weakest lot of lambs I ever had. The next year I tore the south side of the shed and fed a great deal of the hay on the snow, let them have exercise, and we never had such success as we had in doing that.

Discussion.

Mr. Wallace—How large are the flocks of Down sheep in England?

Mr. Gibson—I think they run the Hampshire Down in larger flocks than any other, two or three thousand sheep.

Gov. Hoard—All in one flock?

Mr. Gibson—They will be arranged in flocks according to age. You must understand that a Hampshire lamb has the grandest opportunity of any lamb and a Hampshire ewe has the worst. The lambs run forward and pick out the best of the feed, and then come the feeding ewes, then the old ewes get what neither the lambs nor the feeders eat.

Gov. Hoard—You wouldn't put two thousand sheep in three flocks, would you?

Mr. Gibson—I have seen as many as five or six hundred in a flock, but they are banded so close that they eat up everything given to them in twelve hours and then they are moved.

Mr. Arnold—You couldn't handle five or six hundred in, one flock.

Mr. Gibson—I don't see why?

Gov. Hoard—They feed more than we feed. It is the idea all over the West that you cannot feed more than fifty or one hundred mutton sheep in a flock. They say they don't flock well.

Mr. Wallace—I was over in England three years ago and I was surprised to find six hundred Suffolk sheep in a flock; it struck me as a strange thing.

Mr. Coburn—Do you feed oil cake to your sheep?

Mr. Gibson—They feed it to both cattle and sheep. People have different ways of feeding it,—some feed it alone; I prefer to mix it with grain.

Gov. Hoard—Is it pulverized?

Mr. Gibson—Oh, yes, they have what they call cake-breakers; they are set apart so that you pick it into whatever size you want. We can buy it in pieces about as large as peas. We find that both sheep and cattle prefer it in lumps rather than meal.

Mr. Coburn—You fold those sheep on what you call plowed ground. I gather that the sheep never have a clean place in which to lie down. Doesn't their wool get loaded full of dirt and soil?

Mr. Gibson—I have seen it so loaded in the winter when it has been a wet, rainy season that it is in clods and you can hear them rattle. But the sheep are putting on mutton every day.

Mr. Coburn—In order to fold the sheep, as you say you do, it seems to me that they would sacrifice in a large measure the value of the wool by handling it in this way.

Mr. Gibson—You must bear in mind that these sheep have not got such long wool. The long wool sheep are not

compelled to eat off the ground, their food is prepared for them.

Prof. Henry—What does a good sheep farmer who is raising sheep for mutton, pay for a good sire such as he wishes to put at the head of his flock?

Mr. Gibson—I have known some of them to pay up to 60 pounds, \$300. I know of several instances where that has been paid for Lincolnshire rams, and that is by tenant farmers, too, and they are the men who are making the most profit.

Gov. Hoard—What is such mutton as they are raising worth today in the English market?

Mr. Brown—Eighteen cents.

Mr. Gibson—That is almost like asking a man how big a lump of chalk is, because there is a great deal of difference in the value of mutton in England. Take a small shoulder of mountain mutton and it is worth twice as much as big, heavy, long-haired mutton.

Mr. Taylor—Is this \$300 a fancy price in any sense of the word?

Mr. Gibson—Those men are just as hard handed, business men as you will find the world over, and they are not the kind of men to pay fancy prices, and they don't pay them because they are fancy, but because they can see their way to get that money back again. Sometimes they may be deceived like anybody else.

Gov. Hoard—Tell us how you would select a ram.

Mr. Gibson—I would have a typical ram, especially a masculine ram. I believe in masculine males, I don't believe in the pretty man of today, I never saw a pretty man who amounted to anything.

Gov. Hoard—That is cutting some of us out rather hard.

The Chairman—I have seen a great deal of sheep judging done. I watched Mr. Gibson's work last summer at the Columbian Exposition and I know he understands mutton sheep.

Mr. Coburn—I understand you to be talking about tenant farmers, or, as we say, renters. You say they pay \$300

and below for rams and keep these large flocks of sheep. Now, tell us about the range of prices these men pay for the use of that land.

Mr. Gibson—It varies very much. You take different parts of Lincolnshire and they are renting for about thirty shillings an acre, about \$7.00. I want to say that among the sheep farmers the best of barley is grown. Barley has been selling for more than wheat. It is only on those sheep farms that the best of malting barley is grown. These rents run up as high as \$20.00 an acre, in the lowest parts of Scotland, and the renter pays the taxes besides that.

Mr. Arnold—Tell us how they get it back in case they use certain feeds.

Mr. Gibson—A tenant there is encouraged to farm well, to improve his land, and if it were not for the tenant right I believe the land would go out of cultivation entirely. The tenant is encouraged to spend money in buying artificial manure and growing crops to feed the stock. If he uses fifty tons of oil cake it is understood that he leaves the farm in better condition, if he leaves the farm in April, after feeding that through the winter, he will get one-half of that oil cake bill paid for the manure. If he pays nine pounds a ton for oil cake, he will get back four pounds ten a ton, if he leaves the farm, because the oil cake is supposed to leave that amount of manurial value in the soil and he will get one quarter of the year before. He gets so much for draining and for tiling. The incoming tenant pays it and if he can't the owner pays it.

Mr. Trigg—How would you call Lincolnshires in comparison with Shropshires?

Mr. Gibson—I will have to decline answering that question because I would have a great many of you fellows jumping upon me at once, and I want to get out of this town safe.

Mr. True—You understand how our American flocks are constituted. Would you advise a man wishing to start to raise sheep to buy Merino

ewes as a foundation for that flock?

Mr. Gibson—Most certainly not.

Gov. Hoard—If he had Merino ewes, would you advise him to do the best he could under the circumstances.

Mr. Gibson—I would advise him not to sell them. I would advise him to take a good Shropshire, or some other good mutton sheep and grade up.

Mr. Arnold—We have found that a Shropshire cross on Merino sheep produces the best kind of sheep for this climate.

Gov. Hoard—Wouldn't you advise them to put more Shropshire into the succeeding generations?

Mr. Gibson—Yes, and use better rams every time.

Mr. Henderson—I think we can make a good cross from Cotswolds on Merino. I think I did better on that cross than they did at the station with Shropshires. I believe we could do good work in the State by establishing among the farmers additional Experiment Stations. I want to say that we can successfully cross Merinos and long wools.

Gov. Hoard—I remember a Farmers' Institute in which a farmer got up and made the following combination. He said, "I commenced with Merino, I then crossed with Cotswold, then with Shropshire, then with the Southdowns, and my sheep ain't worth a tinker's Ticonderoga." That man represented a very large class of farmers who are everlastingly making hash of their breeding. It can't be profitable to mix up breeds in this way.

Mr. Gibson—I believe in cross-breeding sheep sometimes for feeding purposes, but where you want to keep a breeding flock, stick to the line right along. I remember once your government published a report by some gentleman in Kentucky who had started a new breed. There were illustrations in this book, and it was like a chemist's prescription, so many pounds of long wool, so many of something else, a little Southdown to give color to the legs, etc.

Gov. Hoard—What do you think of peas as a feed for sheep?

Mr. Gibson—It is one of the best crops we grow in Canada. They are worth infinitely more to us than the corn that we grow. We feed them whole to sheep. We thresh them. We do not feed them heavily to breeding stock.

Mr. Arnold—Do you consider the straw of any value?

Mr. Gibson—Oh, yes. You want it cut at the proper time. One feed of clover hay and one of pea straw is better than two feeds of clover.

Mr. Payne—How do you sow them?

Mr. Gibson—We sow them with a wheat drill about two bushels of seed to the acre, and we cut them with an attachment which we put onto our mowing machine, a long arrangement that runs underneath and raises the peas.

Mr. Wallace—Have you early and late varieties of those peas?

Mr. Gibson—Yes, we confine ourselves principally to the yellow pea.

Mr. Sterne—Which do you consider best, turnips or rutabagas?

Mr. Gibson—Turnips for milk, rutabagas for feed. I have found cabbage one of the best crops that we can grow for feed, and I have such a simple way of growing it that I would like some of you to try it. You sow your seed the same as you do turnips, only put them in early. If it had not been for my cabbage this year I don't know what I would have done. We had no rain from the 25th of June to the last of October, notwithstanding that I had cabbage half the size of that table. Of course we cut them out, leaving them thin, about two and a half to three feet each way.

Gov. Hoard—Can you keep them for winter use?

Mr. Gibson—There is no doubt we could if we had the appliances. My sheep run until Christmas in the field.

Mr. Woodward—We used to keep them in New York by digging trenches and putting them in head down.

Mr. Gibson—Exactly. I believe if you had a shed and put them head down and covered them with straw that you could use them all winter.

The Chairman—This year we had a nice patch of them and we found them an excellent thing, especially in feeding show stock.

Mr. Arnold—How many can you grow to the acre?

Mr. Gibson—There will be 5,000 plants to the acre, ten pounds apiece.

Mr. Arnold—Can you get a ten pound cabbage without cultivation?

Mr. Gibson—But you do cultivate. They are sowed in drills and cultivated. If you have a few in the garden you will have a lot of butterflies at them, but if you put a lot in the field you will never notice the butterflies at all.

Mr. Barnes—Can we afford to feed those cabbages to sheep when they are bringing us from five to six or even more cents per head?

Mr. Gibson—I think if you can get five or six cents a head for cabbages you don't want to breed sheep or anything else.

Mr. Hyatt—How do you prevent the loss from the fly on rutabagas?

Mr. Gibson—I don't know.

The Chairman—They don't bother the Yellow Aberdeen.

Mr. Gibson—That is because it comes at a different season.

Mr. Trigg—If you put in your sweet rutabagas in the early part of May, the fly will never eat them at all.

Prof. Henry—What do you think of rape?

Mr. Gibson—I think it is one of the finest feeds we can have for sheep. I think that rape alone will feed sheep if it is well grown, as well as most any other crop. I know it will with the addition of grain.

Mr. Woodward—Are there two kinds of vetches?

Mr. Gibson—There is a winter vetch and a summer vetch. A friend of mine says, "If you will give me spring vetches and I have to pay a lot for winter vetches, I will buy the winter."

Mr. Miller—I have been troubled a little with worms in the sheep, in the bowels. I tried to fatten three last winter, I couldn't do it. After killing I had the intestines examined, and they were full of little lumps, what you might call worms.

Mr. Gibson—It is more like tubercles.

Mr. Fox—About what time should the farmer sow his rape seed for the land to be green in July?

Mr. Gibson—I do not believe you can get the rape that early to be of much value. I would prefer keeping over mangle-wurzel for that purpose; the vetches will be in about that time.

Mr. Fox—I have sowed the 10th of April and the 25th of June I had a very fine crop standing ready for use which was not affected by the worms at all.

Mr. Wallace—The Agricultural Experiment Station at Ames, Iowa, sowed rape in 1892, I think in May, and about July that rape was a sight to behold. It was as black from the worms as though it had been through a fire,—cabbage worms,—and utterly unfit for any purpose. I sowed rape the same year, the 15th of July, and the worms didn't affect it. If you sow rape with a view of having it for July feeding the probability is that it will not be worth anything on account of the worms.

Mr. Foster—Let those fellows out in Iowa raise a little more clover for their worms, and they will let the rape alone.

Mr. Heath—I would like to know the comparative value of mangle-wurzels for feeding sheep or cows as compared with corn.

Mr. Gibson—I could not compare them without a good deal of thought and calculation.

Mr. True—I am very anxious that we should get the benefit of Mr. Gibson's sheep dip, and have it put in the Bulletin.

Mr. Gibson—It is three pounds of soft soap, three pounds of sulphur, three pounds of washing soda, and three pounds of carbolic acid. This should be dissolved in about two gal-

lons of hot water and well mixed. Then take thirty gallons of hot water and pour upon your dip. When you mix these dips never pour the dip into the water, but always the water onto the dip, it mixes better. The acid sometimes will float if it is not done that way. I prefer to have it a little warm in using.

The Chairman—In closing I will call

your attention to what Mr. Gibson mentioned as to the grading up process that has been going on under Prof. Henry at the Experiment Station. In the last Bulletin you have three or four pictures showing these crosses and grades, and it will be valuable reading for you. I will say that my experience shows the same results as Prof. Henry's.

CARE AND FOOD VERSUS BLOOD IN THE FUTURE OF THE AMERICAN SHEEP INDUSTRY.

J. S. WOODWARD, Lockport, N. Y.

My theme might easily be given so wide a range as to consume the whole session. But I will only consider it briefly under three heads: 1st. The future of the Sheep Industry. 2d. Sheep fitted to the conditions. 3d. Food and Care versus blood in its production.

The Future of the Sheep Industry.

Sheep have always been an important factor in the development of this nation. More than nine-tenths of our clothing is second hand from their backs. And mutton has always formed a large part of our food.

The time was, and not very far in the past, when the principal income from the flock was from the wool. Mutton was of minor importance. Many before me can doubtless remember times when sheep have been bought and killed simply to make available the wool upon their backs.

When unwashed wool sold quickly at 40 or more cents per pound, according to its fineness, the whole energy of the sheep owner was turned to the production of the heaviest fleece of the finest staple. And as the belief was common that the yield of wool was in proportion to the area of the skin, the craze for wrinkles was carried to such

an extent that in some cases as much as two full skins were found on a single carcass.

A Change.

But a change came over the sheep industry. By the settlement of Australia and other southern hemisphere countries, and stocking those cheap lands with innumerable sheep, the production of wool so increased as to give the world an over supply and down, down went the price until in spite of the protection to the American grower by the provision of the McKinley Bill our finest grades of American Merino wools, unwashed, sold for from 18 to 22 cents per pound. But worse yet, at the present time, owing to the uncertainties of legislation by the present Congress, the market has discounted the danger of wool being placed on the free list and millions of pounds are still in the hands of the growers, for which they can get offered but eight cents per pound, and many would gladly sell for ten.

Mutton the Best of Meat.

Happily for the future of the industry, as the price of wool has gone down, the consumption of mutton has increased. Our people are becoming

aware that it is the freest from disease, the most nutritious and healthful of all animal foods. And careful experiments have established the fact, that a pound of mutton can be produced for less cost than flesh of any other kind. While wool is lower than ever before, it is an encouraging fact, and one that should stimulate the sheep owner, that prime mutton is now selling for more money than either beef or pork, and its consumption is increasing much faster than the growth of population.

Sheep owners, then, should not be discouraged, but look the situation squarely in the face; realize that conditions have changed; that in the future mutton must be the chief end and aim of their business.

And while we should not wholly ignore the growth of wool, we must recognize the fact that fashion changes even as regards the kinds of wool wanted. What is now most in demand is not the fine heavy fleeces as formerly, but the lighter, coarser wools, the mediums.

In the future then to get most profit from the flock, will require the largest growth of medium wool, all of which shall be produced for the least money.

Sheep to Meet This Want.

It would be quite natural here to drift into a discussion of the breeds, but nothing is further from my purpose. It is types, not breeds that I shall consider.

We must not lose sight of our previous conclusion, that mutton is of the first importance. We must go another step and show that the mutton now most in demand, is that which is lean and juicy, not over fat. The day of fat eating, by our people, passed away with the active out of door life in clearing our lands of the giant forest that once covered it. What is now wanted is lean meat (flesh). The "gobs of fat" once so welcome, if now on a mutton chop or leg of mutton, for American eating, go into the waste.

Another very important consideration is the fact that the more rapid

the growth and the quicker the animal arrives at maturity, the less food it eats, and the less its cost of production, and "a penny saved is twopence earned," as surely in mutton making as in anything else.

And lastly the wool, for that will help on the right side of the ledger, even if low in price; what we want is a good fleece, with staple from two and a half to five inches long, soft and of close texture, free from gum and yolk, and of good lustre. This class of wool is now most in demand and will sell for from 25 to 30 per cent. more than the fine, heavy wools.

What we want then, is a sheep that will combine in the highest degree early maturity, largest development of meat on the best parts and give the most pounds of the most desirable wool. How shall we secure it?

Food and Care Versus Blood.

No domestic animal is so susceptible to change as the sheep. When Father Adam looked over his stock to give them names, on that bright first Monday of creation he found among them but a single pair of ovines. Just what they were is not so clear, nor does it make the least difference; for whatever they were, they had in their organization capabilities of producing, under proper conditions, all the distinct breeds which we find today.

Change Comes With Environments.

As these have all come from that single pair, there could have been no crossing or mixing of bloods, and we must look for other causes to account for these variations.

"Every effect has its cause."

"Like causes produce like effects."

The same cause now, will produce like effect as a thousand or five hundred years ago.

In looking over the field trying to find or produce the ideal sheep to meet our wants, it may not be unprofitable to glance at the most valuable breeds.

In this country the Merino is the most distinct breed. Imported from Spain originally, and being a fine

wooled sheep, and the demand being then for fine wool alone, so much care was used in developing them on this line, as to result in producing a breed of the heaviest shearers, in proportion to the weight, of the finest wool, of any sheep in the world.

Aside from these, all others have been kept in a hap-hazard way, more as scavengers than anything else, and we find very little variation.

Going to England we find a very marked contrast. There, although all sheep may be included in one of the two great classes, "Longwools" or "Middlewools," almost every county or shire has its distinct breed, and each with very marked peculiarities.

Types Produced.

As we look over the Longwool types, with their massive bodies well covered with long glossy wool, with their abundance of fat laid here and there in lumps or chunks; the Middlewool type with smaller bodies, shorter staple and more compact fleeces, and with their flesh and fat nicely mingled; and the little Welsh mountain sheep, with their scanty fleece, deer-like form and venison quality of mutton, and remember that they all undoubtedly came from the same stock,—from a common blood, seeking the cause of these great variations, we will surely have to look for something besides blood.

Blood not Everything.

Don't call me a crank and say I ignore blood. Far from it. But blood is not everything. Blood is only valuable as it has potency behind it. What I contend for is that there is something beyond and above blood from which this potency comes.

Nature is very kind to all her creatures; she is ever ready to meet half way all who court her, and she will surely and quite rapidly change an animal to correspond with its change of food and environments. Where in all the world will you find such perfect type of physical development as in the oat-eating Scotchman and English

horse. Contrast, if you will, the oat-eating men of Scotland with the blubber eating Esquimeau. Contrast the English draffhorse with the Shetland pony.

All originally from the same blood, and yet, now, how different. What then is the cause of these great variations?

Food and Care.

As to food and care—and by care I mean environments, surroundings, it is a well known fact that the physical, mental and moral development of a nation may be very accurately gauged by their food and surroundings.

But do I believe that it would be possible to start with our common sheep and by any possible system of feeding and care, to develop a sheep of the "long wool" or "down" type? I answer most assuredly, yes. Only it would take too long a time, and cost too much in care, in these days of electricity and steam. We had better by far start with what has already been evolved by many generations of food and care.

Hence you see I place great importance upon blood, blood which has been enriched and enforced by generations and generations of a special line of feeding and care. But this blood, not to disappoint us, must have its potency kept up and reinforced by the same line of feeding and care that has produced it.

Americans are Getting Wild!

Since the great importance of mutton production has become so apparent, our people are getting wild. They seem to think that to buy a few full bloods of some of the English mutton breeds or a thoroughbred ram to turn loose with our common sheep, is all that is needed to change our sheep industry into the mutton channel. *

I desire to sound a note of warning. I see our people foolishly throwing away millions and millions of their hard-earned dollars.

American Breeds.

I said we had two breeds of sheep which had been developed in America.

The American Merino, and the common sheep. The one the result of the greatest care and most judicious line of feeding; pastured on the very rich herbage of the Vermont hills, supplemented by an abundance of nitrogenous food; carefully housed from every raindrop and as constantly protected from the sun and wind by an impervious blanket, it has developed into a sheep, as I have said, nowhere else equaled as a wool-producer. The other by constant neglect has resulted in a race with smaller bodies and longer legs; active and reliant, capable of picking a living in scanty pastures and among rocks and bushes, and living for weeks with no water but such as obtained from the dew-laden herbage. They are small bodied, light sleepers, but have a constitution and hardiness nowhere else found.

To take the special bred, and special fed sheep of England and subject them to the same neglect and want of care that our common sheep get we shall raise only scrubs. The worst of all is the thoroughbred scrub.

Before going into the raising of any of the English mutton breeds, it is well to study the conditions which have produced such splendid results. Reared in a much milder climate than ours, with far more rain, and that more evenly distributed over the year, they run in pastures longer than our summers and the growth of grass is more uniform and abundant. They contain a fine mixture of grasses in which timothy forms no part.

English Feeding.

Notwithstanding the fine character of the pastures nearly all sheep in England have some food, supplemental to the pasture nearly every day of the year, and this is all of a nitrogenous character and furthermore, the sheep never pass a day in the year without succulent food. This extra food consists of turnips, rutabagas, mangolds, sainfoin, vetch, rape, cabbage, beans, peas, linseed cake, barley and wheat bran. Indian corn and corn fodder

forms no part. In fact corn never enters into their food except for a very short time in finishing off a bunch for the block

Contrast this with the manner in which our common sheep are fed. Turned away in the spring time upon some bleak, rocky hillside, or into some bush pasture, and never seen except on an occasional Sunday morning to be salted, with no water except the dew or an occasional shower. Never a mouthful of supplemental food even though the grass be eaten to its very roots. When frost has killed the last vestage of herbage they are brought down to the home farm and turned into some eaten out cow pasture and there compelled to run for the winter, many times with no shelter. Their food consists of corn stalks or swale or timothy hay. If they get grain at all, towards spring it is corn. All the succulent food they have is what little grass they could pick from the frozen sods. Is it any wonder that English mutton is so much better than ours? The wonder is that ours is as good as it is. Even our best importers and breeders, many of them, I may say all as a class the exceptions are so few, fail to see the necessity of making the conditions here conform to what the sheep have enjoyed at home.

Avoid too Much Corn,

I have sometimes thought, as I looked at the way corn was fed here, that it was a curse to the American Sheep breeder. We grow it here so abundantly, easily and cheaply that we lose sight of the fact that it is not a suitable food to be given so exclusively to our flocks. I have been on the farms of very many importers and breeders in this country and on very many of them I may say the most, particularly in the West, I have seen corn drawn out by the load and scattered unhusked in such abundance that in many cases bushels and bushels remained uneaten. I have seen many flocks where the only food they had be-

sides corn was what little grass they dug out from under the snow.

Mutton What we Make it.

The experiments made at Madison in pig-feeding, and at Cornell in lamb feeding, show most conclusively that the character of the meat made on a growing animal is very largely controlled by the food given. That where the carb-hydrates form the bulk of the food the carcass will be very fat and the fat hard and crumbly. That there will be but very little flesh or lean meat and that dry and hard. That on the other hand where the food is mainly nitrogenous a large proportion of flesh or lean meat is produced and that more tender, and the fat is much more tender and yielding, and that where much succulent food is given the meat will be more juicy. These facts being true it is easy to see that mutton can be made to order, lean or fat, and as what produces lean meat also produces a large growth of wool, sheep properly fed will give large carcasses of lean meat, tender and juicy, and a heavy fleece of wool also.

Raise our Own.

Must we continue to import sheep to maintain quality, or can we grow as good at home? This is a vital question to the flock master.

Our English cousins like to have us think it necessary to continually import fresh blood. While they like us first rate, they like our dollars better and nothing disturbs their even good nature as to claim in their presence that we shall soon grow our own stock sheep of the mutton breeds. But just as long as we depend upon corn as our main feeding stuff, and make our sheep mere corn cribs, we shall find a continual deterioration, and that rapidly increasing. The get of our fat corn fed sheep are less able to impart to their offspring these desirable mutton qualities that were their parents, and each succeeding generation will show an acceleration of this trouble. And so long as we go thus blindly on

we shall be compelled to go to the mother country and trade our gold for blood. But I am an American, proud of my country and my birth-right, and I fondly hope to see the day when we shall be able to do with sheep, as we have already done with cattle,—furnish England with better stock than she has at home.

Why not? We have a better climate than she, one much more congenial for sheep development; less diseases and parasitical enemies. If our grasses do not grow as luxuriously and constantly as hers they are far more nutritious. Clover, that best of all forage plants for the sheep, grows a hundred times better here than there, and then we have an abundance of all the by-products which she must import if she will use them as sheep food. And when we awaken to the necessities of the case, and apply our energies in doing our best, we shall find food and care more potent than blood, and, working on this line, will produce the best mutton sheep in the world.

Discussion.

Mr. Noyes—What is your best and cheapest succulent food?

Mr. Woodward—Corn silage by far, and that is one of the things they cannot grow in England.

Mr. Heath—I want to tell about some lambs we had. There was a mistake made, and the lamb came before we expected it. My boy came and asked me if he could have the lamb; it was a very small, weak little fellow, and the boy took great care of it. He blanketed it as we do trotting horses. There were more mistakes and more lambs and the boy went into the house and cut the sleeves off of some of his underwrappers and put the lambs' legs through the holes. He saved the lambs, but his underwear was pretty well used up.

Mr. Sterne—How long would you keep the same ram in a breeding flock?

Mr. Woodward—That would depend

upon how good he was. As long as I could and not breed to his own progeny.

Mr. Henderson—How cold is it safe to have the room where lambs are dropped?

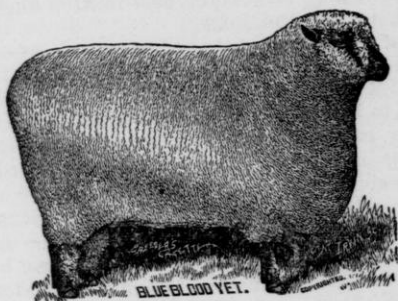
Mr. Woodward—I would keep them as warm as I could. Get your lambs up as quickly as you can and get their stomachs filled. They can stand a good deal then. I think the best stock we have in this country is to take our

native Merinos and grade up. The care and feed is the important thing.

Professor Hoyt of the Stout Manual Training School, was introduced to the Institute, and tendered an invitation to the visiting members to visit the school and study its methods.

The invitation was accepted for four p. m., the same afternoon.

Adjournment was taken till 1:30 o'clock p. m.





WASLEY & SWEET WELLS
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PROPERTY OF A. J. OGDEN

POINTS OF EXCELLENCE FOR PURE-BRED SHROPSHIRE SHEEP.

As adopted by the American Shropshire Association.

	Points.		Points
<p>Constitution and quality indicated by the form of body; deep and large in breast and through the heart, back wide, straight and well covered with lean meat or muscle; wide and full in the thigh, deep in flank, skin thick but soft and of a pink color; prominent, brilliant eyes and healthful countenance.</p>		<p>Head short and broad; wide between the ears and between the eyes; short from top of head to tip of nose; ears short, of medium size; eyes expressive; head should be well covered with wool to a point even with the eyes, without any appearance of horns; color of face dark brown.</p>	10
<p>Objections. Deficiency of brisket, light around the heart, fish back, pointed shoulders, tucked in flesh, pale or too dark skin objectionable.</p>	25	<p>Objections. Horns disqualify, white face disqualifies, head with prominent bones, bare on top of head.</p>	
<p>Size. In fair condition when fully matured. Rams should weigh not less than 225 pounds, and ewes not less than 175.</p>		<p>Neck. Medium length, good bone and muscular development, and especially with the rams, heavier toward the shoulders, well set up, and rising from that point to the back of the head.</p>	5
<p>Objections. Rams in full flesh 175 pounds or under. Ewes in full flesh 150 pounds or under.</p>	10	<p>Legs and Feet. Broad, short, straight, well set apart, well-shaped color dark brown, and well woolled to the knees.</p>	10
<p>General appearance and character, good carriage; head well up; elastic movement, showing great symmetry of form and uniformity of character throughout.</p>		<p>Fleece. Body, head, belly and legs to knees well covered with fleece of even length and quality; scrotum of rams well covered with wool.</p>	10
<p>Objections. Head drooping, low in the neck, sluggish movements.</p>	10	<p>Quality of Wool. Medium, such as is known in our markets as "medium delaine" and "half-combing wool," strong, fine, lustrous fiber, without tendency to mat or felt together, and at one year's growth not less than three and one-half inches in length.</p>	5
<p>Body. Well proportioned medium bones, great scale and length, well finished hind quarters, thick back and loins, twist deep and full, standing with legs well placed outside, breast wide and extending well forward.</p>	15		
<p>Objection. Too fine bones, short body, deficient in twist, legs close together, light in brisket.</p>			5
			100

POINTS OF EXCELLENCE FOR PURE-BRED SOUTHDOWN SHEEP.

As adopted by the American Southdown Association.

Points.		Points
	Hips wide, with little space between them and last ribs.	6
	Thighs full and well let down in twist, the legs standing well apart.	6
5	Limbs short and fine in bone, and in color to agree with face.	3
1	Forelegs well woolled, and carrying mutton to the knees, but free from meat below.	2
2	Hind legs well fitted with mutton and woolled to the hocks, neat and clean below.	2
3	Belly straight and well covered with wool, the flank extending so as to form a line parallel with the back or top line.	5
4	Fleece compact, the whole body well covered with moderately long and close wool, white in color, carrying some yolk.	12
5	Form throughout smooth and symmetrical with no coarseness in any part.	9
7	General appearance, spirited and attractive, with a determined look, a proud and firm step, indicating constitutional vigor and thorough breeding.	8
6		8
6		100

Head medium in size and hornless, fine, carried well up, the forehead or face well covered with wool, especially between the ears and on the cheeks, and in the ewe slightly dished.
 Lips and under jaw fine and thin.
 Ears rather small, tolerably wide apart, covered with hair, and carried with a lively back and forth movement.
 Eyes full and bright.
 Face a uniform tint of brown, or gray, or mouse color.
 Neck short, fine at the head, but nicely tapering, and broad and straight on top at the shoulders
 Shoulders broad and full, smoothly joining the neck with the back.
 Breast wide, deep and projecting well forward, the forelegs standing wide apart.
 Back and loin broad and straight from shoulder to rump.
 Ribs well arched, extending far backward, the last projecting more than the others.
 Rump broad, square and full, with tail well set up.

POINTS OF EXCELLENCE FOR PURE-BRED OXFORD DOWN SHEEP.

As adopted by the American Oxford Down Record Association.

	Points.		Points.
Head. Not too fine; moderately small and broad between the eyes and nostrils, but without a short, thick appearance; crown well covered with good wool.	8	quite to the knee; leg with heavy bone and upright, being clear from superfluous skin; dark brown or smoky in color; should stand square and well apart.	4
Face. Either brown or gray, but not speckled or white; with a white or gray spot on end of nose.	4	Breast. Broad and well forward, keeping legs well apart; girth or chest full and deep.	10
Nostrils. Wide and expanded, and dark.	1	Fore-Flank. Quite full, not showing hollow behind shoulder.	5
Eyes. Prominent, but wild.	2	Back and Loin. Broad, flat and straight, from which the ribs must spring with a fine circular arch.	12
Ears. Broad, moderately long, thin and covered with short, brownish hair or wool.	4	Belly. Straight on under line.	3
Collar. Full from breast and shoulders, tapering gradually all the way to where the neck and head join; the neck short, thick and strong, (with a masculine appearance in rams), indicating constitutional vigor, and free from coarse or loose skin.	6	Quarters. Long and full, with mutton quite down to the hock.	8
Shoulder. Broad and full, and at the same time join so well to the collar forward and the chine backward as not to leave the least hollow in either place.	7	Hock. Stand neither in or out, but straight.	2
Fore-Legs. The mutton on the arm or fore thigh should come	7	Twist or Junction. Inside the thigh deep, wide and full, which, with a broad breast, will keep the legs open and upright.	6
		Fleece. The whole body should be covered with wool of a close texture, a good length, and fine quality.	18
			100

POINTS OF EXCELLENCE FOR PURE-BRED COTSWOLD SHEEP.

As adopted by the American Cotswold Association.

Points.		Points.
	the knee. Leg upright with heavy bone, being clear from superfluous skin, with wool to fetlock, and may be mixed with gray.	4
<p>Head not too fine, moderately small, and broad between the eyes and nostrils, but without a short, thick appearance, and in young animals well covered with long, lustrous wool.</p> <p>Face either white or slightly mixed with gray, or white dappled with brown.</p> <p>Nostrils wide and expanded. Nose dark.</p> <p>Eyes prominent, but mild looking.</p> <p>Ears broad, long moderately thin, and covered with short hair.</p> <p>Collar full from breast and shoulders, tapering gradually all the way to where the neck and head join. The neck should be short, thick, and strong, indicating constitutional vigor, and free from coarse and loose skin.</p> <p>Shoulders broad and full, and at the same time join so gradually to the collar forward and chine backward as not to leave the least hollow in either place.</p> <p>Fore-Legs. The mutton on the fore-thigh should come quite to</p>	<p>8 Breast broad and well forward, keeping the legs well apart. Girth or chest, full and deep.</p> <p>4 Fore-Flank quite full, not showing hollow behind the shoulder.</p> <p>1 Back and Loin broad, flat and straight, from which the ribs must spring with a fine circular arch.</p> <p>4 Belly straight on underline.</p> <p>Quarters long and full, with mutton quite down to the hock.</p> <p>Hock should stand neither in nor out.</p> <p>6 Twist or junction inside the thighs, deep, wide and full, which, with a broad breast, will keep the legs open and upright.</p> <p>Fleece. The whole body should be covered with long, lustrous wool.</p>	<p>10</p> <p>5</p> <p>12</p> <p>3</p> <p>8</p> <p>2</p> <p>5</p> <p>18</p> <hr style="width: 50px; margin-left: auto; margin-right: 0;"/> <p>100</p>

SWINE SESSION.

The Institute met at 1:30 p. m.

Prof. Henry—Ladies and Gentlemen—This afternoon we consider the importance of hog-raising, perhaps next in importance to that of the dairy cow.

I shall call to the chair this afternoon as our presiding officer, Mr. A. F. Noyes, of Beaver Dam. He is a farmer who some years ago started farming in a small way and has grown to be a very large farmer. He is much interested in clover. His clover seed crop amounted to \$2,000 this year, so he knows something about it.

The Chairman—It is generally conceded that when an article is low then is the time that we should seek to know more about how to reduce the cost of production. At the present price of pork it is becoming very necessary that we shall produce it at as low a price as possible.

CARE AND MANAGEMENT OF YOUNG PIGS.

A. SELLE, Mequon, Wis

Mr. Chairman, Ladies and Gentlemen—I have the honor today of giving you some of my ideas as to how to take care of little pigs. Successful pig-raising is an art which cannot be learned in a single season, neither can it all be learned from hearsay, but the best knowledge is obtained from observation, careful study of the subject, especially the requirements of the breeders, and by practical experience, which however, very often proves to be an expensive school.

In order to raise good and healthy pigs it is a general rule to begin four months previous to their birth. I shall take it for granted that you have selected the best sow attainable, (no razor back, of course,) having been careful to select one with well developed characteristics of the respective breed in order that they will be transmitted to her progeny, and from a mother that has distinguished herself as a good milker and in raising a large number of pigs in each litter.

Mature Stock in Proper Condition.

The sow should be at least eight months old at the time of breeding and be bred to a boar equally as well bred as herself, and equally as good an individual, and not closely related; one that has not been overworked but is full of life and vigor.

A sow should be in good flesh and in perfect health at the time of breeding, so that she can start under good and favorable conditions, for we all know that health is a prime factor in successful stock growing and especially in the raising of hogs. I am satisfied that a good many make a mistake by giving the sow too much concentrated food, and not enough exercise, and when getting too fat they are like saloon-keepers—too lazy to take exercise—and any farmer will have noticed that a hog is naturally a lazy customer if he always has enough to eat. If the breeders are too fat from corn, I think this is one cause of the small litters, of which some hog raisers complain; but there are several other causes.

Feed for Health.

After the sow is bred feed her so as to have her in good, strong flesh, but it is not advisable to feed too heavily, especially corn, during gestation, for she will either grow too fat, or develop the young ones too much and both causes will tend to render birth difficult. Now, on the other hand, do not go to the other extreme and keep the sow too thin, like a walking skeleton, and especially young sows coming in with their first litter for if they are stunted too much with proper food and happen to have a large litter they can easily be fed so that in a short time they will look like a bag of bones. If we want a sow to remain in good health we should never confine her in a small pen, where she can hardly turn around, and then leave her there during gestation, and perhaps longer and on one kind of food, expecting her to remain healthy and produce a good family of pigs.

Must Have Exercise.

Much exercise in the open air is very beneficial to pregnant sows, especially to those that suffer considerable swelling of the genitals at the end of gestation. The main object, however, is to keep their bowels open and regular. Should you notice signs of constipation, which is likely when fed too highly and too much dry food, you can easily relieve it by feeding some sloppy food and giving them a little oil-cake meal, or some cracklings, by pouring water over them and letting them stand a day and then feeding it in their slop, about a quart three or four times a week. This is a good thing to give daily a few weeks before farrowing. Those having a supply of roots as beets, mangels, or small unsalable potatoes should feed them daily, as these things are an excellent substitute for grass.

Clover for Hogs.

If you have no roots try some of Everett's patent cured clover hay; this is best fed when cut fine, steeped with

water and mixed with fine white middlings and lobbred skimmilk, which is the best food to correct the stomach.

Many hog raisers are afraid of this method of feeding clover hay, as it is combined with a little extra labor, and is not nearly as handy as to throw a few basketfuls of corn over the fence as is the habit on some farms. But be it remembered with this little extra labor you will have warm food for your sows, a variety of food, and a cheap and proper food, and when feeding this I never have trouble with constipation or irregularities of the bowels with my pigs. Now, again, do not practice too much of a good thing and compel your sows to carry more water in their stomachs around the yard than is necessary, for if you feed too much slop, and very thin swill, the sows often take a different form and soon have a down-hanging cow-belly; it is best to follow the golden middle way.

Whoever raises hogs on a somewhat large scale can have things handy, and use a small steamer to cook his roots or steep clover hay, etc., or as is the case with the average farmer who only keeps a few breeders, he can heat water enough on the kitchen stove. But here is where many breeders strike a rock; whenever they wish to use the stove the atmosphere in the room will soon be in a boiling heat, the result of a row with the better-half. You may wonder what this has to do with my subject. Oh, nothing, perhaps, but it is of some importance, and it puts me in mind of a statement made by a gentleman who is known all over the world or at least in Wisconsin, that whoever wants to make pig-raising a success in winter and is away teaching others how to do it, must have the right kind of a wife.

Special Care at Farrowing.

Next comes farrowing time. Any intelligent farmer knows the length of gestation with the sow. By noting the day of coition you can tell almost to a day when a sow will come in as

they are promptly on time. It is a good plan for each sow to have a pen for herself in which she should be put a week before farrowing time in order that she may get used to it and not be fretful, and that she may have a chance to fix up her bedding a day previous. It is well to run some clean rye straw through a feed cutter, because this cut straw will absorb the moisture better and the little ones can hide in it. If it happens to be a cold day I fill one or two of those large bran bags with cut straw and put them near the stove to have them thoroughly warm, and use them for bedding when pigs are born, for nothing is more beneficial for them than a dry, warm bed. When you have large, old sows, a good many advocate having a shelf or poles twelve inches from the floor, around the sides of the pen so the little pigs can slip behind it when the sow lies down; but when the sow is a good breeder and is in good condition instinct will tell her not to lie on her pigs and all these precautions are not necessary. It is usually the owner's fault when the sow lies on her pigs, for if she received too much concentrated food during pregnancy she will be too fat and lazy at farrowing time and have no life and ambition to get up when one of her little ones cries, hence they are smothered to death.

It is recommended that at the period of deliverance some one should be on hand to assist the sow in case of difficulty in farrowing; but if the sow and her surroundings are in proper shape it is best to leave her entirely alone, for I would sooner have Nature for her midwife than to have some inexperienced person around her.

Abnormal Appetite.

When the pigs are all born the question is whether to remove the afterbirth or not; some sows will eat it and others will not. I have sometimes left it in the stable for two days and the sow never touched it. In my judgment I think if the sows are in the right condition they will seldom eat it,

and if they do it will not hurt them but will correct their stomach.

If the sow gets plenty of succulent food during gestation, as beets, clover hay, milk and many other good things, and is fed as described before, I have never known of her being off her feed or out of condition, for her bowels are all right, and she will seldom eat the afterbirth and never devour the pigs.

Now we will turn over another leaf. This is food for the sow and her suckling pigs. We are more sure to raise pigs in summer, when the sows can get out to eat grass and roots in the ground before pigging time and as soon after farrowing as possible, therefore in winter we must follow the course indicated by Nature and give them a substitute.

Use Judgment in Feeding.

For a day or two after a sow has pigs she needs no food and I would never stir her up to get her to eat even if she lies quietly for two days. Then give her a little dishwater, or the water from soaked cracklings, steeped clover hay or lobbered skim milk; we must always be on the alert to guard against over feeding. Be governed by their condition as to how much feed they shall have; all do not require the same amount; and no iron-clad rule that will fit every case can be laid down; it is like a coat,—this may fit a good many but will not fit everybody.

Sometimes there are sows that get a caked udder, or so-called milk cake. This is liable to happen when the sow is too fat and fed too highly right after farrowing; it will also happen when the sow is of good milking strain and has only a small litter. If the udder becomes badly caked there are only two remedies to be followed,—either feed and raise the pigs by hand or let them die. If the pigs are very valuable it is worth trying to bathe the udder with hot vinegar and water every half hour for a day or so, and feed the pigs with a bottle. If the thick milk can be removed it may come out all

right, but all the trouble is mere guess-work.

In order to be on the safe side and not overfeed the sow make her feed of a more bulky texture and mix her slop, which is best made of bran, middlings, and a little oil meal, with clover hay (steeped), which can be greatly improved by adding some lobbered skim milk, for this is easily digested and she will always be ready for her feed and never be out of condition. If fed in the manner described I like to feed some cracked corn and oats as a variety; this will prevent her from losing too much flesh. Sometimes the sow will not allow the young ones to suckle. In such cases the teeth of the pig should be examined and if pointed too sharply such points should be broken off with pinchers.

Work for Piggie.

Place in the corners of the stable a quantity of earth, charcoal and ashes where the little ones will work. This will prevent them from drinking urine and filthy fluids, and from devouring sour substances usually found near the trough. The devouring of such decaying stuff should be avoided by all means, because it is the cause of the existence of many puny, and crippled pigs. Usually when the pigs are three or four weeks old they begin to eat and are best fed with lobbered skim milk, soaked corn, or wheat, and for a change dry grain coarsely ground and placed where the sow cannot get at it. The most prevailing disease of little pigs is diarrhoea, caused mostly by improper food and over eating of the mother; another cause is a damp and dirty stable and the effluvia rising from liquid manure that has gathered below the floor. For scours the remedies are numerous. If the stable and bedding smell strong remove the bedding and scatter some land plaster or scrub the floor with fresh lime water; also change the food of the mother if this is the cause, or give some rice water and ginger in their slop and you will see the difficulty pass away leaving no bad results.

Pigs, like children, suffer more or less at teething when two to four months old, and scours very often is the result, if precaution is not taken and the feed given regularly and plenty of dry bedding, besides allowing them to have exercise and sunshine. It is always best to prevent disease as little pigs are very delicate and sensitive, and always try to find out the cause, for if not tended to in time I have observed cases where scours have become contagious.

Thumps in Pigs.

There is still another trouble among little pigs before they are four weeks old which is easily prevented but seldom cured; they usually huddle together and sleep, get a thick neck and breathe like a heavy horse. Somebody has named this disease "Thumps." You will notice this disease principally in winter, seldom in summer when the sow runs in pasture followed by the little ones. I think according to my observation the cause of "thumps" is that the pigs have no exercise, and also when the mother is a good milker and only has a small litter they will take too much milk and overload the stomach, get lazy and sleepy, and make no effort to take exercise. If you watch the pigs when the mother is eating and find that they run about, ride on each other, fight and pull each other's ears,—they are on the right road when enjoying that kind of sport,—but on the contrary when they do not leave the nest and are sleeping, when their throats are swelling and they show difficulty in breathing, there is no certain cure and death is the only relief. But as I said before this is easily prevented. In winter we must give them a substitute for what nature provides for them in summer.

Prevention Better Than Cure.

They like to root in the ground, not only for fun, but to find something to correct the digestive organs, therefore I supply them with sods out of fence corners or woods and mix soaked cracklings; in order to pick out the

cracklings they are only too willing to turn over the earth many times, which gives them plenty of exercise. In this way the bowels will be regular, health improved, and disease become unknown. You will surely admit that prevention is easier and cheaper than cure, and if you do not strive to prevent disease it is a sign that you do not understand your business.

There are some other unaccountable misfortunes to young pigs,—why one or two pigs in a litter should develop a crooked back, while all the rest fed alike should not, is a secret to me. It seems to be the result of stomach troubles and in winter when they have a cold stable and not exercise enough it will sometimes happen even with the best care; they will in most cases out-grow this mishap and get straight again. Sometimes a pig will keep poor because his tusks are out of line cutting the lips and making the mouth sore; when this is the case pull the tusks out.

One of the worst misfortunes that can happen to a pig is to have a shiftless owner, one of those fellows who is not ashamed of making his pork in filth and thinks a hog can stand any abuse.

If at the end of six or seven weeks the pigs are growing nicely we may think of weaning, but it should not be determined by their age but on how they are eating and growing and are able to take care of themselves. I then increase their feed and diminish the feed of the sow, but give her more corn, and less milk producing food, in order to get her to her normal standard, and in good flesh for breeding. In five or six days after the pigs are away the udder will shrink and she will usually be ready for business again.

I would take away the two or three strongest pigs in the litter at first; after two days two more, and so on until all are weaned. I then put them on the pasture which is the best place for them, or in winter give them a dry, warm pen. If you keep them shut up

in an old filthy pen, with unhealthy surroundings, which is particularly injurious, you will soon see the mistake.

Feed for Early Maturity.

Feed for growth and not for fattening is the right idea. To feed too much corn for growing young pigs means to check their development. They must have plenty of succulent and sloppy food. Milk is the proper food, clover and middlings, of course, as I have said many times, not of too concentrated nature, at least as an exclusive food. The point is, first development of frame, flinty bone and good muscle, and when that is accomplished the pigs will be ready for putting on fat for going to the show, or his final er.d,—the pork barrel. Many farmers assert that pigs cannot be made to grow materially in winter. Dairymen will take good care of their cows in cold weather. The same principle of care and feed that makes cows give milk in winter will make pigs grow. A dry, warm pen from 60 to 70 degrees, plenty of milk and clean, nutritious food are necessary to bring about this result.

I think I had better close as I do not wish to task your patience any longer, but in conclusion will say that to successfully raise and wean little pigs especially in winter, requires some skill and thought on the part of the feeder and breeder, for we must always be on the alert to find out their many ailments and also the cause of them, and always be ready to administer to their wants. We should know what to do and when to do it, and have patience and general knowledge of their requirements and the whole business.

Discussion.

Mr. McKerrow—Which do you consider the best and cheapest succulent food for your use?

Mr. Selle—I keep my breeding sows on finely cut clover hay, milk, middlings and roots, but if you haven't

any other than clover is the cheapest. You can sooner raise a ton of hay than roots. You see I haven't land adapted to roots, so I raise clover hay.

Mr. McKerrow—What kind of roots?

Mr. Selle—Mangel-wurzels.

Prof. Henry—How do you prepare this clover hay for your hogs to eat it?

Mr. Selle—I run it over the pea-cutter, cut it fine, and steep it with hot water so that it is soft as grass. They want grass in the winter just as well as the summer and this answers the purpose.

Mr. Hyatt—How often do you have to prepare that clover hay?

Mr. Selle—Every time I feed, twice a day, about eight o'clock, and about four. Then they go to sleep.

Mr. McKerrow—When you have had plenty of roots to feed your breeding sows, have you ever had any trouble from caked udders?

Mr. Selle—If I had ever so plenty I would feed clover. A good many feed the most of what they have the most of.

Mr. Linse—I feed quite a little clover, and I have just the pickings-up, the clover blossom and leaves from my barn floor. I pour the slop food right over it, and they eat it all.

Mr. Boynton—Would not ensilage take the place for succulent food?

Mr. Selle—I haven't any ensilage. I couldn't find enough clover leaves on my barn floor as Mr. Linse says, I have twenty-four sows.

Mr. Convey—I think it is a waste of ensilage to feed it to hogs.

Mr. Bradley—Why do you like lobbered milk better than sweet milk?

Mr. Selle—Because it is healthier as it is easier to digest. Anybody with a weak stomach who eats lobbered milk will soon be healthy. Try it on yourself.

Mr. Woodward—You must have entirely different kind of hogs than we have. There isn't anything that my hogs will eat quicker than corn ensilage.

Mr. Selle—Did you ever try them

with clover hay steeped, with milk and middlings?

Mr. Woodward—Yes, sir.

Prof. Henry—At what age would your sows have their first litter of pigs?

Mr. Selle—I have sows that are ten months old, and I have that old sow yet on my place, and she raises two litters a year, but I would not make it a rule. Usually at a year is soon enough. It depends somewhat on the breed.

Mr. McKerrow—At about what ages do you find your brood sows the best?

Mr. Selle—After they have their first litter, they have large litters right along. The one I spoke of is four years old and she is just as good as ever.

Mr. Faville—How old is it profitable to keep a brood sow if she is a good one?

Mr. Selle—If she is a good one I keep her as long as she breeds.

Mr. Miller—Do you keep these sows together in large numbers?

Mr. Selle—Well, I have nine compartments and each stable is full, one is a little the biggest, another, and another, and so on, and the rest are running outside in a large shed, half as large as this hall. There are ten altogether, and the rest, the twelve,—I have them penned up, but they also have a run during the day time.

Mr. Miller—You let them out the same as a man would his horse and put them into a stable again?

Mr. Selle—Yes. About a week before farrowing, I put them in their separate stables, so they get used to it, and fix up their own bedding. If you put them in just the day before, they are not used to it, and they will often loose lots of little pigs.

Mr. Cole—How do you give your young pigs exercise in cold weather?

Mr. Selle—I don't care what the weather is, the weather is all right in the stable. I have my stables where it don't freeze, about 60 degrees. I have an attachment to the cow stable, and

also to the hog stable. They take their exercise themselves, but if they are sickly they will hide themselves in the bed and don't come out. I usually stop a little in the stable and watch them, and they are playing and pulling each others' ears and have exercise enough. If the sow is in good health her milk is all right, and then the pigs are healthy, and they run about and skip and play.

Mr. Miller—When it comes a warm day do you allow those pigs to run out doors?

Mr. Selle—Oh, yes, when it a warm day they go out a few hours.

Mr. McKerrow—What do you feed these young pigs first?

Mr. Selle—I had a young litter that came just two weeks ago, when we had that blow-out storm, and when I left home they were already eating soaked cracklings.

Mr. McKerrow—What are cracklings?

Mr. Selle—They are scraps of meat. Look it up in the dictionary. I have a whole wagon load of sod out of the fence corners and out of the woods that is good for the pigs. I take it into the cellar, and give them half a bushel, mixing it with the cracklings, and they will root it up to find something. They root to find bugs and things, and they will eat it up in two weeks, and they don't eat hardly any milk. That is their first food. Then I have a stable where they can slip through for they are like little children, if they can get something on the sly they like it. I feed a lot of skim milk.

Mr. Hyatt—There is a great complaint some springs of sows destroying their litters of pigs by eating.

Mr. Selle—That is right. They went according to their stomach. You can't do any saving on a hog. If my sows would eat their pigs I would be ashamed to stand here and preach. That is the owner's fault.

The Chairman—Is there any one present who has had that experience and cured it?

Mr. Miller—I think if you follow the

speaker's directions you will have no trouble.

Mr. Selle—That is what I say.

Mr. McCullough—How often do you feed little pigs while they are running with the sow?

Mr. Selle—About three times a day, perhaps a quart in the little trough, and if they won't eat it, I have it removed. Sometimes they won't eat the new food the first time and then I try it again the next day; if they only nibble a few spoonfuls that is enough to get them started.

Mr. McKerrow—Do you use any salt in hog feeds?

Mr. Selle—Yes, they can have a little salt, but I hardly think a pair of scales can weigh the amount they need. I give them some ashes,—I mix some with the earth,—and they may eat it as they want to.

Gov. Hoard—A year ago there was a great mortality with young pigs on account of the wet weather. It is well known that dampness is their destruction. I would like to ask the gentleman if he takes special care to see to it that the young pigs, their bedding and all, is kept free from moisture?

Mr. Selle—Why, yes, that is the main thing. The feed may be ever so nice, and with a damp stable you can finish them in one night; and then the stable has to be cleaned out every night. They have to be very clean, just the same as you wash your little baby. They want clean bedding every day. It is the damp, wet smell in the stable that hurts them. The feed may be ever so sweet, if their bedding is strong and foul it is bad.

Mr. Arnold—Don't you think it is of the greatest importance in raising young pigs that the sow should be properly fed for the first few days after farrowing? People are apt to feed her too much.

Mr. Selle—Yes, if they lie quietly I just let them lie. They like to have a little llobbered skim milk or soaked cracklings and water. They are rather costive at that time, and you ought to

feed them so as to keep the bowels open, and that is all.

Mr. Arnold—Can you make a good hog unless you start right? And you are pretty sure of having a good hog if you get him to be two months old and all right.

Mr. Selle—Yes, if he is spoiled in starting, of course you can't raise him.

Mr. McKerrow—I understand you give the sows the first two days plenty of slop to drink, but no heavy food?

Mr. Selle—That is right. It is more important to feed the sow before farrowing.

Mr. Arnold—Isn't it a good plan to give her some meat?

Mr. Selle—Meat is too high. Cracklings are only half a cent a pound, and they are good.

Mr. Tubbs—You take a couple of pounds of fat pork, cut it into three or four pieces and feed it to them, and you will find that is all the pork they want, they won't eat their pigs.

Mr. Selle—If you shut them up in the stable and feed them a lot of skim milk, it is too rich. If you feed them some lobbared milk it will help their stomachs some.

Mr. Jacobs—Do you think it is profitable for the average farmer to have his sows raise more than one litter of pigs a year?

Mr. Selle—The average farmer, every time. You see it is natural for the sow if she is fed right. It would be just as reasonable to say that we ought not to raise but one colt in every two or three years. One of my old sows raises two litters every year, and I was offered \$200 for her.

Mr. Craig—Do you think there is more profit in fall pigs or springs pigs?

Mr. Selle—There is more profit in spring pigs every time, because it takes less labor in the summer; they attend to themselves.

Mr. Dickson—What do you do for your pigs when they have thumps?

Mr. Selle—That is from lack of exercise; in the summer when they are out on the grass they never have any.

Dr. Porter—It is a diseased condition of the body that causes thumps. I am told that it is fatty degeneration of the heart, that men as well as pigs are liable to have it from lack of exercise and too much rich food.

Mr. Selle—Yes, I have noticed it when the sow has been fed rich food and had only two or three pigs in the litter. They get too much.

Mr. Rapager—Have you ever lost a sow from caked udder or milk fever?

Mr. Selle—I didn't lose any, but I nearly lost one. I saw the pigs were sucking and sucking all the time, and I found she had no milk. I took them in the house. Then I washed the udder in hot water and vinegar every half hour for two days. I fed the little ones with half cow's milk to keep them good and strong, and every half hour I took them out to let them suck.

Dr. Porter—How many minutes at each application did you give?

Mr. Selle—I will say about two or three minutes.

Dr. Porter—Try it the next time fifteen or twenty and it won't take so long.

Mr. Rapager—I myself have frequently had sows bother in that way, and the remedy I found is cold, salt water. Make a brine a little strong and bathe it quite often and let the pigs still be with the sow; finally the fever will leave and the swelling go down, and the sow will come out all right in a short time.

Mr. Arnold—Mr. Selle is speaking from the feeder's standpoint, to make the best pork for the least expense, not from the breeder's standpoint, not to get a strong constitution in the hog or in the progeny. What might be good policy for a breeder might not be for the feeder.

Mr. Selle—If I had a sow that farrowed in June and had only two pigs, would it pay me to keep that sow idle until the next June?

PRACTICAL POINTS IN THE MANAGEMENT OF SWINE.

V. D. HEATH, New Lisbon, Wis.

Mr. Chairman, Ladies and Gentlemen—How evident it is that the present is an age of progress, for within the last few months the steam engine has made better time than ever before, the thorough-bred trotter has lowered the record almost out of sight, and the dairy herd has produced more milk which, with the aid of the separator has been converted into butter in less time than ever before. I am here to tell you that the registered pig is right up in line with the best of them. His valuable excellence and beauty make him a very desirable piece of property. The horse has his rivals in steam, electricity and the bicycle; the cow in oleo, butterine, etc., but the products of the pig will always be wanted in the market and larder.

Now, if you are going to try swine-husbandry the first thing is to see what the market demands. I dare say it is not the scrub hog with a rainbow back and a nose suitable for drinking out of a jug, for such hogs will demoralize the owner and damage his purse. But a scrub hog is more to be respected than the man who breeds him. How many who sit before me have suffered from having a few such hogs shipped in a car with theirs; the buyer and grower both know too well the consequences.

Evenness Commands Best Price.

Then we must have a car of hogs ready all at the same time, or induce our neighbors to raise the kind that we do in order to get the best returns. A registered sire must be at your command if you breed only for the eastern market. It costs but little more to have the dam registered and then you are ready for any market. A market for breeders is preferable, next a mar-

ket for pigs at four weeks old; then comes the 170 to 200 pound hog, and lastly the heavy hog.

Before you cross two distinct breeds consider well what the result will be. Nathusius, the great writer on domestication of animals, says that the infusion of 1-32 or even 1-64 part of the blood of the sus. Indicus hog into the breed of sus. Scrofa is sufficient to change the form of the skull. He further says that rich and abundant food to the young causes the head to grow wider and shorter. Their color is often changed by their surroundings.

Proper Quarters.

If you winter pigs you will need some kind of a house for them and you should plan it to suit your own and their convenience. They demand a dining-room with a clean floor, a bedroom with a roof and a closet. Don't let them in until you have scattered feed all over the dining-room floor, put straw in the bed-room and a shovelful of droppings in the closet. In this way the labor of tending the house will be greatly diminished. The bed-room for the brood-sow should be bedded with a little chaff or cut straw and must have a guard rail or shelf around the base to keep her from lying on her pigs. Should the little ones come in a cold time don't forget to spread a stiff canvas or blanket over the mother hog; also have a weighted canvas at the doorway for day and a board door for night. Don't forget to select your brood sows from second litters in order to obtain length, strength and productiveness.

With all of our diversified cares we need some constant reminder, like a good farm paper, right before us, and after we have attended to these little

details, even the wise ones will say, "I wonder how it is that you always have such good luck?"

Cleanliness with hogs is one of the important things. This, with plenty of exercise is the great safeguard to health. This is one theme which I have always tried to carry out, and I have lost but one hog in fourteen years, and that was for want of exercise.

How to Exercise.

I feed and slop in three different places, partly to give the brood sow exercise. I throw mixed grain in a pile of straw and they spend many happy moments in the winter under that straw. Variety of food is the mother and out-door exercise the father of health and vigor; these wedded to a bin of feed will produce pounds, shillings and pence. When this clean place is in readiness pick out the pigs that are to be parents. Choose according to your market and facilities for handling. I prefer a Poland-China with clean, white feet and a white nose, with a long body and straight on the back,—hair thin and glossy, ears that lop and cause him to look toward the ground. Every mother should have a name, and her record should be kept. How many times has the hired man been known to say in the morning when he came in that such a hog has so many pigs, and the owner's reply was "Is that so, I did not expect them yet,—how time flies." "Yes, but they are all dead except one and I guess that will die, for the old hog got in a small hole in the straw stack and laid on them," or "she got on the wrong side where the cold storm and wind chilled them to death." Then the owner would say, "The old fool," and leave you to guess which or who was the old fool. This record is a very important thing indeed, and only requires a little time to keep it.

Qualifications of a Swine Breeder.

For a person to become interested in a pig story he must needs be one who has made money from growing pigs;

then it naturally follows that he will like a pig. Now, I like a good pig, and my pigs like me. I have seen the time more than once when with the mother pig it was money in my pocket that I was on friendly terms with her. She allowed me to place her pigs in more comfortable quarters and no riot in the family and no little pigs stepped on and killed. Now, these little pigs have to eat. First the mother should be fed on warm, light food, which can be increased quite rapidly. I don't know what simple food is the best, (unless it is milk), but I think the greater the variety the better. If she can have a nice mess like you give that new milch cow once or twice a day it is good for her. Quite often I give her corn to the horses and their oats to her and they both like the change. I feed them shorts, wheat bran or buckwheat bran, rye ground, potatoes, roots, in fact as much of a variety as I can. What for? So that the little pigs will not get sick and so that they may get properties necessary for all parts of the body. When the pigs are large enough to eat I have a low trough in a yard near the old hogs where none but the little pigs can go, and I put milk and some of the best slops in there and teach them to go and help themselves. And this pays, for they grow much faster and the old hogs will be in condition to sell much earlier by so doing. I have tried feeding little pigs on boiled rye, but it did not agree with them. I never derived any particular benefit from cooking any feed only in connection with pumpkins, potatoes, roots, etc. Rye ground and mixed with other grains is all right; the more kinds of grains you mix together the better. I don't like feeding too much thin slop, but I feed it thick and leave water where they can drink as much or as little as they need. Later on their ground feed can be fed dry or wet, I don't think it makes any great difference,—if any it is in favor of dry, —when one has a clean trough and floor to feed on, but if one has not a

proper place for feeding dry and has to water them, and feed in troughs on the ground in the wind I prefer to wet their feed.

Time for Farrowing.

I like to have my pigs born the first of April for then the weather is warm enough so that with a little care they can all be saved, and soon they and the mother commence to condition themselves on that cheapest of all foods, clover, and with a little grain each day through the summer they grow to be quite fat hogs at a comparatively low cost, and by the time the sweet corn is large enough for green corn, I begin to cut and throw over to them. They eat stalks and all, and no time is lost in husking and handling. When frost comes I break off the ears, unless the pasture is short, then I continue to cut the same and let the cows eat the stalks. By so doing I harvest and dispose of a large per cent. of my corn and hardly know how or when it is done. I have gotten out of shorts and other ground feeds at different times and fed corn almost exclusively until worms would rise in their throats and choke them while drinking. Then they try to doctor themselves by eating the lime out of the stone wall. I usually stop these two evils by putting copperas in their swill, with a little sulphur and plenty of coal and ashes where they can get at them. My hogs are never shut in a pen more than a few days at a time, when I want to wean their pigs or when the little pigs get to hunting holes through the pasture fence. Then I make prisoners of them until I can fix the fence and they have partially forgotten where the weak places were,—the rest of the time they have the whole pasture; when the grain is out of a field it is theirs.

Prof. Henry's Experiments.

Another important thing a grower should know is just what it costs him to produce a pound of pork. This is almost impossible for a man who has no scales to weigh his hogs and weigh

his feed. I noticed by a feeding experiment in 1890-91 by Prof. Henry that it took on an average about 4.7 pounds of meal and shorts to produce one pound of live pork where the hogs weighed 127 to 140 pounds, and with such hogs and such feed at \$12.00 per ton one pound of pork would cost a little over 2.7 cents besides your capital and labor. If the feed should cost \$15.00 per ton the cost would be 3.3 cts. per pound. I also noticed that when the hogs weighed 240 to 325 pounds it required 6.3 pounds of meal and shorts to produce one pound of gain. Now it is with such heavy hogs that the feed of maintenance or support figures like interest money. Feed at \$12.00 per ton, 100 pounds of such hog will cost about \$3.75, and when the feed is \$15.00 per ton it raises it to \$4.72. With these estimates at hand when our hog buyers come around we know about how much we are going to get for our labor. We don't do all this for diversion, a part is for profit.

We all agree that the best breed is none too good, if we want to raise a pig that will sell and leave a nice little profit. Also that the owner must like the business and put thought and energy into it and not forget to slop or water as well as to feed, and never try to carry a pig along on a light scrimping ration until he can raise something to feed it on;—or when the hog is fat to hold it and try to raise the price by so doing. A man should thoroughly know himself,—know just how much real courage he possesses,—know whether he could stand a loss for one or more years and know whether he could stand a thorough examination on the question of how much gain all kinds of feed (that he might need to use) would produce,—before it would be advisable for him to make a specialty of growing pork, although the business does not require as much constant personal attention as the dairy business. But when you unite the two you really double the profits of both; one is absolutely dependent on the other.

Spring or Fall Pigs.

In regard to spring or fall pigs I cannot say but that there is just as much profit in one as in the other; the dairyman should have both. I prefer spring pigs because I think I understand handling them best and my farm is better adapted to them. I think I can handle them nearer to Nature's own way which is undoubtedly the best. First the spring pig does not get such a cold reception from Nature as the fall pig, and I think it will build up a better and healthier frame on clover and that will get it ready for green corn that will condition it for ripe corn which will round it up ready to sell; and the money comes just when the hired help want their pay, when the taxes have to be paid, and when the time for recreation is at hand, and pig money goes just as far as anybody's money, and in order to obtain all this you only need to like a pig, etc.

Discussion.

Mr. Arnold—I think the point is of great importance that the eating quarters and the sleeping quarters should be separate and that the sow should be compelled to walk from one to the other.

Mr. Heath—As I said I feed in three different places and that is partly to give the sow exercise. Where I feed the corn is at the corn crib, about ten rods from the basement door where I keep my slops. I feed the corn out of doors when it is nice weather.

Mr. McKerrow—Do you advise an extensive, permanent hog house, or a movable house?

Mr. Heath—For brood sows I would build as cheaply as possibly, either just by making a square about eight feet square, on runners, that I can draw from one place to another or just slanting the boards up and making a roof.

Prof. Henry—Do your hogs sleep on planks or straw or on the ground?

Mr. Heath—My hogs sleep on straw on the ground, but I am careful to change it just as often as I do the bedding under my cows or horses. They keep clean all the time.

Mr. Cole—Is it a good plan to occupy the same feeding ground year after year?

Mr. Heath—I think not. When I throw corn over the fence into the pasture, I never allow it to be thrown more than twice in the same place.

Mr. Miller—Why do you prefer a clay floor to a plank floor?

Mr. Heath—It is cheaper, I don't say it is better; if the ground is dry and you have a closet in connection and the feeding floor clean, the bedroom will be clean.

Mr. Miller—Then would you have your closet floor as high as your bedroom floor?

Mr. Heath—No, sir.

Mr. Arnold—You want your sow to lie on the floor, don't you?

Mr. Heath—I would rather she would.

Mr. Arnold—You want to fix it so no air gets under her?

Mr. Heath—No more air should get under than under our own houses.

Mr. Marks—Isn't it a fact that the brood sow, properly fed and having the run of the yard, will exercise sufficiently for her own good?

Mr. Heath—I presume so, but I can get a little strength and length, perhaps, by compelling her to exercise a little more.

Mr. McGilton—Do you also recommend raising two litters in twelve months?

Mr. Heath—I am just a general farmer. I have done mean things as Mr. Louis said he had done, and foolish things. I first obtained a litter of registered pigs from Michigan. I have bred from young sows; they grew smaller. Then I changed and took in some brood sows for mother hogs, and later on I have concluded it is better to stay right by a good breed that is already made up, than to set myself up and try to make something better

than Mathews and these wise men have done. My practice is one litter per year, but I don't advise it.

Mr. McKerrow—Did you ever feed soft coal?

Mr. Heath—Yes, sir.

Mr. McKerrow—Did you ever feed hard wood ashes?

Mr. Heath—I don't feed them. I leave them where they can eat what they want, and the same with salt.

Mr. Arnold—I have been feeding about 200 hogs all this winter, and I feed about two bushels of soft coal twice a week and they will eat it up; I believe those two bushels of soft coal are worth more than two bushels of corn, or worth more than ten bushels if they didn't have any. It seems to me that the results are better than charcoal. I have had good results also from coal ashes.

Mr. Meyrick—It appears to me that the demand at the present time has changed very much for the quality of meat that is produced, especially of pork. I would enquire what is considered the best ration for lean, juicy, sweet pork?

Mr. Heath—I feed shorts for one thing. I have not a complete ration.

Mr. Goodrich—We want to make just the kind of meat that the market demands; we can make that just as cheaply as any other. The market has come to demanding lean meat. There is a man down at Ft. Atkinson who is making a fancy sausage and bacon, and curing ham. He buys his pigs at from six to eight months old, and weighing from 200 to 250 pounds, of the dairymen, every time, where they are fed on skim milk and middlings, and very little corn. It is well understood that he will pay 25 cents per hundred more than any shipper could give, and I have every reason to believe that he will pay a half dollar a hundred more if he can't do any better, and he has a market for this fancy meat all over the country. He sent some to St. Louis and some to New York. I saw some of his sausage be-

ing sold at St. Louis a few months ago at 20 cents a pound.

Mr. Woodward—We have quite a number of men in New York who are building up just such a trade. We have men who are making a specialty of making hams and shoulders and sausage, and they are feeding right along on the line that Mr. Goodrich talks about. They feed nitrogenous food. I know men there who would not give you a cent a pound for cornmeal to feed to their hogs, and they wouldn't have it if you would give it to them. They want hogs fed by dairymen wholly on skim milk and middlings and oil meal.

Mr. Meyrick—I am working on that same line here in Dunn Co. I am trying to make an extra article for an extra price for our home market.

Dr. Porter—Is there any hog cholera in this State?

Mr. Linse—At La Crosse they have about sixty hogs at different places with hog cholera, and it is caused by feeding acid slops.

Mr. McKerrow—Does this lean meat production of hogs all depend on the feed?

Mr. Heath—No, I think it depends a good deal on the breed.

Mr. Woodward—Does anyone in this state feed bone meal or bone flour to their young growing pigs?

Mr. Arnold—I have a neighbor feeding it, and he claims the bone meal is worth more than the corn meal in conjunction with other foods.

Mr. Woodward—We feed it regularly in New York with all other pig feeds.

Mr. Vasey—How much should a hog put on in weight a day, that weighs a hundred pounds, to be a good average gain?

The Chairman—That would depend a great deal on the feed and the pig.

Mr. Vasey—Do you recommend feeding shorts for fattening pigs.

Mr. Heath—I do in connection with other feeds. I do not recommend feeding any one feed. A pound of corn is good feed, but don't feed it alone.

Mr. McGilton—At what age do you market your hogs?

Mr. Heath—I sell them at 170 to 225 pounds.

Mr. Convey—What success have you had in feeding middlings or shorts dry?

Mr. Heath—Very good success.

Mr. Gibson—The question was asked just now as to certain breeds for lean meat. I may say we have five packers in Canada who are making what they call English Breakfast Bacon from small hogs, weighing not more than 175 pounds, and those men have been importing pigs from England to distribute around through the country to breed this very meat. They do not believe that the fat hog will make fancy English Breakfast Bacon, and to encourage the production of this lean meat they have been at the trouble of importing pigs and distributing them through the country at a nominal price. They are the Tamworth and Improved Yorkshire.

Mr. Massee—Mr. Heath states in his paper that by adding the dairy to the hog business it will double the profit

in both. I can well understand that the dairy business will help out the hog business, but I don't know that the dairy depends upon the hog in any way.

Mr. Heath—They help out in using up the skim milk.

Mr. Arnold—How much more will it cost to winter a yearling or a two-year old or three or four years, from that up, after she has got her growth, than it will a young sow that is growing; would it cost any more?

Mr. Heath—I don't think it would, but the gain for your sow I calculate offsets the fact that she does not raise quite as many pigs in number, nor quite as large ones, so it is about the same thing, if you haven't an old sow, why breed from a young one.

The Chairman—We have with us today the gentleman who judged the swine at the New Orleans Exposition, who judged alone part of the swine at the Chicago World's Fair, and was on the committee to judge the balance, and I now have the pleasure of introducing him to you.

OBSERVATIONS ON SWINE AT THE WORLD'S FAIR.

F. D. COBURN, Topeka, Kan.

It has been well said by high authority that in the American hog we have an automatic, combined machine for reducing the bulk in corn and enhancing its value. A machine that oils itself; puts ten bushels of corn into less space than a bushel measure and in so doing quadruples the value of the grain. Corn loaned on a well-bred hog is cash at a big interest. A good brood sow is an incarnation of safe investment,—a sort of bucolic bond, the coupons of which materialize in large lit-

ters of pigs convertible into cash on demand. Harvesters, combined mowers and reapers when compared with the utility, deftness and profitableness of the complicated and multi-form machinery which is wrapped up in the bristly integuments of a healthy and well-bred pig are insignificant inventions. This patent pig is a condenser; he is also a manufacturer of hams, lard, illuminating oils, hair brushes, head-cheese, tooth-brushes, glue, buttons, fertilizers, fat, bacon,

knife-handles, whistles, soaps, souse, sausage and satisfaction. More than this, the well-bred American hog is a mint and the corn of our common country is the bullion which he transmutes into golden coin. Transformed from his old time homeliness he has become a thing of beauty and joy forever, at least so long as there is a mortgage to lift, a house to be built, a piano, a sewing machine or a youngster's schooling to be paid for. Instead of being driven through muddy lanes and over dusty roads, he now rides to town in a wagon, and continues his further journey toward the great commercial centers of the world in railway cars specially constructed for his comfortable transportation. Having paid his debts to the farmer, he goes forth on a voyage around the world, a privileged character whose company is sought by rich and poor. In all civilized lands he is equally at home at the table of high born lords and ladies and in the rudest cabins of the lowly. He camps with the soldier under every flag, and is the intimate acquaintance of every sailor who braves the perils of the stormy sea.

At the Columbian.

Since first beginning my wild career on a Wisconsin farm some forty-five years ago, I have had perhaps unusual opportunities for observing the peculiarities and workings of this wonderful machine; but it is more especially of it, as seen at the World's Fair at New Orleans and at the Columbian Exposition at Chicago, where I had the honor to serve as a juror of awards and hence was brought into very close and somewhat critical contact with it, that I purpose speaking to you briefly today. Perhaps I can do no better service than to say at the outset what I think needs to be said in Italics to nearly every swine breeder in the United States, and possibly Great Britain and Europe as well, that one of the growing and worst defects in the swine rearing of today is the lack of strength in frame work, as more es-

pecially shown in feet and limbs. This would seem scarcely to need pointing out, while it is a fact that not one in five in high flesh, presumably, too, the best representatives of their kind, past six months old, that is put on exhibition for prizes, is able to stand squarely and steadily on its feet, or to walk into the ring without showing itself, as far as locomotion is concerned, a misshapen cripple. My judgment is that this is getting worse every year as it is so much more noticeable among the younger stock,—animals not yet half grown. Is it not unavoidable that such stock continuously interbred must, in the near future result in a race of swine that anyway fat will be helpless before maturity?

Strength and Activity Needed.

In these days any judge at fairs who requires the exhibitor to move his animals about at a somewhat lively gait even for no more than a moment, is likely to find himself severely criticised in some directions while in truth he is taking the best possible measures to find out if the subject before him is sound and strong in frame work and wind,—if it has the strength, the vigor and the stamina requisite in animal life of the highest order, or is merely a jelly fish—a compound of spongy bone and undesirable blubber. Comparatively few committees or judges pay a tithe of the attention to this feature that its importance demands, and their failure to give such a serious defect the critical notice and the severe treatment it so often deserves is undoubtedly doing the swine industry a grievous harm. This appears as true at least in England as here, for Sanders Spencer, the great pig authority of the British Isles, in commenting upon it recently said in disgust, after much observation of the practice, that, "to award prizes to such animals is a misuse of the society's money, and misleading to the owners and to the public, both of whom have been robbed by these fallacious decis-

tions which led to such poor brutes being decorated with ribbons."

Large as was the display of swine at the Columbian, it has been surpassed in mere numbers at one or more of our prominent State fairs. But I think it entirely safe to say there was never before anywhere, at any time put on parade an array so nearly representative of all the breeds, their characteristic and quality and in a considerable degree their comparative popularity among pork-producers in the United States and Canada. The large proportion of the blacks—Poland-Chinas and Berkshires—suggested forcibly the situation as to popular favorites in the great corn and hog producing Mississippi Basin, and the various white sorts, less in number and quality, indicated the preference in those states further east, where less attention is given the swine and some of those qualities in them which our more thorough-going, more deeply interested and more extensive breeders regard as indeed highly essential.

Some Excellent Individuals.

In nearly all breeds were individuals and groups of wonderful excellence, attesting to a remarkable degree the patience, skill and genius of the latter-day breeder, the feeder and the exhibitor as well. Among some types there were indeed so many of these as to prevent more than a fraction being given deserved recognition in the form of prizes, and of whose worth such failures to receive recognition implied no disparagement whatever. While on the other hand there were animals and in some instances herds shown in this world's competition, by men, too, who have been long in the business, that it would have been discreditable to exhibit at a third-rate county fair in any State where swine husbandry is given intelligent attention; and furthermore the regulations and rules laid down by the management made it possible for such abortions to win prizes sometimes equal in amount to those won by the choicest production of the foremost

breeder's art. And that, too, at the hands of judges thoroughly and keenly alive to the wretched absurdity of what they were doing in making such unworthy disposal of the Exposition's prize money. This state of affairs suggested most forcibly the fact that some of the breeds exhibited quite largely at this and various State fairs are maintained principally for the purpose of filling classes and absorbing premiums rather than for their utility or any pressing need for their existence.

Chance for New Breeds.

Of course new breeds, the promoters of which are making worthy, honest efforts to demonstrate there is a place, and rightly a demand, for something different from or better than we now have, are worthy of all encouragement, but when some of these old breeds, so repeatedly weighed in the public balance and found wanting, that for many years have been either at a standstill or found depreciating in quality and numbers are maintained almost solely for gathering in the shekels of well-meaning Fair organizations, it is time they were given rather less recognition in prizes, and the money which it has heretofore been the practice to squander in that direction used to swell the prizes on other sorts conceded to possess merit in largest measure.

In numbers there were three Poland-Chinas to one of any other breed. But in my opinion the larger percentage of high class animals in any breed shown was found in the Berkshires which at least unmistakably surpassed any others by their high ratio of superior youngsters. A noticeable fact in connection with this breed was that while there were animals in the competition selected and imported to win with, and said to have been winners at the latest shows in England, including the Royal, there was but a single instance in which one was adjudged superior to home-bred stock in the same classes; and the striking excellence of that strictly United States pro-

duct, the Poland-China, was such as to make every true American's heart swell with proper pride.

Polands First.

So much was this the case that I cannot quarrel with one of my fellow jurors when he says that the Poland-Chinas, so far as merit was concerned, were easily first in comeliness, popularity and practical utility, and the exhibits of this breed, save in two sections, was the best, quality and quantity considered, ever presented for awards. The two excepted sections were boars over and under six months, which ranged way below the average of the breed. But with all their merits, their breeders should give strict attention and renewed efforts to get rid of the creases back of the shoulders, the swaying back and the too frequent tendency to flabbiness. In Berkshires, the hams should be better developed and their lower lines can be much improved.

The Western variations of the Chester White, from the earlier Chester County type, may or may not be an improvement. But if the latter have made any advance in style or quality in their old home, beyond what they possessed twenty-five years ago, there was no proof of it presented in specimens brought direct from Chester County to Jackson Park. As a breed for which so much as been claimed, and so much expected in times past, and with so many opportunities for demonstrating if true that they were the hog of the people, the showing they made as a whole was most humiliating. A quarter of a century ago they rated high, but within that time they appear to have been at a standstill as to quality, and retrograding in popularity, while two or three other breeds were making astonishing progress all the while in both these respects. Not more than twenty per cent. of those exhibited had sufficient merit to be used as breeders, and the first class animals could be counted on the fingers, even of a man who had had

one hand in too close contact with a buzz-saw. Wretched backs, poor feet, long, crooked legs, small hams, and ugly heads were the rule.

The Reds.

Duroc-Jerseys were present in fair numbers and some of them were amazingly fine boned and meaty. This was so much the case as to expel the idea of extreme coarseness entertained by many persons in connection with these reddish hogs, and the contrasting of them with the leggy, long-sided, long-nosed, sorrel monsters from England by the way of Canada, called Tamworths, made the Duroc-Jerseys appear almost the ideals of tidy compactness and ready feeding. The excuse offered for the existence of this style of Tamworth is that his meat is lean, and the proposition that the hog which cannot be made fat would yield lean meat if any, would seem not unreasonable. There were, however, a few others hogs shown as Tamworths, bred in the United States that were quite different from those mentioned, possessing quiet habits, fineness of contour and the more blocky form so prized by American breeders. It is but just to say of the ill-favored quadrupeds in a strange land that the females presented every appearance of being wonderfully prolific and suckling well litters of extraordinary numbers, and further that they have much of activity and vigor. The exhibitors of the coarser types of Tamworths were quite free in their suggestions that those of the more compact type had been made what they were in that direction by an admixture with the blood of the Duroc-Jerseys.

Small Breeds.

Considerable numbers of Essex were shown and a few were really meritorious, but as a collection they fell far short in uniformity, quality and high finish as compared with those, especially from Canada, seen at New Orleans in 1885.

A possible 30 per cent. of those exhibited as Small Yorkshires and a like

proportion of those called Suffolks were creditable and fairly typical of what we have in mind when these breeds are mentioned. The remainder scarcely ranged far enough above common-place to justify use in perpetuating their kind. If the best of the two breeds were bred together and the name of one dropped, there should in good hands be evolved a stock that would prove very pleasing to those preferring a compact, contented, good-natured, friendly, quick-feeding hog, for small places, and cleanly, comfortable surroundings.

Another so-called breed brought from Canada and wholly new in the central west was a sort labeled Improved Yorkshires, with a peculiarly concave face, a white coat and pinkish skin, but without much other apparent fixity of type, though by no means unprepossessing in a general way, having good length of body and looking as if first rate material from which to develop a most useful family of Whites. These, it is claimed, are, like the Tamworths, esteemed for the lean bacon they afford for the English markets. I have since discovered that these are nothing more nor less than the family of heaviest hogs most propagated in England by Sanders Spencer and others, where they have no other designation than Large Whites, there being also in that country two smaller types of the same characteristics, one known as the Middle Whites, and a diminutive sort called Small Whites, not dissimilar from what we know as the Suffolk, or Small Yorkshire.

An American Institution.

The Victorias, that boasted blend of Poland-Chinas, Berkshires, Suffolks and Chester Whites invented a few years since down in Indiana by George F. Davis, (an Englishman who should rightly have been born a Connecticut Yankee), are drifting somewhat away from their type of a few years ago which then prompted people to name them White Berkshires, and I may say are losers to that extent. They did not show up at Chicago nearly so strong

as at New Orleans eight years before. There are to be sure, some New Yorkers who have something wholly different that they call Victorias, but less in numbers at least in the west, than the Davis invention, and when I talk about Victorias and mean the Indiana sort the New Yorkers failing to understand what I mean are likely to declare me crazy, in fact one who uses his hat for a telephone.

The only other breed shown was the Cheshire, cultivated chiefly in New York and possibly to some extent in other eastern states and are very little known to the farmers of the country who follow pork-making as a business in earnest. Except the Tamworths, they were the most ordinary of any and there was little about the best to excite the admiration of the average feeder or breeder, their mission or the void they are superlatively qualified to fill was to most observers an unsolved mystery, while the exhibitors seemed quite unable to agree among themselves as to the characteristics of a true Cheshire or to explain satisfactorily the wide diversity in the characteristics of animals from different or even the same herds.

Too Much Refining.

As a whole this grand array of the best of their kind, did much to confirm what some of our most observant breeders had gradually come to believe. One of these beliefs is, as I have before suggested, that the process of refining the bone and lightening the frame work has been carried very near to the danger line, and the time has come to emphatically call a halt in that direction. Another has been that entirely too little attention was being given even in a majority of the best known herds to securing sturdy, straight limbs, and strong upright feet. A very large proportion of the animals shown, over six months old, were defective in this respect and many of them in such a condition as to be deformed if not downright cripples. A third belief confirmed was that the ex-

cess of fat to lean in the hogs as we raise them is detrimental to the best interests of the producer, the handler and the consumer and the need of striving for such methods as shall result in an animal not so nearly all lard. Another objectionable feature, plainly discoverable as common to very many of the youngsters, noticeably Poland-Chinas and Berkshires, was their being too high on their hind legs. Too long, too slender, too much of the pipe-stem order somewhat above and all the way down below the gambrels, ending in slim, uncertain ankles and weak feet together with a failure to pork from the ham, full and well down toward the hock.

This show afforded a grand opportunity for sizing up the general situation as to swine breeds and breeding. The intelligent inquiring observer, regardless of bias as to breeds could not fail at such an exhibition to be helped, enlightened, broadened, and his possibilities for future usefulness greatly increased.

Discussion.

Mr. Jones—There seems to be considerable difference of opinion on the different kinds of corn. I ask the gentleman why he designated yellow corn?

Mr. Coburn—Oh, that was just a pretty phrase. I don't care anything about the color of the corn, if there is any difference I don't know what it is.

Mr. McKerrow—Do you determine the quality of meat beneath the hide by touch, the same as the judge of sheep does?

Mr. Coburn—Yes, to some extent; I like to get my hands on the hog.

Mr. McKerrow—I noticed the judges at Chicago did not handle them very much.

Mr. Coburn—I guess my friend was not about all the time. I know it was done.

Mr. Arnold—Wouldn't it be a good idea to give more attention in breed-

ing to the strength of bone to bring out this quality you speak of?

Mr. Coburn—It is a mighty important question at this juncture.

Mr. Arnold—In considering hogs would you give any importance to the thickness of the skin?

Mr. Coburn—Well, ordinarily in a well bred hog of today, his skin will be primarily all right. Of course, there were animals there that had skins that would disqualify them from any sort of a prize. There is a difference in individuals of the same breed.

Mr. Arnold—What breed in your opinion develops the most muscle of all the breeds you examined there?

Mr. Coburn—The opponents of the Berkshires claim that they are entirely too active, and activity tends to the development of muscle rather than fat, and if there is a fraction of truth even in what the opponents of the Berkshires claim, it is just possible that they are just about as lean as any of the hogs that we recognize in any large degree in this Western country.

Mr. Convey—Do you consider the size of the limb as an indication of quality? I have found in my experience that those large, round boned hogs with spreading feet are more inclined to get out of condition than the medium boned hog.

Mr. Coburn—The bone is largely skin, to be sure, but the bone represents the frame work of the animal, on which you have to build, and of course that is a very important factor. The sort of bone that allows the animal to stand upright and squarely on his feet is the sort of bone we are after, neither too large nor too small, of course. A very large bone, as we know, indicates a sponginess or softness all the way through.

Mr. Philips—From your standpoint as a judge of hogs, how many breeds would you have come into the county Fair for premiums?

Mr. Coburn—Oh, I think three or four breeds are as many as we are suffering for now.

Mr. Philips—Please name them.

Mr. Coburn—Perhaps that would appear to be flying in the face of some gentleman here who has his money tied up in some other breed.

Mr. Philips—Let it fly. You are away from Kansas and it can't hurt you.

Mr. Coburn—I don't know about that.

Mr. Philips—It is a fact as you have stated there, that we have had in our county fair men who have brought in breeds of hogs, not that they thought that they were the best breed, but because they could take away a little of our money from the county fair.

Mr. Coburn—You are frank and honest with me and I will be the same with you. I don't wish to offend anybody, but you are just right about that. It is a big fraud as far as the Association is concerned. I know of a number of cases where men will keep a few of a certain sort of hogs, not because they have any merit, but because they are sharp enough to get premiums provided for them at the County Fairs, and they go there and gather in that money. It is shrewdness on their part, but I admire a Fair association that has back bone enough to decline to be robbed in any such way.

Mr. Trigg—Does not the form of the hog depend principally on the meat or the muscles more than on the bones?

Mr. Coburn—In a large degree I think that is true, but a hog that hasn't a good firm, hard bone, is not likely to be a very good hog on general principles. That is indicative of his character, his constitution, and if he has good bone, he is liable to have good muscle and fair flesh. You have to look out for all of these things in your ideal hog and not let your mind run to bone altogether, nor altogether to muscle, but combine all those essential features.

Mr. Everett—Is not the quality of the bone affected largely by the food;

can we not spoil a good bone by improper food or keep it by proper food?

Mr. Coburn—I should say you can do very much to maintain good bone by judicious feeding, and if you have stock that is inherently weak and bad in bone I don't think it is worth your while or mine to try to feed it up.

Mr. Woodward—Don't you think that this faulty structure of the hog of which you speak is very largely brought about by injudicious feeding?

Mr. Coburn—I am sure of it.

Mr. Woodward—Is there any use of a man buying good hogs and continuing a wrong line of feeding? I think we should teach breeders that the great improvement is in the line of feed first.

Mr. True—Is there any danger of our being led into error by paying too much attention to some fancy points like dished face, or something else?

Mr. Coburn—That is the tendency all the way through. Nearly every man we see is cranky in some direction. One man wants the sharpest face he can get, another wants something else, and I am cranky on bone and frame-work.

Prof. Henry—There is one point which I desire to call your attention to, viz., the importance of unusual or condimental foods in pig feeding. We all know that hogs have a craving or show a liking for such unusual substances as old mortar, soft bricks, soft sandstone, hard coal, coal ashes, etc., etc. Do not be puzzled over these articles, doubting their utility, but give them to your hogs freely if they seem to crave them. Just what use these substances are we do not yet know, but perhaps they correct acidity in the stomach in some cases, and it is probable that in others they kill intestinal worms. At any rate, especially for hogs shut up in pens where they can not get to the earth, and living on a ration consisting of corn, supply freely some of the substance above mentioned.

Permit me to call your attention to

some of our experiments at the Station where bone meal and hard wood ashes were fed to pigs living on a corn diet. In these trials when pigs were about 100 days old, litters were divided into two lots equal so far as we could see in all respects. One lot was compelled to live on corn with water, while the second received the same treatment in all respects excepting that bone meal or hard wood ashes was added to the ration. Bone meal was made by grinding up the bones of animals to a coarse meal, this material being largely used as a fertilizer. In our experiments about one teaspoonful was fed to each pig mixed with the grain ration daily. Where hard wood ashes were fed they were supplied by placing them in a separate trough to which the hogs had access and could eat all they wished. Now for the results in brief of several experiments, which may be summarized as follows:

ashes was to save 28 per cent. of corn required to produce 100 lbs. gain. This shows that ashes are important aid to digestion where corn is fed.

2. That by feeding bone meal more than doubled the strength of thigh bones; ashes nearly doubled the strength of the bones.

3. There was about 50 per cent. more ash in the bones of the hogs receiving bone meal or hard wood ashes than in the bones of those not so fed.

The ashes and bone meal seem limited to building up the bones and aiding digestion, but this is enough to give them a high value with any farmers who feed much corn. Hard wood ashes seem to do the work about as well as ground bone, so that most farmers have the desired material at hand for the mere saving. Farmers whose hogs become too fine in bone have in hard wood ashes a substance which will help prevent that trouble.

Finally, as to the varieties of food

to make the most juicy pork. In Denmark the results of careful and numerous investigations show that skim milk and barley meal will give a better, sweeter pork than will Indian corn and skim milk, but if you will use skim milk and corn you will do pretty well. If you use skim milk and shorts along with your corn you will do pretty well, but if you have barley it will pay you. You can all afford to feed wheat to your fattening hogs, it improves the flavor of the pork. We are now experimenting with wheat. The Dominion government experts say that if wheat is soaked thirty-six hours or ground to a coarse meal, it is entirely satisfactory.

Mr. Brown—Have you ever had any difficulty with hogs being weak in the hind parts, taken with lameness first in one leg and then in another?

Prof. Henry—We had a case within two weeks and examination showed that the kidneys were gone, we don't know how they went.

Mr. Selle—Years ago when my father used to run the farm we fed a lot of peas. If we feed the peas dry they would sometimes go lame like a founder. If we feed too much concentrated food, that sometimes hap-

Mr. Brown—I usually feed milk and shorts and sometimes a little corn.

Mr. Selle—How old were those pigs?

Mr. Brown—They were late fall pigs.

Mr. Selle—Did they have good quarters, clean bedding and enough bedding? Sometimes it also happens in a disease of the kidneys that they get lame, kind of wobbling from one side to the other.

Mr. Hyatt—That thing happened to me years ago. They would go down on their hind quarters and finally die. A man who lost several pigs was advised to give a certain amount of turpentine and it cured them.

Mr. Everett—I think that trouble is sometimes caused by allowing too many hogs to nest together in cold weather, perhaps getting too warm and

coming out into the cold air in a frosty morning they catch cold, and they are taken across the small of the back with kidney trouble and it breaks them down.

Mr. Cochrane—I have used kerosene as a remedy in such cases, just poured it right onto them and rubbed it in. I have one now, I guess he weighs six or seven hundred pounds, and I used pretty near a half gallon of kerosene on him, all at once. I gave him one

good dose. If you are going to get drunk, get drunk and have done with it. If you are going to drink a little today and a little tomorrow, you will probably drink all your life.

Mr. McKerrow—I know of three spring pigs that went down in that way, and the feeding of corn was stopped and they got all right.

The meeting adjourned until 7:30 o'clock, P. M.



POINTS OF EXCELLENCE FOR PURE-BRED BERKSHIRE SWINE.

As adopted by the American Berkshire Association.

	Points.		Points.
Color. Black with white on feet, face, tip of tail, and an occasional splash on the arm.	4	Flank. Well back, and well down on leg, making nearly a straight line with lower parts of the side.	5
Face and Snout. Short; the former fine and well dished, and broad between the eyes.	7	Loin. Full and wide.	9
Eye. Very clear, rather large, dark hazel or gray.	2	Ham. Deep and thick, extending well up on back, and holding thickness well down to hock.	10
Ear. Generally almost erect, but sometimes inclined forward with advancing age; medium size; thin and soft.	4	Tail. Well set up on back; tapering and not coarse.	2
Jowl. Full and heavy, running well back on neck.	4	Legs. Short, straight and strong; set wide apart, with hoofs erect, and capable of holding good weight.	5
Neck. Short and broad on top.	4	Symmetry. Well proportioned throughout, depending largely on condition.	6
Hair. Fine and soft; medium thickness.	3	Condition. In a good, healthy, growing state; not overfed.	5
Skin. Smooth and pliable.	4	Style. Attractive, spirited, indicative of thorough breeding and constitutional vigor.	5
Shoulder. Thick and even, broad on top, and deep through chest.	7		5
Back. Broad, short and straight; ribs well sprung, coupling close up to hips.	8		5
Side. Deep and well let down; straight on bottom lines.	6		100

POINTS OF EXCELLENCE FOR PURE-BRED CHESTER WHITE SWINE.

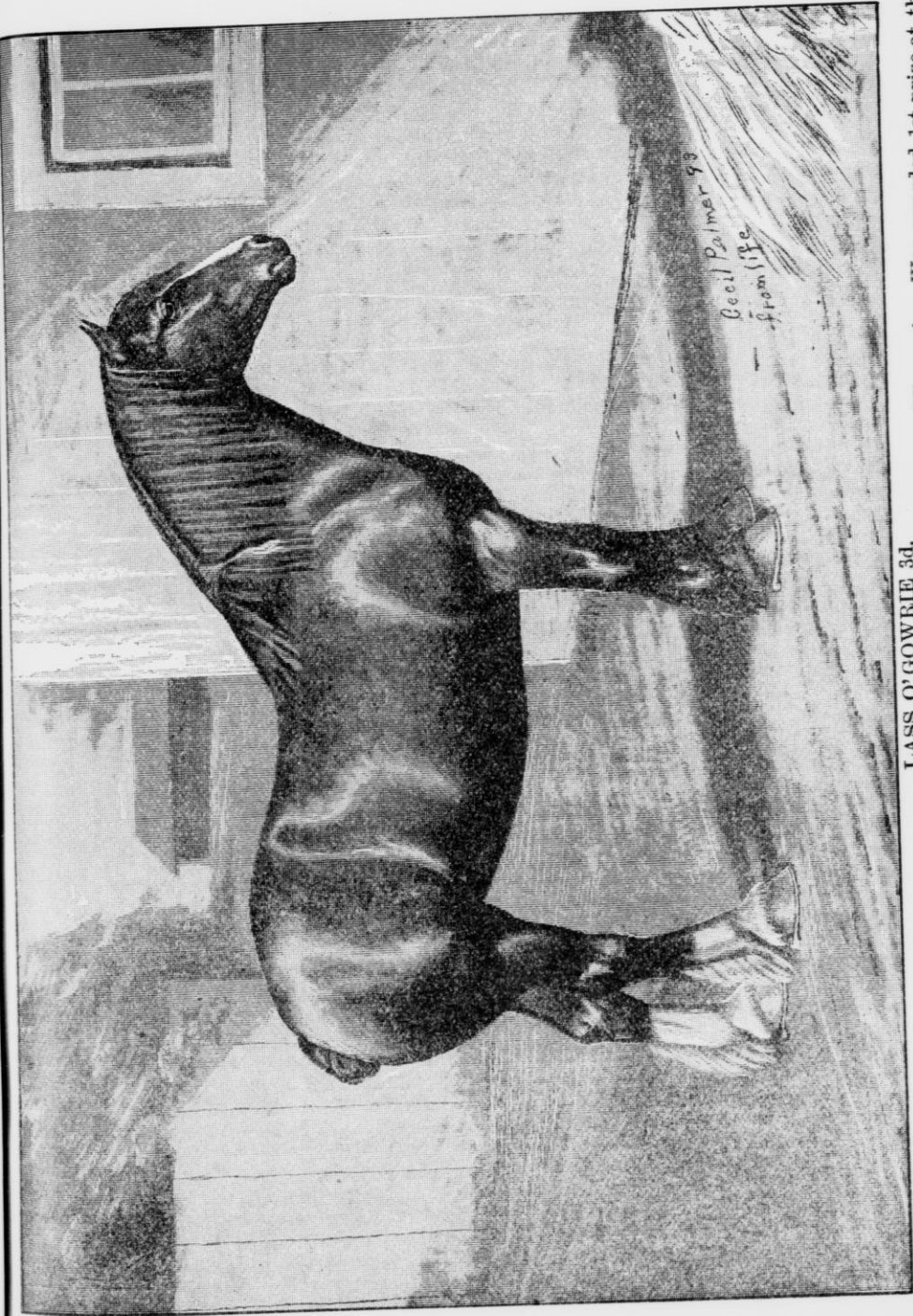
As adopted by the Chester White Record Association.

	Points.		Points.
Head. Short; broad between the eyes, and nicely tapering from eyes to point of nose; face slightly dished; cheeks full.	5	Ham. Broad, full, deep, of medium length; coming down well over the hock.	10
Eyes. Large, bright, and free from overgrowing fat.	2	Limbs. Medium length; short rather than long; set well apart, and well under; muscles full above knee and hock; bone firm and not coarse; pasterns short and strong; foot short.	7
Ear. Drooping; thin; pointing-outward and forward; well proportioned to size of body.	2	Tail. Small, tapering, smooth; well set on.	2
Jowl. Full, firm and neat; carrying fullness well back to neck and brisket.	3	Coat. Fine and thick.	3
Neck. Full, deep, short, and well arched.	3	Color. White. (Blue spots in skin, and black specks shall not argue impurity of blood.)	1
Brisket. Full, strong; well let down; extending well forward, and on line of the belly.	3	Action. Easy; prompt; fine and graceful.	5
Shoulder. Broad; deep; thickness in proportion to the side and ham; full and even on top.	6	Symmetry. Uniform build, and all points in animal in proportion.	6
Girth around the heart. Full back of shoulders; ribs extending well down; wide and full back of fore-legs.	10	<hr style="width: 10%; margin-left: auto; margin-right: 0;"/>	100
Back. Broad; straight, or slightly arched, carrying width well back to the hams, and of medium length.	7	Serious Objections.	
Sides. Full; deep; carrying width and thickness well down and back.	6	10 Form. Small growth; upright ears; small, cramped chest; crease back of the shoulders, so as to be readily seen; deformed and badly crooked legs; feet broken down so that the animal walks on pastern joints and dew-claws.	
Ribs. Well sprung; carrying fullness well back, and deep.	7	Disqualifications.	
Belly. Wide and straight; width approximating that of the back.	4	7 Conditions. Excessive fat; barren; deformed; unsound or diseased; ridgling or one-sided.	
Girth around Flank. Flank well let down and full; loin broad, strong, and full; measure of flank-girth equal to heart-girth.	10	4 Score. A score of less than sixty of the standard.	
		10 Pedigree. Lack of eligibility to record.	

POINTS OF EXCELLENCE FOR PURE-BRED POLAND CHINA SWINE.

As adopted by the American Poland China Record Co.

	Points.		Points.
Color. Black or dark spotted, with white points (sandy spots and speckled color shall not argue impurity of blood, but are not desirable.	3	Belly. Wide and straight.	4
Head. Short, broad between the eyes, and nicely tapering from the eyes to point of nose; face slightly dished, cheeks full.	5	Flank. Well let down and full.	3
Ears. Drooping, fine and silky, pointing forward and a little outward, well proportioned to size of body.	2	Ham. Full, broad, deep, holding width, and coming down well over hock.	10
Jowl. Full, firm and neat, carrying fullness well back to shoulder and brisket.	2	Tail. Well set on, small, smooth and tapering.	2
Neck. Full, deep, short, slightly arched.	3	Limbs. Medium length, well set apart and well tapered; bone firm and flinty, not coarse; muscles full above knee and hock; pastern short; foot short.	7
Brisket. Full, well let down, extending well forward and on a line of the belly.	3	Coat. Fine, thick, and covering the body well.	3
Shoulder. Broad, deep, thickness in proportion to sides and hams, full and even on top.	3	Action. Easy, prompt, fine and graceful.	5
Girth around Heart. Full back of shoulders; ribs well extending well down; wide and full back of fore-legs.	10	Symmetry. A harmonious combination of the foregoing scale of points.	5
Back. Broad, straight, or slightly arched, carrying width well back of hams, and of medium length.	7	<hr style="width: 100%; border: 0.5px solid black;"/>	100
Loin. Broad, full and strong.	7	Disqualifications.	
Sides. Full, deep, carrying size well down and back.	6	6	Excessive fatness, barrenness, deformity, unsound or diseased, score of less than 60 to the standard, more than one-half white or sandy, not being eligible to record.
Ribs. Well sprung and long, carrying fullness and depth well back.	7	Serious Objections.	
	7	7	Upright ears, small, cramped chest, crease back of shoulders so as to be readily seen, deformed or badly crooked legs, feet broken down so that the animal walks on pastern joints or dew-claws, or lack of growth.



LASS O' GOWRIE 3d.
Bred by and the property of R. B. Ogilvie, Madison, Wisconsin. Was awarded 1st prize at the
Great Columbian held in Chicago in 1893.
Sired by the unbeaten Mac Queen.

EVENING SESSION.

The Institute met at 7:30 p. m. Mr. P. C. Wilson, president of the Dunn Co. Agricultural Society in the chair. Music by Grace Church choir.

FARMING HAS NO PARALLEL.

T. J. VAN MATRE, Fayette, Wis.

In accordance with a custom as old as the Institute work we are assembled here in the beautiful and enterprising city of Menomonie to hold the closing meeting of 1893-94. And we can but congratulate the people of this city upon their good fortune in having such whole-souled, philanthropic men as Captain Tainter, whose munificence has given to you this spacious and commodious Memorial Hall, and other gentlemen alike generous who have given to you a Manual Training School with its complete equipage which should be and I trust is the pride of every citizen of Menomonie.

"Truth crushed to earth shall rise again.

The eternal days of God are hers.
But error mangled writhes in pain,
and dies among her votaries."

The Objects of Institutes.

I suppose the object of this Institute work is to raise the agricultural banner from the dust of error and place it beneath the bright light of truth. And as a plain, practical farmer I wish to pat you on the back and extend to you the right hand of fellowship, for I am proud to stand before the people of my own State as a practical representative of the business upon which a thousand millions of men are dependent for daily sustenance, and upon which two hundred millions of men devote their daily toil. It is expected if a man stands before the people to discuss any

particular subject he will very naturally paint his subject red. Tonight I shall employ no color for my subject;—it needs none; behold it for yourselves. It stands unparalleled. "Like the tall cedar that lifts its head high above the surrounding forest, like the strong oak that strikes its roots deeply into the earth," it fears no competitor.

Agriculture our Mainstay.

Agricultural industry finds a natural home in these United States. It has ever been a great and constantly increasing contributor to our nation's wealth and prosperity in time of peace and our country's mainstay in time of depression and war. And during the great financial troubles of the past summer which shook this country from center to circumference not one farmer did I hear of making an assignment or going into bankruptcy, but the papers recorded the daily suspension of many banks and business houses. Its growth has been almost phenomenal. A varied climate and inviting soil has encouraged native energy and held out perpetual inducement to immigration. The national government has thrown open its public lands to actual settlers, and to some who are not so actual, at nominal figures, and has encouraged its citizenship to engage in the most healthful of occupations. It is to be regretted, however, that agriculture in this country has not been carried on as an exact study. But latterly the

Department at Washington and the different State Experiment Stations have done much to encourage and stimulate thought in connection with farm labor and the breeding and feeding of stock.

Agricultural Advancement in Wisconsin.

As I steamed across the beautiful expanse of country which intervenes between this place and my own home, showing unmistakable evidences of the intelligent application of thought to agriculture, I was brought to exclaim, "What a change, what a happy change has taken place within the easy recollection of your speaker,"—for I once knew much of this country as an uninhabited wilderness. This change might be attributed to the excellent native qualities of our soil, the kindness of our climate, and the rush after extended acres, so characteristic of our people. A farm in this country means more than in almost any other country, for as a rule it is a man's own acres and thus becomes a direct contributor to thrift and independence of character. Farm occupancy in general is not humble tenancy but proud ownership.

Success the Reward of Industry.

Yet with all the advantages of a luxurious climate and productive soil we must remember that success in any department of life is always the reward of industry and pains, and that there is no excellence without great labor. Repeated instances may be cited where the seductive influences of a luxurious climate in conjunction with the love of ease has paralyzed the noblest faculties of the mind and lulled to repose the energies of the body, and many instances have come under my immediate observation of men of the greatest natural genius whose beginning promised everything, but who have degenerated wretchedly as they advanced, simply because they depended too much on their own natural gifts and made no effort to improve. We are all climbers upon a lad-

der upon which we are just as likely to descend as mount higher, and the very instant that any of the faculties of the mind or body ceases to operate that instant retrogression begins.

Object of Education.

The object of our agricultural colleges, the object of our Dairy school and in fact the object of all our great institutions of learning is to encourage thought, for out of thought comes knowledge, and knowledge is power. Should I say to a boy, "My boy, what are you doing?" and he should make reply, "I am thinking," I would at once conclude that I had discovered in that boy material for future greatness. Rome had her Mars hill dedicated to the god of war; Wisconsin has her Madison, and Madison her College hill dedicated to science, literature, agriculture, and the arts of peace. And now while our minds are directed toward College hill I wish to call your attention to what the state of Wisconsin, through Prof. Henry, aided by his efficient corps of workers, is trying to do for your boy and for mine, and which only our extreme indifference can prevent.

Scope of our Agricultural College.

Perhaps there is not a farmer in this state who has not heard of our agricultural college at Madison, but, alas, how few there are who comprehend its scope and usefulness. In regard to the situation I want to say there is not on the face of this great green earth a more inviting natural situation than that occupied by our State University. The agricultural department in which we as farmers should naturally feel most interest consists of three courses: the Graduate course, the Long course, and the Short course in agriculture.

The Short Course.

It is in this latter that our interests as practical farmers principally center and to which I wish to call your attention. This course is designed to meet the wants of young men who are

anxious to excel in their chosen profession and who feel the need of more and better preparation before entering upon their life work. The time which such persons can devote to study is often limited, and for this reason everything has been arranged so as to afford the student the greatest amount of information and assistance without overcrowding. Those studies are taught in regard to which every young farmer should have definite knowledge, and they are handled in such a way as to be helpful to the student in the highest degree. There is no longer any question concerning advanced definite knowledge regarding agriculture to those who follow it. Education and training pay on the farm as they pay elsewhere in life.

Feeds and Feeding.

Prof. Henry, one of the most advanced agricultural experimenters in the United States lectures upon the feeding value of the different farm products. Lack of definite knowledge regarding this one subject is costing the farmers of this state many thousands of dollars annually. It is not enough that we are industrious and economical, that our stock is well fed, or that our work is done at a proper time, for we may be a model in all of these respects and yet fail to get the full value from our crops from want of wisdom in feeding. There is no other source of so great loss to the farmer, as this, and there is no other way by which our profits may be increased with no additional expense except by intelligent feeding so as to get the full development of the animal and the whole value of the food consumed. Animals fatten not so much upon what they eat as upon what they digest. The value of a food consists not entirely upon the amount of nutriment it contains, but the amount which the animal is able to get out and assimilate.

Breeds and Breeding.

Another subject of much importance

is breeds and breeding. This subject is taught by Prof. Craig, a graduate of the Ontario agricultural college, Canada. In this department much attention is given to the judging of livestock in order that the student may be enabled to judge stock well, not alone for his own personal gain, but that he may become an expert in the show ring, where animals are gathered for exhibition and competition. The students visit the neighboring stock farms where they get practical knowledge, using the score card and they thus acquire the habit of judging accurately almost at a glance.

Other Topics.

Agricultural Physics, Practical Mechanics, Horticulture, and Economic Entomology—Farm Dairying and Veterinary Science are all taught by professors of experience and ability. The University library, consisting of 25,000 volumes, the Madison city library, consisting of 12,000 volumes, are open to the students. The agricultural library consists of 4,000 volumes, four hundred volumes of registered pedigrees. The reading rooms are supplied with all of the most advanced agricultural journals both of this country and of Europe.

A Plea for More Students.

With an agricultural college equipped as ours is, with a state overflowing with young men as ours is, with a nation thirsting after advanced agricultural knowledge as ours is, I say it is a shame that we have to go over this state begging for boys to fill our agricultural college, while all of the literary institutions of learning throughout this country are full to overflowing, preparing men for the different vocations of life, while how very few there are who think it necessary that a boy who is to follow the most complicated business on earth, that of farming, should have any education at all. I ask you, brother farmers, how long you think we can maintain this unequal contest,—pitting ignorance against knowledge, muscle against

brain. Oh, you say, we can't afford to send our boys to an agricultural college. You old hypocrite, you have spent money enough in the last ten years for beer and tobacco to give your boy a thorough agricultural education. Do you ask how much it costs? Only seventy dollars, all told.

A Need of This Education.

Now, I have spent my entire life upon the same farm and there is not a day passes that I do not feel the need of just such an education as is accorded to your boy and mine at Madison, almost without money and without cost, and which was denied to us as boys, at any price. I am acquainted with a number of young men who have taken this short course and also the dairy training, whose services are being anxiously sought after at a salary of twelve hundred dollars a year, while thousands of young men all over this state with equal natural ability but wanting this same mental training are seeking situations at one-fourth this amount. A business does not consist entirely in the dollars and cents which may be gotten out of it, but we should also take into consideration the pleasure, the independence, and the health—and viewed along these lines there is no business which can compare with farming. The constant contact with nature and the ever varying scenery makes it pleasant.

Agriculture the Foundation.

The fact that all other business rests upon farming as a basis makes it the most independent, and the constant exercise in the open air with the most wholesome food makes it, as statistics show, the most healthful. I would rather work twelve hours each day upon a farm well supplied with its modern improvements than I would work eight hours grading a road or digging a ditch. Ah, you say, I would neither grade a road or dig a ditch, I would be an engineer, a lawyer or a merchant. An engineer making a daily run between two large cities in this

state told me recently that it was two years after before he noticed the timber that had been removed and a beautiful residence erected along his run, so intent was his mind and his eye upon his business. He was a part of his engine, a mere machine, and the engineers running the flying trains between New York and Chicago the past summer averaging forty-eight miles an hour were only able to work three hours each day, so great was the physical strain, and when at the end of their run they clambered down from their cab, pale and exhausted, they had none of that elasticity of step seen in an ordinary granger after he has ridden a John Deere or Cassady sulky plow for ten or twelve consecutive hours.

Farmers' Advantages.

For my part I never could see a very great deal of pleasure in a law office where the occupant continually halted between hope and fear at the sound of every foot fall. Hope on the one hand of meeting an unfortunate client, fear on the other of meeting an irate and unpaid householder. Oh, you say, many lawyers are rich and revel in luxury. Grant it those are the exceptions and not the rule. And the great trouble with us in comparing our condition with that of the rich is we entirely overlook the great gulf of poverty which intervenes between us and by which we are very likely to be swallowed up. I have often thought it would be a grand good thing if some of our farmer boys who find so much to condemn on the farm and so little to commend could only have one year's experience behind the counter in some large retail establishment in the city of Chicago, or some other equally dark and sooty city where artificial light must be provided day and night for six months in the year, and where the sunbeams come struggling in dim and late as if they loathed the sight. Fortunate is he who lives a life of rural quietude and enjoys its abundant fruits, free from the allurements and

temptations of city dissipation. The city may have its temporary amusements and feverish attractions, but the country is the place in which to be supremely happy. And I would say to every young man, qualify yourself by a course of agricultural training so

you may farm with a proper understanding of your business, and assist in elevating your calling to that position to which it is entitled by its great importance.

Music, Solo—Mr. Clark.

WISCONSIN'S FUTURE AS A DAIRY STATE.

Ex-Gov. W. D. HOARD, Fort Atkinson.

Bold indeed would be the intellect that would deem itself sufficient to adequately attack this subject. The future of Wisconsin as a dairy state is an unknown quantity. No spirit of prophecy that ever opened the lips of seer can adequately picture what the opportunities are that lie locked in the embrace of Wisconsin.

Wisconsin's Resources.

Wisconsin is a state of marvelous resources. It is a state today but imperfectly understood by even the men who may be said to be the most conversant with it; they but little understand the wonderful power and resources which it contains. It comprehends today a wonderful power of agricultural resources. Its annual earnings up to the present year were about five hundred million dollars annually. In manufactures it produced about two hundred and fifty millions, the annual increment to the amount of labor in the manufactories; in agriculture, from one hundred to a hundred and fifty millions more, making an annual wage account in one sense of nearly five hundred millions of dollars, and this with a population of 1,600,000, today probably in the neighborhood of 1,800,000

Dairy Products.

Of this agricultural product dairying stands credited today fairly and honestly with an annual production of about \$30,000,000. The cows in Wisconsin, 701,000 in number, bring up the state milk account to about \$30,000,000. So rapidly has dairying progressed that we have today in Wisconsin about 2,500 cheese factories and creameries representing about 100,000 men who are interested in this pursuit in this line alone. We have also a vast army of men who are engaged in private dairying. We have other men who are supplying cities with milk, and this interest, silent and unseen, almost like the silent forces of light and heat, produce every year a wonderful influence in winning the honorable fate and destiny which characterizes our state.

The Farmer to Blame.

Now the difficulty with Wisconsin today, and it has ever been so, is not the soil. The soil of Wisconsin today is just as kindly, and as quick in answer to intelligent tillage and good culture as it ever was. The cows of Wisconsin are not to blame. Who is to blame if Wisconsin does not take at once the largest possible place in the economy of this country in connection

with her interest in the dairy work? Who is to blame? I am accustomed to speaking firmly and plainly when I treat on these questions. I put the blame right where it belongs. The farmer of Wisconsin is the man solely to blame today for all lack of progress in this direction. He has been moved upon, he is moved upon, and gradually the scales are falling from his eyes, and gradually he is taking hold of the dairy truth, and as fast as it enters his nature and comprehension it creates marvelous changes in his environment and in the progress and prosperity of the State. The markets are all right.

No Call for Grease Better.

Do you know of anybody today going around in the city of Menomoneie hunting for poor butter? "Is there a man with soul so dead who ever to himself said, 'Give me poor butter?'" Do you know of a cow today in the whole county of Dunn that is clamoring to have her milk made up into poor grease? You can't find a customer that wants it, you can't find a cow but feels outraged at such treatment. Who is it then that is producing this vast flood of poor butter, that is laying upon the stomach of the market undigested? The man or woman who makes a pound of poor butter outrages God, the market and the cow in that production, and Heaven looks down with pity upon the scene. I have said before and I will say it again that if the cows of Wisconsin could be heard, they would be heard all over the land calling for an improved breed of dairymen.

Ignorance in the Way.

Now, it is this sluggishness of thought, it is this unwillingness to face one's own error that stands in the way of the glory of our State; it stands in the way of the wealth of our State. It is this willingness to roll ignorance and stupidity under one's tongue like a sweet morsel. I tell you, my friends, I have never in my life time been

hindered one moment of my progress by the intelligence of my neighbor. What is it that has always laid across my pathway and hindered me? It is my own ignorance and stupidity and that one single factor has done more to delay my progress and cast beyond my grasp that which I felt I ought to have than any other thing, and if one could only roll away these clouds of ignorance and stupidity and see the truth, the plain, simple truth as it exists, "it would from many a blunder and foolish notion free us." We need to stand up and confess. If there is a set of men on God's green earth that need to stand up and bravely face their own shortcomings, it is the men today, that are dealing or attempting to deal with the cow.

Growth of This Interest.

The difficulty is that self-love and vanity,—we have been accustomed to hear ourselves so much rated,—oh, if you could stand where I do, if you could look back to the year 1870 and see with what feeble steps this infant commenced to toddle its way across the floor of its destiny, this little infant then scarcely out of its swaddling clothes, this thing we call the Wisconsin Dairy Interest, that you look at today almost with awe as it goes on making conquest after conquest, bringing neighborhood after neighborhood under its benign influence, if you could see it as I did, it seems to me you would take courage, and more than that you would be convinced of the truth of my words, that no man has ever made progress who has not himself confronted his mistakes, who has not been willing to learn.

Self-Conceit Must Go.

Christ said, "Except you become as little children you shall in no wise enter the kingdom of heaven." It is a profound truth, one that applies so wonderfully not only to moral questions but to material questions. He might well have said, "Unless you become as little children, you shall not

enter the kingdom of mathematics, or the kingdom of science, or the kingdom of agriculture, and particularly the kingdom of dairying." Men must become teachable and here lies today this disinclination on the part of the average farmer to take in knowledge, to see himself as the facts show; these are the things that stand in the way of the progress of dairying everywhere.

Comparison of Methods.

I hold in my hand the annual report of the Hoard Creameries to their patrons, now nearly 600 in number. That little book contains the names of all the patrons at the time it was published, and their yearly average, and this is issued to every member and each man there sees himself as he stands in comparison with his neighbor. Let me say to you that as an element of education among 600 farmers, that and the Babcock test on which it is based, have been the most potent of anything I have ever seen or known, and I have lived among those men and preached to them steadily for twenty-four years. When we put that little thing out and said to every man, "Stand and confront your record in comparison with your neighbor," there was bank after bank of ignorance and prejudice went down before the comparison. An old farmer said out in Iowa, "The Babcock test can beat the Bible making a man honest."

A Moral Machine.

I quoted Scripture to them for two years and it never phased them a bit, and the Babcock test brought them to time in less than a week. Spiritual minded men are affected by spiritual things. Carnally-minded men are affected by the Babcock test. Now, this little community is a type of Wisconsin today throughout the whole length and breadth so far as the dairy interest is concerned. I have studied those men, I have pleaded with them for greater skill, for the exercise of bet-

ter knowledge, for the taking in of more knowledge. I have said to many to them when they have come to the creamery in the morning. "Now, this isn't right, can't you do a little better, can't you put more money in your pocket? Can't you make your practice conform with the truth a little better?" and those men gradually begin to take on better judgment and better skill.

Skill at a Premium.

I have before me the problem that applies to every neighborhood in the State of Wisconsin. It is the same today in Dunn County as it is in Jefferson County. It is simply a question of whether these men shall sell to the market skill, or whether they shall sell crude labor. Now, what is crude labor worth? It is worth the wages of a hired man, but dairying, my friends, calls for the exercise of a larger and wider range of knowledge. Now, this little book shows a range of from 89 cents a hundred to \$1.36 a hundred pounds of milk. Think of it. The man who gets \$1.36 sells skill, sells thought, sells a study and intelligence, sells energy, has become as a god knowing good from evil, is determined to be a student. That man does not content himself with sitting down and being merely a common farmer, but he says, "I am bound to be a dairy farmer to the extent of my ability." That man with a herd of nineteen cows, nine of them two-year old heifers, makes his cows pay him \$65 per cow, and then we turn him over his skim milk which has been calculated here to be worth 15 cents, and so you see his cash returns on the whole herd come to \$80 apiece. The other man gets 89 cents a hundred. His cow gave less milk than the first man who received \$1.36. What is the difficulty? What is the difference between the two men? Just the same condition that makes the successful and the unsuccessful dairyman all over Wisconsin.

Thought Makes Better Cows.

One is a thinker, and thinks towards expression; the other is a man who is

as adverse to thinking as possibly can be, who is content with simply going along with a herd of cows and barely existing with them.

Now, my friends, I have given you the key to the secret which will make Wisconsin a Dairy State of greater and vaster glory than she is today. In 1870 practically we commenced our dairy work in this State. We then had about a million dollars' worth of dairy products, and what was our situation as farmers? So low had we sunk the productive effort, that in Jefferson County, for instance, the land would produce but eight bushels of wheat per acre. The mortgage indebtedness of Jefferson County at that time was equal to about 45 per cent. of the farm valuation of the county.

Dairying Changed It.

What is it today? One of the richest communities that I know of, either in the west or in the east. In the banks of Jefferson today lie deposited in the neighborhood of a million and a quarter of dollars put there by dairymen, a reserve fund, and this does not represent the wealth in land, in cows, in buildings, in factories and in creameries, but simply the cash surplus. Furthermore, the effect upon the price of real estate has been wonderful. The price of real estate today runs from \$65 to \$90 per acre. Now, what makes this? The wonderful effect of steady, constant accumulation from the cows. Those farmers have come to know the value of the cow, and then they have used the plow with more intelligence and wider diversity.

Improvement all Along the Line.

They have gathered to themselves all these adjuncts of the dairy, the pig, the calf, the raising of better stock, they have gone into breeding, and there is shown in all these creameries today a large sprinkling of improved blood, and today there are herds representing an actual increase over 1870 of nearly 2,000 pounds of milk per cow. The cows of the United States num-

bering about seventeen millions, average 3,800 pounds of milk apiece, or an average of about 115 pounds of butter apiece. In 1870 the cows averaged only about eighty pounds of butter apiece. Now, I am ambitious for Wisconsin. As I pass through other States engaged in dairy work, I grow more so. Wisconsin is to me a constant spur to do what I can in the best possible way to advance the dairy interest here, and add to the material prosperity of my State.

Educational Advancement.

I am gratified when I see the outlook. In 1870 we had hardly any organization among the farmers into cheese factories and creameries; we had no Farmers' Institutes, we had no Dairy School, and I remember well how Uncle Hiram Smith and myself used to come together in 1872 and '73 and '74 and '75 and every year up to the day of his death, in the Wisconsin Dairymen's Association, and talk about what we could do to arouse the intelligence, the thought and make the Wisconsin farmer think towards a larger and better expression. We have today in Madison the culmination of much of that thought. We have a Dairy School which is today famous throughout the length and breadth of the land. I was way up at Foxcroft in Maine, this winter, attending a convention, and men asked me questions there concerning the Wisconsin Dairy School. The same questions were asked me in Keene, New Hampshire, in Ohio, in Pennsylvania, and in New Jersey.

It Pays.

In New Jersey I spent several weeks among the Quakers, and one old Quaker said to me, "Thee has a very fine dairy school, I understand, in Wisconsin." "Yes." "Does thee think it pays?" "Well," I says, "I can't say how much it pays, but I know that the road that has been traveled up to the present establishment of that school has paid the farmers of the

State greatly, and I believe that the dairy school has become one of the most important elements in the larger reward to the labor of the farmers of Wisconsin." He says, "Will thee tell me why?" I noticed two young men at the table looking over intelligently at me. I says, "This, my friend. We have wasted labor in Wisconsin; the farmers of Wisconsin have wasted time and labor and millions of dollars in the fruitless effort and in the fruitless expense to do their work with a mixture of intelligence. We have established the dairy school to teach the young men to do dairy work with intelligence, and I believe intelligence never cost half as much nor one hundredth part as much as ignorance." "My friend," he says, "thee is right," and he turned to his sons and says to them, "That is a good text. Intelligence never cost one-hundredth part as much as ignorance." I found that one of these boys was ambitious to leave the farm. He had told his father there was no opportunity for a young man of brains upon the farm, and this conversation had been very shrewdly led around where the young man got the benefit of it.

Intelligence Seeks Light.

The father asked me, "What sort of men attend your Dairy School?" "What do you mean, what sort of men?" "Well, are they the most ignorant or the most intelligent?" "Oh, bless you, they are the most intelligent, 'the poor we have with us always.' The most intelligent attend the Dairy School." "Are they suffering with an excess of intelligence?" the father asked. I couldn't get his drift, but I answered, "No, I hadn't heard of anybody doing that up there." "Well, there are some," he says, "in Pennsylvania, some young men who are suffering with an excess of intelligence, and they think farming will not give them an adequate field."

Well, now, I wonder if there isn't some young man of that character in

Dunn County. I know there are in some other parts of the State.

Central Wisconsin for Dairying.

Now, my friends, I will close this rambling talk with just this injunction: Dairying today in Wisconsin promises to be the redeemer of a vast portion of this part of the State. You have no finer section in Wisconsin today for the progress of dairying than these central counties. I have hunted and fished over a large portion of this timber tract, and in every tote road where you see the magnificent swathe of grass that you do in this section, you can be sure that this is the place for the cow. Wherever grass grows the cow will be successful and you have a salubrious atmosphere. You have many things which conduce to success in dairying and you need not be very much worried over the over-production of the article. The cows do not increase any where nearly as fast as does the population. The cows of Wisconsin have increased only about five and one-half per cent. annually, since 1850, so that it takes about twenty years to double the number. The population increases very much faster.

A Better Product.

The great trouble today is the production of poor butter and poor cheese, the keeping of poor cows, the wasting and discouragement of the farmer in this way by poor results, and the spread of adulteration and counterfeit in the form of counterfeit butter. If you have the soul and the spirit and the pride of American citizens you will pretty soon put yourselves on record against the further sale of this counterfeit, robbing the farmer as it does of his rightful market, and robbing the consumer as it does, of his right to an honest production. The outlook is encouraging, the prospect is good and it has come through better thinking, better study, and the better intelligence of our people. The hands of the farmer are today no harder than they were in 1870,

but his head is harder, his thinking is harder, his intelligence is stronger, and he is beginning to put an intellectual stamp upon this business. He worked just as hard before as he does now, yea, harder, and it shows that farming is largely a business of cultivation and study.

NAMING THE FARM.

BENJ. BLEASDALE, Janesville, Wis.

In naming the farm some captious individual might be led to exclaim, "Why, what's in a name?"

But if we take more than a cursory or superficial view of the matter, I think we shall find that the name of any place or thing, carries with it a certain significance and importance which cannot very well be laid aside or underestimated, even if it be only a farm.

And to most of us, I presume, the greater part of our school days were spent in poring over ancient and modern history, searching out, noting and naming the various places made memorable by some particular feature, circumstance, event or production; a knowledge of which was supposed to impart a certain strength to the mind, while making us better acquainted with the world outside our local surroundings.

Names as Reminders.

And even today, the names of various places will revive the memory and carry us back in remembrance to some momentous period, filled with some soul-stirring event, to awaken pleasurable emotions in the heart, or sink in the depths of woe at the folly, depravity and crime which mark the history of centuries.

And we, who are now standing on or have passed the meridian of life, have only to take a retrospective view and look back a few decades, to note

how our own history has handed down to us and future generations, the names of places made memorable and famous by our civil strife, which heretofore had remained in comparative obscurity, until the outcome of some fratricidal contest brought them to our light and knowledge.

And in our revolutionary war the names of Lexington, Bunker Hill, Valley Forge, and Trenton, will ever be enshrined in the heart with patriotic devotion, while filling a monumental niche in the world's history, as paving the way for the downfall of monarchial tyranny, oppression and wrong, and the repudiation of that musty old idea of divinity, which for ages had popularly been supposed to hedge about a throne and be the heritage of kings alone; the ignoring of which by our predecessors, has now placed us as a people and a country, in the vanguard of human liberty, human development and worldly progress.

Exultant, proud, tender, or mournful associations thus cluster around the names of places made sacred in history, song and story, and though we may have no other Mount Vernon with a revered Washington; no other Monticello with its Jefferson; no other Hermitage with its Jackson; yet, the name of some of our farms, like theirs, in the future, may go down on the pages of history as having been the birth or abiding place of some statesman, warrior, poet or divine, who has electrified

the world by the glory of their achievements, either in peace or war.

Name the Farm.

Then is not the farm worthy of a name—a special baptism? Seeing that its culture is the chief and most important calling of the human race; the reservoir from which flows all those healthy and reproductive powers, which revivify and restore the emasculated, wasted energies, vital force and life of cities; the fountain head from which our most eminent men have sprung, and have their being—the nursery where the virtues of temperance, good morals, thrift and love of liberty emanate to help us as a people to the attainment of a broader humanity, a higher civilization.

And it seems somewhat surprising, since we have become a well-settled part of the state, that the naming of our farms has not become more general, as our county is popularly supposed to possess so many progressive farmers alive to their interests in other directions; but it is likewise to be deplored, even at this time and day of the world, with all its ready intelligence, progressive ideas and methods, there are still some farmers who do not take kindly to any seeming innovation, it generally taking some time to outgrow deep-rooted practices and prejudices and to adopt new methods: nevertheless, let it be said to their credit, that when experience has proved the utility of any measure or thing, they readily fall into line and seize the opportunity to benefit themselves; which I hope will be in this case, seeing they are accustomed to giving a name to their children, their cattle and horses, then why not to the farm as being of as much consequence and importance as its productions?

Names Necessary.

And in view of the ultimate realization of rural free mail delivery, we can see how essential it is that some method must be adopted to more readily reach the farming community;

and though free delivery in the country districts, may still seem to be far from an assured fact, yet it must eventually come, if right and justice ever predominate, and equal privileges are accorded to all classes notwithstanding the set back it has received by the unfavorable report of the experiment by the assistant postmaster general.

Then is the naming of the farm desirable or practicable? We think it is.

At a meeting of the Pomona Grange held during some time last summer, a committee was appointed to formulate or suggest some plan by which this desirable result might be attained. After some consideration, they reported in substance, that the most feasible plan, with the least cost, in their estimation, was that it needed no special legislation to secure the right to any name the owner of a farm might adopt; that all that was necessary was that the town clerk should keep a record in his office of the name, so that the owner might have a legitimate claim thereon; and that a special effort should be made to appoint and induce some public-spirited individual in each school district throughout the county to interview and solicit each land owner to adopt a farm name, so that like any other profession, trade or occupation, his calling and place of business might be designated.

Plan in Practice.

And I have been told, and am glad to say, that this plan, in a measure, has been carried out to some extent in the towns of Janesville and Fulton, if not in others, by the enthusiastic and individual effort of one of the members of the appointed committee so it seems that if a special effort is made there need be no farm in the county unnamed.

And while thinking over this matter, it has seemed to me that our town board of supervisors throughout the county should also have the various

roads leading in different directions from our county seat, likewise named.

Every street or road in a city or incorporated town, has its name, to more easily reach its inhabitants, and why not our town roads have a given name, also.

[In Harmony with the Surroundings.

And in giving a name to the farm let it be given one, if possible, in harmony with its surroundings. We can see how inconsistent it would be to adopt a name, with none of the features or characteristics its name would naturally indicate.

Naming a farm Shadeland, Shady Nook, or Shady Hill, with only a wire fence enclosing it for the farm stock to seek relief from the oppressive heat of summer days, or cold of winter, would to most minds seem supremely ridiculous, or to name a farm Pleasant View, with a hog pen on one side of the homestead, and a cattle yard on the other, would seem somewhat incongruous to a refined nature.

But if a homestead is situated on an eminence, surrounded by a grove, or woods, or water in close proximity, a name can readily be found, appropriate to the situation, and if any individual farmer finds himself in a quandry in regard to choosing a name, let him by all means consult his wife, as her ready intuition might soon help him out of his difficulty, or let the Bible be searched, or the Greek and Latin names at the end of a dictionary be looked over, and if not suited there then it might be inferred he is as difficult to be pleased with a name as a newly married couple with their first baby.

Keep in Use.

Having named the farm, let all correspondence on social or business matters have its appropriate farm heading, so that we, as farmers, may be more identified with our calling; never ashamed to put the farm name on any article or package shipped therefrom; always striving to gain a good reputation for the farm name as well as its owner, that the package disposed of at home, or shipped, is guaranteed what it purports to be, either good or the best of its kind, while always striving to excel, so that the epithet of "honest old farmer" may become more of a reality in word and deed, and not so often used as a by-word and sarcastic term of reproach by the city dweller, when finding nine eggs out of a dozen to be unserviceable after purchasing, as one of my city friends asserted was the case with her last summer.

Ties to the old Home.

As a good name is more to be prized than riches, then let the farm be named, and as one by one the children depart from it—as some by choice or necessity must—to battle with the stern realities of life on the world's highway, its good name may bring back cherished remembrances and sweet relief when sick and weary of the city's endless turmoil, rush and strife, which today's mad rush for wealth engenders.

Music, Grace Church Choir.

The committee on resolutions was announced by Prof. Henry, as follows:—H. C. Taylor, A. A. Arnold, B. S. Hoxie.

Adjourned to meet at 9 o'clock a. m. the next day.



Jersey cow "Brown Bessie," champion butter cow at World's Fair. Bred by Homer
C. Taylor, Orfordville, Wis. Owned by C. I. Hood, Lowell, Mass.

DAIRY SESSION.

The Institute met at 9 o'clock, March 1.

In opening the meeting Prof. Henry introduced a number of short-course students and agricultural students, who were present at the meeting. Mr. Thomas Convey was called to the Chair.

RAISING THE CORN CROP.

GEO. L. HOWARD, Durand, Wis.

Mr. Chairman, Ladies and Gentlemen:—We are about to devote a day to the discussion of subjects relating to the dairy interests of our State.

As a food for the dairy cow we raise no more important crop than corn, both for its grain and fodder. Its importance is easily recognized when we learn that Wisconsin produces annually about 30,000,000 bushels, having a market value of about \$12,000,000, to say nothing of the value of the fodder. But when we view it in another light and see that the average yield per acre is hardly 30 bushels, it must strike us forcibly that much can be done to increase the yield, thereby greatly increasing the net profits of the farmers; for the proportion of net profit to the cost of production increases rapidly as we increase the yield per acre. There is, of course, a limit to this, but we are far from reaching it yet.

Seed.

How then, will we accomplish this end? Among the things required for a good corn crop are, good, well-bred seed, a soil adapted to the crop, and thorough cultivation of the right character. The difference between seed that will throw out strong, healthy sprouts and seed that merely has life enough to grow will make a far greater difference in the yield than is realized

by most farmers. Choose the type of corn that you think will do best on your farm and then select ears that come as near your ideal as possible, and with good judgment you will be able to improve your corn year by year. Always avoid ears containing smutty kernels. To insure good seed pick it either before or at husking time and place it where there will be free circulation of air around it, and where it will become thoroughly dried as soon as possible. Then keep it dry until planting time. Never store seed corn over or near bins of grain.

Proper soil.

By a soil adapted to the crop I mean not only a fertile soil, but one that is well drained, yet sufficiently moist, and lying in a position to be well warmed by the sun's rays, for corn is a crop that requires a large amount of heat. I know of nothing better for corn than a clover sod that has not been down over two years, with a top dressing of manure. The best time of the year and the proper depth of plowing will vary greatly upon different soils.

Upon our soil we prefer to plow in the spring for two reasons. One is that it enables us to manure the ground with manure direct from the stables during the winter and early

spring, thus avoiding the losses that would occur by its being left around the barns; and another reason is that our land is sandy, and fertility is easily lost by percolation. Therefore we prefer to have a growing crop upon the land as many days of the year as possible.

Plowing, Fitting and Planting.

We plow about four inches deep. The plowing should be well done and we find a jointer very useful as it turns under all grass and weeds at the edge of the furrow. The preparation of the soil before planting should be thorough as a good seed bed will give the corn a start in the spring that it will maintain throughout the season. Timothy or blue grass sod especially should be well pulverized to a depth of at least three inches. In planting, especially with hand planters on sandy soil, care must be taken not to get the seed in too deep. There will be a great many less weeds to contend with if the land has raised a crop of clover the year before or has been used as a sheep pasture.

Cultivation of Crop.

The objects of cultivation are, the destruction of weeds, the preservation of soil moisture, improving the texture and friability of the soil, and aeration of the soil. The question of soil moisture is coming to be recognized as one of the most important factors in growing a good crop. Prof. King of the Wisconsin Agricultural Experiment Station has found by a series of experiments that in Wisconsin it requires something over three hundred pounds of water to produce one pound of dry matter in corn. In his field experiments this amounted to a rainfall of from 12 to 14 inches. But in growing the corn in galvanized iron cylinders and supplying water enough to amount to 25 or 26 inches of rainfall, he more than doubled the computed yield per acre on the same kind of soil and under as nearly the same conditions as were possible.

Saving Water.

This would lead us to believe that we naturally have too little water in our soils to produce the largest crops. As the normal rainfall for this section of country during the growing season is only about 20 inches it is plain that we must carefully preserve what water we do get if we would obtain the best results. This can best be done by keeping the surface soil in a fine pulverized condition, thereby making a dry mulch which effectually prevents the evaporation of the water that is being brought up from below by capillary attraction.

Before the corn comes up and before it has attained a height of six inches the quickest and most economical form of cultivator to use is a light straight-toothed harrow. Harrow as often as the weeds begin to start or the surface soil becomes compact by rains. Harrow only on warm, sunshiny days, never when the corn is wet either with dew or rain, as it is then much more brittle and easily injured.

Root Pruning.

While it is true that a dry mulch of earth 4 inches deep will preserve more moisture than a mulch one inch deep, another factor comes in here. The corn plant throws out, even in the early stages of its growth, a large number of feeders near the surface of the soil. It was found by examining corn 27 days after planting that the roots extended laterally to a distance of 24 inches and their tips were only 4 inches below the surface sloping gradually upward toward the hill where they were only two inches below the surface. In cultivating with the old-fashioned four or six shovel plow four or five inches deep close to the hill, so many of these feeding roots are cut off as to hurt the crop. Many of the best farmers of the State testify that by changing to shallow cultivation they have materially increased the yield.

I would recommend cultivating about three or four inches deep, in the centre

of the row, and two inches deep near the hill in the fore part of the season, lessening the depth to two inches in the centre and an inch and a half near the hill at the close of the cultivating season. Use a cultivator that will leave the ground as nearly level as possible as the throwing up of ridges increases the amount of surface exposed and likewise the amount of evaporation.

In conclusion I will say, use your best judgment to adapt yourself to circumstances, be thorough in all the details, and success will be yours.

Discussion.

Mr. Cole—How do you preserve the moisture after plowing if it happens to be in a dry time?

Mr. Howard—After plowing in the spring I think that the soil should be worked down as soon after plowing as possible. Harrow it down thoroughly and pulverize the surface, so as to prevent the evaporation of the moisture.

Mr. McKerrow—Do you plant in hills or drills.

Mr. Howard—Always in drills.

Mr. Barnes—What time in the season do you save your seed corn?

Mr. Howard—We prefer saving it at husking time, as it gives us a better selection.

Mr. Wilson—Do you use any fire heat to dry your seed corn?

Mr. Howard—Yes, we dry our seed corn in a loft over the kitchen.

Mr. McCullough—Why not plow in the fall and save this rolling? It seems to me that it would be easier to work into a perfect seed bed, particularly in clay soil.

Mr. Howard—I have never had experience with clay soil. Perhaps it would be better to plow in the fall.

Mr. Noyes—Mine is clay soil, but I get the best results following Mr. Howard's plan.

Mr. Tubbs—How deep do you harrow?

Mr. Howard—We use a harrow with straight teeth. I never measured to

see just how deep the teeth did go. We harrow until the corn is four or five inches high.

Mr. Meyrick—There is another point which applies to the clay land, and that is drawing out the manure in winter when we have time to do it and likewise in saving the fertility of the manure.

Mr. Goodrich—Do you advocate changing seed?

Mr. Howard—No, I don't. If you have a good kind of corn stick to it. You can grow better seed yourself than you can get, as a general thing.

Dr. Porter—Would that be true of ensilage corn?

Prof. Henry—I saw seed corn that had been grown for fifty years, not only on one farm, but almost on one spot. If there is any plant that can be grown over and over, on the same soil as long as there is fertility, it is the corn plant. It is particularly a home-loving plant, and like the Indian, it pines away and never does so well when removed from its native spot. I receive letters every week at this time in the year from farmers asking where they can get a good variety of seed corn and what variety I would recommend. That is altogether impossible for me to say. If you have a good kind of corn stick to it. If your neighbor right by you, on the same kind of soil practically, has a better variety, then I would take his, but I would not go more than a few miles from home for my seed corn, if I could possibly avoid it. As to silage corn, it does not matter so much. You want a large variety that does not always mature.

Mr. Noyes—Does level culture preserve more moisture than otherwise?

Mr. Howard—Yes, more than ridge culture. The ridge culture will throw up ridges and it accordingly increases the surface of the soil and there is little mulch along in the bottom of the furrow and this allows the moisture to come up from below by capillary action, and it passes off easily into the air.

Mr. Stiles—How late would you cultivate?

Mr. Howard—We have never practiced cultivating any later than it could be done readily with the sulky plow, about when the corn is tasseled out.

Mr. McKerrow—In case a season is very wet, we find it a good plan if the weeds get the start of us, to run the cultivator through and then the harrow after to get the weeds out.

Mr. Cole—You say you plant upon spring plowing? In case a person has fall plowing wouldn't you think it would be advisable to run the harrow over that fall plowing as soon as the ground got in condition, in order to preserve the moisture?

Mr. Howard—Yes, I would.

Mr. Vasey—Wouldn't it be necessary to cultivate the corn deeper in order to cover up the weeds?

Mr. Howard—If the corn is kept thoroughly clean during the fore part of the season and the weeds not allowed to get a start, there is not much necessity of cultivating deep to cover them up.

Mr. Thorpe—I find in our section, although we have been harrowing corn for twenty years or more, that there are a great many farmers who do not understand the true principle of harrowing. They wait till just the wrong day before they harrow. Of course it is all right to harrow as much as you choose before it is up, but they harrow it after the leaves have grown out, perhaps two or two and a half inches, and they think if they wait any longer, they will surely ruin their corn crop. Now, that is just the wrong time to harrow. They had better wait till the corn is still higher, then go on with a light harrow. The corn will not break, and hold those leaves down, but while it is so short a lump will fall on top of the hill, if there are any lumps, which there generally are, although there should not be,—it will sometimes bury those short leaves and they can't start up again, while, if they wait until the corn is six, or even eight inches high,

they can harrow through it and it won't hurt it.

Mr. Goodrich—In my experience I find that there is no time to wait in harrowing corn. You must commence before it is up and harrow very often, and when the ground is dry, I want to keep harrowing and prevent the weeds from coming up, for when they once come up, we cannot kill them with the harrow.

Mr. Heath—The secret of success in harrowing depends upon getting the surface of the ground smooth before you harrow. I think it is quite detrimental to try to harrow corn where the seed-bed has not been properly prepared. Farmers complain that they lose a great deal of corn by harrowing and that is where the trouble is.

Mr. Everett—At what depth do you prefer to plant corn; what kind of culture do you use when the corn is three or four inches high, and would you harrow in the forenoon or afternoon?

Mr. Howard—I think an inch is plenty deep enough in ordinary seasons, just to get it down to where the soil is good and moist. Be careful not to get it too deep. As to the soil culture, we have not been using the old style cultivator. I would not recommend it. The later styles for shallow cultivation are the best. I consider the afternoon is the preferable time to harrow, as the corn is then more limp and less liable to break by the harrow passing over it.

Mr. Rapager—These men are all talking about farms where there are no stumps to contend with. What are you going to do with your nice cultivation where you have stumps and trees.

Mr. Howard—I guess in that case the double shovel would be probably the best.

Mr. Rapager—My best success has been with the large shovel on a small cultivator.

Mr. Trigg—I would recommend my friends to get a spring-toothed cultivator and cultivate shallow, and if it catches onto a root, it will let go, and

the rest of the teeth that don't catch will keep in the soil.

Mr. Rapager—My dear friend, I have got one.

Mr. Woodward—Isn't it customary here to plant in drills instead of hills?

Mr. Howard—The majority of farmers plant in hills as yet. I think that more corn can be grown in drills, and with the later and more improved style of cultivator I think it can be kept clean as easily as the other way.

Mr. Woodward—In New York we are planting largely in drills wherever the land will permit of it and in regard to the harrowing we never stop for covering up. If we cover it up in harrowing one way, we take it the other way and uncover it.

Mr. Noyes—What depth of shallow or deep culture do you consider best?

Mr. Howard—Shallow culture I consider to be three inches or less and deep culture would be more than that.

Mr. Dickson—For many years I have made a practice of going through the corn sometime after cultivation and taking out any weeds that are left.

Mr. Howard—That is no doubt a good plan if a person has time and help.

Mr. Fox—It seems to be agreed here that it is a good practice to drag after fall plowing. I believe it is a very bad one, and for this reason. In the first place you are spending time and labor that has to be reapplied in the spring at a time in the fall when you want to take care of the maturing harvest. In the second place, plowed ground in the fall should be left as rough as possible, much rougher than you would plow it in the spring, and this for two purposes. If you spread your manure in the winter the manure is caught in these rough places, the snow which comes on is caught in the rough places, and you get a greater accumulation of moisture with a more even distribution and a more even percolation of it into the soil afterwards.

Mr. Everett—I would like to use about thirty seconds in emphasizing some excellent points that have been

made here. One is, that it is very important that we have our soil in the spring very fine, if it is dry weather. Another point is in the drill and check rowing. Where we have clean fields and can use the cultivator ahead of the drill, there is no question but what we can get better corn by that method, but where we have stumps, perhaps it would be unwise to try it. Another point is in harrowing corn after it is up. So many people make mistakes by harrowing in the forenoon when the corn is brittle and breaks off, when by waiting a few hours, it becomes soft and gives.

Mr. Tubbs—One spring I had a piece of corn and there were some ten or twelve acres; it was pretty heavily manured and I planted it three feet and ten inches one way and about two feet the other. I had considerable corn to attend to and I went through it with the cultivator and the weeds came up thick, and the corn got up six inches high after it had been cultivated. I told the man to go through it and harrow it. Well, the hired man and my son told me if I did I would tear it all to pieces. Says I, "Then I will have to, because it is so full of weeds, I can't possibly get a crop." I put in a seventy-two perpendicular tooth harrow, right onto it, and I set a boy on that, and told him to lap it half and go lengthwise of the rows; he did so, and I asked if it tore it up much. He says, "It don't tear up at all as I see." He went right over it that way. I went and looked the corn over once, and says I, "You turn right around and go the other way;" he did so, and that did the corn more good than any cultivation that I ever gave a piece of corn in my life, and I have raised a good deal.

Prof. Henry—I wish to call the attention of the farmers in this part of the State and especially those living farther north, to the importance of making a thorough test of the flint varieties of corn. We get our corn in this section largely from points to the south of us, where dent corn mostly

prevails. Further north flint corn only should be grown. This year at the Experiment Station we grow from seventy-three to seventy-eight bushels of shelled flint corn per acre. Many have an idea that the flint corn does not yield so much as the dent. This is incorrect for this section, and I urge the farmers, especially those who have a somewhat cold soil, to try flint corn.

Gov. Hoard—Consequently you must have more shallow cultivation, as the flint varieties do not grow deeply.

Prof. Henry—We planted the White

Smut corn, but I don't think it is important.

The Chairman—The question is asked what shallow culture means.

Mr. Noyes—As I understand shallow cultivation, it means an inch to an inch and a half, and deep cultivation between two and three inches.

Mr. Howard—I am asked about cultivators. I use the Tower Surface Cultivator and the Breeds Weeder.

Mr. Convey—I have used the Disc cultivator, with levers attached; I have a style of cultivator that you can adjust the depth of the cultivation.

CLOVER AND GRASSES.

HENRY WALLACE, Des Moines, Iowa.

Mr. President—While the subject assigned me by your committee is "Clover and Grasses," I propose to confine myself mainly to the clovers and particularly to such varieties of clover as can be grown readily in Wisconsin, and without which agriculture cannot reach its highest success in this or any other State in the humid sections of the Northwest.

If the ancients had known what we know about clover, of its power of obtaining its supply of the costliest element in stock food and food for the human family from the free winds of heaven, it would have been regarded like the lotus of Egypt, a sacred plant, and a wreath of clover would have been the garland for the brow of the victor in the great contests at the Olympian games. Had it not been for the fact that so far back as we have any knowledge of agriculture, clovers have been regarded as great soil renovators, the discoveries of later years with reference to the sources from which the plant obtains its fertility and the par-

ticular kind of fertility which it supplies would have been received with utter incredulity, not only by the farmers, but by scientists. It is the fact that this discovery explains much which has been mysterious that has won for the new doctrine the universal acceptance by scientists and has led the farmers to say, "We don't understand the reasons given nor the hard words used to explain them, but nevertheless we accept it as true and will act accordingly. We believe that no agricultural discovery that has been made during the last hundred years has been so important and valuable to the tillers of the soil.

Use of Clover.

Whether this discovery will result in enriching the soils, improving our livestock, adorning and beautifying our homes and adding to the solid comfort of farm life as well as to the wealth of the country as a whole, or whether it will result in impoverishing our soils and with it impoverishing the whole agricultural interest, depends upon the

use which we make of the clovers. The danger may be a distant one in many sections of the country, but it is none the less real, and we wish to impress upon the farmers of Wisconsin this important truth that clover may prove to be to the soil what the gospel may be to the soul, "A savor of death unto death as well as of life unto life." It may be the means of conserving and starting and gradually increasing the permanent fertility of the soil, or it may be the means of stimulating it to a point where it wisely refuses to receive further stimulant; in other words, it may become clover sick in order to retain the non-nitrogenous elements of the fertility yet remaining. This is already the case over almost all of Europe and in many sections of the eastern states. How, therefore, now to use the clovers is a question of the first importance.

Those Adapted to Wisconsin.

The clovers which may be used in Wisconsin to advantage are the common red (erroneously called medium red, this being the scientific name of the mammoth and not of the smaller variety) the mammoth, the white and the alsike, botanically known in their order as trifolium pratense, trifolium medium, trifolium repens, and trifolium hybridum, this last being so named erroneously because of the belief that it was a hybrid or cross between the white and the red. This by no means exhausts the clover family. The Creator has sown the earth with clovers with no lavish hand, and has given to every latitude and longitude capable of sustaining an agricultural population a variety adapted to its wants. If we use these wisely we need never complain of a barren soil or abandoned farms. Unwisely used our only refuge will be in the use of commercial fertilizers.

Soil Cannot Forgive.

If I sin against my friend and repent, he forgives me; if we sin against our Maker and repent he forgives us, but if we sin against our land it does not

forgive us. It requires the penalty of transgression to be paid in full. If by the use of clover we draw upon the winds of heaven for fertility in the form of nitrogen, which enters into all the flesh-making compounds, the draft will not be honored unless counter-signed by a legume. If we draw off and sell the product in the shape of hay, then plow under the roots, grow grain, sell it off the farm and repeat the process, it is only a question of time when we will have land so poor that only commercial fertilizers, costing in a very few years more than the land is worth will restore it; the land may perhaps be saved, but the owner will be bankrupt. Nature steps in and binds up by her slow process the broken-hearted land, but for this the owner cannot afford to wait.

Different Class of Growers.

Before dealing with these varieties of clover in detail, I will speak briefly of the different classes of farmers who wish to grow the clovers. The first class is made up of men who are brought to realize what they did not believe years ago would ever happen, that their land has lost much of its virgin fertility, and they wish to grow clover for fertility, and if possible for seed, and ask what kind they shall sow, how much seed, and how they shall manage it. The plain answer to this is the mammoth. Ten pounds of seed per acre sown with spring grain and well covered, or on winter grain before the frost begins to leave the ground, or, on drier lands and in drier sections, alone without a nurse crop and harrowed in.

Care of Clover.

In Wisconsin a stand can be secured usually in any of these ways. If secured it should not be pastured very closely in the fall and on drier lands not at all. It may be pastured in the spring up to the 1st of June, and even later; in wet seasons up to July 1st, provided sufficient stock is turned on to eat it down even, or it may be kept mowed off, provided the mowing is

done early and often enough up to the 1st of June; but until the farmer has had some experience we advise him to leave the mower in the barn. (The only thing I have to retract or modify after a year's criticism of the book on Clover Culture, is the advice given to mow mammoth clover about the 10th of June. It is one of those pieces of advice given on the testimony of farmers living farther east. I have taken the advice myself, and in a second edition will retract all that is said on the subject.)

The Seed Crop.

Treated in this way mammoth clover will furnish a seed crop in August with reasonable certainty. It should be cut and threshed when ripe, and it is better not to wait for the late heads to ripen. It should not be allowed to stand until the haulm is rotten, as many old clover growers contend, but threshed as soon as it is dry enough, which in hot, dry weather will be in from three to five days. It should be threshed, if possible, with the huller, and not with a hulling attachment. If it is intended to follow this crop with winter wheat, the land should be plowed as soon as possible; if with corn, it may be pastured as closely as a farmer likes until late in the fall, and then turned under just before the ground freezes up. There is no better place, we may remark, to apply manure than on clover sod intended for corn. The reason the land should be plowed as soon as possible for wheat is to give time to prepare a solid seed bed, and for this purpose the less haulm there is left on the ground the better. The reason the plowing should be delayed as long as possible for corn is to keep the soil filled with live roots in order to arrest the waste of nitrogen during the fall rains.

Value of Seed Crop.

This method may result in the financial salvation of the farmer, or it may mean just the opposite. His seed crop should give him from five to ten dollars rent or net profits per acre from

his land and add as much to the value of the next crop or at least the next two, but if he concludes that he has found the Philosopher's stone, or that he can check at will by the sign manual of the clover leaf on the winds of heaven, he will sooner or later be a wiser and poorer man. If, however, he has his wits about him, and uses mammoth clover as a means of changing his base and becomes a stock farmer and a diligent gatherer and spreader of manure on his land, he is all right.

Rotation.

Another very large class of farmers have adopted a regular rotation of from three, to six, seven or eight years. They are engaged in stock growing, in dairying, or in sheep growing, and who wish clover for fertility, for hay, for pasture and in favorable seasons for a seed crop. To this class we recommend the common red under ordinary circumstances, and as a rule they need very little advice as to how to grow it. If their rotation is a short one, for example, clover, corn, oats or barley, or spring wheat, and then back to clover, I would usually sow the clover alone. If, however, it is intended to mow two years, or to mow one and pasture one, or more, I would sow timothy with the clover. If the land were thin and needed building up, or if the clover seed midge prevailed in the locality, then I would have no hesitation in sowing the mammoth for clover hay. If the land were rich and would produce a rank growth, I would not.

For Hay.

However, if a large amount of hay were required, I would sow part of the meadows to mammoth, sowing the thinner land with the object of prolonging the hay harvest for the reason that mammoth comes into its best estate along with the timothy. There is another class of farmers with whom the great object is to secure an abundance of pasture and of such variety as will furnish a stand with a succession of bloom from spring until fall. In this case I would use the mammoth,

and the common red in equal proportions. Care should be taken, however, not to get these varieties mixed where the object is to procure seed from either, for the reason that their period of maturity is so far apart that either one or the other will have to be sacrificed. There is about as much difference between the seed maturing period of these as there is between that of winter and spring wheat.

Alsike.

The main place for alsike is in sloughs in the prairie sections, on river bottoms subject to overflow, on cheap lands too wet for cultivation and too low in price to drain. We know of no grass its equal for this class of lands. Alsike will grow on land that is too wet to plow nine years out of ten. If sown in the slough or on lands of the above description, on the sod in the spring without plowing, and if the growth of wild grass is kept down either by frequent mowing or pasturing to give the young alsike plants access to sunlight and air, there will usually be no difficulty in securing not only a stand but a profitable crop. It is absolutely necessary, however, that the wild grass be kept down in some way. If it is allowed to grow until the usual hay harvest and then the land mowed, the hot sun and the dry period likely to follow the haying season will either scorch the young and tender alsike or kill it from lack of moisture. It is essential that the young plants have every opportunity for development. It is remarkable how rapidly alsike will dry out lands of this kind, mainly, I think, by occupying the ground, when given the above advantages to the exclusion of the wild grasses. In time the roots of these grasses decay and allow the water to sink away. If the field is pastured instead of mowed, the tramping of stock will greatly force the water, in case of sloughs or swales with any perceptible fall, into narrower channels. The alsike then naturally gives way to white clover and the blue grass if these

grasses are established in the neighborhood, and in time we have a mixed, permanent pasture.

Good Done.

I know of many farms in Iowa where sloughs have been converted by this method from unsightly wastes to exceedingly profitable pastures or meadows. This, however, is not the only place for alsike clover. It does fairly well on good corn land as a mixture in a permanent pasture, not yielding the quantity either of pasture or hay, but of superior quality. It should form an ingredient in the mixture for hog pastures, and I cannot conceive of any finer sheep hay than that made from alsike clover. In sections where the insects peculiar to the common red clover prevail, it may be substituted for it on any land for the time being, as also in sections of the country where the winter climate is so severe that the common red or mammoth varieties are in danger of winter killing.

White Clover.

Of white clover it is not necessary to speak, further than to say that as a rule our farmers do not appreciate its value. It is their good friend, although like many other friends, it has its disagreeable traits. It is blamed for causing horses to slubber, justly perhaps, but the other clovers may well share part of the blame at the period at least when their seed is ripening. It is blamed for bloating cattle, and sometimes does; so do the other clovers when not properly handled. I have kept on an average of one hundred head of cattle a year for ten years on rank clover pastures, and have never had a case of bloat from clover, although I have had one, not fatal, however, from blue grass. Allow me to hazard the opinion that were it not for white clover, blue grass would not be very much of a success in many sections. These two are married, and no priest can forbid the bans, and no court dissolve the bonds of union. The white clover feeds the blue grass with

nitrogen, and thus it is growing while the blue grass is taking its natural two months siesta or mid-summer nap, and modestly falls in the back ground when the fall rains come and the blue grass says, "Watch and see how I stretch out and occupy the ground and provide feed for horses and sheep when the soil is covered with its mantle of snow and the roar of the blizzard is heard from the North."

Alfalfa.

I have frequent inquiries as to how alfalfa will do in Wisconsin and occasional inquiries concerning crimson clover. There may be farms and spots where alfalfa will be preferable to the clovers I have mentioned, but they are few and far between. Alfalfa land is land that has a light soil of good depth and a porous sub-soil resting on water bearing sand. It requires a climate for growing so hot and dry that when cut one-fourth in bloom it can be cured readily. This does not fit Wisconsin conditions. Crimson clover has not yet been developed to a point where it can be safely sown as far north as southern Wisconsin, nor even as southern Iowa and central Illinois. In time it may become acclimated, and have a gradual northward extension, but at present it fits into southern conditions and the light, sandy soils of New Jersey when used for trucking.

Covering Seed.

Having thus described the different varieties suited to different conditions and circumstances, I wish to say something as to the method of covering. Western clover growers brought with them from the east the practice of sowing on the surface on spring grain and allowing the first rain to cover it and also the practice of sowing on the last snow in March. Farmers are very conservative and do not change their methods, especially when they are taught, as they have been by European and eastern authorities, that clover seed will not grow when covered one-fourth or at most one-half inch deep.

Iowa Experiments.

Some two years ago I requested the Iowa Experiment Station to make some experiments in covering clover from one-half inch to four inches deep. I will not give the experiment in detail; suffice to say, that while clover covered one-half inch deep came up the quickest and for a time looked the best, that covered two inches deep was on the whole the best, while that covered three inches deep stood a severe drought better than any other. If clover seed is sown with the expectation that it will be covered by the freezing and the thawing of the ground, we would not wait until the last snow in March and sow it when the first snow goes off the ground and before freezing and thawing has commenced. In this way we get the deep covering with much less danger of freezing than if sowed later and only partially covered before the frost goes out of the ground.

On Spring Grain.

If sown on spring grain the depth of covering will depend upon the character of the soil; if it is light, we would give it the same covering that we give spring grain; if a heavy clay soil, we would cover it more lightly. It should be noted that self-sown clover is always sown in the fall when the seed ripened; that it lies in the ground all winter, having the advantage, however of the haulm as a protection. Farmers have often noted, by the way, that clover sown in the chaff, was sure to grow.

An important question arises in connection with the sowing of any of these clovers as to the character of the companion crop, or as it is ordinarily called, the nurse crop with which it is sown. The term "nurse crop" is misleading. Any grain sown with clover and allowed to mature is always a damage and never a benefit. It nurses the clover to its death. Nevertheless to save a year's use of the land, farmers nearly always sow a companion crop, and hence treat clover as a catch crop. The best com-

panion crop is rye sown in the fall and pastured off in the spring, thus giving the clover full use of the land as fast as it can occupy it. I have never known a failure of clover managed in this way. Even in the driest seasons the pasturing of rye when the land is in fit condition with small cattle or with hogs is a positive benefit in itself, as their treading compacts the soil, and enables it the more readily to withstand moisture. If pastured when the ground is wet, it will of course be injurious.

Early Sowing Best.

Clover seldom fails except on springy and undrained land if sown in the spring on winter wheat, and the earlier it is sown after the snow is off the ground and before freezing and thawing begins the better. It is dangerous to wait until after freezing and thawing is well nigh over, for the reason that if the clover is not deeply covered by this process it may spring up too quickly, get into the third leaf and catch a frost which occasionally proves fatal. Of the grains, barley, or spring wheat are preferable to oats. The broad leaf of the oats shade the ground so thoroughly that the clover has little chance to become hardy or to grow vigorously, and hence when the oat crop is removed in harvest, a few hot days or a prolonged dry spell will in all probability kill the clover. A good stand may even be obtained by sowing with flax in its proper season, but my experience has been that flax in some way is poisonous to clover as it is to almost everything else. It is not, therefore, recommended.

On Wild Lands.

Red and mammoth clover, and alsike may be established on wild lands, whether prairie or newly cleared timber, by sowing on the surface in the spring, and then keeping the native grasses closely pastured during the period of their most rapid growth. The stand is, however, difficult to maintain, when blue grass is sown with it, for the reason that clover is a biennial,

and the farmer is not likely to allow it to go to seed. I have, however, maintained a clover pasture of this kind for eight years by simply spreading second crop clover, too light in yield for threshing, over it in the fall of the year, and allowing the cattle to eat it and then not pasture it so closely as to prevent more or less going to seed.

On Old Pastures

I am often asked whether clover can be introduced on a timothy pasture. I have never tried it, but should do so if I had a timothy pasture, without hesitation. Farmers have often noticed that when clover and timothy are sown together, the first crop is mainly clover, the second timothy and, in the third clover comes in again. It could only do so by self seeding, and if clover, by self-seeding can hold its own among timothy why can it not when sown by hand on the bare ground in the latter part of the winter? In all farming operations it is well to study nature's methods carefully, and in none more so than clover culture. I obtained my first idea of deep covering and the necessity of compressing the ground by noticing that among my first sowings I had a stand only around the edges of the field where the horses turned and also along a wagon track through the field over which some hauling had been done. It occurred to me then that the difficulty was lack of covering and compression of the dry prairie soil. I once had a fine stand in native prairie grass which disappeared, the first leaves becoming yellow, sickly and then dying. I concluded the reason was that it was nursed to death by the wild grasses.

Vitality of Seed.

I noted that clover will lie two or three years in a manure pile, and grow when the manure was spread on the ground, and I concluded that three things were essential to the growth of the clover plant, moisture, heat, and more or less light, not one or two, but all three. If any of you will lift up

the edge of a stack of old clover hay in the month of June and notice how far in the clover seed has sprouted, you will get an object lesson as to the conditions under which clover seed grows. It should always be borne in mind that the mammoth clover and the common red are, speaking in a loose way, biennials, that is, they grow one year, mature seed the next and then die. Strictly speaking, however they are not biennials for the reason that the common red will mature seed the first year and the mammoth in all probability would if the season were but long enough, and that by pasturing they may be continued to three. They are, therefore, strictly speaking, short perennials.

Farmers' Mistakes

From lack of correct knowledge on this point a great many farmers make mistakes. They conclude that if they sow mammoth clover in the spring of 1892 and had a fine crop of seed in 1893, and the stand seems good, they will take another crop of seed in 1894. In this they will be mistaken. They will have one-third to half a stand in 1894, mainly from seed that failed to grow in the spring of 1892 and came up in 1893. I have never tried it, but believe that if half a sowing were made in the spring or first fall, crops of clover might be taken from year to year if desirable, provided that there were always enough shatterings to reseed the land. In fact I have kept up a stand without reseeding on one meadow for ten years, cutting it for seed, however, but one or two years, but keeping it as a winter pasture, thus allowing it to seed itself.

Clover Hay.

Prof. Henry has suggested that I touch upon the subject of making clover hay. It is one of those subjects that must be treated differently, however, in different sections of the country. I would suggest to most Wisconsin farmers a method that is impracticable on my farm, viz., that of cutting and curing in the cock, using hay caps

as advised by a number of your Institute workers. I believe in this way a better quality of clover hay can be secured on a good farm, and under your conditions, than in any other way. My own practice is to start the mower about five o'clock in the afternoon and cut as much as can be handled successfully, using a seven foot cut. The next morning I start the tedder, using a rapid walking team, and in some cases use the tedder the second time where the growth is very heavy, and by eleven o'clock or by the afternoon the hay will be ready to put into the barn or stack. The condition of the atmosphere and the temperature are the determining factors. A warm day with a light breeze and a drying atmosphere are desirable conditions under which the work can be pushed rapidly. Under the reverse conditions the progress is very slow.

Avoid External Moisture.

In curing hay in this manner, it is essential to avoid any wet bunches and to avoid handling clover hay after sundown or under unfavorable atmospheric conditions for a half hour or even an hour before it. If the clover is placed in large mows over twenty feet, with either wet bunches or carrying much moisture in the shape of dew, there is imminent danger of spontaneous combustion. It is due to say that under our conditions, much of the clover hay put up is greatly damaged. It is allowed in the first place to become too ripe the heads being all brown in many cases, and it is often allowed to lie too long in the swath and become sunburnt, thus losing the leaves and involving a large excess of woody matter in the stalk. It should be cut when the advanced heads are beginning to turn brown. If I had the choice, the most practical rule with most Iowa farmers is to begin as soon as you can, work as fast as you can, and quit when you get done. I might state that we have had hundreds of cases of spontaneous combustion of clover hay in large barns

and stacks. I have never known one where the barns were not over twenty feet to the square and where the stacks were not large and put up with hay quite green or soaked with dew.

Seed Per Acre.

I think of but one other point that could interest you, and that is the amount of seed to be sown to the acre. This again varies greatly under different conditions. On lands sown to clover for the first time, I would not use less than ten pounds of the mammoth or the common red clover to the acre and four pounds of alsike. On lands that have been growing clover it is not necessary to sow so much for two reasons. One, there is more or less clover seed in the ground, and another, that the clover root microbe is abundant.

Self Seeding.

I once had a fine stand where no stand was intended, the ground being supposed to be too rough for a meadow. A crop of seed had been taken and then a crop of corn, among which winter wheat was drilled with a one-horse drill, thus throwing the undersoil to the top and the result was a perfect stand which was cut the next year and then cut for seed, afterward being turned under for corn. I would not, however, risk this. I am now sowing winter wheat, put in on mammoth clover stubble a light cast in order to make assurance doubly sure.

I have thus grouped together as much practical information as I could in the time on a subject which I think will interest you. I would be glad to answer any questions that may be propounded on subjects that have not been touched upon, or upon which my meaning has not been clearly understood.

Discussion.

Mr. Powell—In attempting to grow crops with the aid of clover, without the application of suitable manures, is there danger of exhausting the potash and phosphates in the soil?

Mr. Wallace—If it is kept up there certainly is.

Gov. Hoard—I had a little experience last summer which was very interesting to me, and upon which some light has been thrown by Mr. Wallace's paper. I seeded a piece of oats. It was corn stubble the year before, and I dragged it and harrowed it very thoroughly, and I seeded it with oats and a good, heavy seeding of clover. You will remember that we had a beautiful start of clover in Wisconsin this past year but that a very severe drought ensued. I watched the clover, it came up nicely, but the drought came on very severely, and I concluded to try a little experiment. I would cut the oats for hay. I did so. The clover was up nicely a couple of inches or so high. I cut the oats when in the milk, thoroughly green, and that clover came on and did nicely. I pastured it quite strongly in the fall; it went through the severe drought, and I did not find a single plant that failed. I was quite interested in it, and I called a neighbor of mine, by the name of Stephens, and asked him to look at it. "Why," he says, "this is something interesting." He says, "We have the same thing whenever we cut into our oats for early forage for our horses. In every one of those patches where the oats were cut green the clover is standing all right, and where the oats went through and were harvested, the clover is dead." I have found by investigation a large number of farmers with the same experience. As Mr. Wallace has said, the nurse crop nursed the clover to death. It exhausted the moisture and killed the clover evidently.

Mr. Everett—In addition to what Mr. Powell, of New York, has said, ought we not to add manure made on the farm to the clover crop, in order to maintain the phosphoric acid and potash in the soil?

Mr. Wallace—Most certainly. Clover is a large exhauster of potash and phosphoric acid.

Mr. Barnes—Which variety or varieties of clover would you recommend sowing in an apple orchard where the grass will not be cut off, but left to grow up, and remain on the ground for a permanent covering?

Mr. Wallace—I do not think it makes much difference whether you put in the Mammoth or the common Red. If your land is very rich, the Mammoth might grow too long to travel through. A mixture of Alsike and Medium clover would be all right.

Mr. Woodward—What do you mean by clover sickness?

Mr. Wallace—That is one of the terms that is like malaria, and a lot of other wild phrases. It is one of those words that is used to cover up our ignorance. When you come down to a disease called "clover sickness" I don't know of any in this country. In England they have what they call "clover sickness," which is a disease, and the plants die in the ground. What I call clover sickness is when the potash and phosphoric acid are exhausted and the clover won't grow, or where you come to the point where nature says you shall not grow clover and rob her of phosphoric acid and potash any longer. That is the only sense in which the term can be used in this country.

Mr. Faville—Is it not a fact that most of the land, especially the west, is sick from want of clover rather than the other way?

Mr. Wallace—Yes, there is no doubt about it.

Gov. Hoard—I run onto a point in Connecticut this year as to clover sickness. Prof. Phelps, of the Storrs's Agricultural School, gave a very interesting account of his experience with clover the past year and he found that on the land where he could not produce clover, that he could take about six hundred pounds of dirt from land that did produce clover and scatter it over the other land, as he expressed it, he "inoculated the soil with the bacteria which belongs to clover," and

in that way he established clover in this clover sick soil.

Mr. Wallace—I met that same thing in the beginning of my clover experience. Gentlemen, I tell you I never was so puzzled with anything in my life in connection with agriculture as I was with the inactivity of clover on prairie soil. I regarded it as an insoluble problem, until I got hold of a quotation from Helreigle and Wilmarth's work. I sent to Paris and had it translated, and it explained to me what had puzzled me all these years. In plowing up a piece of raw prairie and sowing it to clover, I found I would get a pretty good stand each year, and then, as the farmers out in Iowa express it, it began to "Peter out," until I would have maybe about one quarter of a stand, and that in spots, and in the spots where the native legumes grew. I found then that if I just let that stand and let the second crop go to seed, that it would begin to spread all out and in about three or four years I had a perfect stand of clover. I had a letter from Nebraska the other day, stating exactly that experience on new soil there. It means simply that that land was not inoculated with the clover microbe. In Germany they follow the same practice, and I advised a farmer two years ago who could grow clover in his orchard, but nowhere else, I said, "You go to work and sow the soil from your orchard over the rest of your land and it will be all right."

Mr. Convey—State the plants that will grow in this country.

Mr. Wallace—Peas, beans, all the different varieties; in other words, legumes. They all have more or less of that same quality.

Mr. Convey—How about buckwheat?

Gov. Hoard—And "pusley?"

Mr. Wallace—I believe that is the same family, I don't know.

Mr. Kronk—Wouldn't it be advisable not to try to raise the whole grain crop?

Mr. Wallace—Yes, a great many

farmers sow a two-thirds stand of crops when they want to grow clover.

Mr. Gibson—I am perhaps a little familiar with clover sickness, as we had it in England before I left to a very large extent. I do not believe the cause is yet known, except what

has been offered this morning. You could grow white clover in rotation every other time. The white clover did not have the clover sickness. Then you could come in again the fourth year with your red clover.

AMERICAN STANDARD RATION FOR DAIRY COWS.

Prof. F. W. WOLL, Madison, Wis.

We instinctively look for laws and underlying principles in the phenomena surrounding us, and seek to regulate our actions accordingly. From the hap-hazard, the go-as-you-please manner of doing things the effort is constantly toward the definite, the systematic. In the feeding of animals the earliest stage was utilization of anything on hand which the animals would eat; then experience came in and told us that such and such feeds were apt to give good results, and slowly a stock of facts concerning the comparative value of different feeds was accumulated. Then systems and working theories would be formulated.

German System.

The German system of hay values of the different cattle foods is the earliest effort in this line. Thaer, the originator of the system, compared all feeds with meadow hay of average quality; in his table of hay values published in 1837 he gives 100 lbs. of meadow hay as equal to any of these quantities—400 to 500 lbs. green clover, 450 to 500 lbs. green corn, 230 to 300 of straw of winter cereals and 175 to 200 lbs. straw of spring cereals, 40 to 50 lbs. grains, 40 to 45 lbs. oil cake, etc. This system of valuation was rather short-lived, however, we do not have to search long for the reason. Feeding stuffs, and especially the coarse cattle foods, vary greatly in their composi-

tion and nutritive value, and none of them vary more than the meadow hay used as a standard; the fertility of the soil, the time of sowing, the length and character of the growing season, the climatic conditions during the curing, all are factors of the greatest importance, and under the vague term, average meadow hay, a variety of products of greatly differing feeding value will therefore be included. There are other weighty reasons why a system of hay equivalents could not stand very long, but they need not be brought forward here.

Relative Values.

Efforts to express the relative value of the different cattle foods by some definite figures were continued along other lines, however; Liebig, Wolff and Grouven, all German scientists, originated different schemes, one developing farther the plan of the preceding workers, and so today, we have a system of standard rations for the various farm animals, as the result of hard work and study by master minds in this field, for more than half a century. This system considers the content nutrients in the various feed stuffs and the requirement of each animal for each group of nutrients, and is intended to show the quantities of these necessary for the various animals in different periods of growth, or when fed for different purposes. The

German system for standard rations as developed by Dr. Wolff, was introduced into this country fourteen years ago in Armsby's Manual of Cattle Feeding, and has with us become synonymous with German feeding standards.

The question of rational feeding of farm animals has been a fertile field for theorizing, and a good deal of dogmatic preaching has been done by writers on agricultural subjects in this country and out of it. While I have the greatest admiration for the early German investigators in this field, the pioneers, who taught us nearly all we know about the laws of animal nutrition, and about the office of the different nutrients in animal economy, I have none of the same feeling for many of their numerous followers who swear by anything the leaders say, and proceed to enlighten their fellow beings concerning the proper solution of their problems, without considering the variations in the requirements of different animals or the multiplicity of phenomena of life.

Nitrogenous Ration.

We have an illustration of this matter in the dogmatic way in which we have been told we must feed our dairy cows, in order to obtain the best results. In the study of this subject, the German experimenters soon found that the relatively highest production of milk and butter could only be obtained when the cows receive a highly nitrogenous ration, one containing a large quantity of digestible protein. This is necessary for the rapid building up of the cells of the milk glands, the raw material of the milk; the more liberal supply of protein therefore, up to the limit of the capacity of the glands of each cow, the greater the flow of milk. The best ratio between the nitrogenous to non-nitrogenous nutrients, according to Wolff is 1:5 or 1:5.4, that is, the ratio found in good pasture grass.

Cost not Considered.

This ratio, as well as all standard

rations for farm animals proposed by these experimenters, were the outcome of earlier experiments in this line; they were given out without any regard to the cost of the feed, looking at absolute, and not economical yields. Suppose, e. g., we find that a cow will give 20 lbs. of milk a day, on a ration containing two pounds of digestible protein; now, if the protein be increased to 2.5 lbs. a day, feeding otherwise in about the same way, we may expect a daily yield of say 22 lbs. but it may easily happen that the cost of the ration will be increased more than the two pounds of milk gained will bring. What becomes then of the economy of the more nitrogenous feeding? I have this criticism to make of the German standard rations, with their nutritive ratios,—and it seems to me that it is a very grave criticism,—that they are theoretical, pure and simple, in so far as they do not take view of the economy of the various feeds; “such and such feed rations produce the best, the highest results in milk and milk solids, hence feed this way.”

Profitable Combinations.

This is an entirely fallacious guide to offer those in need of help; what the farmer wants to know is not what kind of feeds and what nutritive elements will give the highest results, but what feeds and what combinations will give the most profitable returns. The one question is one of physiological chemistry, the other is one of practical economics. It is the former system offered by German scientists, and indiscriminating followers of them, it is the other which American experiment stations are slowly working out, and concerning which they are gathering more and more data.

Here we deal more especially with the feeding of dairy cows; the so-called German standard ration which has been directly transferred to our conditions and preached to us as the only way to salvation, says to feed 2 1-2 lbs. of digestible protein daily to a cow, with 12.5 lbs. of digestible carbo-

hydrates and 4 lbs. of digestible fat, in order to obtain the best results; now, as against this standard we find that our best American dairymen, successful business men of superior intelligence and experience do not feed much more than 2 lbs. of digestible protein, about 13 lbs. of digestible carbohydrates, and about .7 lbs. digestible fat, a ration containing about seven times as large a quantity of non-nitrogenous nutrients, against 5.4 in the German ration. This is an average of 128 American rations for dairy cows as actually fed in different herds, and its teachings therefore come with a good deal of weight; from the large mass of material entering into this ration, as well as from the character of the evidence we may be justified in naming it an American standard ration for dairy cows, as distinguished from the German ration spoken of.

The Practical Ration.

The practical importance of the subject lies in this, that the feeding stuffs rich in protein are our most expensive foods; the cost of the ration is therefore increased by feeding much of them. We have abundant supplies of carbohydrates (i. e. starch, sugar, etc.) in our coarse fodders, corn silage and fodder, hay and grains; we usually have to go outside of our regular farm products for a good supply of protein; hence the less we need of them, the better. We may then depend largely upon our staple crops, corn, hay, grains, when the price of the latter allows them to be fed with advantage, and each need only reinforce the same by smaller quantities of protein foods. Like refuse feeds from flour and oil meals, etc. If a farmer arranges to have clover hay on hand, and oats and peas, he will have all the protein substances needed for the proper nutrition of his dairy cows, and will be independent of millers, oil companies, distillers or brewers. The cash outlay for concentrated feeds which may come easy to the capitalist, is a hard

difficulty to overcome for many dairy farmers.

Wise Feeding.

Our experience teaches us, however, that feeding a good supply of concentrated feed stuffs rich in protein is along the line of wisdom; with market prices for protein foods and starchy foods about similar, select the former; with prices higher for protein foods feed only enough of them to bring the nutritive ratio down to about 1:7. Corn fodder, corn silage, or ordinary hay, with ground cereals do not contain flesh-forming substances in sufficient quantities to produce the most economical results, and must be supplemented by some protein foods, like clover hay, or feeds like bran, shorts, malt sprouts, gluten meal, or the different kinds of oil meal. In the selection of these, the farmer must carefully consider the market price of each feed stuff. Our knowledge of the chemical composition of the feeds, and of their digestibility, in so far as we know this with any degree of accuracy, will here be of good service to us.

Feeds on the Farm.

While the feeds on hand must decide which of these feed stuffs are the most valuable for our purpose, we may say, in general, that there is ordinarily no great difference in the feeding value of the cereals and the mill refuse feeds; wheat bran at \$12 is cheaper than oats at 25 cents a bushel or more; wheat at 50 cents a bushel may be considered of similar value as corn at \$16 per ton, or barley at 40 cents per bushel. As between the linseed meal or cotton seed meal on one hand, and the bran or oats on the other, the latter are usually the cheaper feeds at our ordinary market prices; comparative feeding experiments of oil meal refuse feeds and of cereals or flour mill refuse feeds have failed to show any great superiority of oil meals over the last mentioned feeds. Thus, cotton seed meal was found only one-fifth more valuable than corn for milk production at the Pennsylvania station,

and oil meal only slightly more valuable than corn meal, at our own station. As the price of oil meal is usually about 50 per cent. higher than corn meal, and double that of bran, while the difference is still greater between these and cotton seed meal, it is evident that at our Wisconsin prices, we ought not, as a rule, feed more of these feeds than is necessary to furnish variety and stimulate the appetites of the cows; in this respect they possess a value that cannot be measured by their protein content or the content of any other single component. When we further consider the manual value of the various feed stuffs, the oil mill refuse feeds and other highly nitrogenous feeds have the advantage, as they supply a manure greatly richer in fertilizing ingredients than do the home feeds.

Vary With Animals.

Rations for dairy cows must vary with the animals fed, the stage of lactation, the system of farming followed, and many other conditions. It might therefore seem futile to speak of feeding standards and of fixed rations. This may safely be done, however, if we remember that the rations allow of considerable latitude; the quantities given are for good cows of medium weight in full flow of milk, and any dairy farmer will then know that a cow at the last stages of lactation, or a poorly yielding cow ought to receive less feed, while an extraordinarily rich milker must have more to do her best. The grain feeding may amount to 8 to 10 lbs. a day per cow; our best feeders give as much as 10 to 12 lbs. At the 90 day breed test in Chicago last summer the Jersey and the Guernsey cows were fed 20 lbs. of grain feeds a day, on an average, and the Shorthorns 18 1-2 lbs., but very few farmers have cows that will stand such intense feeding, and give returns for the same in the milk pail. Any good cow will stand up to 12 lbs. or thereabout, however; and this must be remembered that by heavy feeding we

increase not the cost of the maintenance of the cow, but only her productive capacity. Hence we find that the best dairymen are heavy feeders and are feeding each cow in their herds to her full capacity.

Heavy Feeding Pays.

It is almost the unanimous testimony of our most successful dairymen, that heavy feeding pays, that nothing but liberal feeding pays, and that the farmer who does not feed his cows with a liberal hand will not obtain good results.

In closing I would recommend all dairymen present who are anxious to improve their business, to study carefully the bulletin just issued from our Experiment Station on the system of feeding dairy cows practiced by one hundred dairymen and breeders; I have gathered in the bulletin the views of successful farmers on many subjects connected with the feeding of milch cows, and believe that there are many suggestions brought out in the statements which will prove of importance to every farmer who is studying how to realize greater gains from his dairy.

Discussion.

Mr. Daly—What do you consider the difference between the old process oil meal and the new process?

Prof. Woll—In old process oil meal the oil is pressed out, and more of the fat is left in the refuse, and consequently it is not as highly nitrogenous as the new process oil meal, where the fat is extracted by a solvent and taken out more completely. New process oil meal has not as a rule been found as satisfactory a feed for dairy cows as the old process, however, and old process meal is preferred by most dairymen at the present.

Mr. McKerrow—Is not that small percentage of oil in the old process meal of advantage on account of its stimulating effect upon the digestive organs of the animal?

Prof. Woll—Yes, I think it is. The

fat is a wonderful heat producer and stimulant.

Gov. Hoard—I think Prof. Woll did not bring out one fact as he ought to. He says that oil meal was found to be only one-fifth better at the Experiment Station than corn meal. With my own cows I find that corn meal has a physiological effect upon the cows that oil meal does not; for instance, I fed a three-quarter-bred Jersey cow as high as fourteen pounds of corn meal a day, and she took it and gave me in ninety days 3,240 pounds of milk, and by the Babcock test, 160 pounds of butter. I took another cow and fed her and carried along the experiment. She was a native cow, and I undertook to see whether she would take that same amount of corn meal and carry it, but I found that cow would not take over eight pounds of corn meal without she would stop at once and go right to putting it on her ribs. The dairy tendency in the Jersey was so high that she would take a larger amount of corn meal. In the oil meal we don't have that undesirable effect that you do in corn meal, and I think that this fact should be carried along with it. Oil meal is not fattening to the same extent that corn meal is.

Prof. Woll—Would you consider it advisable to feed fourteen pounds of corn meal a day to a milch cow?

Gov. Hoard—I would if she would pay for it, I would feed her twenty pounds if she would pay for it.

Prof. Woll—How many cows would pay for it?

Gov. Hoard—How many cows are good cows?

Mr. Martin—How many pounds of oil meal can be fed per day to a dairy cow?

Prof. Woll—I would not feed more than two pounds at any one time. Where you are making butter, and therefore have to look out for its quality, it is not safe to feed more than one pound a day of any one kind of oil meal.

Mr. Goodrich—I like this idea of a

balanced ration, but it seems to me there is something else to be taken into account. You could formulate a balanced ration that the chemist would say was balanced, and the cow wouldn't do well on it at all. We could take straw for instance, and oil meal and bran so as to make a balanced ration and the cow would not eat it and wouldn't do well. We must cater to her appetite; she must like it, must be able to digest it. You might fix the ration for me that the chemist would say is all right, but if I don't want to eat it I won't eat it.

Mr. Woodward—I think that Prof. Woll did not sufficiently emphasize the value of succulent feed in a cow's ration. I find in my experience that a cow will eat about one-third more of the rich grain feed with plenty of succulents than she will without it, and she will digest and pay for it. I have kept cows for many years, not for sympathy or companionship, or anything of that kind; if I can get \$2 out of a cow in a month, extra in profit, by crowding her, I am going to do it, and I don't care how soon she wears out. We do not give this matter of succulents sufficient attention.

Mr. Trigg—Do you not consider shorts of much more value than bran?

Prof. Woll—That will depend on what other feeds you have to go with it. I think that the market price of the feeds indicates very nearly the relative value of them. Shorts are usually a dollar or two higher than bran and I consider them somewhat more valuable, but no cast iron rule can be given as regards the relative value of them.

Prof. Henry—The Wisconsin Experiment Station publishes an annual report and not less than four bulletins a year. The last bulletin is entitled "One Hundred American Rations for Dairy Cows." That bulletin contains the condensed reports of over one thousand letters. That is free to every farmer in Wisconsin who will address a postal card to the Agricultural Experiment Station at Madison.

Mr. Woodward—We get those bulletins down in New York, and I want to say that this one just spoken of is worth its weight in gold to any dairyman who will take it and read it.

Mr. Powell—(Of New York.) Workers in Farmers' Institutes sometimes run across some very interesting facts among practical farmers. I made the same statement at a Farmers' Institute in New York that Prof. Woll has made here, that I considered two pounds of oil meal as much as could be judiciously fed on account of affecting the quality of the butter. A very practical farmer rose up in the audience and said, "I am feeding ten pounds per day of oil meal to my cows, and have pursued this practice for twelve years. What have you got to say about that?" Well, it looked like a poser for a moment, and it seemed as if the practical farmer had the best of the Institute instructor. I finally turned upon him by asking him the question: "Who are your customers, where is your trade for this butter?" "Well," he says, "I have always sold

this butter in New York City." I says, "To how many customers?" "To the same customers, for all this length of time," he says. Then I said, "that explains it exactly. You change your customers and you will have a kick immediately. Your customers have got used to this quality of butter, and so they keep on buying it. You change your customer and you will ruin your trade." On further inquiry I discovered that he had shorthorn cows that weighed from 1,300 to 1,400 pounds. That accounted for it again, for a Shorthorn, of course, will take a great deal more than a Jersey. That much will ruin a Jersey.

Prof. Woll—Our conditions here in the west are very different from those in the east as far as the cost of feeds are concerned, and the same rule as to which feeds are preferable will not apply to both sections. In the east you have to pay from \$20 to \$24 a ton for bran, while we get it here for about \$14, with oil mill refuse feeds but little more expensive in the east than with us.

SELECTION AND CARE OF DAIRY CATTLE.

H. C. TAYLOR, Orfordville, Wis.

The topic assigned me by the superintendent may be subject to more than one construction. If the object is simply to so equip the dairyman that he can go into his neighbor's herd and select the cow he wants to buy, he may meet those circumstances over which he has no control. It is therefore an unsafe and laborious and expensive way to secure the cow wanted. If, on the contrary, it is admitted, as I verily believe it must be, that the only safe place to go for the dairy cow is among those of your own breeding then it involves the question of breed-

ing, that you may have something to select from.

Selection of Foundation Stock.

Selection then, commences when you buy the sire and dam of the future dairy cow. The dairyman having in view the best results in direct dairy products and having also in view what in the natural course of events will surely happen, namely that he will have surplus stock to sell, will select for copulation male and female with not only pedigree of authentic record, but will require the best attainable evidence of their individual and an-

cestral performance. Having these he is in a position to start. Start with few or many as his circumstances justify. Successful dairying then, we believe to be inseparably connected with breeding, and selection not only involves a choice of breeds but a choice of individuals of that breed. The basis of improved dairying is selection of cows. Feeding, training and handling surely are factors of influence, but cannot be said to be the basis of progressive dairying. Selection both develops and perpetuates chosen qualities. The unrivaled excellence of our different breeds of domestic animals, each filling a special purpose in animal industry is in the breed inborn, inherited, transmitted from generation to generation. The first day of a calf's life is the day on which selection proper commences. On that day, as well as at any future day, malformation may be detected and if any such exist the calf should be rejected. If it is selected it should receive its mother's milk for four to six days, then taught to drink, and gradually brought to a skim milk ration, accompanied with oats, bran, and clover hay. This calf should be grown with an idea of developing a healthy, strong animal, but not a fat one and from the first day to maturity should receive no check in its growth.

Points of a Good Cow.

If you ask me what constitutes a good cow I would reply, 1st. A good cow must be a good feeder and have good assimilating powers,—four to nine years old, an easy milker, kind disposition, not necessarily large, medium size preferred and thoroughly feminine in her organization. 2d. A good cow is characterized for an inherent tendency to convert her food into milk and an organization especially adapted to that work. These are largely the result of breeding. Dairying in winter is a modern invention and as to some methods it is not strange that "Doctors disagree," as success or failure depends largely—we might say almost entirely—on the treatment of the cow

at that inclement season, it's mete that we give the subject our most careful consideration. Shelter, food, drink, care, how shall these indispensables be secured and how applied are questions that call loudly for intelligent answers. Men who will furnish answers on call are plenty, but the man who can give the right answer to fit all cases has not been born yet, so various are the conditions.

Environment.

Having some little experience and some opportunities for observation I venture, not without a sense of diffidence, to offer a few suggestions. 1st, Shelter. Your stable may be costly or it may be cheap, but it must be warm. How many stables are there in Wisconsin where the mercury will not go below 50 degrees in the coldest weather? Many, I hope, but I fear there are more where it will go below 30 degrees. Cows kept in a stable where water will freeze and where an axe is one of the tools needed in removing the excreta will soon convince you that winter dairying is not what it is cracked up to be. But without steam or other artificial heat you say it is nearly impossible to build a barn that will not freeze. Granted, if you leave the barn empty for any length of time. This brings us face to face with the question, How much exercise does the cow need? Different men will give different answers. If you prefer to follow in the footsteps of your "illustrious predecessors" afford your cows the luxury of all out doors, corn stalks in the field and water in the brook included, from the rising of the sun until the going down thereof. Why, God help you, you had better dry your cows off in the fall and wait for the June grass to build up the skeleton and get them ready to begin their work about the middle of summer and be dried off again in November. Then if you would have a winter dairy, keep your cows in the barn most of the time. Some successful dairy-men would say all the time. The barn

keeps the cows warm—the cows keep the barn warm.

Exercise.

But how about exercise? Domestic animals need to be trained and handled with an eye single to the service we require of them. We give our horses exercise and plenty of it; their usefulness in this world depends on their ability to go along; whereas the usefulness of the cow depends largely on her ability to stand still. In this direction the dairy cows from the Channel Islands have been trained for generations, perhaps for ages. They seek their food at home, within short distances, and that under the immediate guidance of the country maid and the tether. If you want rustlers, go to the ranches of the plains and buy the full sister of the Texas steer. This affiant happens to know that the Jersey cow Islip Lennox 31,703, a cow standing well up in the Columbian Dairy breed test at Jackson Park, when making her famous year's record of 712 1-2 pounds of butter, never drew a breath outside of stable doors between the middle of October, 1890, and the 1st of May, 1891. In the Minnesota herd where she was then owned, all cattle, young and old, were handled in the same way that year, and all subsequent years. That herd has been fairly successful both in the dairy and in the show ring.

Food Elements.

There are before me in this room men who can tell you all about it. So much nitrogenous food and so much carbonaceous food. About one part nitrogenous to six parts carbonaceous. The average dairyman uses about 1 to 7. The wider the ration the cheaper and poorer the milk. The narrower the ration the more expensive and richer the milk. The standard formulas laid down by our Experiment Stations are a useful guide and an aid to a better system of feeding, but should never supplant the judgment of the painstaking dairyman.

Ration for Dairy Cows.

The best ration that I know of is 26 lbs. of organic matter daily to a cow in full flow of milk. 1 part nitrogenous food, 6 parts carbonaceous food, 2 parts kindness and 2 parts enthusiasm.

The dairyman must have good food and he must have cheap food. Of course you either have now or will have a silo. Estimate all your stock, horses, cattle, sheep, into cows for eating capacity. Allow 4 tons, 200 cubic feet of corn ensilage for each cow. Cut up and carefully shock all corn that does not go into the silo. Do this when the ears are glazed and the stalks yet green. As you commence feeding ensilage, commence hauling in the corn, put in through your ensilage cutter, ears and all. Mix with ensilage equal parts, turn on the hose and sprinkle to a condition a little more moist than the ensilage. Allow it to lay 12 hours in your feeding hall when you will find it all warm, and the cattle and all stock will eat the whole of it and relish it too; and you will be surprised to see how much stock that patch of corn will winter. If anyone makes you believe that it is not a well balanced ration, and the professors will try to, tell them you will add some oatmeal, or oil meal, or wheat bran. This makes you independent of a hay crop. Don't husk your corn and leave the stalks (a good half of the crop) to "wither in the wintry blast and waste their sweetness on the desert air."

Watering.

We are located in a prairie country. We depend largely on some kind of pumping process to raise our water from wells. Raise it to a level just higher than the ceiling of your stable. Then with gas pipes and a bit of hose place it before every animal in the barn and keep it there. They will drink a great many times a day.

As to Flesh. Don't be afraid to feed well when cows are dry lest they be in too high flesh at time of parturition. It is held by many that good flesh in-

vites milk fever. I think a fleshy condition is often confounded with and taken for a plethoric condition. The two are very different. One indicates health and strength; the other an excess of fluids in the system and in a sense is disease. Many men are feeding dry cows as well as those in milk with the sole purpose of bringing up their flesh as a reserve force to fall back upon when they are called on to do their best work in the dairy. These men are having no more milk fever in their herd than other men.

Stable Fastenings.

I do not like to put my cows in stanchions. They seem rigid. They should be so tied as to give sufficient latitude to turn their heads and allow them to reach any part of their bodies with their tongues. Make the platform on which they stand wider at one end than on the other to accommodate cows of various sizes, use plenty of bedding. If corn stalks are more plenty than straw put them through the cutter and they make good bedding. Keep the cows clean. Take the time that your neighbor uses in driving his cows off down to the corn stalk field in the morning, and in watching his dog bring them up at night, and go carefully over them with a card and brush.

Care at Calving.

After having used all possible care in selecting the cow, and after you have religiously resolved to treat her with kindness and consideration your profits for the year all depend on the treatment you give her for 30 days after freshening. Give special attention to her general condition and health prior to this time,—a prosperous, thriving, up-grade condition preferred. It is after freshening that all the skill and judgment of the herdsman is called for. She should have a box-stall and in winter weather should be kept blanketed and absolutely free from draughts of cold air for 30 days. All water given should have the chill taken off and she should receive small quantities frequently, especially for a

few days. Remember the cow has more or less fever at this time; her temperature ranging from 103 to 103 1-2 or even 104 degrees is often reached without any apparent disturbance. For this reason coupled with the fact that she is a mother, performing the function of maternity, she is a sick cow, and in all cases should be treated as such. Twenty-four hours previous to parturition we administer 1-2 oz. of nitrate of potash in 1 lb. of salts. After freshening she should receive 10 drops of aconite twice a day to counteract the fever. If she is a heavy milker give no slop food for a week or until the danger period is passed. Don't expect an increased flow of milk until the fever subsides and she resumes a normal condition.

Development up to Capacity.

Then give increased rations three times a day, gradually bringing her up to her full capacity, which should not be reached under two months, always remembering that the more a cow produces the more she is able to produce and that a cow well wintered is half summered. If you have made a wise selection in this cow and do your duty to her as your interests demand, you will soon become an enthusiastic dairyman. My friends, it is enthusiasm all along the line we need. Did you ever think it is the enthusiasm of the preacher that drives convincing truth home to the heart of the sinner? That it is enthusiasm of the physician that brings to bear his best medical skill that aids nature in restoring the sick man. So it is the constant heavy ration of enthusiasm that causes the cow to respond to good selection and training. So my hearers, in all of your dairy enterprise in getting milk, cream, butter and cheese, I beg of you get enthusiasm.

Discussion.

Mr. Hennessey—Some of us would like Mr. Taylor to explain the points of difference in the two illustrations on the board.

Mr. Taylor—The illustrations on the board speak for themselves to you dairymen. You have eyes and you can see that there is a difference in these two animals. They are both pedigreed animals, but the whole influence of man has been brought to bear upon them, and their ancestors for generations, and has turned the tide in those different lines of producing different human foods. One has been bred for generations with the idea of converting farm products into flesh; she has a pedigree back of her that would not allow her to be a milker in any sense, and be true to her breeding. The other cow has been trained for hundreds of years with the distinctive purpose of converting farm products into milk and butter. She has not a drop of beef-producing elements in her blood.

Mr. Woodward—Mr. Taylor, do you think those animals came from the same animal originally?

Mr. Taylor—I think they did.

Mr. Woodward—Then don't you think it would be possible to change one type into the other in the course of time?

Mr. Taylor—You are too old, and I am too old to take up that question. It might be possible, but not profitable.

Mr. Woodward—The point I want to get at is this. There was something produced that change. Now, was that something selection or feed?

Mr. Taylor—Selection and feed. The different breeds of domestic animals which embody the sum total of animal industry comes from selection.

Mr. Woodward—Is it selection first or feed first?

Mr. Taylor—Selection first; then feed and care comes along.

Dr. Porter—Do you think it is necessary to give the cow just before calving those salts and afterwards a dose of aconite? Is not that process physiological and not pathological?

Mr. Taylor—I give this dose of salts previous to parturition if there is any tendency to constipation. If not, I do not administer it. There is no need

of it in feeding silage, but there is absolutely a necessity to administer aconite to counteract the fever after parturition. If there is a tendency towards milk fever this will counteract it, and if milk fever sets in, then you have all the effect of this aconite accumulated, and it will help you carry this animal through.

Mr. Powell—I am very thoroughly impressed by the point you made of comfort to this cow. We are here in a winter climate attempting to carry on dairying which requires the condition of summer temperature. Now, how far can we go on breeding the dairy cow and securing that very important principle of strong vitality in her constitution, in order that she may be large in her productive power and at the same time not do this at the cost of the same principle in her offspring. In other words, can we continue for generations to come, strong vital power and good health in the conditions under this system of close housing?

Mr. Taylor—As I understand the question it is: Can we keep our cows in the barn and follow this system without sacrificing their vital force or energy? I think we can. When a cow lies down and chews her cud she is working. A horse, when he trots or runs, is doing his work. That is specifically the work for which we will raise the cow. She will stand still all winter and do exactly that work next summer on the pasture.

Mr. Trigg—Would not feeding carrots obviate the necessity of giving her salts?

Mr. Taylor—Yes.

Mr. Trigg—Mr. Taylor said it was injurious to feed immediately after calving, within the first week. How would it operate to feed roots, carrots or potatoes?

Mr. Taylor—It would be an excellent feed. I meant, of course, that we do not give them any heavy feed, such as corn meal; we give them a little oil meal three times a day, to keep the bowels loose. The cow should always

be in the hospital when she freshens. Give her a little water, she will thank you for it in a thousand ways. She is a sick animal, bear that in mind, and she cannot produce good milk when she has a fever. When the fever comes down increase her feed, but do not get her up to her full capacity before two months.

Mr. Everett—What do you mean by being independent of hay?

Mr. Taylor—You have so much coarse feed that if you haven't any clover hay you can buy bran and other things. Every dairyman ought to raise a crop of clover hay to go along in connection with silage, but if you haven't got it, don't be scared. Your grain crop will carry you through; that oil meal and oat meal.

Mr. Everett—How long do you let your calves stay in the barn?

Mr. Taylor—From four to six days.

Mr. McKerrow—Do you draw all the milk from the udder of this cow for the first few days?

Mr. Taylor—No, sir, we don't. A cow that has a very large udder, we milk partially, from each teat.

Mr. Philips—Do you allow the cow to drink the first milk?

Mr. Taylor—No, sir.

Mr. Cronk—How do you raise the calf, indoors or outdoors?

Mr. Taylor—He doesn't go out doors until the warm weather, next summer.

Mr. McCullough—Why is it you do not draw off all the milk right after parturition?

Mr. Taylor—Men who have made this a study advise not to do it, as it is apt to collapse the udder to such an extent as to invite inflammation, which might run into milk fever.

Mr. Arnold—It seems to me that we should lay as much stress upon the feeding and handling as upon the breeding of a cow, to produce the results shown in these two, and in that respect I would criticise Mr. Taylor's paper.

Mr. Martin—Do you milk before calving?

Mr. Taylor—No, sir.

Mr. Arnold—Do you consider from one to six a ration for all your cows?

Mr. Taylor—We vary it one to seven and sometimes one to five, when we get an extra good cow.

Mr. Carlyle—Do you warm the water for your cows in the winter?

Mr. Taylor—We warm it out of doors, and water twice a day. Cows that are in full flow of milk we water three times a day, the temperature of the water is about 60 degrees.

Mr. McKerrow—How much feed can a good cow use daily?

Mr. Taylor—If she is worthy a place in your dairy she ought to eat eighteen pounds a day when she is in full flow of milk and doing her best work. I have got them in my herd to eat up to twenty-four pounds. If I had a cow like Gov. Hoard's, that would eat fourteen pounds of corn meal a day, I would dress her in fancy silk. We feed about forty pounds of corn silage early in the morning, besides the eighteen pounds, of course, that is, concentrated feed. The cow that can take a large portion of concentrated food is what you are after. I do not count the corn in the silage among the concentrated food.

Gov. Hoard—Give us your ration.

Mr. Taylor—From four to six pounds of corn meal, one and a half of oil meal, four pounds of bran, four pounds of oats. I don't care how you make up this ration so that you get about fourteen pounds of digestible organic matter and feed it in the proportion of about one to six or seven, it is all right; study the characteristics of your cow and give her what she can take.

Mr. Everett—What did Brown Bessie have?

Mr. Taylor—Brown Bessie was fed twenty-six pounds for her regular ration in the test.

Mr. Goodrich—What are you going to do with all such cows as Brown Bessie, after they are nine years old?

Mr. Taylor—I am contemplating building apartments in the barn to keep them in if they are good ones.

Mr. Martin—Ain't the majority of

our dairy cows, after nine years, of more profit than before?

Mr. Taylor—Not in the dairy. The best thing to do with a worn out dairy cow is to sell her right off.

Mr. Martin—How many cows at nine years old are worn out in our country?

Mr. Taylor—It is according to how they have been treated. They ought to be worn out when they are nine years old.

Mr. Martin—Wouldn't it pay to keep such a cow as Brown Bessie for breeding?

Mr. Taylor—Yes, sir.

Mr. Woodward—You think there is such a thing as a worn out cow?

Mr. Taylor—I mean she will stop giving you large returns for the feed you give her.

Mr. Woodward—I had a cow in my herd that the man said he couldn't spend time to whittle sticks to put on her horns, and she was the best cow I ever owned.

Mr. Taylor—That is the kind of cow to hold.

Dr. Porter—I wish you would tell the occasion of Brown Bessie's death. It has been claimed that she died from overfeeding.

Mr. Taylor—Oh, no. She was in splendid shape the morning that they shipped her; she was feeling as good as could be, so glad to get out of that hot place. She felt the heat very much, not having very much muscle, being in a soft condition. They put her in a car on a very hot day, and shipped her down as far as South Chicago, on the Lake Shore, and there they stopped and left her there for several hours, subject to the lake wind; she got acute inflammation of the lungs and died, the most lamentable death that ever occurred in Jersey history.

Mr. Meyrick—How do you feed this feed?

Mr. Taylor—We feed hay, two or three pounds; we then milk her, and feed her a grain ration dry. After breakfast she gets twenty pounds of corn silage, according to the cow, every

cow. Then that lasts them until pretty near noon. In the middle of the forenoon they are watered. At noon they are turned out a few minutes and the stables cleaned, the cows put back and given twenty pounds more silage. At night they get a grain ration in the manger, and then the hay ration. We are working our cows for a full flow of milk and we feed three times a day. We study the likes and dislikes of the cow, give them what they want and encourage them to take more. You want to watch carefully that you don't overfeed, and you can work her up to such a pitch that she will give more and more milk. We had a cow a little while ago; she freshened the 28th day of November, and I had great hopes of her. I thought she was in a nice thrifty condition. She was kept indoors from November till spring. Then I bought some cows of Mr. Foster, and among them was this one. They took them out of the barn when it was 23 degrees below zero and took them to my farm, and it made a set-back. When she freshened in November I said, "We are going to get a cracker out of this cow." In fifteen days she was giving over twenty-two pounds and it was rich, pretty near seven per cent. The milk kept increasing until we got it up to thirty-two pounds, and it was still rich. We weren't satisfied. We put two pounds of ground oats into a pail of water and let it stand about an hour. We filled the pail full of water and gave it to her at half past nine and again at half past three in the afternoon; that was the first; then we gradually increased the water until we got a pailful of slop. Finally we got to six pounds of ground oats in the slop. It had a wonderful effect in stimulating the milk production. She went to thirty-nine and a half pounds. Then we had a fall of temperature down to 23 degrees, and she fell in her milk, but during the week she made thirty-five pounds of milk daily, and produced 19 pounds and 4 ounces of butter. The next week she did

almost the same thing within two ounces. We have followed that same plan of increasing the flow of milk with other cows. The stimulation of this cow to the secretion of milk is what does it,—intelligence does it, and enthusiasm,—the kind that causes you to get up in the night and go to the barn to nurse a little calf and feed the cow and give her a drink of warm water.

Gov. Hoard—Do you take special care to clean the mangers to prevent the souring and the accumulation of bad and distasteful and unhealthy ferments?

Mr. Taylor—Yes, sir. We have found that it will accumulate under the boards, and about the boards it will become soaked and the cow won't eat at all. We feed in a box, each cow by herself, and that box is scalded very thoroughly. There are germs of disease that will accumulate there very quickly and the warmth of the barn will help to increase them, of course.

Mr. Hennessey—How long do you let your cow go dry?

Mr. Taylor—All the way from four to six weeks.

Mr. Hennessey—Do you keep them in stanchions?

Mr. Taylor—I was in hopes you wouldn't ask me that. I do keep them in stanchions. My only excuse is that it is a matter of habit.

Mr. Rapager—How do you like the Bidwell tie?

Mr. Taylor—That is an excellent thing. I am going to build a new barn soon and put them in.

Mr. Woodward—Do you expect that the calves of these heifers that you have been developing will be better than their mothers?

Mr. Taylor—I do, because they develop capacity, a quality which in our domestic animals is desirable.

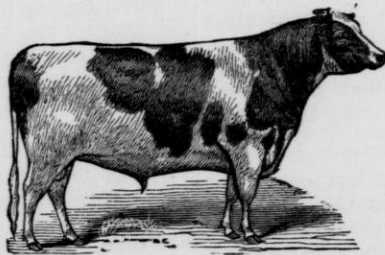
Mr. Woodward—How do you develop the quality, by selection or by feed?

Mr. Taylor—By selection first, by perpetuating certain qualities.

Mr. Woodward—Don't you believe that the better feeding of those animals makes them actually transmit to their progeny better qualities?

Mr. Taylor—Yes, sir:

The Institute adjourned till 1:30 o'clock.



AFTERNOON SESSION.

The Institute met at 1:30 p. m. the same day. Mr. Goodrich called to the Chair.

THE VALUE OF INDIVIDUAL TESTS IN THE HERD.

W. F. STILES, Lake Mills, Wis.

The two chief points sought in a dairy cow are the quality and quantity of milk she is able to produce. By quality is meant the per cent. of butter fat in it. The quantity is very easy to determine and because of this with many it has been the end sought in securing a herd. Before the oil tests were discovered the cow that gave the greatest amount of milk was hailed as the champion. Those animals whose pedigrees traced back to her were eagerly sought after. Since the oil tests have been discovered quite a revolution has taken place in the dairy world. It is now rare to hear of a cow giving one hundred pounds of milk in a day. Their value is now placed upon the amount of butter or cheese they are able to produce in a given time and from a given quantity of feed. When we consider that it is the per cent. of fat in milk that gives it its value, and that a cow is a machine to convert feed into milk and fat, it can be seen that this is the true method of estimating her value.

The Babcock Test.

Before the Babcock test came out it was not an easy matter to determine the amount of fat in each cow's milk. With that machine it is quite an easy task. The entire process is simple, and anyone who is able to manage a herd can make the test. Its great value over the older methods is that it is a much shorter process.

The variations found in the milk of different cows is surprising. In our herd of twenty-five cows the range is from 2.4 per cent. to 4.8 per cent. or twice as high. I have found that the cows that give the smallest quantity of milk do not test the highest, nor do those that give the most test the lowest. The quantity in the same herd at least, rarely has any relation to the quality.

In Chart No. 1 are given the results of a two days' test in the home herd. The feeds given were ensilage 50 lbs., middlings 9 lbs. and clover 10 lbs. I have allowed \$2.50 per ton for ensilage, middlings \$12.50, and clover \$8. All the cows had the same, or nearly the same amount of feed. Fifteen per cent. of the fat is added to itself for the butter, and 25 cents per pound is allowed for the butter.

I venture the assertion that there is as great a difference as this in many of the herds of the State. If the hay and ensilage had to be purchased the same as the mill feed we would either be obliged to dispose of these low yielders or put up the sign "closed out." How long would a manufacturer continue to run a machine that did not turn out goods enough to pay for the coal and labor? The dairyman must awaken to the fact that this is an age of rapid progress.

Must Fall Behind.

The man who continues in the old

Chart No. 1.

No.	LBS. OF MILK.		TEST.	BUT- TER.	VAL- UE.	COST OF FEED.				PROF- IT.
	Nov. 30th.	Dec. 1st.				Per cent.	Lbs. Per day.	Per day.	Silage.		Meal.	Clover.	Total.	Cts.
1	35	36	3.4	1.38	\$.345	6.2 cts.	5.6 cts.	4 cts.	15.8 cts.	18.7
2	36	36	3.7	1.53	.383	6.2 cts.	5.6 cts.	4 cts.	15.8 cts.	22.5
3	32	31	3.15	1.14	.285	6.2 cts.	5.6 cts.	4 cts.	15.8 cts.	12.7
4	31	31	3.55	1.26	.316	6.2 cts.	5.6 cts.	4 cts.	15.8 cts.	15.8
5	23	24	3.4	.92	.229	6.2 cts.	5.6 cts.	4 cts.	15.8 cts.	7.2
6	23	24	3.9	1.05	.263	6.2 cts.	5.6 cts.	4 cts.	15.8 cts.	10.5
7	21	24	3.25	.84	.21	6.2 cts.	5.6 cts.	4 cts.	15.8 cts.	05.2
8	20	20	3.90	.89	.224	6.2 cts.	5.6 cts.	4 cts.	15.8 cts.	6.6
9	22	23	2.95	.733	.183	6.2 cts.	5.6 cts.	4 cts.	15.8 cts.	2.5
10	18	22	3.9	.89	.224	6.2 cts.	5.6 cts.	4 cts.	15.8 cts.	6.6

rut will wake up some morning and find that he has been so completely frozen in that he can never hope to extricate himself. As dairying has paid well in the past some have rushed into it blindly and as a result many inferior cows have been produced. Competition will be sharper in the future, and only those dairymen who have good cows will be successful. The proportion of dairy farmers is constantly increasing, and more than this we are obliged to sell our goods in competition with the various imitations of butter. Thus it behooves us to look well to it that we have only first-class cows and then feed liberally and judiciously.

Advance the Standard.

What each must strive for is to bring up the standard of his herd. There are two ways, it seems to me, by which this may be accomplished:

Either by purchasing thoroughbreds with good pedigrees and from individual merit, or by thoroughly and carefully testing each cow in the herd, and then from the very best of them grade up by using a thoroughbred sire of good approved merit. Of the two methods the latter, it seems to me, is the better for most dairymen.

Allow me to read an extract from Hoard's Dairyman of Dec. 8, 1893, by Wm. H. Caldwell. "At the present time no farmer has a legitimate excuse for remaining in ignorance of the yield of butter and milk of any animal in his herd. The more progressive dairymen have a definite standard of butter production, ranging usually between 200 and 300 pounds per year, and any animal falling below that point is put out of the herd. The offsprings of the animals showing the greatest yield of butter are selected for breeding purposes. This

system is entirely rational and has been productive of great good, but we should not overlook an equally important factor in dairy breeding and management and closely allied to this, viz.: The selection for breeding purposes, at least of animals that not only produce large quantities of butter, but do so at the minimum of cost." If after we have thoroughly tested the herd we find that we have cows that do not produce milk enough to pay for the feed we should beef them and sell them to the butcher at once. Those that are paying a slight profit should be carefully watched, and if they do not improve they should be disposed of as soon as it is necessary to reduce the size of the herd. If each cow is tested the owner will know just which ones to sell in case of necessity.

Gain by Testing.

The chief point, however, to be gained in individual testing, it seems to me, is to be able to determine which cows to raise the calves from. The great law of heredity "Like begets like" should hold here the same as in other lines. "Men do not gather grapes from thorns or figs of thistles," neither do they mate Shorthorns and Galloways and expect Jerseys. Throughout the vegetable kingdom we find that "Whatsoever a man soweth that doth he also reap." Nancy Hanks do not often spring from streeters nor Brown Bessies from scrubs. Thus we should not expect a cow whose milk tests but two and five tenths per cent. to produce a calf, that, when a cow, will give milk testing five per cent. of fat.

Good Blood.

In raising the standard of the herd it is usually best to get a thoroughbred sire. Be sure that he has a good reliable pedigree, and be certain that it is good in the last two or three generations. For the mothers use only the best cows in the herd. Let each animal be tested for who knows but what in some of the untested herds

"Some mute inglorious Pauline there may stand," some Brown Bessie guiltless of the herd's low test.

After a dairyman has determined which are the best cows in the herd he should divide them into families the same as the various breeds of thoroughbreds are. In order to do this accurately it is best to keep a home herd book, and then label the cows and keep them registered in the home book. To rely entirely upon one's memory is not a good way. To grade up the herd in this way will be somewhat slow, but there are few things of much importance which are attained in a day. If the work is done faithfully to the end I believe that the result will be worth all the effort. We should not expect that each time we will get an extra, A. No. 1 cow. Some may not be as good as the mother. There may be those which have not the power to transmit their qualities to their offspring. Some may do better through their granddaughters than through their own daughters. In order to determine this the records must be carefully kept.

It is not best to judge a cow by one test, or even by three or four. There may be causes which we do not notice that make her test high or low.

In Chart No. 2 are given the results of several tests of the same cows as in Chart No. 1. It will be noticed that there is quite a variation in the quality as well as in the quantity of their milk. Thus we can see that it would not be well to judge by one test. In order to determine a cow's value correctly she should be tested at least once a month for the entire period of her lactation. It would be safer to take a sample once a week. The sample should always be from two consecutive milkings. At the end of the season the several tests can be added and an average made. By this method we can form a true estimate of her value. At each time the cow is tested she should be as near as possible under natural or normal conditions. Let the same person do the

Chart No. 2.—Result of Several Tests.

No. of cows	1ST.		2ND.		3RD.		4TH.		5TH.		AVERAGE.	
	Amt.	Test.	Amt.	Test.	Amt.	Test.	Amt.	Test.	Amt.	Test.	Amt.	Test.
1	18	4.	21	3.4	37	4.4	36	3.6	34	3.8	29	3.84
2	22	4.	29	3.	39	4.6	36	3.7	34	3.7	32	3.8
3	16	3.	22	3.3	38	2.6	33	3.1	32	3.2	28	3.04
4	21	3.2	22	3.6	33	3.3	31	3.3	33	3.4	28	3.36
5	17	3.4	21	3.3	21	3.4	24	3.4	23	3.4	21	3.38
6	9	4.2	16	3.2	23	3.9	24	3.8	28	3.7	20	3.76
7	20	3.2	24	3.	29	2.8	24	3.6	24	3.6	24	3.24
8	15	3.6	18	3.	26	3.4	20	4.	20	4.	20	3.6
9	16	4.2	25	3.7	19	3.8	22	3.8	26	3.9	22	3.88

milking and have it done at the usual time. Cows that are kept in a warm stable should give more nearly uniform results than those which are out in the yard most of the day.

Dairymen all Need a Test.

Each dairyman should have a Babcock tester either on the farm or at the factory. They can be had for a very reasonable price, at the present time. If the herd is large it is best to have a fair sized tester. It takes no longer to make a test in a large machine than in a small one, and it is the time that some object to.

When it is convenient to test in the large tester at the factory, I believe that it is a good method. When this can be done all that is necessary to buy is the test bottles and a half sized pipette.

Test Alone Tells the Story.

Testing a cow by means of the scales and the Babcock test is the only true way of arriving at her value.

A dairy cow is, to a great extent, different from other lines of stock. The machine by which she does her work is on the inside. She may have all the external appearances of a good cow and yet not be a profitable animal to keep. "By their fruits we must know them," and to determine these we must test them. To purchase a herd of dairy cows because they all have good dairy forms would be some like sending men to our legislature because they chanced to be good-looking.

The Babcock test is one of the best inventions that has been made in the interest of dairymen, and now if we do not use it we will be the losers. As a rule, I think that we are apt to cling to old practices and allow some one else all the gains of new discoveries, and then wonder why farming does not pay. What we need to make our vocation more profitable is more system in our work and more readiness to adopt new methods.

Discussion.

Mr. Rapager—What sized tester would you recommend for an average dairyman?

Mr. Stiles—A man with thirty-five cows ought to get a tester of fifteen bottles.

Mr. Kronk—How long would you keep a cow or at what age would you test her?

Mr. Stiles—She ought to be tested when she comes in the first time.

Mr. Cole—Do you find the different breeds have anything to do with the quality of the milk?

Mr. Stiles—I suppose you refer to the per cent. of butter-fat. The individual cow has much more to do with it.

Dr. Porter—Do you find that a difference in the milkers has anything to do with the per cent. of fat?

Mr. Stiles—It has been found at the Experiment Station that the difference in the milkers will make considerable difference at first. After the cow has got used to him it don't make so much difference.

Mr. McKerrow—Would it make any difference in the test as to whether your cows are milked ten hours between milkings or fourteen hours?

Mr. Stiles—If there is only ten hours between milkings she will give a less amount of milk. That is all.

Mr. McKerrow—In making these tests how was it?

Mr. Stiles—I think she would give a less amount of butter by milking ten hours at one time and fourteen the next. I took two samples.

Dr. Porter—Does the morning's milk test the same as the evening's?

Mr. Stiles—Not unless she is kept under the same conditions.

Mr. Thorpe—How long have you used the Babcock test in your herd?

Mr. Stiles—I think I commenced three years ago, when I was attending the school. I have tried it right along since.

Mr. Thorpe—What is the object in keeping that low-testing cow that pays you no profit?

Mr. Stiles—I do not own the cow, and I cannot sell her.

Dr. Porter—How many cows have been discarded in that herd as a result of the test?

Mr. Stiles—I have only tested since I took charge of the farm last spring, and we have disposed of none since, but I shall strongly advise the disposing of five or six in the herd.

Mr. Phillips—Would you discard a three-year old heifer if she tested under three per cent. the first season and gave a fair amount of milk?

Mr. Stiles—No, I would not.

Dr. Porter—Would you discard a two-year old heifer that gave about 115 pounds of butter the first year?

Mr. Stiles—I think I would not, not the first year.

Mr. Taylor—About how far from freshening do you expect your cows to do their best?

Mr. Stiles—I have found that when cows are fresh they give the largest amount of butter fat although the impression is that when they are first fresh they give a large quantity of milk, but a small per cent. of fat.

Mr. Cole—The aggregate of fat you think is more, when they first come in?

Mr. Jacobs—Do you expect a larger per cent. of butter fat from an aged cow than from a heifer, a two-year old, the first time?

Mr. Stiles—Yes, I think when she was four or five she would give a larger per cent. After that I don't think it makes much difference.

Mr. Gibson—I think I understood you to say that the feed made no difference as to increasing the butter fat.

Mr. Stiles—In increasing the per cent. of butter fat it changed very little. The quantity of milk kept increasing.

Mr. Gibson—Why then should we give nutritious food?

Mr. Stiles—To increase the flow of milk and thus get a larger amount of butter?

Mr. Rapager—What do you do for a cow that is hard to milk?

Mr. Stiles—Sometimes I milk her and sometimes the hired man does.

Mr. Rapager—Does that make her milk any easier?

Mr. Stiles—It does to me if he does it. I haven't found any way to help hard milking.

Mr. Carlyle—Has the period of lactation any effect upon the amount of fat?

Mr. Stiles—After milking about five months she usually gives a smaller flow but with an increased per cent. of fat.

Prof. Henry—A farmer asks me to ask if milk taken for test the first of the month can be kept good for the test till the 15th of the month?

Mr. Stiles—I think it can. There are chemicals that can be put in that will keep it, so they can take a sample once a week and test once a month.

Prof. Woll—There are several methods proposed of preserving samples of milk for analysis. The most satisfactory is the use of the yellow bi-chromate of potassium, but I do not think it is wise for a farmer to use any such chemicals. He ought to test at least once a week, and if the milk is measured out into the test bottles they can be kept safely for that length of time so that no chemical will be necessary.

Mr. McCullough—Is there any invention that is worthy of being called a milking machine?

Prof. Woll—I don't think there is.

Mr. McKerrow—If you were feeding your herd of cows as they should be fed on good feed and plenty of concentrated grain ration up to the first of June, or whenever grass became plenty, and you put them out upon that grass alone, would you expect your test to be as rich a week after they had been on that grass as it had been previous to that on dry, rich feed?

Prof. Woll—No, I should think that it would not be as rich, but I would expect them to give more, and give more butter, not quite as high a per cent. of fat, although at some tests they have maintained or even increased the per cent. of fat on an increased flow of milk.

Mr. McKerrow—Will it pay to feed grain at that time?

Prof. Woll—Sometimes it does and sometimes it does not. It varies according to the condition of your pasture and according to the price you are getting for your butter. The Cornell Experiment Station has made a long series of experiments along that line and they found that when the pasture is fresh and plenty it does not pay in immediate effects to supplement the pasture by grain feeding. That means that they do not get at that time any greater flow of milk, because of the feeding of grain, but cows that receive grain while on pasture will give milk for a longer time, and a larger quantity of milk, after they get off from the pasture, so that in the net returns it will usually pay to feed grain to cows on the pasture. They will do better the next year.

Mr. Faville—And the same pasture will take care of a good many more cows.

Mr. Everett—I am often asked this question: "Why is it necessary for me to have the Babcock test?" I can weigh the milk, churn it and weigh the butter, and I know then what the cows are doing. Can you tell us why that method is not accurate, and why we should have the test?

Prof. Woll—With one cow you can tell pretty nearly by testing with the churn, but a man with fifty cows cannot test them separately by the churn.

Mr. Everett—In churning by the test you cannot tell how much fat there is in the buttermilk and skimmilk.

Mr. Arnold—About how much will a cow's milk increase in richness during the period of lactation?

Mr. Stiles—About one per cent.

Mr. Taylor—Did you ever test a cow continually from the time of freshening for three or four months so as to know her total increase of butter produced?

Mr. Arnold—I have tested one cow I think five months, beginning with the time of freshening.

Rule the sheet perpendicularly with lines about 3-4 of an inch apart. The first column is for the day of the month. Over each succeeding three columns write a cow's name. The first column of each cow's section is for the morning's milking, the second for the night's milking, and the third for the total for the day. Two columns to a cow will answer, the first for the morning's milking and the other for the total. If you use the regular milk scale the readings will be in pounds and tenths of pounds. With the common scale read the fractions as 1, 2 and 3, each representing 1-4 of a pound. Add the total columns at the end of each month.

Monthly and Yearly Record.

Keep a yearly record in much the same way, having the cows' names at the top of the sheet and the monthly records in a column. At the end of the year this column added will give you the cow's milk record. Unless you keep some such record you cannot tell within 1,000 pounds, or even more, of how much milk any cow gives. For instance, one cow in your herd gave 41 3-4 lbs. of milk at her flush, and in 300 days gave 5,400 lbs. Another giving 36 lbs. at her flush, nearly 6 lbs. less than the other, gave 650 lbs. more in 300 days. A third giving but 29 1-2 lbs. at her flush gave 6,300 lbs. in 330 days.

Results of Test.

Milk records in our herd have run from 4,400 lbs. up to nearly 10,000 lbs. in one year. It is safe to say that a cow that will milk an average size mess of milk and is persistent, will give more milk in a year than one giving several pounds more at first, but not so persistently. The majority of our cows calve in September, and some of them will milk as much when they go to grass in May as when they first came in, while others do not give over half as much.

The second part of the subject is of even more importance. I have owned

a Babcock test since February, 1891, and have never owned another tool that pays so large a dividend on its cost. A test is made in our herd at least once each month, of both morning and night's milking of each cow. The number of pounds of milk given by a cow each month multiplied by the per cent, of fat shown by the test for that month will give you the number of pounds of fat given. If you continue this record for a year you can tell approximately how much butter each cow has made. The longer I use the test the surer I am that there is no way to tell anything about how much a cow's milk will test without using the machine. The amount of cream shown is just a little guide. So is the color of the milk, as that runs in breeds, or rather in families of breeds.

Flesh no Criterion.

The most fallacious of all is the oft-repeated statement that the condition of a cow as to flesh is a sure guide, claiming a fleshy cow will test higher. From all the tests I have made, several hundred in all, I find no difference. We have one very fleshy Guernsey cow, and she is this winter the lowest tester of any of the Guernseys. The more tests I make the more I think it is useless to try to tell how much a cow will test. To illustrate,—there stand side by side in our barn two cows,—about the same size, condition, etc. In seven days from Sept. 24-30, 1893, one gave 269 1-4 lbs. of milk, an average of 38 1-2 lbs. daily. The other gave 183 1-2 lbs. or 29 lbs. daily. The first one gave 11 lbs. of fat or an average test of 4.1 per cent., while the latter gave 11 3-4 lbs. or an average test of 5.7 per cent. How would anyone judge between those cows without the test?

Two others tested Oct. 5-11, as follows: One gave 203 3-4 lbs. of milk with an average test of 5.95 per cent. which should make over 14 1-2 lbs. of butter, while the other giving only six lbs. less milk in the week made 3 lbs.

less butter. Other instances nearly as marked could be shown from any month's record of our herd, and it was even worse when we first purchased the test. At that time a cow milking but 12 lbs. per day was making nearly one pound of butter per day and more than another giving 26 lbs. per day. The best one was then making 13-4 lbs. and the poorest 2-3 of a lb. I have repeatedly tested whole herds for the neighbors and there are always cows making 1-3 more butter than those giving more milk. There is never a month goes by, but in testing some surprises develop.

Single Test not Satisfactory.

However do not depend on a single test to determine the value of any cow, as she may be off her feed, in heat, or in some other way not quite right. Prof. Farrington of the Ill. Experiment Station says in the Breeders' Gazette of Feb. 7, 1894, that when a cow in the World's Fair test showed an abnormal per cent. of fat the superintendents would go immediately to the barn and take the cow's temperature. They would nearly always find her feverish. There were some days a cow gave nearly twice as much butter as the day before. A test made on either of these days would have been unjust. The Guernsey cow that made the highest weekly record for that breed in the World's Fair test, 161-4 lbs. was fourth among the Guernseys in production in the 90 day test, and was the tail ender of the Guernseys in the 30 day test. There were ten Guernseys in that test that had been milked longer than she had and that excelled her in both production and profit.

Of course a single test is better than none and it is an excellent way to buy cows by testing them, but I am here to plead with every dairyman to keep a daily record of milk from each of his cows and to test the milk as often as once a month so as to know what they are doing. Commence to-day. Don't put it off. If anyone purchases a scale and tester on my recom-

mendation and after careful use for a year does not think he has paid for it several times over I will take it off his hands at the original cost.

Discussion.

Mr. Everett—Do you find that the fresh cows give the lowest percentage of fat?

Mr. Hill—As I said I don't think there is any possible way of telling.

Mr. McKerrow—In making a comparison of those two cows which was the most profitable, the cow that gave the twenty-nine pounds, or the cow that gave the twelve or thirteen pounds?

Mr. Hill—The one that gave the smaller quantity of milk was the most profitable. She, if anything ate less. I did not enter into the details of feed, though I do watch it pretty carefully. The smaller cow, of course, would eat considerably less.

Mr. Arnold—Would it not do just as well to weigh the milk once a week instead of every day?

Mr. Hill—It would do just as well to test it once each week. I am making tests oftener than I was before. I presume the time will come when it will be oftener than once a week.

Mr. Thorpe—Do you suppose that if a man goes to the trouble of getting appliances to weigh his milk that he will stop at that?

Mr. Hill—No, I know he will not. He will get in the habit of it with the scale right handy and the scale sheet close by.

The Chairman—Do you know what the expense of weighing milk for a herd of cows would be?

Mr. Hill—I will guarantee that it will not be over ten dollars a year.

The Chairman—I have heard folks talk about the trouble, so much trouble to weigh the milk, and I thought I would time the boys; I found that it averaged twelve seconds each weighing, that is, one minute's time weighed the milk of five cows, and they were not hurrying either, they didn't know that I was watching them. That in-

cludes recording it also, and they could have done it in half the time if they had tried.

Mr. Hill—I calculated that it took five minutes' extra time each milking, or ten minutes a day, not to exceed that on our twenty-two cows.

Mr. Heath—I tried weighing my milk with a pair of scales, and at the end of the season I calculated it was worth \$25; when the man weighed it I thought it was worth fifty.

Mr. Hill—I believe that the men are enough more careful in milking a cow to cover the difference in the expense.

Prof. Henry—What we are saying goes into history. I want to find out today how many dairymen in this room at this time are weighing the milk of their cows so that in the future we may know the progress of all dairymen along this line. Please raise your hands. Nine, I see. Now, they will talk about that ten years from now when there is another convention in this room.

Mr. Powers—Have you noticed a difference in the quantity of milk taken with changes in the temperature from warm to colder weather?

Mr. Hill—The weather doesn't effect them enough so that I can tell. I don't let them feel the weather. They go quite a little distance to the spring to drink, but they are out on inclement days not to exceed twenty minutes.

Mr. Powell—Have you ever noticed that you get less milk on colder days?

Mr. Hill—No, sir, if anything it is the other way. If the weather is brisk and smart they feel better, the same as we do, and they eat a good deal more.

The Chairman—I would like to ask a question to go with the other: How many dairymen here not only are in the habit of weighing the milk of their cows, but are testing it with the Babcock tester? Fifteen, I see.

Mr. Convey—I want to make a remark that may be of some value to this meeting. At one time in our herd

the milk fell suddenly about one-half in the amount of butter fat, and on enquiry we found that the herd had been disturbed during the day by parties that were inspecting with the object of buying.

Mr. Hill—Last year I read a paper at the State Dairymen's Association and I made the same assertion that Mr. Stiles made in his paper today, that the per cent. of fat increased, I thought, one per cent. as the cow got along further in lactation. I think that the highest per cent. of fat in certainly two-thirds of my cows this winter was shown within two months or within six weeks after they came in. I think that if they change at all after that, as many of them go down as up.

Mr. Brown—The cows exhibited at the World's Fair Dairy test fell about one per cent. on an average below what they had tested at home. A cow giving five per cent. of butter fat at home gave about four per cent. on an average.

Mr. Thorpe—I had some experience like Mr. Convey's. I didn't get over half the cream. I tested the skim milk and also the cream. The cream, when I only got half the amount, tested 36 per cent. When I got the full amount of cream it tested about twenty-two per cent.

Mr. Martin—How do you account for the fact of the cows testing more at home than at the World's Fair, Mr. Taylor?

Mr. Taylor—They were under normal conditions at home. When I am away from home and have my store clothes on I am under a strain, I get more tired. You remember those cows were driven up twenty or thirty or even forty times a day, and people were going back and forth all the time. If one tried to go to sleep, she was instantly wakened up; she was disturbed, not surrounded by her normal conditions, in a barn, upon dry feed. All these things pull down the butter fat. Our cows should be made extremely happy and contented, and then

they will respond to good feed, care and selection.

Mr. Hill—The cow from our herd in the World's Fair test was certainly one per cent. below what she was at home, and she has not yet got back to her per cent. of fat that she had shown the other two years of her milking.

The Chairman—I should judge from what you say that it was not safe for a man to be dairying without a Babcock test, and I don't know as it would be safe to keep house without one. How is that?

Mr. Hill—I can't say for keeping house. I know it wouldn't be safe for me to try to dairy without one. Of course, I have what I have got out of it in three years.

Mr. Taylor—It would be extremely unsafe to select a cow out of a herd where the owner had a Babcock test.

Mr. Carlyle—What was the highest individual test you ever got from one cow's milk?

Mr. Hill—8.4. She was not giving enough milk to amount to a great deal, about ten pounds a day. We have had fresh cows repeatedly test six per cent.

Mr. Carlyle—You don't know how high that 8.4 cow tested when she first came in?

Mr. Hill—She had been milked two years, she was a farrow cow. Six per cent. is a high test for a cow when she is fresh.

Gov. Hoard—When you hear men say that their cows test ten, twelve and fourteen per cent., do you believe it?

Mr. Hill—Why, yes, I have no reason for disbelieving it. I have heard of cows that made butter out of three and a quarter pounds of milk.

Mr. Taylor—Do you know that nature is retrogressive, and that if you give a strictly dairy cow a large quantity of butter producing feed, she will digest it and assimilate it and in order to get rid of it, it puts her into an abnormal condition and you get it in butter fat. These cows that are giving ten, twelve and fourteen per cent. of butter fat are in an abnormal

condition, and it is a dangerous condition in which to get a cow.

The Chairman—What was the highest test at the World's Fair in one day of any one cow?

Mr. Taylor—I don't know that I can remember exactly. Brown Bessie went 8.4 per cent. one day, and way down to 3.2 the next day.

The Chairman—There was one cow went above nine per cent.

Mr. Taylor—I think that was true. I would like to know where your fourteen per cent. cows come from.

The Chairman—I guess they are cows that were sicker than Brown Bessie was.

Mr. Taylor—That is right. A cow can give less milk, and it can be very rich. We have a cow that has been tested and makes four pounds of butter to thirty pounds of milk, seven and eight tenths (7.8) per cent. of butter fat during the week, upon actual test, and the butter agrees with that test.

Mr. Cronk—Are you not apt to find these extremes more in Jerseys than in other breeds?

Mr. Taylor—We find more extremes there I think than anywhere else, that is, an average in that extreme high level.

Prof. Woll—I think it may safely be put down as true that when milk tests above 7 or 8 per cent. there is something wrong with the cow or with the method of sampling. There are no records of chemical analyses having been made of carefully sampled milk that tested above eight or nine per cent. except where there was a specific reason why that cow gave that kind of milk. She may have been feverish and sick, or may have given only a fraction of a pound of milk. Normal milk from cows giving a fair quantity of milk will not run up to any such per cent. as 7 or 8 per cent.

Mr. Convey—We tested some very rich samples of milk in this state and have almost invariably found that such milk was produced from cows fed on a ration calculated to dry them up

so that while there was a rapidly decreasing milk flow, there was a higher per cent. of butter fat, so that these high tests are very often due to feeding an unbalanced ration.

Gov. Hoard—That is the kind of ration you must feed if you wish to dry up the cow.

Mr. Hill—There certainly has come this much out of the Babcock test, the day of weekly butter records exceeding forty pounds, made with the churn, is gone by. If I did not know it in any other way, I know it by the way men talk who come to our place to pick out a bull. There are five now where there used to be one asking how many pounds that bull's mother gave. They are going by the record more and more.

Mr. Remington—One of my neighbors is a graduate of Prof. Henry's school. I got him to come over and test my cows; he took the milk both night and morning and it run all the way from six to nine per cent. I don't know whether it was done right or not.

Prof. Henry—Get a test, my friend, and do it yourself; you can't afford to be without it.

Mr. Carlyle—What is considered the average test of a good cow's milk?

Gov. Hoard—The average test of eight creameries that we handle is about 4.3. There are a very large number of grade Jerseys and grade Guernseys.

A Member—Some time ago I was using a dairy of cows that were all of my own production, and I wasn't satisfied exactly in regard to whether I was doing the best I could or not, and I concluded to weigh my milk; I rigged a table and had a spring balance and kept a record during the year of what each cow gave. In summing it all up, I went up to compare with my neighbors; I told one what I had done and I found that nobody else was doing it, so I told this gentleman I wouldn't say anything about my experience in the meeting. However, he called me out and I told them

what my cows had done; there began to be a terrible rustling around in the Grange and whispering to one another, and I couldn't think what they were doing, but I finally found out that they were doubting my word, so I don't know that it is safe for a man to weigh his milk.

The Chairman—Some men have asked if the Farmers' Institutes paid the farmer. If they had never taught anything but the use of the Babcock test on the farm, they would have paid ten times over. There is one thing that has not been mentioned about this Babcock test, and I think it is going to settle a great deal of difficulty between patrons and directors of creameries. If every patron of a creamery would have a Babcock test and test his own milk he would know whether the creamery man was giving him credit for just what he brought in.

Mr. Tubbs—What is the cost of the Babcock test?

The Chairman—They can be bought very cheaply. I have been told you can get it for five dollars. It was invented as you all know by Prof. Babcock of our Agricultural College.

Prof. Henry—Already some of the creameries in New Zealand are paying the farmers by the Babcock test. Three weeks ago Dr. Babcock received a letter from London saying that a firm had just received an order from Australia for ten gross of the Babcock test bottles to be used by farmers there. Now, this is an invention of Dr. Babcock, which he did not get patented so that everybody could have it free, and our farmers ought never to doubt for one moment whether they ought to use it, right here in the home of Dr. Babcock, when already in far away New Zealand the farmers say they must have it, and Australian manufacturers are writing up to London to get the test bottles. There are probably forty creameries in Australia today paying by the Babcock test and probably six or eight in New Zealand. Now, to you farmers, right here in

Wisconsin, I will guarantee that every one of you who uses the test, will save all of your taxes each year that you use it, in the use of it.

The Chairman—Perfect butter scores 100 points. I have attended a great many State Fairs, not only in this State, but others, and also many meetings of Dairymen's Associations, and

I never saw any butter score 100 points until I saw it last summer at the Columbian Exposition, but butter was sent down there that was made in Wisconsin that scored 100 points and we are fortunate today in having the man here who made that butter that scored 100 points, or perfection.

HOW I MADE BUTTER THAT SCORED ONE HUNDRED POINTS AT THE WORLD'S COLUMBIAN EXPOSITION.

CHAS. LINSE, La Crosse, Wis

You will find by looking over the 21st report of the Wisconsin Dairymen's Association that the butter of seven exhibitors of our State scored one hundred points. You will also find that the butter of these exhibitors in no one instance scored alike in the different exhibits they made. This shows that we have not yet learned and discovered a standard rule which enables us to make an even grade of butter under like conditions at all times. It would hardly be reasonable to believe that the butter of these exhibitors that scored alike was made alike. This teaches us that the best butter can be made in different ways and under different rules.

What Skill Gives.

The mechanical skill in butter-making that is to give the butter the proper grain, color, and salting is not very difficult to understand, but to learn how to develop the fine flavor is a more difficult task. This flavor which insures to us the highest price for our butter is what we all are trying to produce. If we could lay down a standard rule by which the most delicate and highest flavor could always be obtained the problem would be solved.

To secure the very best results in

butter-making, three things are indispensable,—good milk, pure air, and the most scrupulous cleanliness. To obtain good milk, good cows are required giving us milk rich in butter fat, as butter of two and one-half and three per cent. cows will lack in grain if in nothing else. We must feed such cows good, clean and healthy food, for I hold that the food we feed the cows may not change the butter fat in her milk as to quantity but as to flavor. Such cows must be in a good, healthy condition, as the milk of a cow in an unhealthy and feverish condition is unfit for making fine flavored butter. Close attention must also be given to the flavor in the milk. If any of the cows in the herd for reasons unknown are out of condition, though all seem to be in full health and vigor, one of such cows may give milk of a disagreeable flavor, and very little of such milk is required to be injurious to a whole mess. Especially is the milk of cows near the end of lactation very often of a bad taste or flavor.

Must Keep Clean

That the flavor of milk can be impaired by unclean milking is indisputable. The udder of the cows should always be washed before milking. To

milk with dry or wet hands is a matter for each one to decide but it can be done cleanly either way. Speaking of wet hands I mean not dripping wet, but only moist. I hold that milking with moist hands is preferable to milking with entirely dry hands. Experiments have proven that in milking with dry hands more dust and bad substances have entered the milk than if done with wet or moist hands. It is also more pleasing to the cow, as a dry hand at milking is apt to irritate the udder to such a degree that she may withhold more or less of her milk.

Pure Air

Another important factor to secure a delicate flavor in butter is pure air. Pure atmosphere lacking in the place where butter is made, no first class article can be procured. It is therefore absolutely necessary to have a building for the purpose in question, entirely isolated from any dwelling house. A building 16 ft. square on the inside is large enough for a dairy for from 15 to 20 cows. A building built of stone half way under ground, located if possible on the north side of other buildings, or otherwise well shaded, is preferable, for it is of great importance to have a building cool in summer and easily warmed in winter. Such a building must be equipped with a stove and an air draught. A shaft 10 inches in diameter for an air draught of such a building is of sufficient size, and should begin at the level of the bottom floor outside of the building and extend upward about 6 ft. above ground, entering the wall on a level of said floor under ground, terminating and opening under the stove. The stove must be enclosed by a so-called jacket made of tin, leaving a space of about four inches between the stove on all sides of the jacket. On the opposite side from the stove in the room must be a brick chimney about 10 inches square inside, which must come down to the floor, leaving an opening at the bottom of said chimney of about 6 inches. Into this chimney

the stovepipe must run at proper height and be extended on the inside thereof to the top of said chimney. In this way a circulation of fresh, pure air may be secured whenever it is necessary.

Free From Odors.

The principle upon which this theory is founded needs no explanation as all modern houses are now furnished with ventilation on this plan. If I enter the milk room before breakfast, soon after the hired girl has been getting milk or cream for the same, I can tell without mistaking, of what my breakfast will consist, whether of buckwheat pancakes and fried pork, or ham and eggs or hash, as even the short time the girl remains in the same room is sufficiently long to fill it with the odors of the kitchen. It is an undisputed fact and we all know that milk will readily absorb all odors it comes in contact with. How can it be expected to make good flavored butter inside of a dwelling house.

Clean Surroundings.

The third of the most important factors in making fine butter is cleanliness. That cleanliness must be observed to start with in the cow barn, has been already mentioned. But even people who are moderately clean in the barn are way off in the milk room, and have no idea that they are. They think they have reached the height of cleanliness if they wash the cream and milk vessels with warm water, thinking they do an extra job if they give the cans a rinsing once in a while with hot water, by pouring a quantity of it from one can to another, and by the time they get through with a dozen or more the water is cold. That such procedure is entirely insufficient has been fully proven by experiments, as it requires boiling water to destroy all germs or bacteria. A good brush and soap must be applied when washing the cans and milk vessels. Special care should be taken to scour the seams of all tin vessels; they should then be scalded in boiling water in a

larger vessel instead of pouring the water from one can to another and so on. It is a good plan to have the vessel you scald your cans in on the stove and the water there is continually boiling while rinsing your cans. The churn should be well scalded and well aired, and the cover must never be left on the churn while not in use. These are only the gross outlines to be observed in regard to cleanliness in dairying.

Separating Cream.

There are different ways of separating cream from the milk. The best and most effective method applied in creaming, consists in the use of centrifugal force by the so-called cream separator. The next best system of creaming is setting the milk in cold water. If this is properly done, most all the cream can be obtained, unfortunately, however, not more than one out of a half dozen farmers will do it right. To secure a complete creaming by this method two things must be observed,—the milk must have a proper temperature, that is not less than 90 degrees, and the water in which the cans with the milk are kept for creaming must not be above 40 degrees. In very cold weather it is advisable to add to each can of milk from one to two quarts of nearly boiling water, for the purpose of restoring the lost heat in the milk. The skimming should be performed with the utmost care to prevent losses. The cream being of a thin consistency will readily mix with the milk if skimming is done in a hasty and awkward manner.

Ripening.

Having made sure of a good creamery building, and good cream, we will now proceed to make good butter. The butter our market demands is such as is produced from soured or so-called ripened cream, which must be allowed to attain a certain stage of acidity in order to develop the desired flavor. Here is a field of unsettled questions. What degree of acidity must the cream have reached to impart to the butter the finest flavor, is the most difficult

question in butter making. Having no established rules and measures by which to be guided in such questions, our senses, taste and smell are our only assistance, and considerable experience is required to ascertain the proper state of acidity in cream for obtaining desired results. It will be found that while the cream undergoes the different stages of acidity, its most pleasant taste is full developed when it has reached the turning point, of forming from the watery into a thickened creamy condition, and has the most unpleasant taste just before it reaches such point. Tasting milk just before its final congealing or thickening, will convince one that its taste when in that state is apparently the sourest and most unpleasant, this circumstance induced me to examine and taste the cream in its various degrees of ripeness to ascertain at which time it has reached its proper and desired flavor.

The Starter.

I use a so-called starter in souring and ripening the cream. To prepare this starter I take fresh skim milk, warm the same to 90 degrees, and keep it in a warm place until it has reached the required acidity. The mistake should not be made of undertaking to make such starter in your kitchen or in any room in the dwelling house, as the same disagreeable odor or bacteria will impregnate your milk as if you kept your cream there. Our learned professors tell us that these bacteria increase in number far more rapidly than a herd of Jersey cows, in fact small numbers of these individuals will increase themselves in a comparatively short time, so you can see that a very small quantity of such adulterated starter may and will impregnate a large mess of cream with its injurious matter.

Time for Ripening.

The time for ripening the cream I regulate to be from 18 to 20 hours. It is not necessary to churn every day. If cream is kept at a temperature of less than 50 degrees it can be pre-

served two or three days without injuring the quality of the butter. The different skimmings must always be mixed together in one vessel to secure an even ripening. In the winter I find that the cream must be warmed to a temperature of 60 to 70 degrees to bring it to a proper condition in the time above mentioned. In summer, of course, it is not necessary to heat the cream at all, but a different course must be adopted to accomplish the same result. A great deal depends upon the temperature of the room in which you keep the cream to ripen.

Amount of Starter.

About a half pint of the starter per gallon of cream is sufficient, and must be mixed thoroughly with the cream, which should be stirred gently as often as possible, during the time of ripening. The proper temperature for churning depends a great deal on the kind of cream you are churning. I found that the cream from the deep setting in ice water required a higher temperature than the cream I now get from the separator. I had to heat the former in the winter season about 64 degrees, while the cream of the separator requires only about 58 degrees in winter and less in summer. I aim to effect a churning in from 30 to 40 minutes, which I can accomplish by having the cream at the above mentioned temperature. The time of churning may be almost completely controlled by the temperature of the cream, which is not always understood by many of our farmers. If cream is churned too warm, the butter will lose the texture or grain and also some of its flavor. The loss in butter fat in the butter milk is also greater than if a slower churning is affected by churning the cream colder. When the butter comes and the granules have reached the size of wheat I stop churning. If after a short time of rest the butter milk will not flow readily I simply add cold water to the mass which always effects a good separation. After the buttermilk is drawn I float

the butter thoroughly with cold water; after this no more washing would be necessary if the butter did not get too hard in winter to be salted and worked. I therefore apply a second water less in quantity than the first time, and temper it to about 62 degrees which effects the desired condition. I do not practice salting in the churn, but use a common lever butter worker, on which I salt and work the butter. I believe too much salting, soaking and leaching the butter with strong brine has a tendency to carry away some of the fine flavor.

Salting and Working.

Great care must be taken in salting and working the butter, as over-working will damage the grain of the same. It requires considerable skill to do it right, and cannot very well be explained, but must be learned by actual practice. All instruction I can give on this point is, that the butter must be evenly spread over the butter worker in a layer not more than two to two and one-half inches in thickness, over which the required amount of salt must also be spread evenly. The first working of the butter is the most important. Only a small part thereof should be cut down with the lever at one time to prevent the salt from being packed into large quantities and divided unequally in the butter, as it is difficult afterwards, if such is done, to effect an even salting, and results in stars and stripes which are not so pleasant nor so much admired in the butter as are the stars and stripes of our country when floating in the air.

The proper amount of salt to be used depends entirely upon what your market demands, but always be sure of what you are doing and never use guess work. Weigh your butter, and salt, every time as nothing injures the butter market more than an uneven product, especially that produced by an uncertain quantity of salt applied.

Private Dairymen

In the aforesaid I have been trying to outline to my brother farmers to

whom this paper is addressed the chief principles in dairying in general and those of butter-making in special. Our learned butter makers would not listen to the advice of a common farmer. While I would advise the general farmer to stay with the creamery, I can also safely say that many an intelligent farmer might find a productive field to cultivate in making it a specialty to produce fine butter on the farm. The farmer is just the man who can accomplish this far easier than our creameries, which are depending partly upon the honesty and skill of others, but we should never lose sight of the fact that he can only be crowned with success if he is exerting all his energy to produce only the best that can be produced.

Discussion.

Mr. Gibson—What was the quantity of salt in the butter?

Mr. Linse—Half an ounce.

Mr. McKerrow—Spring water or well water?

Mr. Linse—I have well water.

Mr. Briggs—Isn't half an ounce pretty light for the general market?

Mr. Linse—I can't tell you anything about the general market. My butter all goes to private customers, who demand just this amount.

Mr. Martin—Do you work butter once or twice?

Mr. Linse—Once.

Mr. Martin—At what temperature should milk be when it is put in ice water in the deep setting process?

Mr. Linse—I have stated not less than ninety.

Mr. Martin—Was your butter separator butter?

Mr. Linse—Yes, I used the separator.

Mr. Briggs—Was the milk from which you made this butter from new milkers or old milkers?

Mr. Linse—They were comparatively new milkers. Twice I sent butter to the World's Fair which scored the highest in quality, forty-five points was what they gave me in flavor. The

first time I failed to get the forty-five points. I think it was because I had new milkers, and it failed to hold up the flavor.

Mr. Martin—What was your ration when you got forty-five points on flavor?

Mr. Linse—It was in summer, good June grass and white clover pasture. I will say right here that it even makes a difference in the quality of butter, the flavor, on what grass the cow will pasture. I have different pastures, but I always have the finest flavor when the cows run in this particular pasture where it is June grass and white clover.

Mr. Cullom—Did you make this butter from selected cows?

Mr. Linse—I took the butter out of my churn, twenty pounds, such as went to my customers, from my whole herd.

Mr. Gibson—Did you use ensilage in the winter?

Mr. Linse—I did. I have for twelve successive years. This winter I don't use any, because I haven't it.

Mr. Everett—if you damage the grain, do you not sacrifice flavor also?

Mr. Linse—I cannot see into it clear about this point. It seems to me that in judging butter, flavor is the first thing and the last thing we have to have in order to get a good price for our butter, and I don't see how it is possible when we are forty-five points in flavor that the butter should not have the proper grain.

Mr. Thorpe—Would you attempt to make a churning without a thermometer?

Mr. Linse—I simply couldn't make butter without a thermometer.

Mr. Masee—I inferred from Mr. Linse's paper that he obtained the flavor by the acidifying of the cream. I now understand that he looks somewhat to the freshness of the cows for the flavor.

Mr. Linse—And the feed too. The feed cuts a great figure.

The Chairman—I understand from the speaker that certain kinds of food

affect the flavor. Now, does pure air have anything to do with it; such as would not be found, for instance, in underground stables, not well ventilated? Can cows that breathe such air make good butter?

Mr. Linse—Oh, if the air is full of foul odors I wouldn't have my cows in such a place. Still about having milk set in the stable, you need not be afraid that this milk would take on these stable odors so quick, because you will not leave it long enough in the stable to cool down, and as long as the milk is at a higher temperature than the stable there is no danger of absorbing odors from the stable.

The Chairman—Don't you think that a cow breathing impure air will have the milk affected?

Mr. Linse—I have had no experience in that line, for my stable has pure air in it; a man can eat his breakfast there, plenty of ventilation. The theory is that cows will impart bad flavors to the milk through the lungs, so I don't know why impure air should not affect the milk, if it is in the barn.

Mr. Carlyle—How do you ventilate your stables?

Mr. Linse—I have a basement barn stable, but not in a bank. I have doors and windows all around, and I have two ventilators right through the roof, extending to the hay mows on each side of the barn. I have seen teams stop in a cold winter morning and look over to the barn and think it was afire, because these two ventilators are like two smoke pipes, smoking, showing that lots of this foul odor passes right away.

Mr. Convey—Do you gain in quantity or quality by the use of the separator?

Mr. Linse—Well, I think I gain in quantity, and I think a little in quality, too. I will tell you, I have made fully as good butter as I make now in the deep setting. I have also made fully as good butter in the open cans, but it was more difficult to make it, and I couldn't make quite as even a grade. It happened years ago once in a while a customer complained, he thought the

butter had not exactly the same flavor, but since I am using the separator, the butter is so uniform that my customers flatter me very often, and they say, "Mr. Linse, your butter is too good, we have to buy too much of it."

Mr. Woodward—When your cows go onto the grass in the spring does the flavor change?

Mr. Linse—Yes, it does, some of my customers like it, and some of them don't exactly. I had a customer fifteen years ago. When he first began to buy butter of me he wanted to salt down some butter in June. He says, "I want butter with June flavor, I don't like winter butter." I told him, "I can't supply you, because I don't make butter in that way, but I will bring you some butter that I will make in the winter." He has been my customer ever since.

Mr. Woodward—What breed of cows have you?

Mr. Linse—Grade Jerseys. I graded up my herd about ten or eleven years ago with full blooded Jerseys.

Mr. Woodward—Do you make better butter from those Jersey cows than you did years ago from the old cows?

Mr. Linse—I make a more firm butter, with a firmer grain. I am shipping butter to St. Paul in prints; have been doing this for four years. My customers demand it in square prints of two pounds, and that butter goes in common wooden boxes, not in a refrigerator car, but in an open car by express, of course. It has to stand this for twenty hours, a most severe test, and never a complaint was made yet, but that the butter got there all right. I guess I couldn't do that with the kind of cows I used to have.

Prof. Henry—Can you tell us how to modify that grass flavor in butter that comes in June that is sometimes a little offensive?

Mr. Linse—There are certain weeds that start a little earlier, and on the other side I guess the grass is in an unripe condition.

Mr. Cole—Would not grain modify that to some extent?

Mr. Linse—I do feed my cows as long as they have a mind to eat, I always feed them some wheat bran.

The Chairman—How would ensilage do towards modifying that?

Mr. Linse—I never had any left yet.

Mr. Everett—I don't know of any more important question than this one about proper air, and I want to ask this question: Does not the cow breathe in that carbonic acid gas in the act of breathing, and is not the blood provided by the act of respiration, and is not milk elaborated from the blood and thereby made impure by the impure air?

The Chairman—I don't know anything about carbonic acid gas, but I do know that breathing impure air will affect the milk. If you take some onions and bruise them and place them before a cow in her manger where she can breathe that scent, the milk will smell and taste of onions.

Mr. Carlyle—What kind of salt do you use?

Mr. Linse—I am using so far Ashton salt, the imported salt, but they tell me that there are American salts now just as good, and I am going to give them a trial. I think if we can have

the same good salt here we ought to use it.

Mr. Heath—How do you color your butter?

Mr. Linse—We color it with color in the cream every time. Add your color just before you commence churning, and it is a good plan to take the amount of color you are going to use and dilute it with cream first before you put it in with the rest of the cream. I have been using The Hanson's butter color for some time.

Dr. Porter—Do you color it high or medium?

Mr. Linse—Medium. There is a lot of butter spoiled by too high coloring.

Mr. Carlyle—What is your reason for keeping grade Jerseys?

Mr. Linse—I have no particular reason only I am not a breeder. To improve my herd in those days when I started in I couldn't reach down far enough in my pocket-book to buy those high-priced cows, so I selected the best milkers I had and got a good sire, and I have a good herd of cows now. Some of them you might call high grade, though I have not registered them.

DIRT IN THE DAIRY AND WHAT IT DOES FOR MILK.

Prof. H. L. RUSSELL, Madison, Wis.

The subject that I have to present to you today is in no sense a new one, but one that every one of you knows to be fundamentally true.

Practically every man interested in dairy pursuits knows full well that cleanliness is a cardinal factor in successful dairying; that without it a man might have the best breed of cattle and other conditions of the very best,

but if he allows filth to accumulate in his dairy he loses all the advantages that he has gained in other ways.

Now, purely from the standpoint of actual experience, the importance of cleanliness has long been recognized in dairy pursuits, but today I wish to present the reasons why cleanliness is of such great importance in connection with the keeping qualities of milk.

Experience and Knowledge.

We may learn a thing from pure experience and know that it does happen as a fact, but the why of the thing enables us to broaden our conception of the fact and also to bring it into relation with other facts.

In other words, a scientific explanation of an ascertained truth enlarges the basis of its application, and allows the investigator as well as the practical worker to approach his work in a much more satisfactory way.

This has been shown most conclusively in regard to the fertilizing properties of clovers. Their ability to restore the fertility of impoverished soils has long been known, but now we know that this property is due to the minute bacteria that are enclosed in the tiny swellings on the roots.

Recognition of this fact, and a study of these organisms, and the conditions under which they grow enable us to intelligently use clover as a fertilizer. Clover without these tiny swellings is of much less value relatively than that which contains them.

The same is true with the conditions that affect cleanliness in the dairy. When we study the effect of dirt upon milk we find that it is not the dirt itself, but what it contains that is of detriment to milk.

Bacterial Life.

This "invisible" dirt as we may call it, is nothing more or less than the bacterial life that adheres to the dirt particles that come in contact with the milk after it leaves the cow. Milk in the udder of the cow is perfectly free from germs. If we could secure it in the same condition as it is in the cow it would remain unchanged for an indefinite period of time, but owing to the prevalence of bacterial germs this is impossible.

Souring of milk is so constant a phenomenon that we consider it inevitable, but this is really not so. If we prevent the entrance of, or kill out the organisms that bring about this process, milk will remain sweet any length of time.

A recognition of this fact and the conditions that favor the souring, that is to say, conditions that favor the opportunity for germs of all sorts to get into milk, would stop a great deal of loss that annually occurs under our present system.

Bacterial life is so omnipresent that we cannot entirely exclude it from milk or from any substance except under special conditions, but we can do it, and that is what we should strive for.

Changes Produced.

Not only is the souring of milk produced by the entrance of foreign organisms, but all of these disorders that are to be noted in milk at one time or another, such as ropy, stringy, sliry, bitter, red and blue milk are due in great part to the action of these infinitely small germs that in some way gain access to this fluid. Now, our duty as dairymen is to prohibit as far as possible the entrance of these germs. Milk is so admirably adapted for the growth and propagation of all forms of bacterial life that if germs once gain access, they grow and thrive enormously. Therefore it is necessary that we should keep the seed from getting into such a fertile soil.

Factors of Contamination.

Today we will discuss the several factors that enter into the contamination of milk and see what relative value they have, and how far it is possible for us to get rid of their influence.

There are five factors that are of prime importance in accounting for the bacterial content of milk. They are as follows:

1. Contamination from unclean milk vessels.
2. Dirt from animal and milker.
3. Dust in the air.
4. Bacterial life present in the fore milk.
5. Influence of temperature in governing bacterial growth.

We will consider these five elements

in their order and note the effect that each one of them has upon the changes that take place in milk.

Contamination From Milk Vessels.

While vessels in which milk is received and stored may be clean as far as the visible dirt is concerned, by far the great majority of dairymen do not clean their dairy utensils so that the bacterial germs are entirely gotten rid of. Consequently when milk is milked into such pails the germ life that adheres to the walls and are enclosed in the minute cracks and joints of the pail find in this warm, rich, nutritive food medium the very best conditions for growth.

How to Clean.

Milking pails may be cleaned in hot water; they may even receive scalding or boiling water for a short time but in the way in which this is ordinarily applied it is quite insufficient to kill out the resistant germs that are always to be found in these vessels.

Milk pails made of wood should never be used. Pails of tin or galvanized material should be used because they can be readily cleaned; then too, the cracks and joints should be filled with solder to effectually exclude this dirt catcher and its contained germs.

Under ordinary conditions the milk derives a larger proportion of its bacterial population from this factor than from any other. The effect of this factor I have repeatedly demonstrated by milking the milk of a cow partly in a sterilized pail and partly into one cleaned in the ordinary way. The number of bacteria in a c. c. (cubic centimeter) have been greatly reduced and if the milk was set under similar conditions and allowed to sour in a perfectly natural way, the milk from the sterile can remains sweet from six to twelve hours longer.

Not only must the milking pail be thoroughly sterilized, but all other vessels that come in contact with the milk must be as carefully cleaned.

Strainers, cans for creaming, factory cans, dippers, all should be immersed in boiling water or preferably subjected to the influence of boiling steam for twenty or thirty minutes. This procedure will suffice to kill out the different forms of germ life that are to be found invariably under such conditions, and will often be the means of saving the owner from considerable loss and inconvenience.

Dust Contaminates.

Another fruitful source of contamination arises from the dust and dirt that gets into the milk directly from the animal and the person of the milker. Dust and bacteria are invariably associated. Where dust is found we also find germ life, and as the conditions to transport are so favorable, more danger is to be attributed to the influence of dust than presence of moist surface. Bacteria cannot be dislodged from a moist surface, so that as long as the body is wet, no matter how rich it may be in germ life, it is impossible for it to part with any of its contained bacteria.

Now, in the coat of the cow, and on the skin, germs are to be found in myriads. These are derived from the particles of excreta that adhere to the flanks of the animal, and may have adhered to the under parts in passing through a stagnant pool in the pasture. In many ways, germs of all sorts get into the coat and there find a refuge for the time. When dry, they are easily dislodged and every movement of animal or milker must of necessity cause them to fall to the ground.

So in this way, there is a constant rain of spores and germs into the open pail during the process of milking. Every hair and particle of dirt that is dislodged and falls into a milking vessel is the bearer of scores and hundreds of individual germs. It may be said that these are strained off before the milk is set away, but this makes little difference. This is not done until they have accomplished their work.

The adherent germs are washed off in the rich nutrient medium, and the straining process simply removes the visible filth and dirt that is objectionable to the eye. The invisible germs pass any strainer and continue their growth unchecked.

What is true of the animal itself, is likewise true of the person of the milker in a somewhat less degree. Dirty hands and dust-laden clothes are as effective agents of distribution of germ life as any other.

How to Check Falling Dust.

Is it possible to check in any way this constant deposition of germ life? We know that bacteria cannot be dislodged from a thoroughly moistened surface, and the knowledge of this fact is of value in this connection.

Experience has taught many dairymen that thoroughly washing the udder of the cow is of value in keeping the milk pure and clean. This process is to be thoroughly commended and the application of warm water to the udder and to the under parts and flank of the animal is a most effectual means of preventing the dislodgment of bacteria in the hair. We cannot prevent entirely the hairs from being rubbed off, but actual experiment shows that the number of germs may be very greatly diminished. We have experimented upon this point in order to determine just exactly what influence was to be noted when milk was received in these two ways.

Covered glass dishes containing a thin layer of sterilized gelatine were exposed for sixty seconds underneath the cow during milking, and then protected so that the germs which were deposited upon the moist surface developed into little patches that were visible to the eye. By actual count the number of germs were determined, and the result was as follows:—

Large Number of Germs.

Under a cow with thoroughly washed udder and belly, 560 germs per minute would fall into a 10 inch pail under ordinary conditions, the

cultures revealed the presence of 1,700 germs per minute as deposited. Taking the average length of milking as five minutes there was in this instance 2,800 organisms introduced when precautionary measures were used against 8,500 under ordinary conditions. Of course this number is not constant, and would vary greatly, depending upon many conditions, but there can be no doubt but that the actual number of germs may be diminished from 1-2 to 2-3 by the exercise of this simple precaution.

Conditions of Air.

We come now to the consideration of another factor that has an undoubted bearing on this same question, and that is the influence of the air of the barn. Bacteria are always present in the air, but usually in still clear air in small numbers, only however, in dust laden air the number is materially increased. Therefore, all of those conditions that favor the raising of dust, of necessity increase the germ contents of the air so that the practice often in vogue of feeding hay and straw or bedding the animals immediately before or during milking is to be deprecated. The different forms of germs adhering to the dust particles settle by gravity into milk vessels that are at all exposed to this influence. Often forms that are particularly common on hay and straw and have an especially deleterious influence in milk gain access to the fluid in this way. This factor enters into the consideration of the question of the contamination of milk, but is not as important as the preceding influence. The influence of this can be largely diminished by the removal of the milk from the barn and by feeding the stock subsequent to this removal.

A Bacterial Incubator.

Milking as ordinarily done, even in the most efficient manner never withdraws the entire mass of milk. A few drops will remain in the lower part of the milk ducts in spite of all ordinary precautions. The opportunity

of contamination of these few drops with the outside is inevitable and we have always in the lower end of the milk duct a veritable incubator in which the bacteria have the best possible conditions for growth. There is warmth, food and moisture, so that they increase greatly, and are in a rapidly developing condition at the time of the next milking. When the cow is next milked, these bacterial masses are milked into a pail and consequently infect the whole milking. These forms being in a rapidly growing condition on account of their excellent surroundings are able to increase much faster than those germs that gain access in a resting or spore condition such as those from the hay or straw. The milking of the first few streams from the teat washes out the great majority of them, and will decrease this factor of contamination considerably.

To these four factors are to be charged in large degree the contaminations that get into milk and inevitably bring about such a complex series of changes. The number of organisms that gain entrance is legion, and the number of different species is considerable.

Good and Bad Forms.

Some forms are good, that is, produce desirable flavors in milk and butter, some are different and some are positively bad. Now milk is an acceptable food medium to a noxious as well as a beneficent form, consequently the only thing we can do to prevent the entrance so far as we can of all kinds and then if we desire we can aid special forms that will bring about desired results. If the cheese maker wants lactic acid forms to ripen his milk the dairyman does not, for this destroys his product, and it is far better for the cheese maker to control his milk by adding a starter and thus "boss the acid" than it is to let the acid "boss him."

The utmost care that we can take will not enable us to secure milk perfectly free from germs. In spite of

our best endeavors bacteria will gain an entrance, but we can largely reduce the number so that the milk instead of coming to the factory sour will remain perfectly sweet for a much longer period than ordinarily.

Of the four factors we have mentioned there is a difference in their relative importance. Contamination from the milk vessels is by far the most important; next to this come the germs received from the cow and milker, next the influence of the fore-milk and probably the least is the influence of the barn air. All four of these factors are more or less under our direct control; some of them entirely so.

Best Conditions.

The first, impurities from vessels, can be entirely overcome by sterilizing thoroughly.

The second can be greatly diminished by thoroughly wetting the under parts of the cow and washing with water and soap the milker's hands. The udder should not be left dripping wet, but should be wiped off. The point is to thoroughly moisten the surface of the cow to prevent the dislodgment of dust particles.

The effect of the third factor cannot be entirely nullified, but by proper ventilation and taking care that no unnecessary dust is raised during the milking, the influence due to this can be greatly diminished. Rejection of the fore milk will require the influence of the fourth factor, but will not entirely do away with it, but an intelligent application of these suggestions will enable any farmer to prolong the period from one to three days in which milk will remain sweet.

Temperature of Milk.

One other element governs the bacterial impurities of milk so much that it should be mentioned here, and that is the relation to temperature.

Temperature is so important a point in the development of bacteria that it cannot be overlooked. Their rate of development is so rapid, and growth

takes place so much faster at an elevated temperature within certain limits that the presence of relatively few organisms in a rich food medium like milk will very soon contaminate the entire lot.

Decrease in temperature will delay the souring process and this is because the bacterial development is checked. Now in order to keep the germ life that under the best conditions will inevitably gain access to the milk it is necessary that the temperature of the milk be reduced below the growing point of the germs. Many of the bacteria that gain access to the milk during milking are in a resting or spore stage. In order for them to germinate it is necessary that the temperature of the fluid be above the point of germination. Therefore, if the milk is immediately cooled, the temperature of the fluid falls below the growth point of many of the germs and their development is held in abeyance, and the milk retains its sweetness for a much longer period of time.

Cannot be too Careful.

What I have recounted at such length is no new story to many of you, yet I trust that the exposition of the why these conditions are of value in keeping milk in a pure and normal condition may not be amiss. Certainly we can't be too careful in regard to cleanliness in handling milk. No substance is more susceptible than this to outside influences, to change brought about by decomposition, to taints and odors absorbed from the exterior, so that the lessening of every factor that increases the impurities in milk is a result devoutly to be desired.

Discussion

Mr. Convey—It has been asserted a number of times that where milk was of a higher temperature than the surrounding atmosphere, it would not be contaminated with odors from the barn.

Prof. Russell—That is so with reference to the odors, not so with reference to bacteriological contents.

Mr. Carlyle—Don't those bacteria injure the butter?

Prof. Russell—Not necessarily. You may have favorable forms present in that air. You may have, of course, undesirable ones. The only way is to exclude them all and then introduce what you want afterwards.

Dr. Porter—Can you furnish us bacteria that will give a good flavor to the butter?

Prof. Russell—Yes, sir.

Dr. Porter—How long can we keep those?

Prof. Russell—It depends upon how clean you keep your milk. You may be able to keep your milk for one churning only, or for longer. Thoroughly sterilize your vessels and keep that condition as long as you possibly can. The ideal starter is that the bacteria produce just the flavor you want. There are samples on the market already. Some bring the right flavor and others do not. The whole subject is so new that we are only just beginning on it.

Dr. Porter—Could that starter be placed in skim milk?

Prof. Russell—Not unless it has been previously sterilized the germs killed out of it. Of course, if you introduce it in ordinary skim milk, you introduce it in competition with hundreds of other organisms, and you carry those others into your cream just the same as your starter.

Mr. Carlyle—Are there bacteria in cream that cause foaming of the cream in the churn?

Prof. Russell—That I don't know. The ferment gas of course is due to bacteria, and if this foam in the gas is due to ferment gas, it is more than likely that it is bacteriological in its nature.

Mr. Convey—Does the aeration of milk retard the souring of it?

Prof. Russell—That is a moot question as yet. I cannot see what effect the aeration of milk would have

upon the lactic acid organisms. It is claimed, however, that it does affect it.

Mr. Faville—Do I understand you to say that the milk from a healthy, normal cow is pure?

Prof. Russell—In the udder it is perfectly free from germs.

Mr. Howard—How low a temperature is it necessary to have to keep out germs?

Prof. Russell—A lower temperature than you would be able to employ in any dairy. They can be checked at a temperature of forty to forty-five.

Dr. Porter—Have you ever found germs of tuberculosis in milk?

Prof. Russell—It is possible they have been found coming from animals diseased with tuberculosis.

Dr. Porter—Have you ever discovered those germs in your researches?

Prof. Russell—We are carrying on a series of experiments at the Station just at present. We have not found any as yet, but I do not know what the result of the experiments will be.

Dr. Porter—Is it practical for me to determine by the use of tuberculin whether my herd is affected by tuberculosis?

Prof. Russell—I think it is.

Dr. Porter—Is there any danger of giving the cows tuberculosis by the introduction of tuberculin?

Prof. Russell—No, sir. It is only the extract of the tuberculosis, not the tubercles themselves.

Mr. Convey—How do you sterilize skim milk?

Prof. Russell—Heat it at a sufficient temperature to kill out the germs,—in other words, boil it, say for forty-five minutes to an hour. The probability is that a few spores may remain even then, but it is not necessary in this case to deal with it as carefully as in our culture system, because you use your starter in a short time, and you put in so many more that you have all you want.

Mr. Thorpe—Do you suppose that this idea of introducing the right bac-

teria will ever come into general practice?

Prof. Russell—I do. It has very decided advantages. It possibly may not make a better product, but it will make a more uniform product, because you will use the same ferment right along; you generally get good butter, but not always. It is going to make a better keeping butter; possibly not a better flavored butter than the best butter-makers make. The off-flavors in butter are eliminated by this process.

Dr. Porter—Do you believe that separator cream is more free from bacteria than other cream?

Prof. Russell—No, sir. A drop of that under the microscope shows millions of these organisms. Part of them go with the slime, and part of them seem to attach themselves to the globules of fat in either process.

Dr. Porter—Does the starter separate the tubercular germs?

Prof. Russell—Yes, they go with the slime and are not found in the cream. They are slightly heavier than most of the other forms of bacteria and it is supposed for that reason that they go with the heavier substance in the milk.

Dr. Porter—In order to use this particular culture would it be necessary to sterilize your new milk?

Prof. Russell—Yes; otherwise you would only introduce a small amount of good forms in with a much larger number of other kinds.

Dr. Porter—To make better butter then we must first pasteurize the cream

Prof. Russell—Yes, heating it to about 150 degrees. That will kill out about 99 per cent.

Dr. Porter—Does the skimmilk run through the separator contain many of these germs of tuberculosis?

Prof. Russell—It depends upon the condition of your milk. If the milk is badly affected there is a possibility of it. If the milk is sterilized, then, of course, it is perfectly harmless.

Mr. Thorpe—Where are they when the cream is raised by the deep setting process?

Prof. Russell—They go with the sediment in the bottom; being heavier than the other organisms, they have a tendency to settle downwards. They are much more liable to be found in the skim milk in that case than in the separator skim milk.

Mr. Thorpe—Won't it injure the butter to heat the cream to 150 degrees?

Prof. Russell—You can heat the cream sufficiently high so that it gives a cooked taste to the milk and then by rapid cooling down to a low temperature, the cooked taste is lost and experts are unable to tell the difference between the two creams. With the temperature at 150 degrees Fahr. there will be no cooked taste, and that is sufficient to kill out the growing bacteria, not the spores.

Mr. Thorpe—How long would it take to kill them out?

Prof. Russell—About fifteen to twenty minutes.

Dr. Porter—How long does that milk keep sweet?

Prof. Russell—It depends upon how it is treated afterward. If it is cooled down below the germinating point of these organisms that remain in the milk, and then put in a cool place and kept there, it will remain sweet for a week.

Mr. Carlyle—What is the distinction between pastuerizing milk and sterilizing?

Prof. Russell—Pastuerizing means heating it up to a point a little below

the scalding point. Sterilizing means heating to a boiling point. That will destroy all germs, if retained for a long enough period, say one hour, or perhaps thirty minutes is sufficient to kill them out, but in order to be absolutely certain you must continue it an hour or an hour and a quarter.

Dr. Porter—Are we in danger of contracting the disease of tuberculosis from cows?

Prof. Russell—I think no special danger. We certainly have not any more tuberculosis than we did have before we knew so much about it. Adults very likely do not take tuberculosis from milk so affected. There is a possibility that it may be contracted in the case of children where they take cow's milk for a large portion of their food. Of course, the infection takes place by way of the intestinal canal. Usually it is through the lungs.

The Chairman—I understand that there are certain bacteria that get in the milk that produce good flavors and others that produce bad flavors. Now, I have heard it claimed that it is possible that our barns or other buildings would get stocked with some form or brand this good breed of bacteria so that butter made from that form would invariably have better flavor than from other forms where the conditions were the same.

Prof. Russell—That is very possible, although the converse of that is more possible, that they get stocked with bad forms, because you will find filth in so many of such places which will produce the undesirable kind.

SOILING.

RHODELL CROSSFIELD, Ft. Atkinson, Wis.

Mr. Chairman, Ladies and Gentlemen: My subject today is soiling. I am a dairyman and the son of a dairyman. The first work I can remember of trying to do was to milk a cow, and what I am going to tell you is actual personal experience, no proxy work about it, my figures are all deducted from actual weights and tests, no estimates, and no guess work. If a man comes to us to buy a cow we can show him just how much milk she has given each milking in the last year, and how much butter it would make by the Babcock test; how long she went dry, when she will come in again, how old she is, and of what breed.

We do not make any pretensions to large results nor large profits, are not extremists in any sense of the word. We have a farm of 95 acres, all told. 20 acres of this is rather poor marsh, 10 acres covered with thick timber, and 5 acres occupied with buildings and yards, garden, etc., leaving 60 acres of tillable land. We find by actual measurement that we plow just 58 acres.

Good Showing.

On this 58 acres we are keeping 41 head of cattle and 7 horses and colts, making 48 head, besides hogs, and we manage to keep so much stock on so few acres by a system of feeding known as soiling. We buy no coarse feed and no coarse grain, but we do buy bran, middlings and oil or cotton seed meal to feed to the cows, and would do that if we had but five cows or only one. Now, I am here to tell you how we do the soiling.

I will commence in the spring, but to do so I must go back to the fall and latter part of the summer before, when we sow, as early as we can, a good lot of winter rye, and a small piece of win-

ter wheat, 1 or 2 acres, the rye usually makes some fall pasture. In the spring as soon as the rye starts enough to make a bite and the land gets in condition, we turn the cows on and let them eat it as fast as it grows until we want to plow the land for spring crops. Besides this we have a small piece of rye and the winter wheat where it does not get pastured at all.

Rye First.

As soon as the rye gets large enough to mow, which is a little before it begins to head, usually from the middle to the last of May,—we commence to cut it and draw it in the barn and feed it to the cows. Rye will do to feed about ten days or two weeks, when it gets so old the cows don't like it. By that time the winter wheat is ready to feed. This will remain good until it gets ripe, by the time the wheat is gone the oats are ready; these with the green clover and some millet or hungarian takes us through until the corn is old enough to feed, which, with the aid of the silo keeps us in green feed the rest of the year.

Please bear in mind that we have good corn ensilage, oats in the bundle and our boughten feed (bran, etc.) to feed with this green stuff; cows would not do much on such green slushy food alone. I will say here, the ground we cut the green rye off from we turn over and plant to corn, and have never failed of getting a good crop to put in the silo, and the ground we cut the winter wheat from is sown to millet or hungarian and usually we get a good crop.

Now, a few words as to how we raise the rest of the feed for our stock. As I said before we have about 60 acres, in round numbers, to till. We raise 30

acres corn, 15 acres oats, and 15 acres clover. With two crops of corn in succession this makes us a four year rotation. 20 acres of the corn is planted in drills thick, 1-2 bushel seed per acre,—planting three varieties, Flint, common Dent, and what we know as the Salzer corn, which is a very large and late variety, grows tall, is very leafy, also ears well when planted thick. We do this to get a succession when we fill the silo. We can commence filling early on the early corn, and when we get to the last variety it has had the full length of the season to mature.

Filling the Silo,

In filling our silo three men and three horses do all the work and it takes from three to four weeks to put in the corn. Our silo holds 280 tons (silo rule) and we have been trying for a number of years to fill it from 20 acres of corn, but have never had it quite full yet and never had quite enough ensilage to feed the year round; but we are not discouraged, and are going to keep right on trying. I think, with the practical experiences that I have heard at the Farmers' Institutes this winter, the day is not far distant when we will have our silo full and feed ensilage the year round.

The other ten acres of corn are planted in check rows, and husked to feed the pigs, horses and chickens. The stalks are run through the feed cutter in the winter and fed to the cows.

The oats are cut just as the top kernels are turning ripe and the straw is yet quite green. Cut with a self binder, bound in small bundles, and set up two and two and capped, taking a good deal of pains to set them up and cap them good as it takes them a long time to cure through. When thoroughly dry they are stacked close to the barn, right on the ground, two loads in a stack, and drawn in the barn a stack at a time as wanted to feed; this is to prevent the mice working in them.

Clover.

The clover we make into hay the best we know how, using hay-caps and curing mostly in the cock, and feed to the cows during the winter in connection with the other feed.

As to the results of all this I will say; we have a good place to live and about all the comforts of life we want, and we are not obliged to figure very closely on the cost. We have a tenement house and hire a man by the year, so we are at liberty to go to the Fairs, Farmers' Institutes and visiting occasionally. We drive pretty good horses and good buggies, and have good farm machinery. In fact, we are rather independent, owe no man a dollar and manage to get ahead a little every year.

Discussion.

Question—Do you keep your cows in the barn in summer?

Mr. Crossfield—I think we do not keep them in as much as we ought, for it seems rather hard to put cows into a dark basement stable when the thermometer is 100 degrees in the shade, but I do believe the cows are better off in the stable when flies are bad.

Our cows are put in at 4:30 o'clock in the morning and turned out about 7 or 8 o'clock. They will go off into the woods and pick around until the middle of the afternoon when they come down and are put in the barn at about 3 or 4 o'clock and turned out again about 7 o'clock in the evening. They are shut in the barnyard over night. All the time they are in the barn they have feed in the mangers,—clover hay, green oats and whatever is in season. The stables are darkened with curtains.

Question—Do you use any of your land for pasture? If so, how much?

Mr. Crossfield—Our cows run over all the farm when no crops are growing, but we grow one and two crops on all our farm except about 25 acres. Five of this is occupied by buildings. Of the 20 remaining acres ten are covered

with thick second growth oak, 5 are boggy marsh and 5 are land bordering on the marsh. The woods grow no grass except a few places where the trees are thin. Only about 1-3 of the marsh grows grass, the rest is cow paths and mire holes. The other 5 acres furnishes June grass pasture. As I stated in my paper we have some rye pasture in the fall and spring. We do not depend upon pasture at all.

Question—What kind of oil meal and how much do you feed per cow?

Mr. Crossfield—We feed about two lbs. oil meal a day per cow during the winter. In the summer we don't feed any oil meal. We use the old process oil meal.

Question—Do you feed ensilage all through the year?

Mr. Crossfield—We have never been able to have ensilage enough to keep through the summer. I can't see but what it keeps very well. It will spoil some in the corners. The latest we have had ensilage to feed was July 10th; this year we fed the last June 20th. It was just as good as ever except in the corners and near the sides. I think with a smaller and deep silo it will keep all summer.

Question—How do you handle the manure?

Mr. Crossfield—The manure is applied to the clover sod during the winter and spring before it is plowed for corn.

Question—After your trial are you satisfied that soiling is the best system of feeding for you?

Mr. Crossfield—We are satisfied that by this system of soiling is the only way we can keep cows enough on a small farm to make it profitable. If we should go back to the old way of pasturing it would take our whole farm to furnish pasture during the summer, or else our herd would have to come down to 7 or 8 cows.

Prof. Henry in the Chair.

Prof. Henry—Ladies and Gentlemen:—In bringing our meeting to a

close we will first have the report of the committee on resolutions.

The Committee on Resolutions offered the following report which was read section by section, and each resolution adopted as read:

1. Resolved, That the coming Legislature of Wisconsin is hereby requested to enact a law similar to that now in force in the State of Massachusetts whereby the manufacture or sale of all imitations of natural butter or cheese in color, form, or name, is strictly forbidden under proper penalties.

We have no objection to the sale of oleomargarine or butterine if done on its own color and on its own merits, but we demand the protection of law for both producer and consumer against the sale of all imitations of dairy products which are counterfeits.

2. Resolved, That the Members of Congress from Wisconsin are hereby requested to support and assist in the successful passage of the bill now before the United States Senate offered by Senator Hill whereby all imitations of honest butter and cheese may be placed under the police jurisdiction of the several states.

3. Resolved, That we hereby express our thanks for the kind attention of the citizens of Menomonie, and for the pleasant drive they gave us to the County Asylum and to the Capt. Tainter Stock Farm.

4. Resolved, That while we have been entertained with most generous hospitality by the citizens of Menomonie during our stay at this closing Institute, we must at the same time thank Capt. Tainter for his magnificent gift of Memorial Hall to the city of his adoption, in providing a building so perfect in all its appointments. And to the trustees of the Stout Manual Training School we also extend our thanks for the opportunity given us to visit that most excellent institution of industrial education, which in many respects has made advance over former systems, and we commend its management to the school boards of

our towns and cities, and especially the generosity of Messrs. Stout and Tainter to the thought of men of wealth to found more of such institutions as monuments to their memory more enduring than that of marble.

5. Resolved, That in the death of J. M. Smith we as farmers and horticulturists of the State of Wisconsin have lost a true friend and honored citizen of this commonwealth, and though his life work is ended and we deplore his loss, yet we feel that the life and character of a good man never perishes, so we who knew him best in the intimate relations of life would commend that type of manhood which made him dear to us and his name to be revered as one whose life was full of justice, truth and integrity, as an example to every young man. And as the most prominent horticulturist and market gardener in our State whose name was always a bond, never discounted, wherever the work of his hand was known, so in promoting the work of Institutes in every way possible, often at much sacrifice on his part, we, as Institute workers, personally extend to his devoted wife and family our kindest heart-felt sympathy in this hour of great bereavement.

And be it further Resolved, That a committee be appointed to prepare a memorial to be published in the Bulletin with his portrait, and that a suitably bound copy be presented to his family.

6. Resolved, 1st, That we deeply deplore the untimely death of our late Superintendent Wm. H. Morrison. He was an able leader, an efficient organizer, and a wise counsellor. To him may be traced the efficiency of the Institute work in our State, and to which we point with pride, deserving as we believe the emulation of our sister States. He ever watched the farmer's interests and guarded with the greatest fidelity any retrenchments upon fostering legislation. We miss his genial face and wholesome enthusiasm. We accept the decree of the

All Wise, and hope that He will raise up one who may in some fair measure carry on the work he has so nobly begun and maintained.

2d. To his wife and family we offer our deep sympathy and condolence in their bereavement, hoping that time, the great heart cure, may yet give them years of health and happiness.

3d. Resolved, That a suitable memorial be prepared for the next Bul-embracing likewise a portrait of our late friend and benefactor.

H. C. TAYLOR,

B. S. HOXIE,

A. A. ARNOLD,

Committee.

On the offering of the last resolution, Gov. Hoard moved its adoption in the following words:

Gov. Hoard—Mr. President, as one who has had something to do with the early organization of this Institute work, as one who was intimately acquainted with the personal characteristics of Mr. Morrison, as one who believes that the glory of a State is best seen in the glory of its manhood and particularly its farming population, as one who believes that, when a man has done a fair and honest day's work, there should exist for him in the hearts and minds of the men who have labored with him an honest meed of justice, as one who believes that that surcease of sorrow that comes to us in sweet death is but the crown to a large reward in the hearts of our fellows, if we have done our duty, I move you, sir, the adoption of this resolution by the standing vote of this Institute.

The resolution was unanimously adopted by a standing vote.

Prof. Henry—Ladies and Gentlemen:—It would be too bad to part and go to our homes in all distant parts of the State and back to our farms without a just word from some of these friends who have come a long way to be with us. Now, we none of us believe much in in-breeding, and to get thoughts, to get ideas from

others living at a distance is sometimes the happiest thing that comes to us, and in keeping with this I wish to call for a few remarks from Mr. Geo. T. Powell, of Ghent, New York, who, happening to be in the West at this time, very fortunately for us, is with us. Mr. Powell was recently the superintendent of the New York Institutes. We have but two minutes for each speaker, but I am sure you will be glad to give those two minutes to Mr. Powell.

Mr. Powell—Mr. Chairman, Ladies and Gentlemen:—I can hardly represent in two minutes the great pleasure it has given me to meet with you today, and mingle with the deliberations of this Institute, with the most admirable program which has been carried out at this time. One of the surprising things that has attracted my attention while being away for a short time in your great Northwest has been the large attendance of young men that come to these Institutes. When I come to stand upon this platform and mingle with the men who have helped to put this great privilege into the hands of the young men of the West, it gives me double pleasure to stand here with your honored citizen, the apostle of improved dairying of Wisconsin, Gov. Hoard; with Prof. Henry, who has done so much to advance scientific and skillful agriculture in your State, and to stand in the borders of the State which has produced that grandest of citizens, Theodore Lewis, the apostle of the hog; furthermore, when I have listened from this platform to such intelligent presentations of questions as have come from the young men who are the graduates of your Agricultural College, who, instead of going to some city to engage in business, have gone upon their Wisconsin farms and put into their work the intelligence gained in their College, I think that it is the most hopeful sign of the times for the great West, the splendid work that has come from your Agricultural College.

Yesterday while sitting at the table an intelligent German sitting by me said, "If I send my boy to the Minnesota Agricultural School would I lose him or not? He is the only boy I have got. I don't want to lose him from my farm." I said, "My friend, what kind of farming are you carrying on?" Well, he said he was raising wheat. I said, "Send your boy to the school, my friend. Let him become skillful in agriculture, and when he comes back he will pull you out of this hole in which you are. If you don't send him to the college and don't stop wheat-growing, and go at something better,—the dairy cow and the pig and sheep,—the boy will leave the farm sure, and you will undoubtedly have to leave it yourself." This is the great hope of the West I believe. You are fitting your young men to become skillful agriculturists. If we could have had this sort of instruction in New York State thirty years ago, the State would have been a great deal better off than it is now and there would not have been fifty per cent. of our cows losing money to their owners every year they keep them. We are behind in dairying, behind the business men of all other lines of business in this country. We must make a change, and you are certainly working along the right line.

Let me say, it has given me great pleasure to sit here and listen to the very intelligent deliberations of your Institute. We, in New York State, have long listened to the gospel which has been preached here, but we easily realize that in many ways you lead us, and we are all deriving benefits from the farmers and workers in the Wisconsin Institutes.

The Chairman—I have now the pleasure of introducing to you Mr. J. S. Woodward, of Lockport, New York, who had a good deal to do with the establishment of the first Farmers' Institute in New York.

Mr. Woodward—Gentlemen:—I have enjoyed this Institute very much and I am glad I came to it. I feel as we

used to say in the Methodist meeting that it is good to be here, but when the reference was made to Mr. Morrison it rendered me incapable of saying much to you. I had the honor of being the first director of Institutes in our State and they gave me the honor and the credit of being the originator of that work, for which I am very grateful, and I want to say to you that to Mr. Morrison more than to any other man did I owe the success that I made of that work. I could always call upon him for aid and encouragement, for direction and advice and it was always freely given. I never had the pleasure of meeting Mr. Morrison until last winter and I enjoyed that very much. He was a very warm friend of mine.

Now, in regard to the present conditions of agriculture. I know that we feel that it is greatly depressed; we feel that we are worse off than anybody else, at least I know they do in our State, and I have heard a good deal of it here, but we don't know other people's sorrows; we only know our own, and I want to say to you that I am in a position where I know something about it. I have a son who is in the merchantile business and I assure you that there is no class of the community anywhere in America that are so free from the severe strains of this financial depression that we have been through as the farmers. I do not know of a farmer anywhere within my experience who has been begging bread. I do not know of a farmer anywhere within my acquaintance but who has been willing to contribute of his substance to the relief of those who have been begging bread; but I do know this, we do not appreciate our advantages as farmers; we do not appreciate that we have good houses, and we live right up close to the heart of the great God who furnishes all things and that we get our sustenance right at the very bosom of Mother Nature first, and we ought to have the best. We don't appreciate that, we don't appreciate the

freedom from anxiety, from nights of thinking and worrying how, in the absence of collections from other customers we are going to meet our demands.

Then, I want to say another thing, for the encouragement of the farmers. I believe that we are standing now on the threshold of the greatest era of prosperity that ever came to agriculture, and why? For the reason that since the beginning of this country this nation has never done anything for its agriculturists up till within the last quarter of a century or about that. It furnished facilities for the education of all other classes, except him who had to feed them all, and it never looked to him unless it wanted him as a soldier, or to pay the taxes. Now, look at the present time and see the great change that has come over all this. Today the whole resources of the scientific world are expended in one of two directions, either in the direction of electrical appliances, or in the direction of scientific agriculture, and the advancement that has been made within the last few years since the establishment of these agricultural colleges and experiment stations give me the faith that is in me that we are just entering in the dawn, as it were, of this era of agricultural prosperity, which it would be good for a man to live in. Why, sometimes I feel that we have lived too soon in the world, we who are old and gray-headed. I can't stay here very much longer, but if I could only commence back with the advantages that are now furnished for young men in life, and opportunities of agricultural education, I would be almost willing to sacrifice everything I have in the world to do it. If I were not too old I think I would be tempted to go into an agricultural class now and graduate. Now, let me say to you fathers that are here, you ought to live on one meal a day if it is necessary, and send your sons and your daughters to Madison and give them a course in agriculture rather than to

go on, rolling up wealth and have those boys and girls go out into the world with a meager knowledge of their business, one hundred times better it would be.

Mind controls matter in this world, always. Just look about you wherever you are and see. Look at this beautiful building that we are in, this matter has existed from all eternity, but mind put it into shape. You were down at the World's Fair and saw the splendid architecture that was there. Don't you know that all that material has been laid away since it came from the hands of the creator until the present, and it only wanted mind to touch it and lift those forms in all their beauty. What we want today is thinking, reasoning agriculturists. Let me plead with you. I was glad to see those young men that were here on the stage this morning, graduates or pupils from the short course. They have got something that is much better than money. Give the boys and give the girls a chance. I will say again I am glad to have been here, and whether I ever meet you again or not in the world, I hope that the Wisconsin farmers will never forget their Agricultural College and Experiment Station up at Madison. I hope also that you will never let this Institute work go down. These old gray-headed fellows here can't go to college, they are like me, I can't go to college, but I could and have learned a great many things in Institutes. I have learned some things since I came here, that will benefit me and go with me. Now, don't let the legislature cripple this Institute work, but spread it, extend it. I hope to live to see the time when there will be a Farmers' Institute in every school district in my State and if the legislature don't give us the money to do it, we will banish the legislature. So, I say, let us stand by the Agricultural College and the short course and the long course, and all the other courses, and then let us demand that we shall have more facilities to extend the Institute work until

it shall reach every farmer in the State.

The Chairman—We feel that we own Mr. Woodward in Wisconsin. This is the second time he has been with us, and we hope he feels as much at home with us as we do with him. We have heard from the east; there is a great country to the west of us, and in that portion of the country is a great state called Iowa; in Iowa is a man who has been preaching clover. You all know him. You have heard of him, but I want you to look at him, so that as you walk through your clover fields next summer you can think of Mr. Henry Wallace of Iowa, the friend of the clover plant.

Mr. Wallace—Ladies and Gentlemen, I don't feel that I am a stranger in Wisconsin. I have watched you pretty closely for the past year, I have kept track of these Institutes. I came up here expecting just such a round-up Institute as you have had; it has come up to my expectations, it has not gone beyond them. I want to say to you gentlemen, that I regard this Institute work as the best of any state in the Union. In Iowa we are trying to imitate your Institute system as closely as we can; we have a few cranks out there,—a few men who are afraid that somebody will do something so much better than they can ever hope to do, that they don't want anybody to do it. But we are waiting patiently, and we will have an Institute something like yours, some day; and we are looking to you for instruction. Now, you know every State has its own peculiar development. A man who does as much writing as I do cannot give out all the time without taking in sometimes. I come in and I sit around and I watch you and observe, and I have observed enough here in the last two days to keep me running for six months, suggestions, facts, something that takes root and grows and develops and spreads out. You will hear a whole lot of this back again, some of you. We come up to Wisconsin to learn about dairying, about ensilage, about fruit culture in the northern sections

and a vast lot of other things, and so in every department of this great west is something that we can learn. We can learn how things go where men are farming with brains, where men are striving for developed brain work, and that is the key to your success in the State of Wisconsin. There is nothing that stands so much in want of human attention as human ignorance. There are none so blind as those who will not learn. Go on with the methods that you are following and that other States are following; the time will soon be here when to be a farmer on his own farm, will be as proud an honor as can be conferred upon a citizen of the United States. You are doing what you can, God bless you. We are trying to imitate you in the west, and we expect that by and by possibly we can teach you something in the future. We are all learning one from the other. This Institute has been a grand success, but the next will be better than this, I am sure.

The Chairman—We have with us a Canadian friend, a gentleman who has proved his worth in his own section, and in ours, a gentleman who has made his mark as judge at the World's Fair. I want every farmer to see Mr. Gibson and hear his voice, because, as an agricultural writer and worker he stands in many respects pre-eminent.

Mr. Gibson—Mr. Chairman, Ladies and Gentlemen: Speaking is not my forte. I would rather you were a flock of sheep and I was judging them. I am sure I could get along a good deal better, but I do want to say this. It has given me a great deal of pleasure to come to the State of Wisconsin. I thought when I left Ontario that we probably knew as much about the farm as you did here and there are a great many things that we do as well, I think; but I am satisfied that there are a great many things we don't know as well, and I have learned a great deal, and it will be with a great deal of pleasure when I go back that I shall tell our people, especially of the work that is being done at your Exper-

iment Station. I do claim as a practical man to have some knowledge of how practical agriculture should be carried on, and I want to assure you that your college is being carried on in the right line, and that your experiments are being carried on in the right line, in a practical way, so that it will result to your good. I thank you very much for your kind attention and for the lessons that I have received whenever I have been in the State.

The Chairman—Ladies and Gentlemen, Farmers of Dunn County and adjoining Counties, Friends from other States, Visiting Members and Delegates—Has it paid? Has it paid you fathers and mothers who have left the old homestead that you have been settled upon for so many years, the piece of land that you love? Has it paid you to leave that home and come up and spend three days with your neighbors? I think so. I think you will go back to the old farm with a greater love for it than you ever had before; appreciating that an acre of land is a pretty good investment after all, that eighty acres is a heritage and that 160 acres is a principality. Farmers' sons and daughters who are here, go back to the farm and love it as you never did before; believe in the soil, remember that those who trudge along the crowded streets of the cities, there is a fascination about it, but it is the fascination of death. In the fields freshening in springtime, in the bright sunshine of May and June, there can come more true pleasure to him who lives near God and Nature, God's natural works. There is more for human life to those that will wrest it from the soil and from nature in the country than any other place. Don't forget to get large things out of the field and the greatest of the actual. We have talked as though it was all money. My friends here, and every other farmer knows that the best of farm life is not money, and so I close this Eight Annual Farmers' Institute with the full satisfied answer by every one here that it has paid.

I wish to say to all from a distance that they will have an opportunity to visit the different parts of this building, that there are rooms below, a library beyond, a Grand Army Room Room above, and that it is but right that we should carry away with us as perfect a picture of what has been done here in this gift to these citizens of Menomonie and the people, as perfect a memory of it as possible, so I hope you will all visit the rooms and notice how beautifully everything fits

together, for the one purpose of uplifting the citizens of this vicinity. I want to say that a member of the local committee said to me that while this room had been used for all classes of meetings, that the farmers had littered the floor less and done less harm to this beautiful building than any body of people who ever met here before for the same length of time. My friends, the best is none too good for the farmer. The meeting is now closed.



POINTS OF EXCELLENCE FOR PURE-BRED JERSEY CATTLE.

As adopted by the American Jersey Club.

For Cows.		Points.	Points.
1.	Head small and lean; face dished, broad between the eyes and narrow between the horns.		13
2.	Eyes full and placid; horns small, crumpled, and amber colored.		11
3.	Neck thin, rather long, with clean throat, and not heavy at the shoulders.	2	10
4.	Back level to the setting on of tail.	1	5
5.	Broad across the loin.	1	5
6.	Barrel long, hooped, broad and deep at the flank.	8	10
7.	Hips wide apart; rump long.		100
8.	Legs short.	1	
9.	Tail fine, reaching the hocks, with good switch.	6	
10.	Color and mellowness of hide; inside of ears yellow.	10	
		10	
		10	
		2	
		1	
		5	

- 11. Fore udder full in form and not fleshy.
 - 12. Hind udder full in form and well up behind.
 - 13. Teats rather large, wide apart, and squarely placed.
 - 14. Milk-veins prominent.
 - 15. Disposition quiet.
 - 16. General appearance and apparent constitution.
- In judging heifers, omit Nos. 11, 12 and 14.

For Bulls.

The same scale of points shall be used in judging bulls, omitting Nos. 11, 12 and 14, and making due allowance for masculinity, but when bulls are exhibited with their progeny, in a separate class, add 30 counts for progeny.

POINTS OF EXCELLENCE FOR PURE-BRED GUERNSEY CATTLE.

As adopted by the American Guernsey Cattle Club.

	Points.		Points.
Quality of milk, 30 points.		12. Barrel round, and deep at flank.	4
1. Skin deep yellow, in ear, on end of bone of tail, at base of horn, on udder, teats, and body generally.	20	13. Hips and loins wide.	2
2. Skin loose, mellow, with fine, soft hair.	10	14. Rump long and broad.	2
Quantity and duration of flow, 40 Points.		15. Thighs and withers thin.	2
3. Escutcheon wide on thighs, high and broad, with thigh ovals.	8	Symmetry, 14 points.	
4. Milk veins long and prominent.	6	16. Back level to setting on of tail.	3
5. Udder full in front.	6	17. Throat clean, with small dewlap.	1
6. Udder full and well up behind.	8	18. Legs not too long, with hock well apart in walking.	2
7. Udder large, but not fleshy.	4	19. Tail long and thin.	1
8. Udder teats squarely placed.	4	20. Horns curved and not coarse.	2
9. Udder teats of good size.	4	21. Head rather long and fine, with quiet and gentle expression.	3
Size and substance, 16 points.		22. General appearance.	2
10. Size for the breed.	5		100
11. Not too light bone.	1	For bulls, deduct 18 counts for udder, points 5, 6 and 7.	

POINTS OF EXCELLENCE FOR PURE-BRED HOLSTEIN FRIESIAN CATTLE.

As adopted by the Holstein-Friesian Association of America.

For Bulls.		Points.	Points.
Head—Showing full vigor, elegant in contour.	2	Tail—Reaching to hocks or below, large at setting, tapering finely to a full switch.	2
Forehead—Broad between the eyes, dishing.	2	Hair and handling—Fine, soft and mellow, skin moderate thickness, secretions oily and of a rich brown or yellow color.	10
Face—Contour graceful, especially under the eyes, medium in length, broad muzzle.	2	Mammary veins—Long, large, branched, with extensions entering two orifices.	10
Ear—Of medium size, fine, covered with soft hair.	1	Rudimentary teats—Not less than four, large, well spread.	2
Eyes—Moderately large, full and bright.	2	Escutcheon—Large and fine development.	8
Horns—Medium in size, fine in texture, short, oval, inclining forward.	2	<hr style="width: 10%; margin-left: auto; margin-right: 0;"/>	100
Neck—Neatly joined to head and shoulders, nearly free from dewlap, of good length, proud in bearing.	5	A bull that has from three to five of his progeny in advanced registry shall be credited with five points in excess of what he may scale in structure.	
Shoulders—Of medium height, well rounded and even over tops.	4	No bull shall be received that does not scale 80 points.	
Chest—Low, deep and full.	8	No bull shall be received that, in the judgment of the examiner, will not reach a minimum weight of 1,800 pounds in good flesh at full age.	
Crops—Full and level with shoulders.	4	For Cows.	
Chine—Straight, broadly developed, and open.	3	Head—Decidedly feminine in appearance, comparatively long from eyes to base of horns, fine in contour.	2
Barrel—Well rounded, and large abdomen.	6	Forehead—Broad between the eyes, dishing.	2
Loin and hips—Broad, full, long, and level.	5	Face—Contour fine, especially under the eyes, showing facial veins, length medium, broad muzzle.	2
Rump—High, long, broad and level.	5		
Thurl—High, and great width.	4		
Quarters—Long, straight behind, wide and full at sides.	5		
Flanks—Deep and full.	2		
Legs—Short, clean, tapering, with strong arm, in position firm, wide apart, feet of medium size, round, solid and deep.	6		

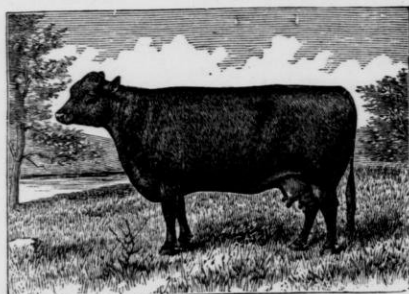
	Points.		Points.
Ears—Of medium size, fine, covered with soft hair.	1	Tail—Reaching to hocks or below, large at setting, tapering finely to a full switch.	2
Eyes—Moderately full, large and mild.	2	Hair and Handling—Fine, soft and mellow, skin of moderate thickness, secretions oily, and of a rich brown or yellow color.	10
Horns—Set moderately narrow at base, fine, oval, well bent, inclining forward.	2	Mammary Veins—Large, long, crooked, branched with extensions entering large orifices.	10
Neck—Fine, nearly free from dewlap, neatly joined to head and shoulders, top line slightly curving, of good length, moderately thin, elegant in bearing.	4	Udder—Capacious, flexible, well developed both in front and rear, teats well formed, wide apart, and of convenient size.	12
Shoulders—Fine and even over tops, lower than hips, and moderately thick, deep and broad.	3	Escutcheon—Large and fine development.	8
Chest—Low, deep and broad.	6		<hr style="width: 10%; margin-left: auto; margin-right: 0;"/>
Crops—Full and level with shoulders.	2		100
Chine—Straight, broadly developed, and open.	3		
Barrel—Well rounded, with large abdomen.	5	A cow that has made a milk or butter record in excess of the minimum requirement applicable to her case (See Rule 6) shall be credited one point for each and every eight per cent. that such record exceeds such requirement.	
Loin and Hips—Broad, full, long and level.	5	No cow shall be received that does not scale 85 points (credits from milk records being allowed as provided above).	
Rump—High, long, broad and level, with roomy pelvis.	4	No cow shall be received that, in the judgment of the examiner, will not reach a minimum weight of 1,000 pounds at full age, in ordinary flesh, milking form.	
Thurl—High, with great width.	4		
Quarters—Long, straight behind, roomy in twist, wide and full at sides.	4		
Flanks—Fairly deep and full.	2		
Legs—Short, clean, tapering with strong arm, in position firm, wide apart; feet of medium size, round, solid, and deep.	5		

POINTS OF EXCELLENCE FOR PURE-BRED AYRSHIRE CATTLE.

As adopted by the Ayrshire Breeders' Association.

		Points.
For Bulls.		
<p>The points desirable in the female are generally so in the male, but must, of course, be attended with that masculine character which is inseparable from a strong and vigorous constitution. Even a certain degree of coarseness is admissible; but then it must be so exclusively of masculine description as never to be discovered in a female of his get.</p>		
<p>1. The head of the bull may be shorter than that of the cow, but the frontal bone should be broad, the muzzle good size, throat nearly free from hanging folds, eyes full. The horns should have an upward turn, with sufficient size at the base to indicate strength of constitution.</p>	10	
<p>2. Neck of medium length, somewhat arched, and large in those muscles which indicate power and strength.</p>	10	
<p>3. Fore-quarters-shoulders close to the body, without any hollow space behind; chest broad, brisket deep and well developed, but not too large.</p>	7	
<p>4. Back short and straight; spine sufficiently defined, but not in the same degree as in the cow; ribs well sprung, and body deep in the flanks.</p>	10	
<p>5. Hind-quarters-long, broad and straight; hip bones wide apart; pelvis long, broad and straight; tail set on a level with the back; thighs deep and broad.</p>	10	
<p>6. Scrotum large, with well developed teats in front.</p>		7
<p>7. Legs, short in proportion to size, joints firm. Hind legs well apart, and not to cross in walking.</p>		5
<p>8. Skin, yellow, soft, elastic, and of medium thickness.</p>		10
<p>9. Color, red of any shade, brown or white, or a mixture of these—each color being distinctly defined.</p>		3
<p>10. Average live weight at maturity, about 1,500 pounds.</p>		10
<p>11. General appearance, including style and movement.</p>		15
<p>12. Escutcheon, large and fine development.</p>		3
		100
For Cows.		
<p>1. Head, short; forehead wide; nose, fine between the muzzle and eyes; muzzle, large; eyes, full and lively; horns, wide set on, inclining upwards.</p>	10	
<p>2. Neck, moderately long, and straight from the head to the top of the shoulder, free from loose skin on the under side, fine at its junction with the head, and enlarging symmetrically towards the shoulders.</p>	5	
<p>3. Fore-quarters-shoulders, sloping; withers, fine; chest, sufficiently broad and deep to insure constitution; brisket and fore-quarters light, the cow gradually increasing in depth and width backwards.</p>	5	

	Points.		Points.
4. Back—short and straight; spine, well defined, especially at the shoulders; short ribs, arched; the body deep at the flanks.	10	distance apart at the sides should be equal to 1-3 of the length of the vessel, and across to about 1-2 of the breadth.	30
5. Hind-quarters, long, broad and straight, hook bones wide apart, and not overlaid with fat; thighs deep and broad; tail, long, slender, and set on level with the back.	8	7. Legs, short in proportion to size, the bones fine, the joints firm.	3
6. Udder, capacious, and not fleshy, hind part broad and firmly attached to the body, the sole nearly level and extending well forward; milk-veins about udder and abdomen well developed; the teats from 2 1-2 to 3 inches in length, equal in thickness—the thickness being in proportion to the length—hanging perpendicularly, their		8. Skin, yellow, soft and elastic, and covered with soft, close, wooly hair.	5
		9. Color, red of any shade, brown or white, or a mixture or these—each color being distinctly defined.	3
		10. Average light weight, in full milk, about 1,000 pounds.	8
		11. General appearance, including style and movement.	10
		Escutcheon, large and fine development.	3
			100



TESTING CLOVER AND GRASS SEED.

A. F. NOYES, Beaver Dam, Wis.

Whenever progressive farmers meet, and for whatever purpose, you hear the talk of clover as a crop for pasture, hay and fertility.

How much the "catch" as it is termed depends on the seed we sow very few of us know. We test, 1st, for the germinating quality, or ought to, of all seeds sown, because if we know positively what per cent. of the seed we sow will grow, then we know the amount of a given seed it is best to sow, and then have reliable data to know how much seed under certain conditions of soil and season give us the looked for result.

We say, "Why I saved this seed myself, of course it will grow," but we don't know how large a share of it will not germinate at all, let alone the portion of it that will make a poor, struggling growth.

Manner of Testing.

In testing seed we use sawdust as the material to hold moisture; a plate or shallow dish of any kind is filled with the sawdust, and a cloth laid on top on which the clover seed is placed and the cloth folded back on the seed; the seed is out of the water but will get the moisture sufficient for germination if dish is kept in a warm room, it is easy to count off all or a certain portion to find the percentage of growth after three or four days.

With corn and grain 48 hours will suffice if for any cause it has been neglected. Our tests with clover seeds the last season showed mammoth and medium of our own growth to have been 95 per cent., of white 98 per cent. This was seed well cleaned. Of alsike in seven samples we found but one that tested better than 55 per cent. down to 40 per cent. We bought what we could find of that which tested 90 per cent., but had to sow some of the

poorer to finish sowing the field. The seed showing a germinating test of only 76 per cent. of medium clover was the lowest of any we have sown, which was several years ago, also of our own raising.

Canadian Experiment.

Mr. W. Sanders, of the Canada experimental farms, in report for 1892, gives the results of over 1,300 tests of seeds. Wheat, barley, oats, peas, beans and corn showed up to 100 per cent. down to 0, 19, 25, 8, 60 and 0 per cent., respectively, as the lowest. Clover from 63 to 88 per cent. An average of the samples of clover tested was 76 per cent., of corn 73 per cent., and the other seeds named above 84 to 93 per cent.

Of grass seeds the best was 44 per cent. down to 0 per cent., an average of 18.6 per cent. If only about 1-6 of the seed grew, how could the farmer expect a good "catch."

Foul Seeds.

2nd. We test with the eye and by glass for foul seeds in clover and grass seeds. We have enough varieties of weeds to contend with without adding more. In sowing home raised seeds we clean, as best we can, with a seed mill that also cleans grain, especially barley, very nicely. In buying we get the cleanest from foul seeds we can find. Two years when there was a failure in the timothy seed crop at home we sent to a friend in Minnesota for seed. On a hundred acres sown one fall we picked about twenty wild mustard plants the next season, so you see the friend had selected wisely considering it was a section which raised considerable wild mustard.

Iowa Experiment.

F. C. Stewart, in Iowa Station Bulletin No. 21, gives a synopsis of 63 sam-

ples of clover seed tested, and containing an average of 5.74 per cent. by weight of impurities; 35 varieties of fowl seeds in all. Eighty-four samples were examined, 57 from Iowa—the balance from neighboring states, Wisconsin included. In one sample 67 per cent were impurities, or about 40 lbs. per bushel. In only three samples did the fowl seeds fall below .3 of 1 per cent.—the average as above stated 5.74 or 1-16. To judge by some of the samples, should one want fowl seeds, it would be no trouble to get them. From our observation and experience we can say that the seed sold and sown in this vicinity averages considerably better than above, credit being given, in a great measure, to the men who handle seed. One of the hardest to clean out of timothy, after wild mustard, is sorrel. Clover seeds

being heavier are easier cleaned. We are not familiar with many of the varieties of fowl seeds and their names, either Latin or local, so are not able to say much about them. Our work has been along the line of sure growing and clean seed.

How to Buy.

We buy seeds, when necessary, and of men whom we have confidence in; we prefer to buy clover and timothy seed grown in the neighborhood, and like to see the crop growing ourselves, if we can.

The successful farmer is the business farmer, and his success depends upon the care given all things. He may be a success and still neglect many things, among them testing the seed he sows, and yet one cannot tell how much greater the success if he had. "As ye sow, so shall ye reap."

FEEDING STEERS ON HIGH PRICED LAND.

RICHARD GIBSON, London, Ont., Canada.

In speaking of high-priced land in connection with beef-feeding, I have changed my ideas considerably since I have been in Wisconsin, and I am afraid our Canadian system will never be in vogue here where corn is so cheap and labor high, until you are compelled to farm better to keep up the fertility of your soils; at present you have not exhausted the stored up fertility of the virgin soil.

A Mistake

You are farming for the present,—not the present year alone, but the present week and day. We are farming more for the future, considering rotation of crops and the maintenance of the fertility of our soils more than an immediate profit. With you if corn is likely to be cheap next year and

oats dear, oats are sown and corn neglected, and you would not hesitate to sow the same field with oats again and again. If pork sells well and mutton cheap, all jump into hogs and the poor sheep has scarcely a friend.

Hog is king today. Horses and sheep are utterly despised, and none can be found to speak a good word for them. The tariff changes are offered as an excuse why sheep won't pay, but for the horse no excuse is vouchsafed except that "there is no money in horses any more." Should potatoes sell for 50 to 60 cents a bushel, there are plenty just waiting for the next "snap" to jump right in and bring down the price to 12 or 15 cents, ever forgetting the law of supply and demand.

A Steady Pace.

Now, we are differently constituted. I suppose we think too slowly to grasp the quick movement of the kaleidoscope, and allow the opportunity to pass before we have time to change our base. I have sometimes thought we were no worse off for being a trifle slow and conservative. Our farmers go on about the same; whether wool is up or down they will keep just as many sheep. Once a man breeds Shorthorns, he will keep breeding along, just the same, no matter whether he is selling bulls for \$100 or \$300. The herd that won the principal laurels at the Centennial was again to the front at the Columbian, and should there be another International fair twenty years hence, my good friend Russell will without doubt be again on hand with another herd, if alive. The same with cropping. Ask what a certain field will be bearing five years hence, the reply will be forthcoming at once, rotation being followed, and if oats are worth more a pound than wheat, we should sell oats and feed wheat, as it will bring at least one dollar a bushel to feed to hogs, when pork sells as high as at present.

Canadians More Conservative.

I think our better class of farmers take more pleasure in their occupation and more thoroughly enjoy life; they have better buildings, cleaner farms, neater fences, and tidier premises, with more taste about the garden, lawn and surroundings. While you are working at high pressure, make more money, get around oftener, are keener at a bargain, have more confidence in yourselves, maybe showing Shorthorns one year, next equally at home fitting and training a trotter, and the next with just as much confidence fixing and preparing a flock of sheep for a Columbian. We are both nevertheless working for posterity,—you to increase the size of your farms and add quarter section by quarter section, and a big bank account, and we to

leave a good farm in the highest state of cultivation, maybe wasting our energies, not in increasing our possessions so much, as in breeding and developing the various kinds of domestic animals.

Comparison of Methods.

You glory in sending immense bunches of fat steers to the Chicago market, we to watch the development of a calf or colt until the time comes to make his appearance in the show ring, and then to still watch, maybe for years, the development and future success or failure as a sire. You must have your results at once; we patiently wait the issue for years. Your men can get up on the platform and address you fluently, while I have to put my thoughts on paper, a true object lesson to carry out the simile, of the peculiarities of the two people.

However, as I said before, we are both working for posterity and I fancy I hear some wag exclaim, "Fools both. Let posterity take care of itself. What has posterity done for you?"

Cheapest Beef.

Now, I may be wrong in my deductions, but it does seem clear to me that we cannot produce beef to compete with you in price, and should there be a reciprocity treaty between the two countries, we should be compelled to go out of beef feeding entirely, except we take into account the manure produced, and value it as so much to be charged to future crops, the same as in the English Tenant Right system. Otherwise I am satisfied our local butcher would be selling Chicago dressed beef, that is provided you sent us the proper quality. We are epicures as far as meats are concerned, and it will not be Texan or plains cattle that we fear, but just such steers as the tops of a bunch I saw at Mr. Wm. Ogilvie's last Sunday.

Now, here comes in a point. Where are your steers of the future coming from? The cows I have seen are not steer breeders, no matter how good

they may be at the pail. As a close and unprejudiced observer, who has been conversant with the Chicago stock-yards for the last twenty years, I am satisfied that the quality and size of steers are decreasing rapidly, and more so during the last five years than the previous fifteen. If I am correct, and I believe I am, it must be a matter of concern to all interested.

The Shorthorn.

If I were asked the reason I should say that you have not been sufficiently careful in the selection of your sires. In this State alone, there should be three times the number of Shorthorn herds, and they should be strained to the utmost to supply the demand for bulls. Why, we have over 500 Shorthorn breeders in Ontario, and the prices have been gradually getting lower, still we keep up the number of memberships in our Association, well knowing that just as long as cattle will pay to raise, whether for beef or milk, Shorthorns will be near the top with both, and that they will be the last to leave.

Change to Cows.

As an introduction to my subject proper a few words as to the change that is gradually taking place in Canadian steer feeding may not be out of place. Taking Middlesex County as a center, the four or five adjoining counties contain the very best grazing lands in the province, and for summer feeding equal your boasted Kentucky blue grass lands. Taking Ailsa Craig as a center and striking a six mile radius, over 20,000 steers have been grazed for the British market in a season, and the owners thereof were making money faster than farmers interested in any other branch of farming. This has all changed, and these grand pasture lands are now being desecrated by the common dairy cow. "O tempora! O mores!" Where the owner formerly rode around and strolled among them in the summer, he now has to doff overalls, and milk,

and work during the summer to provide winter keep for his cows. Steers on these fat, bottom lands of the Thames and Au Sable are no longer king.

Early Maturity.

Another system was adopted, with Guelph for headquarters, were steers were stall fed, root crops being grown extensively for that purpose. These farms were well tilled and the system of farming was such as to yearly add to the fertility of the soil. I venture to say that nowhere on this continent could be found such a continuation of well-tilled farms and prosperous surroundings, and even if the house is often insignificant, the out-buildings are ample and apparently extravagantly so. These farmers graze not, but have depended upon purchasing their steers and selling them off fat, between Christmas and Easter. They are changing their system as circumstances demand. Competition in British markets, with western corn-fed steers and cheap grades from Spain, the Australian and New Zealand trade have taught them that the only way to feed steers profitably on high priced land is to force from start to finish, and market when two years old.

Of course the system of farming is changed to meet these changed conditions. Instead of buying steers, well-bred cows are being purchased, and steers raised from them. Such steers as are required for this purpose are not on the market, they cannot be picked up, they must be bred. But the change is being gradually effected, and satisfactorily, as far as returns are concerned.

Raising the Calf.

The system is simple, though the details are numerous and important. The calves are either raised by hand or allowed to suck. If the latter the cow is entrusted with two calves. Occasionally a good cow will raise four, but this is exceptional, these simply

run with the nurse at pasture until weaning. Those raised on the pail are given whole milk for a month, then gradually put onto skimmed milk and oil meal porridge. These calves are not turned out except for an hour or two a day, but fed grain. During the heat of summer they are kept in dark stables and are turned out in the evening. Care is taken to see that they eat up clean, and pains taken to get them eating as soon as possible. The mangers must be kept clean; a little food left sours quickly in warm weather, and it is well to wash and scald mangers at least once a week. When I kept "Bach" I tried to get my dishes and plates washed at least once in the seven days, and when I got married I transferred my washing operations to the calves' mangers instead, and with equally satisfactory results.

During the hot weather it is advisable to house during the day in dark pens, and let them have the run of a paddock by night. In pail-feeding there is this advantage,—the calf never has to be really weaned, he has no affection for the pail beyond what it contains, but weaning from the cow is different; they miss the low of recognition, the lick of the tongue, and a something which we, with all our reasoning faculties imagine only belongs to ourselves,—a recognition after months of separation,—a language, if not spoken, expressed. The breaking of these ties is very hard on some calves, hence the pail is advisable in judicious hands. Besides, with the frugal house-wife, those pounds of golden butter if they do not add much to the bank account, they do bring to that household many a little luxury that otherwise would not be obtained.

After Weaning.

After weaning in the fall give them big, roomy box stalls, or preferably a yard with good sheds open to the south, by night; a rape pasture by day will be found very advantageous at this time. When winter sets in pulped

roots, grain and hay will be the ration. Keep a lump of salt for them to lick, and see that neither lice nor infest them.

The secrets of successfully carrying out this system are, proper selection of the parents, judicious feeding, punctuality, and quietness. Feeding grain on grass the second summer is a moot point. I find it profitable to do so, though many do not. My experience teaches me that there is a period when stock care but little for it, and that is after having been on pasture perhaps three or four weeks. I imagine they suffer from what the school boy irreverently styles "sore teeth" with which he is periodically afflicted about the time sour apples reign. The acidity of the early grass "sets his teeth on edge." This, however, wears off, and it is during the latter part of summer that the grain ration tells. Of course the second winter's feeding is the most important, and it is advisable to tie up in comfortable stalls, for finishing.

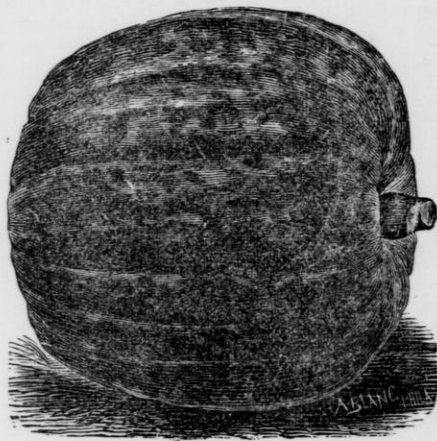
A Good Mixture.

I have used the following mixture very successfully. For 15 head take 4 lbs. clover hay chopped, 1 pail (16 qts.) bran, 3 pails mixed chop (2 parts oats, 1 peas, 1 corn) with 16 lbs. linseed cake, and 5 bu. pulped turnips, a little salt and sufficient water to thoroughly wet, well mixed and allowed to stand two hours. We mix two of these rations a day, and feed at six, eleven, four and eight. A small quantity of long hay is given in the rack at the same time. With the proper subjects to treat thus, there should be no trouble in getting them to weigh 1,400 lbs. at two years, and command the highest market price.

The Young Animal for Profit.

The great lesson taught at the Chicago Fat Cattle Show, was that the greatest profit was made when young. For instance, the average cost of growing steers from birth to twelve months of age, taking the figures as furnished by the Breeders' Gazette,

averaged \$3.39 per 100 lbs. live weight, and they weighed up to 1,000 lbs. Of the nine five were carried over another year and the cost per pound gain was \$7.97 per 100 lbs. or nearly eight cents per lb. although the increase was an average of 604 lbs. The next year two were fed on, and the cost per lb. of added weight was over 12 1-2 cents per lb. live weight.



STANDARD OF EXCELLENCE FOR SHORTHORN CATTLE.

Adopted by the Ohio Shorthorn Breeders' Association.

	Points.			Points.
1. Size.	30	19. Chine.		55
General Quality.		20. Fore-ribs.		40
2. General Style, carriage and vigor.	60	21. Fore-flank.		35
3. Bone.	20		130	
4. Color.	10	Middle.		
	90	22. Back.		25
5. Hair.	30	23. Back-ribs.		40
6. Handling.	60	24. Belly.		15
7. Evenness of fat and flesh.	40		80	
	130	25. Loin.		45
Head.		26. Flank.		45
8. Muzzle.	10		90	
9. Nostril.	5	Hind-quarter.		
	15	27. Hip or hook.		15
10. Forehead and face.	30	28. Rumps.		50
11. Eye.	20	29. Tail and set-up.		25
12. Horn and ear.	25		90	
	75	30. Quarter.		30
Fore-quarter.		31. Thigh		20
13. Neck and throat.	40		50	
14. Breast.	20	32. Twist.		40
15. Brisket.	25	33. Teats.		10
	85		50	
16. Crops.	15	Legs, etc.		
18. Shoulder.	30	34. Knee and gambrel.		15
18. Fore-arm.	10	35. Leg.		10
	55	36. Hoof.		5
			30	
			1,000	

THE STANDARD DESCRIPTION OF THE NORFOLK AND SUFFOLK RED POLLED CATTLE.

Essentials

Color, Red. The tip of the tial and udder may be white. The extension of the white of the udder a few inches along the inside of the flank, or a small white spot or mark on the under part of the belly by the milk veins, shall not be held to disqualify an animal whose sire and dam form part of an established herd of the breed, or answer all other essentials of this "Standard Description."

Form. There should be no horns, slugs, or abortive horns.

Points of a Superior Animal.

Color. A deep red, with udder of the same color, but the tip of the tail may be white. Nose, not dark or cloudy.

Form. A neat head and throat. A full eye.

A tuft or crest of hair which hangs over the forehead.

The frontal bones should begin to contract a little above the eyes and should terminate to a comparatively narrow prominence at the summit of the head.

In all other particulars the commonly accepted points of a superior animal to be taken as applying to the Norfolk and Suffolk Red Polled cattle.

STANDARD OF EXCELLENCE FOR ABERDEEN-ANGUS BULL.

Adopted by the American Aberdeen-Angus Breeders' Association.

	Points.		Points.
1. Color—Black. White is objectionable, except on the underline behind the navel, and there only to a moderate extent; a white cod is most undesirable.	3	3. Throat—Clean, without any development of loose flesh underneath.	3
2. Head—Forehead broad; face slightly prominent, and tapering toward the nose; muzzle fine; nostrils wide and open; distance from eyes to nostrils of moderate length; eyes mild, full, and expressive, indicative of good disposition; ears of good medium size, and well set and covered with hair; poll well defined, and without any appearance of horns or scurs; jaws clean.	10	4. Neck—Of medium length, muscular, with moderate crest (which increases with age), spreading out to meet the shoulders, with full neck vein.	3
		5. Shoulders—Moderately oblique well covered on the blades and top; with vertebra or backbone slightly above the scapula or shoulder blades, which should be moderately broad.	6
		6. Chest—Wide and deep; also round and full just back of elbows.	10

	Points.		Points.
7. Brisket—Deep and moderately projecting from between the legs, and proportionately covered with flesh and fat.	4	14. Flesh—Even and without patchiness.	4
8. Ribs—Well sprung from the backbone, arched and deep, neatly joined to the crops and loins.	8	15. Skin—Of moderate thickness and mellow touch, abundantly covered with thick soft hair. (Much of the thriftiness, feeding properties and value of the animal depends upon this quality, which is of great weight in the grazier's and butcher's judgment. A good "touch" will compensate for some deficiencies of form. Nothing can compensate for a skin hard and stiff. In raising the skin from the body it should have a substantial, soft, flexible feeling, and when beneath the outspread hand it should move easily as though resting on a soft cellular substance, which, however, becomes firmer as the animal ripens. A thin papery skin is objectionable, especially in a cold climate.)	10
9. Back—Broad and straight from crops to hooks; loins strong; hook bones moderate in width, not prominent, and well covered; rumps long, full, level, and rounded neatly into hind-quarters.	10	16. General Appearance—Elegant, well bred, and masculine. The walk square, the step quick, and the head up.	10
10. Hind-quarters—Deep and full, thighs thick and muscular, and in proportion to hind-quarters; twist filled out well in its "seam" so as to form an even wide plain between thighs.	8		100
11. Tail—Fine, coming neatly out of the body on a line with the back and hanging at right angles to it.	3		
12. Underline—Straight as nearly as possible, flank deep and full.	4		
13. Legs—Short, straight, and squarely placed, hind legs slightly inclined forward below the hocks; forearm muscular; bones fine and clean.	4		
		When bulls are exhibited with their progeny in a separate class, add 25 counts for progeny.	

STANDARD OF EXCELLENCE FOR ABERDEEN-ANGUS COW.

Adopted by the American Aberdeen-Angus Breeders' Association.

	Points.		Points.
1. Color—Black. White is objectionable, except on underline behind the navel, and there only to a moderate extent.	2	11. Tail—Fine, coming neatly out of the body on a line with the back, and hanging at right angles to it.	3
2. Head—Forehead moderately broad, and slightly indented; tapering toward the nose; muzzle fine; nostrils wide and open; distance from eyes to nostrils of moderate length; eyes full, bright and expressive, indicative of good disposition; ears large, slightly rising upward, and well furnished with hair; poll well defined, and without any appearance of horns or scurs; jaws clean.		12. Udder—Not fleshy, coming well forward in line with the body, and well up behind; teats squarely placed, well apart and of good size.	8
3. Throat—Clean, without any development of loose flesh underneath.	3	13. Underline—Straight, as nearly as possible; flank deep and full.	4
4. Neck—Of medium length, spreading out to meet the shoulders, with full neck vein.	3	14. Legs—Short, straight, and squarely placed; hind legs slightly inclined forward below the hocks; forearm muscular; bones fine and clean.	3
5. Shoulders—Moderately oblique well covered on the blades and top; with vertebra or backbone slightly above the scapula or shoulder-blades, which should be moderately broad.	6	15. Flesh—Even and without patchiness.	3
6. Chest—Wide and deep; round and full just back of elbows.	10	16. Skin—Of moderate thickness and mellow touch, abundantly covered with thick, soft hair. (Much of the thriftiness, feeding properties, and value of the animal depends upon this quality, which is of great weight in the grazier's and butcher's judgment. A good "touch" will compensate for some deficiencies of form. Nothing can compensate for a skin hard and stiff. In raising the skin from the body it should have a substantial, soft, flexible feeling, and when beneath the outspread hand it should move as easily as though resting on a soft, cellular substance, which, however, becomes firmer as the animal ripens. A thin, papery skin is objectionable, especially in a cold climate.)	10
7. Brisket—Deep and moderately projecting from between the legs, and proportionately covered with flesh and fat.	4	17. General Appearance—Elegant, well-bred and feminine. The walk square, the step quick, and the head up.	5
8. Ribs—Well sprung from backbone, arched and deep, neatly joined to the crops and loins.	8		100
9. Back—Broad and straight from crops to hooks; loins strong; hook bones moderate in width, not prominent, and well covered; rumps long, full, level, and rounded nearly into hind-quarters.	10		
10. Hind-quarters—Deep and full; thighs thick and muscular, and in proportion with hind-quarters; twist filled out well in its "seam" so as to form an even wide plain between thighs.	8		

In judging heifers, omit No. 12, and add 3 counts to No. 15, and 5 counts to No. 17.

THE MUTUAL RELATIONS OF SCIENCE AND STOCK BREEDING.

Prof. WM. H. BREWER, New Haven, Conn.

Address read before the American Association for the Advancement of Science, Madison, Wis., August, 1893.

The production of crops and the production of animals are the two great branches of Agriculture. The modern application of science to the economic production of plants has been so much more conspicuously before the public than its application in the economic production of animals, that I have thought it might be well, on this occasion, to consider the latter.

The application of scientific methods to the solving of economic problems constitutes perhaps the most distinctive feature of modern intellectual progress, and in no industry has this been more significant than the revolution which science has produced in the art of Agriculture, for within about a century greater changes have taken place than in all the centuries from the dawn of history.

In the production of cultivated plants the great change has been in lessening the labor of tillage, in harvesting the crops, in handling the product, increasing the number and kinds of species and varieties cultivated, in fertilizing the soil, and in transportation. These have come about mostly through the science of chemistry and the growth of mechanical invention. The economic effect has been to diminish the number of men required to produce a given amount of crop; and to lessen enormously the amount of capital employed in agricultural production as related to the amount invested in other industries. It is only fifty years ago that Johnstone, the eminent writer on Agricultural Chemistry, asserted that nine-tenths of the working capital of

the civilized world was invested in Agriculture or in handling its products. Now, perhaps, not one-third is thus employed, and the ratio is continually diminishing.

In the breeding and rearing of domestic animals, science has worked somewhat differently. Economic results are following more tardily and from a somewhat different direction. Biological rather than the strictly physical sciences are the leading factors, and Biology is of later growth and application than Chemistry and Physics.

There could be no science of Agriculture worthy of the name until we had a science of Chemistry, and very soon after this was placed on a sound foundation by the promulgation of the atomic theory, and chemical analysis was established on a scientific basis, works on Agricultural Chemistry as an applied science appeared, and then we began to have a science of Agriculture.

Not so with breeding. It remained strictly an art until very much later. The production of useful animals is one of the oldest industries, as it is one of the most widely spread, and, as an art, it attained a high degree of efficiency at a very early date, but has only risen to the dignity of a science since the publication of Darwin's "Origin of Species." There is no proof that the art advanced much from the days of Cain, the earliest breeder in history, down to the last quarter of the last century. About that time, and just as several of the physical sciences were being established on a philosoph-

ical foundation, experiments in breeding, carried on more especially in England, did much to advance the art, and laid the foundations upon which a science is now being constructed. There was, however, no obvious connection between the scientific awakening and the breeding experiments; they merely belonged to the same period.

During the ages preceding the Christian era mankind had experimented on the taming and training of animals for various uses, and had already domesticated the few species now used for this purpose. During this long period, artificial breeding had changed the nature of the wild originals into the several characters essential to domestic animals. Man had made them perfectly fertile in captivity, had established the instinct of tameness, and had bred into them that variability and plasticity which adapted them to the artificial environment which he imposed. This was so slow a process that none of the more important species have been domesticated since. The process is such a slow one, that time and capital are now too valuable. The turkey had already been domesticated by the Mexicans before it was introduced into Europe, so we may say that the canary bird is about the only modern domestication, unless it be the ostrich, which we are now beginning to breed.

The breeding of domestic animals may be arranged into three illy defined classes;—those bred merely for use, of which swine and asses may be taken as examples; those bred for social and ceremonial purposes as well as for economical use, as horses, dogs, and game fowls; and those bred for pure fancy, as fancy pigeons, canaries, certain varieties of pet dogs, and white mice. The general laws underlying their production are the same, but the details of the art are very different.

The production of new varieties as well as the production of the very best

examples of each breed or sort in practice still remains strictly an art. Modern science has aided us comparatively little in this. What it has done has been to place the general economic production on a much surer basis, and make results more certain by greatly lessening the element of chance. Let us now note the way this progress came about. Selection was the foundation of all the work, but until the last century purity of blood in the sense in which we now use the term played a secondary part. Except with certain strains of Arabian horses, and possibly of game fowls, it was considered of minor importance. The inheritance of acquired characters was assumed as a fact by all breeders; although it was not believed to be the most important factor, it was one to be considered.

Although there was no science of breeding, there was a large literature produced before the beginning of this century relating more or less directly to the art. For social reasons literature relating to horses and dogs is much more voluminous than that relating to the other domestic animals, but there is considerable devoted to both useful and fancy breeding.

The rules laid down are almost as numerous as the authors, and wild speculations are freely mingled with records of observation. Good parentage is always recommended, but "blood" in the modern sense of the word, was almost unknown, or at least was practically ignored. The general principle that ancestry is more important than the special excellence of the immediate parents does not appear to have been known to most writers, and the selection of animals for pairing depended entirely upon the sagacity and experience of the breeder.

It was then as well known as now that cross-bred animals were often superior to either of the parents. It was, therefore, but natural that crossing should be the favorite method in

the attempts to improve useful livestock.

Improvement within the breed, keeping the blood pure, was not pursued in Europe until the last part of the last century. The great change in practice began in England first in breeding race-horses. It was some time later before it extended to the breeding of cattle, sheep, and other species.

Horse-racing was a favorite sport with the higher social classes in England from early times, and long before the beginning of the last century horses for racing were imported from Oriental countries and from various countries of Europe, more especially from Spain. From the mixture of these varied stocks the present English Thoroughbred originated. The Racing Calendar was begun in 1727, and pedigrees of the winners began to be published soon after. After a time the sporting periodicals also published a list of the "winning sires;" that is, a list of the stallions whose progeny had won the races of that year, along with the names of the winners and the amount of the winnings. These gave data for the selection of sires in breeding for speed.

Cheny proposed publishing a list of pedigrees of famous horses in 1741, but this was not done as a separate publication until Weatherby collected the pedigrees as far back as there were any data, and published the first volume of the Stud-Book in 1791.

This was the beginning of the means for founding a science of breeding. There could be no science, in the modern sense of the word, until there was a systematic record of the facts essential for study published and available to students, and from which generalizations could be deduced. No law of heredity could be established until we had the means of studying all the ancestors of an animal for the last three or four generations back. The Stud-Book furnished the means for such a study of the animals of one breed. From the data thus published it came

to be noticed that the "winning sires" were, as a rule, those of the purest blood, but this rule of breeding was not extensively practiced in the producing of farm animals until long after. There was no publication of any record of pedigrees of animals other than horses for more than thirty years later. The "Shorthorn Herd-book" was published in 1822.

Remember in this connection, that the leading breeds of domestic animals had been established as to general type long before this, and partial pedigrees were kept by some of the most successful breeders. But these were manuscript records, kept merely as aids in the private practice of a secret art. Until long after the publication of the Shorthorn Herd-Book there was no science of breeding recognized.

The wide and capricious variation induced by crossing must have been noticed from very early times and to lessen its uncertainties, breeders in the last third of the last century began to practice extensively the opposite extreme. Then the term as well as the practice of breeding in-and-in came into practical use in Great Britain. It was the forerunner of breeding by pedigree applied to other animals than race-horses. Its great promoter was Robert Bakewell, who began his experiments about 1775. Beginning with a very few choice animals, he grew his flocks and herds from them, breeding between the nearest of kin. The ends gained by this were greater uniformity of excellence and increased prepotency. He selected with rare judgment and wrought a marvelous improvement in his animals. The changes extended to form, quality of flesh, early maturity, and general useful qualities. He wrote nothing. With him breeding was a secret art, but, fortunately, he taught this art to certain pupils of whom the brothers Colling became famous as breeders of Shorthorns. Their success was so great that at a sale in 1812 one of their

bulls sold for a thousand guineas, the first time that so large a price had ever been paid for any animal of the ox kind. Through breeding in-and-in, "fixity of type" became common as a breeder's term for breeding true, and then, naturally, pedigree became the basis for breeding.

Still, the principles of breeding were not yet understood. Even Colling introduced a cross into his herd, and breeders to this day are discussing the influence of this "Galloway cross" on the Shorthorn breed.

Sir John Seabright, of whom Darwin says, "the monument to whose genius exists in the Seabright Bantam," was one of the clearest of the early writers, and by some is considered the father of the science. In a letter published in 1807, he says: "Were I to define what is called the art of breeding, I should say that it consisted in the selecting of males and females to breed together in reference to each other's merits and defects." He then qualifies this at length, stating that it is not necessarily by pairing the best male with the best female that the best results are produced, as they may augment some defect which another cross would decrease, but he does not appear to have understood the relations of this to the more remote ancestry. This only came to be understood later by a study of published pedigrees, and after Darwin pointed out certain causes which induced variation, and coined that word "reversion" now in such common use by breeders.

Most of the leading breeds of our farm animals existed, after a fashion, in the last century. The early history of nearly all of them is obscure, although much research has been expended in modern times to unravel it. But unless confined to some small island, as were the Alderney, Jersey, and Guernsey cattle, the breeds were not kept pure, because the methods of improvement were by crossing with other blood rather than by the care-

ful selection of pure-blooded animals of the same breed. Uniformity could not be secured by such practice, therefore all the economical results were very uncertain. The value of breed was recognized, but the value of pure blood was not, at least by breeders at large.

After pedigree records were systematically printed and studied, then improvement by selection within the breed became the rule. Herd-books were multiplied and finally especial associations sprang into existence for the promotion of the several breeds. The quarter of a century during which Darwin was accumulating the data for his "Origin of Species" was an important one in the history of the theory of breeding, and the publication of pedigree records of one kind and another was then begun. But scientific naturalists, absorbed in the description of natural species, ignored man's artificial productions. A breed may be, and often is, as artificial as a picture or a statue. The breeder, like the artist, must have his ideal toward which he is working. The greater his genius, the nearer his creations come to reaching his ideal. They work by different methods and with very unlike materials, but both are artists. A noted breeder of sheep once said to me, while talking about his methods and success:—"All real sheep have defects, none are perfect. How to breed out the defects and breed in the merits wished for, is the great problem. I can shut my eyes and see standing before me the sheep I have so long been trying to breed. I can see it just as plainly as I can a real sheep, but," he added, sadly, "I have never been able to produce it." He did, however, produce wonderful creatures that were sold for more wonderful prices, animals that had a reputation among sheep growers all over the world. And his creatures were as actually artistic productions as were those of Phidias.

The younger generation of naturalists, in these modern days, can hardly

appreciate how completely the work of breeders was ignored by scientific naturalists during the half century preceding the Darwinian era. The earlier naturalists, like Buffon and Cuvier, had treated and written of domestic animals as a part of nature's productions, but their successors came to look upon these "monstrosities" with great contempt. They conceded their economic importance, but put them outside of scientific investigation.

Nevertheless the times were ripe for the publication of a new theory on the origin and nature of species. The difficulties of the old system had accumulated until they were wellnigh crushing the life out of natural history. The distribution of species was a mystery without philosophical explanation, and the relation of species to varieties a source of perpetual discord and discussion. When Darwin brought us out of the difficulty it was largely by a study of the experiments made by breeders. This was analogous to introducing to the scientific naturalists of the world a new and vast biological laboratory for scientific experimentation.

It is in fancy breeding that the most wonderful results are obtained and this Darwin pursued experimentally. Here the economic and useful factors are eliminated. With the creature thus evolved there is no struggle for existence. Man provides, protects, and sustains. There is often no reason for its being except man's whim. We now see societies and associations for the promoting of useful breeds of farm animals so numerous and so prominent that we forget that it was the "Fanciers" who first had such clubs or associations in the interest of their favorite breeds.

Here let me explain that all the earlier Stud-Books and Herd-Books were started by individuals as private business ventures, but later most of them came to be published by associations having much wider aims. Now, nearly every useful and important breed has

an authoritative pedigree record of some kind, its "Stud-Book," Herd-Book," "Flock-Book," or "Register," published under the auspices of an association formally endowed with authority. I have no knowledge of how many such there are, but this much I may say, that in 1859, when the "Origin of Species" was published, there was not in the whole world a single society or association in existence for registering the pedigrees of the useful farm animals, or for defining the special and essential characters of the several breeds. Nearly every useful breed has now an association for this end, and pedigree records run into the hundreds, if not thousands of volumes. The "Live Stock Journal," of London, stated in 1886 that in 1872, only fourteen years before, there was not one such society in the United Kingdom, while at the writing (1886) there were twenty-five. Nearly every breed in every country now has an authoritative association which, by the recording of pedigrees and the fixing of standards, dictates what the character shall be of those artistic creations called breeds. They are strictly analogous to those scientific bodies which make rules to govern nomenclature, establish units of measure, or dictate methods by which analyses, experiments, or observations shall be made.

But the breeds of fancy stock had their societies and set their standards very much earlier; how early I do not know. Fancy breeds of canaries had a "standard" and a "boom" long before any useful breed of farm animals had. I have seen references to the list of standard qualities of canary birds published by the "Hand-in-hand Canary Society" as early as 1779, and twenty years later Hervieux, in his work on canaries, gives the price of birds, and which of the favorite breeds brought fancy prices, ranging up to one hundred and twenty-five dollars each. It is interesting to state in this connection, as illustrating the caprices of fashion in fancy breeding, that the breeds most desirable then have now

so completely passed out of existence that it is uncertain what they were, or even what they nearest resembled. There were also many dog clubs and pigeon associations long before the days of Darwin. Many of you remember how he joined the various Pigeon Societies of Great Britain, and put up his cotes; and the interest with which he mingled with his fellow fanciers is indicated by many allusions in his life and letters.

The Saturday Review recently published a notice of Ure's work, "Our Fancy Pigeons." This notice, which was not intended to be scientific, expresses so well the sentiments that were formerly held by scientific men, as well as literators, that I will quote it. (It is to be understood that "The Fancy" has come to be a popular name in England for "Fanciers," more particularly for the breeders of fancy pigeons.)

"There could not be a better name than 'The Fancy' for people who are absorbed in the contemplation of pigeons, have their minds crammed full of pigeons, and evolve from their inner consciousness most wonderful forms, which they actually succeed in producing by close attention to breeding. Some pigeons are so highly bred that they cannot fly; some cannot see; others that cannot walk; and others,—tumblers,—tumble themselves to death, so much has breeding done for them."

Referring to the frontispiece of the book it goes on to say that "to a poor, ignorant, unfastidious person this plate looks like an exaggerated picture of a monster of ugliness, but so far from that being the real truth of the matter, it is a faithful likeness of one of the most beautiful and perfect Pouters that ever was bred."

No wonder that breeding had no scientific status when we consider that this was the attitude that naturalists as well as the ordinary public assumed towards pigeon fancying previous to the publication of the "Origin of Species." I need not remind my hearers of the great change that has

occurred since, nor of the rich results to science that have come from the scientific study of these biological phenomena.

There is not a naturalist in the whole world today who would not be ashamed to confess such ignorance of the subject as most naturalists were then actually proud of. Artificial selection and what it may produce is now an essential part of the elementary study of every naturalist, and indeed is now studied to some degree by every educated person. I question if the doctrine of natural selection would have readily gained acceptance had it not been that the results of artificial selection were conspicuously before every one's eyes. Artificial selection and natural selection are in fact more unlike than is generally conceded, but they are sufficiently alike for very important scientific deductions, and the results are now freely used to explain theories in science.

Time forbids my following this line farther, but I do not think that I state the case too strongly when I say that a study of the art of breeding has resulted in a profounder change in scientific dogma than has ever been produced by the study of any other economic art.

Let us now glance again at the economic aspect of the subject. The first great effect of this scientific study has been to render breeding for economic purposes more certain. Pure science is exact in the proportion in which it enables us to predict events; its economic applications are valuable in the proportion in which it enables us to control results. The breeder of today controls results with a success his ancestors never dreamed of. With mongrel stock without pedigree, there may be produced some animals of great individual excellence, the accidental result of uncontrolled and uncontrollable variation. With pedigree we may reasonably predict the production of good animals, not as the result of accident, but of design.

The economic production of animals

is therefore now placed on a very much surer foundation. The chances for failure are enormously lessened and the methods of improvement are founded on a philosophical basis. Characters are changed at will when economic considerations advise it. These are the days of "records," but until lately these records have affected breeding only in one direction, that of speed in horses. Now it is being applied to numerous other achievements and qualities. Milking tests are a factor in the breeding of dairy cattle; fattening qualities and early maturity, in the production of animals for flesh; size, prolificacy, color, and form,—in fact, any desirable characteristic,—are now bred for with promise of success.

When we consider the magnitude of our animal production and the intimate connection of domestic animals with our social life we get an inkling of the vastness of the subject and the economic importance of its being placed on a scientific foundation. In economic animal production new breeds can be evolved in shorter time, old breeds quicker and more surely improved, relative qualities more accurately tested, and excellent animals

more surely produced. All the economic results are already rendered more secure because of our better understanding of the laws of heredity and of the causes which promote variation.

There are numerous scientific and social problems which are yet to be settled, in which the data for the solution lie largely in this field. For example, the question now mooted by naturalist, the inheritance of acquired characters if ever settled experimentally will be settled by experiments on domestic animals. So, too, the production of new instincts, the ultimate effect of education and other social problems, can best be here studied experimentally. It is a universal laboratory for experiment and observation. No other biological experiments are conducted on so vast a scale. Animals are bred in countless millions, for a great variety of purposes, by people of every race and grade of culture, and they are subjected to every condition of environment. The ultimate gain to pure science from the study of the great mass of data here available I will not attempt to predict.

THE TUBERCULIN TEST FOR BOVINE TUBERCULOSIS.

Prof. H. L. RUSSELL,

In the following paper no attempt will be made to give an exhaustive account of the general symptoms that are found in tuberculosis as it exists either in cattle or in the lower animals, but merely a brief synopsis of the use of tuberculin as an aid in detecting the disease in cattle. Tuberculosis in cattle, or as it is sometimes called, bovine tuberculosis, is a very widely distributed disease. It does not differ essentially from tuberculosis

as it is found in any of the lower animals or in man.

All tubercular affections, whether in man or in animals are caused by the activities of a minute species of plant life that belongs to the bacteria, and is known under the scientific name of bacillus tuberculosis. This tiny organism, which is only one ten thousandth of an inch long and one fifty thousandth of an inch wide, is the essential cause of all of the dif-

ferent phases of consumption and other tubercular affections, under whatever names they may be known. In cattle it is very widely distributed, more especially in those breeds that are best adapted for dairy purposes. The probable reason for a larger number of these animals being affected is not that dairy breeds are more susceptible to the ravages of this germ than other kinds of stock, but that the conditions under which dairy stock is often kept are such as to favor the more rapid spread of the trouble if it once gains an entrance into the herd. Prolonged lactation, immature breeding and close confinement, conditions that are too often found in our dairy herds, afford the very best possible opportunity for the rapid growth of tuberculosis if it is once introduced. It is for this and similar reasons that a much higher percentage of tubercular animals have been found in the various high grade or full blooded herds in different parts of this country.

Bovine tuberculosis in many of its phases is an extremely difficult disease to detect. In some cases the ailment may assume a chronic form during which the animal may live for a considerable number of years; often the disease in these cases passes unnoticed and even baffles the skill of a practical veterinarian. Then again the course of the disease may be extremely acute, the animal rapidly becoming emaciated, thus dying a lingering death. Among cattle the disease is quite apt to assume a chronic type and under these conditions the animal may linger for a long time giving no intimation to its owner that it is in a diseased condition.

The difficulty of detecting this disease in its early stages is readily patent to any one who is at all familiar with this malady, so that heretofore it has been practically impossible to use any severe measures in eradicating it from our herds. The best that could be done, even under the guidance of an expert veterinarian, was to isolate

those animals that were so badly diseased as to be easily detected by the examiner. In this crude way, however, a large number of animals already affected in the primary stages by tuberculosis escaped, and as the disease continued its ravages among those that were allowed to remain in the herd, it was practically impossible to extirpate the trouble. By the use of the tuberculin test the difficulty seems for the most part solved.

The tuberculin test, or as it is sometimes called, the Koch test, is destined to supplant, or at least aid in a most valuable way, the physical diagnosis in detecting this disease in cattle. It consists merely in the introduction into the animal's body of a small quantity of a fluid known as Koch's tuberculin. In case the animal is healthy, that is to say, free from the slightest trace of tuberculosis, no change is to be noticed. If it is afflicted with the disease in any of its phases and to any degree, its condition will be revealed by a marked rise in its temperature for some hours succeeding the introduction of the tuberculin. All that is necessary then, in using this test, is to determine what are the normal temperatures of the animals in question, then to introduce the tuberculin, and later to measure the temperature of the herd and observe whether there have been any indications of a fever.

This febrile condition that is known as the inoculation fever is present only in those cases that are affected with the disease. Healthy animals almost invariably fail to present any marked rise subsequent to the introduction of the tuberculin.

This tuberculin which was originally discovered by Dr. Robert Koch and was a few years ago used most extensively as a curative agent in human tuberculosis, is nothing more than a soluble extract in glycerine of the products that are manufactured by the tubercle bacillus in its growth on any food medium. It is now manufactured in this country under the direction of

the Bureau of Animal Industry, and in our experiments we have found the domestic product quite as efficacious as the imported material. This tuberculin is made by filtering a glycerine extract of pure cultures of the tubercle bacillus through germ-proof porcelain filters. The filtrate is afterward heated to a temperature sufficiently high to kill any organisms that may have passed an imperfect filter. It is therefore a chemical substance devoid of all living germs of any sort, so that the charge that is often made against its use, that it introduces the diseased germs in a modified form into the animal, has no basis whatever for support. Its action in living tissue is not as yet thoroughly understood, and much further study must be made with it before we can hope to explain all of the phenomena that are observed in its use.

The tuberculin is supposed to act only upon tissue that is affected by the tubercle bacillus. When that is present, it hastens the tissue changes of the diseased parts, causing a degeneration of structure that finally results in death. A tuberculous condition is evidenced by a marked fever in the animal. The height and duration of this reaction fever varies much, and unfortunately does not seem to bear any relation to the magnitude of the disease in the animal. It is not possible in all case to select an arbitrary temperature indicating a reaction fever, from one that does not represent a diseased condition. In our experiments we have almost always found that a rise in temperature of two degrees Fahr. may be regarded as sufficient evidence that the animal is affected with the disease. This is about the minimum limit and in all of those cases in which the reaction does not exceed this number of degrees, the diagnosis should be pronounced doubtful and the test repeated at a subsequent date. Almost always the fever is so strong that the increase in temperature exceeds this doubtful

limit and varies from three to six or seven degrees Fahr.

Manner of Using Tuberculin and Precautions to be Observed.

The tuberculin imported into this country from Germany comes in a very concentrated form and must be diluted with some sterile, indifferent fluid before it can be used. For this purpose, a dilute solution of carbolic acid (1-2 to one per cent.) is usually employed. With this fluid a 10 per cent. solution of the tuberculin is usually made. The tuberculin prepared under the direction of the Bureau of Animal Industry at Washington is put upon the market in a much more diluted condition and is ready for immediate use.

For an injecting instrument, an ordinary hypodermic syringe such as is used by a physician or veterinarian will suffice. The syringes and needles employed in making the inoculations should be carefully disinfected by soaking them in a 5 per cent. solution of carbolic acid previous to the inoculations. The point of injection may be varied to suit the convenience of the operator. We have usually found that part of the neck immediately in front of the shoulder blade to be the most suitable for this purpose as the skin of the animal is usually thinner at this point than immediately over the shoulder. After the hair has been clipped off at the point selected, rub the surface of the skin with a disinfecting solution (5 per cent. carbolic acid) and inject into the animal the necessary quantity of the tuberculin. A light pressure over the point of inoculation easily distributes the fluid. Immerse the needles in the carbolic solution after each injection. In disinfecting the needles in this way, one usually avoids the local swelling of inflammation at the point of inoculation. The dose administered must be varied according to several conditions and depends somewhat upon the strength of the tuberculin that is used. Directions mailed with the Bureau of

Animal Industry's tuberculin indicate the dose to be employed, which varies from 2 to 3 cubic centimeters (30—45 minims) of the tuberculin as sent. The imported tuberculin is administered in very much smaller doses, usually from .1 to .4 of a cubic centimeter (2—6 minims) of the concentrated solution.

Calves and heifers require a much smaller dose than fully matured animals. Bulls should receive larger doses than females of the same age. Animals which are in perfect health seem to require less than those that are lean and poor. The best time for making the inoculation is either in the early morning or late afternoon. Perhaps for convenience and in order to economize as much as possible in time, the early morning is preferable for inoculation, because the reaction fever usually begins to indicate itself in about 6 to 8 hours after the injection, so that if the animal is inoculated early in the morning, the tuberculous condition will be manifested by the fever in the afternoon or evening of the same day. The period of reaction fever varies considerably depending upon the previous condition of the animal.

If the disease is not present, the injection of the average dose of tuberculin does not materially disturb the condition of the animal. The temperature of the animal may, however, rise to a slight extent after the inoculation of the tuberculin, but this rise is not of a prolonged duration and is in no sense a fever, but merely a temporary variation.

In a diseased animal, the temperature generally begins to exceed the average normal in the course of a few hours (6 to 10 hours), gradually increasing until the maximum fever is reached, which happens usually in the course of 12 to 20 hours and then slowly falls to the normal. During this fever period, the temperature must be taken quite frequently, usually every 2 to 3 hours, as it is possible for the fever to reach its maximum

point and fall somewhat within the limits of 3 to 4 hours. A tuberculous condition might in this way be easily overlooked.

There is one point, the importance of which needs to be emphasized in using the tuberculin test, and that is the securing of a full test of the normal temperatures of the animals preceding the inoculation. The temperature of cattle is subject to so much fluctuation that it is impossible to take any single temperature and use this as a standard from which to compute the extent of the reaction due to the inoculation. For this reason we have usually taken the temperature of herds, 3 or 4 times at least, preceding the inoculations and then adopted the average of these as the basis for computation. Usually the temperature of the animal under normal conditions is highest in the afternoon and early in the evening, and lowest in the early morning. This rule, however, is not an absolute one and it is necessary to determine the variations in each individual case. There are many influences that tend to produce a temporary rise in temperature that are due entirely to external influences. Any sudden variation in customary treatment, such as close confinement for a great number of hours, sudden exposure, or prolonged thirst may cause a temporary febrile condition that may mislead one in determining the average normal. We have found a variation in the temperature of animals of 6 to 7 degrees within a period of an hour where animals have been subjected to no other treatment than merely driving them into the barn from the cow yard at an hour of the day to which they were unaccustomed. Animals in heat or approaching parturition often have an exalted temperature, so results obtained under these circumstances cannot always be depended upon. Where animals are allowed to drink but once during the day, their temperature may show a marked decrease after they have been watered. These points, although insignificant, must all be taken

into consideration for upon them depend largely the success of the tuberculin test.

The expense connected with the use of the tuberculin test is not relatively high when we take into consideration the benefits that are derived from its use. It can be used most advantageously in herds of twenty or thirty head or more as the temperatures of this number can be taken quite readily in the interim between the different temperature readings. The cost of the tuberculin is about fifty cents per animal so that the entire expense of testing a herd of thirty need not exceed a dollar per head for material used and veterinarian's fees.

When the total expense need not exceed these limits is it not the part of wisdom with every progressive breeder and dairyman to find out whether he is free from the disease or not? With the higher grade herds, it has become a serious question with many whether they can eradicate the disease without destroying the whole herd. From the financial standpoint alone, the tuberculin test will repay a farmer many fold, for his stock is well worth a marked advance over the same grade where it is sold with this guarantee.

Tuberculin is not an infallible agent for diagnosing bovine tuberculosis. In a comparatively few instances, cases have been found where animals have been affected with tuberculosis and still did not react to the tuberculin test. On the other hand cases are not wanting in which there has been a marked fever noted in the animal after injection which was diagnosed as indicating a tubercular condition, and the

animal upon being sacrificed was found to be free from all traces of the disease. These cases are however comparatively rare. In many instances where reputed errors in the tuberculin test have been reported, the trouble has been with the operator rather than with the tuberculin. Mistakes in temperature reading and insufficient data of this sort often mislead the expert and in many cases in which no tuberculosis has been found in the body it has been because they have been overlooked.

The tubercular condition of the animal is often confined to the small lymphatic glands situated in the different parts of the body and it is a very easy matter for the operator to overlook some of these small structures in making the autopsy. Failure to detect tuberculosis in these beginning stages would often be charged to the fault of the tuberculin rather than to the oversight of the operator.

The experiments with tuberculin for the purpose of diagnosing this disease in cattle have now been extended for over a period of four years. In this country several thousand inoculations have already been made with this agent. In Europe, especially in Germany, Denmark and France it has been still more extensively used. It is now most strongly advocated by all of the best veterinarians as being by far the best means that we have at present of detecting this disease in cattle, and while our knowledge of it and its action is by no means perfect yet its use can be most strongly recommended for this purpose.

JOHN M. SMITH.

John M. Smith was born in December, 1820, and died in February, 1894. Within these dates are woven the incidents of a life of more than common interest,—active, broad, sympathetic, generous and successful. Into his life came sorrow and business reverses which were borne with quiet fortitude and bravely overcome.

Mr. Smith neither desired nor sought for political preferment, but into his life came honors more sweet and precious than this, because they brought him in full touch and sympathy with those who conferred them. What inauguration day might be to a president or governor, his annual strawberry festival was to him; and in faith and loyalty the guests of those occasions were second to none.

The force and trend of his life work are best given in the closing sentence of his paper published in the Wisconsin Horticultural Report for 1875. "To stand still is to be left behind. Then

let our motto be 'Onward and upward.' Many of us have heads already whitening with age, and we know that we shall not always remain in our present places. Then let us so work that when, one by one, we fall from the ranks with life's journey ended, kind friends may say of us, as they bear us away, 'His labors are over; his life's work is finished, and it was well done.' If this can be said of us, however humble our positions here, we shall not have lived altogether in vain." This thought he lived in its fullness, and it was not in vain. Thousands have profited by his example and council, and though he is at rest, thus will the influence of his good work go on and on.

He was a friend and earnest worker in and for the Farmers' Institute from their very beginning. We miss him and mourn him. May our love for him lead us to strive to emulate his grand, unselfish life.

THE STOUT MANUAL TRAINING SCHOOL.

Prof. J. E. HOYT.

An incident of the Round-up Institute at Menomonie was a visit to the Stout Manual Training School. The interest aroused has led to a request for a brief description.

The school was founded by Mr. J. H. Stout, and began operation in January, 1891. It had its origin in a desire that school training should be made more fully a preparation for life as it comes to the average boy and girl, giving besides a disciplined, well-stored mind, a general preparation, through practice as well as instruction, for engaging with advantage in the various industrial pursuits incumbent in one form or another upon all.

General as well as local benefits are contemplated in the aims of the school, which may be thus stated:—

1st. To secure to the youth of Menomonie and vicinity the breadth and added value which manual training can give to general education.

2d. To aid in demonstrating that a course of manual training of large educational and industrial value can be carried on in connection with, and without detriment to the usual academic work of the high school.

3d. To disseminate information as to the nature, amount and appliances, and the educational and practical results of manual training, thus aiding in its adoption, where conditions are favorable, as a form of educational work.

The Manual Training School is organized as a branch of the public schools of the city, and is co-ordinate with the high school, in which its technical courses are complemented on the academic side. Thus, the four year manual training course may be taken in connection with either of the three

high school courses, as one exercise a day throughout. It may also be taken by those who are prepared in certain essentials in English, mathematics, and science, without connection with the high school courses, and thus may be considerably shortened in time.

The subjects and order of this course are substantially as follows:—

For Boys:—Free Hand and Mechanical drawing throughout, joinery, one year. Wood turning, two terms. Pattern making, molding and casting, two terms. Forging, two terms. Machine shop practice, three terms.

For Girls:—Plain sewing, two years prior to entering, or one year within the High School. Dress-making, including measuring, drafting of patterns, fitting, etc., two terms. Cooking, three terms. Invalid cooking and hygiene, two terms. Free hand drawing and art work throughout the course.

As a preparation for, and a means of placing upon a higher plane the course just outlined, the manual training branches in certain forms are begun in the lower grades as early as may be to advantage. Following the manual and concrete exercises of the kindergartens, drawing for all pupils is begun in the primary grades, sewing for girls in the fifth, and mechanical drawing and knife work for boys in the sixth grade.

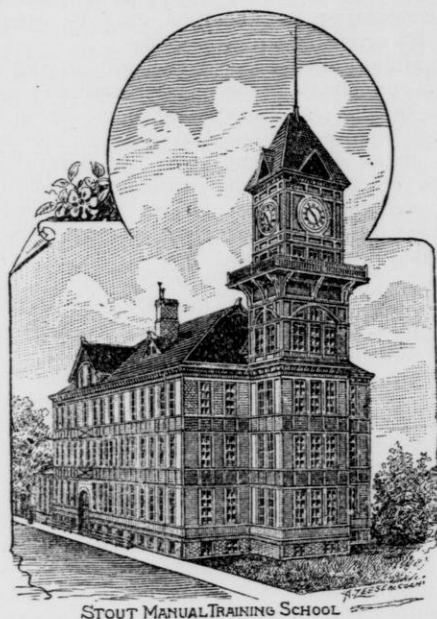
In all forms of work a high quality as to accuracy, proportion, neatness, adaptation to use, fit, finish, etc., in the product, is insisted upon and secured. Only methods and processes which are practical and of educational value are used or permitted. The product, though often of great interest, is held as of little or no conse-

quence in comparison with the thinking, the esthetic feeling, the carefulness or skill, which are developed or exercised in its production.

A marked feature of the school is the abundant and excellent provision made in every branch, including also the sciences of the High School courses, for actual and constant doing by the pupil. Work in the shops, the drawing rooms, the kitchen, and the laboratories, is interrupted only to present in the lecture rooms the di-

stantial, roomy, well lighted, and provided with ample means of ventilating and warming by the hot-blast system. Longitudinal and transverse halls give immediate access to each of the twenty-nine rooms, which are in constant use.

In the basement are found the engine and boiler room, molding room, fuel and other storage rooms; on the first floor are separate rooms for office, lumber, tools, journey work, wood turning, finishing, machine shop and



ductive matter necessary to render doing intelligent, and fruitful of knowledge or ability.

The building occupied was erected expressly for the school, after much observing and careful planning. Two years of trial have proven it specially well adapted for its uses. Located upon the central school grounds alongside of the High School building, it rises a beautiful wooden structure, with three stories and basement, upon a foundation 59x135 ft. It is sub-

stantiated with ample means of ventilating and warming by the hot-blast system. Longitudinal and transverse halls give immediate access to each of the twenty-nine rooms, which are in constant use. In the basement are found the engine and boiler room, molding room, fuel and other storage rooms; on the first floor are separate rooms for office, lumber, tools, journey work, wood turning, finishing, machine shop and

blacksmith shop; on the second floor rooms for mechanical drawing, library, kitchen, sewing and recitation; the third floor has two large rooms for drawing and art work, a science lecture room, and the laboratories, chemical, biological and physical. All work rooms are well supplied with water, and the laboratories also with gas. Much of the furniture was specially designed for the school; the equipments of machinery, forges, tools, utensils, etc., are of the best make

and adapted to manufacturing purposes; the apparatus for science work in which the school is specially fortunate, is of the quality used in the colleges and universities.

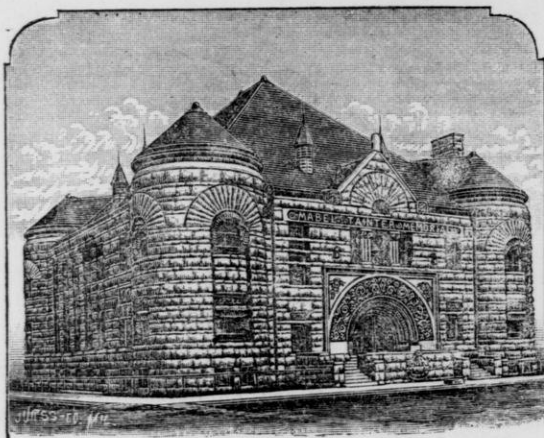
From the foregoing brief sketch some idea may be formed of the completeness and excellence of the provisions made for the school on the material side—all of which is due to the generous interest and wise insight of Mr. Stout.

By the arrangement originally made it devolves upon the Board of Education to manage the school, provide for the instruction, and supply the material used up in the teaching processes. With the sanction of the Common Council and the hearty encouragement of citizens, the Board has sought to discharge this duty in a manner worthy of the magnitude and liberality of the enterprise, and well-aimed to secure a faithful and capable application of the means to the end sought.

The teaching force has been selected with great care. As in the High School, each of the instructors giving full time to manual training subjects

and science, is a graduate of a college or a technical school of collegiate work, and has had extended experience in the study and teaching of the chosen specialty. The instruction, therefore, while keeping within the limitations of the secondary school, is scholarly and efficient, and yields the best of discipline. Moreover, the teachers are themselves capable of doing upon a commercial basis by the most direct and practical methods, work of the kinds which they teach, leaving no grounds for the prejudice on the score of alleged artificiality and ineffectiveness, which is sometimes felt towards the college trained teachers of the arts.

The growth of the school has been uninterrupted; many plans are yet undeveloped, and additions are constantly being made to the equipments. Of the propriety and the value of the training which it affords there is but one opinion among those who have observed closely its workings or shared its benefits. It is steadily winning its way to a secure place in the confidence and esteem of the people.



MABEL TAITER MEMORIAL HALL.

The Memorial Building in which the closing Institute was held, was formally opened on the evening of July 3d, 1889. It was erected in memory of Mabel Tainter, whose death occurred in June, 1886, by Captain A. and Mrs. Tainter, at a cost of \$100,000, and by them given to an organization known as "The Mabel Tainter Literary Library and Educational Society."

The building is used for several purposes, public and private. The Auditorium and part of the basement is used for church gatherings by the Unitarian Society, and for Dramatic entertainments and lectures. The club rooms are free to young men. A large fire proof library and reading room is

open to the public in Dunn Co. Rooms on the third floor are devoted to the G. A. R. and Woman's Relief Corps.

A fair idea of the exterior appearance of the building can be gained from the engraving, yet the engraver's art, in detail, does not do it justice. The scroll work and lettering above and near the arched door is carved out of solid stone.

The building is located on one of the most prominent corners of the city, and covers an area of 80x90 feet. Unrestrained use of money and superior judgment and taste have secured the very best of everything needed. The Auditorium seats from 500 to 700 persons, and is a study in itself.

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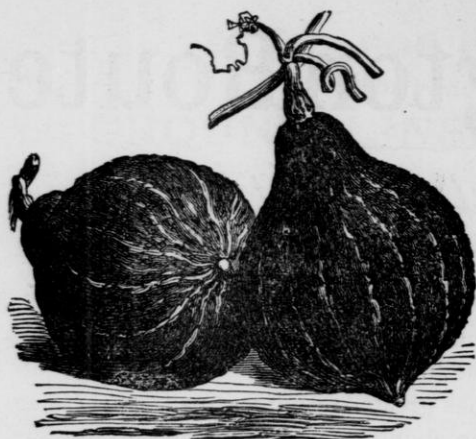
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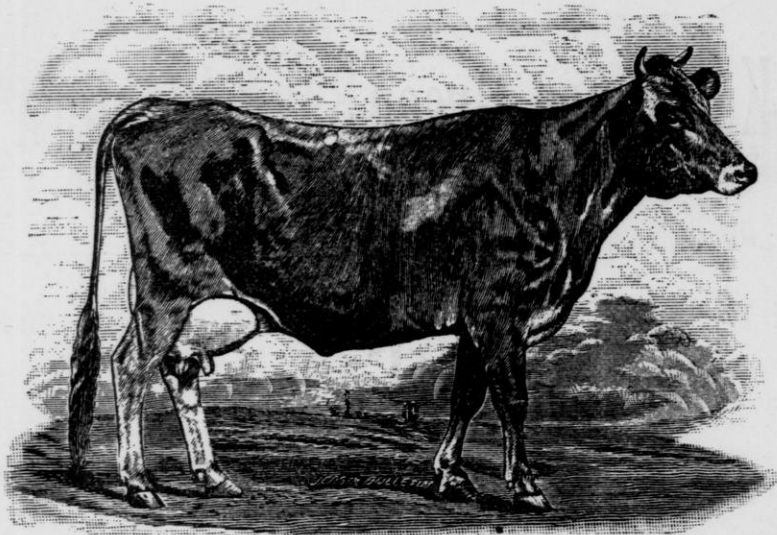
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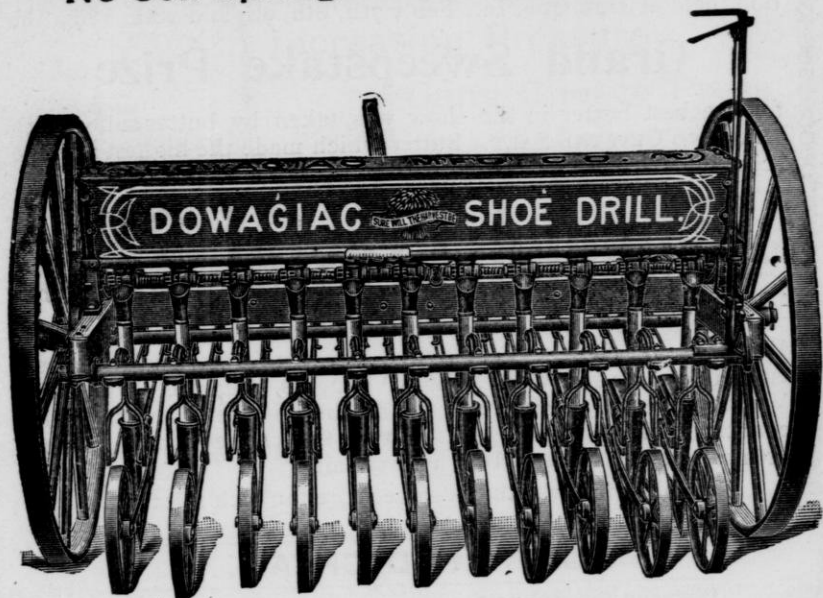
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The only drill that will sow in rows 5 and 6 inches apart. A perfect trash rider—will not clog—effective pressure, and a feed that will sow all the oats desired without change of gear. Made in all sizes from 11 to 26 shoes. Do not fail to see this drill before placing your order. For further information call on the largest implement dealer near you or address

DOWAGIAC MFG. CO.,

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A Prize Winner.

At the National Butter and Cheese Makers' Association Convention, held at Dubuque, Ia., Feb'y 7th, 8th, 9th and 10th, 1893, the

Grand Sweepstake Prize

for the best butter in the show was taken by butter salted with **DIAMOND CRYSTAL SALT**. Butter which made the highest average score in each class was salted with

Diamond Crystal Salt.

There were over 300 competitors in the contest, from all the Dairy Sections in both Eastern and Western States, and the butter entered was salted with Ashton, Higgins, Genesee, Worcester, Warsaw, Kansas, Kerr Bros., and all the dairy salts known in this country, making the biggest show of the kind ever held, and the greatest victory on record for a dairy salt.

The following was the average score for each salt :

GATHERED CREAM.

Diamond Crystal Salt	94
Ashton	93 2-3
Genesee	92 2-5
Worcester	91 1-3
Higgins	91
Warsaw	89 1-3
Kerr Bros	86

SEPARATOR.

Diamond Crystal Salt	94 10-15
Higgins	94
Ashton	93 3-8
Genesee	93
Worcester	92 5-9
Kerr Bros	92 1-3
Kansas	90 4-9

DIAMOND CRYSTAL SALT CO., St. Clair, Mich.

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THE LATEST AND GREATEST
Improvement in Cheese-Making.

The New "Continuously
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AUTOMATIC. Constantly and continuously increasing the pressure. The Cheese, after being put in the press, require no attention until finally removed to shelves—thereby greatly saving in labor. Owing to the steady and uniform pressure applied, no white whey is started. A richer, firmer and better cheese is produced. This press is being adopted by the largest combinations and the leading factories. Recommended by N. Y. State Dairy Commission. Send for testimonials and descriptive circular.

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COMPLETE CHEESE FACTORY OUTFITS A SPECIALTY.

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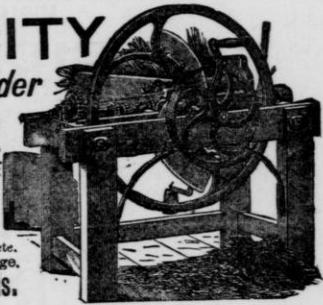


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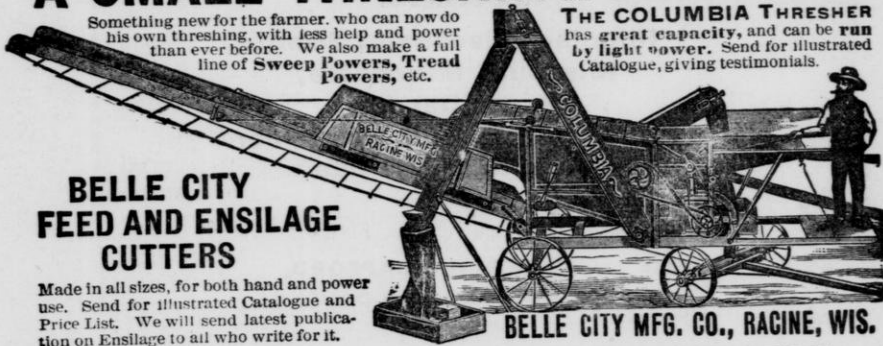
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Also breeds Poland China pigs of the best strains. Come and see us or write for pedigrees and prices.

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Locations for Industries.

* * * * *

THE trend of manufacturing is Westward, and among all manufacturers there is a latent feeling that the West as a territory for the manufacture of goods presents features unexcelled by any other section in the Union.

The eight States traversed by the 6150 miles of the **Chicago, Milwaukee & St. Paul Railway's** tracks (Illinois, Wisconsin, Northern Michigan, Iowa, Missouri, Minnesota, South Dakota and North Dakota), possess in addition to the advantages of raw material and proximity to markets, that which is the prime factor in the industrial success of a territory—a people who form one live and thriving community of business men in whose midst it is safe and profitable to settle. Many towns on the line are prepared to treat very favorably with manufacturers who would locate in their vicinity.

In addition to the vast agricultural resources, its territory comprises forests of hard and soft woods, mines of iron and other metals, coal and other minerals, quarries, clays of all kinds, tanbarks, flax and other raw materials. Water powers (both river and artesian) are also still available.

A number of new factories have been induced to locate—largely through the instrumentality of this Company—at towns on its lines.

The central position of the States traversed by the *Chicago, Milwaukee & St. Paul Railway* makes it possible to command all the markets of the United States. Nothing should be permitted to delay enterprising manufacturers from investigating. The Industrial Department promptly furnishes practical information to manufacturers. As it is to the interest of the Road to secure the location of industries at places where the surroundings will insure their permanent success, the information furnished a particular industry is pertinent and reliable.

LUIS JACKSON,

Industrial Commissioner, C. M. & St. P. R'y.,
425 Old Colony Building, CHICAGO, ILL.

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Prepared Fertilizing Salt

Has been sold direct to Farmers in car loads, 15 tons or more for the past 15 years in Wisconsin, Michigan, Indiana, Ohio and Illinois. It is free from hard lumps, being ground by machinery, is all nice even grain and is in fine condition for broad casting on the land; read the following letter from one of our Michigan farmers this year:

KALKASKA, MICH., Feb. 10, 1894.

E. S. FITCH, Bay City, Mich.

DEAR SIR: - I have used your fertilizing salt for several years with good success. A number of farmers tried it and say it is no good, BUT I KNOW BETTER. The fact is they did not put on enough to do either harm or good and then condemned it. I know that I get one-third more grain per acre than they do, and my stock eat the straw better and do better than others who do not use the salt. I want five or six tons. My son and one of my brothers will use some. How many tons in smallest car load and price on cars at Kalkaska? Yours respectfully, Wm. LEWIS.

For further particulars and circulars address

—FITCH SALT CO., BAY CITY, MICH.

Ground Bone and Oyster Shells FOR POULTRY.

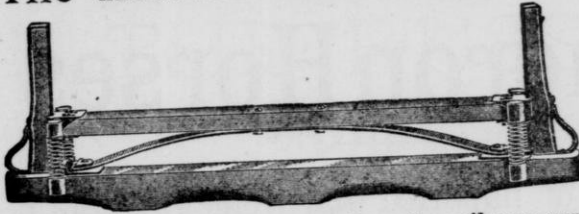
SOME of our farming friends appear to be deeply impressed with the notion that hens need no food but corn in some of its forms. But we ought not to forget that food means the material for everything that comes out of the system, and if any particular race takes up any special branch of manufacture they must have the raw material. All animals consume more or less lime; it is one of the principal elements entering into the composition of the bones, but the hens need an extra supply. The domesticated hen also needs more than wild stock of any sort, since she is stimulated to a greater production of eggs. In consequence, we must give her more than is contained in the various grains. The most useful forms in which to give lime are in the shape of coarsely ground bone and oyster shells. Feed these articles most abundantly at the time when the hens are laying most freely, and anticipate, if possible, by feeding early in the season.

Raw bone has been proven by analysis to contain every part of an egg—white, yolk, and of course shell. It should be constantly kept in a special place in the pen or apartment of laying hens, as they will consume large quantities of it, and it goes chiefly to egg production. Granulated is the best form in which to place it before adult fowls, and in this shape it keeps fresh longer than when ground into meal. Bone is one of the principal ingredients in the composition of most of the "egg foods" in the market.

FITCH FERTILIZER WORKS,
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The Holmes Oscillating Bolster Spring.



PRICE LIST.

No. 0, Cap. 1,500 lbs., per set,	\$5.00
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No. 2, Cap. 3,500 lbs., per set,	7.50
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In ordering state distance between Bolster Stakes.

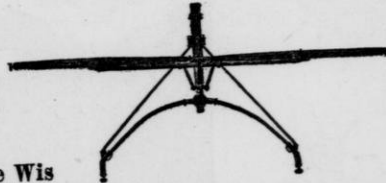
IN the construction of our springs, the coils are supported on the ends of the bolster, by a Hinge Yoke, which permits of a free and easy oscillating motion, and causes the compression to be always in line with the center of the coils, thus avoiding breakage. We claim that in our combination of the elliptic with the coil spring, we have the **Best Graduated Bolster Spring** on the market, and that it will carry any load, at any point, easier than any other Spring made. We guarantee these springs to carry without breakage, up to their stenciled capacity.

The "Holmes" Adjustable Pole.

Adjustable to any width from a buggy to a cutter with perfect equalizer that prevents side draft; also **THE ACME STEEL POLE**. Entirely new and practical Lighter, Stronger more durable and neater than any pole made.

Write for Prices and Terms.

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Curtis Babcock Farm Tester.



4 Bottle Machine Complete.....	\$5.00.
6 Bottle Machine Complete.....	6 00.
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Every Dairyman who keeps a half-dozen cows ought to provide himself with one of these testers if he cares the snap of his finger to know whether he has a cow in the herd that is worth keeping. More than one cow "eats her head off" every year she is kept. This tester is designed expressly for farm use, and so low a price put on it that every man who owns two cows can have a four bottle machine. We sell Hand Separators, Churns, Butter Workers; in fact all kinds of supplies for the Dairy, Creamery and Cheese Factory.

Cornish, Curtis & Green Manf'g Co.,

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Now have about *fifty* head of choice stallions and mares of all ages for sale, and will sell them as cheap as the cheapest, quality of stock considered. All stock guaranteed as represented. As I expect to continue in the business of importing and breeding, I earnestly solicit your patronage and will do all in my power to make terms satisfactory, as I want you to come again. Respectfully,

*Farm a half mile west of P. O. }
on C. M. & St. P. R. R.*

H. A. BRIGGS,

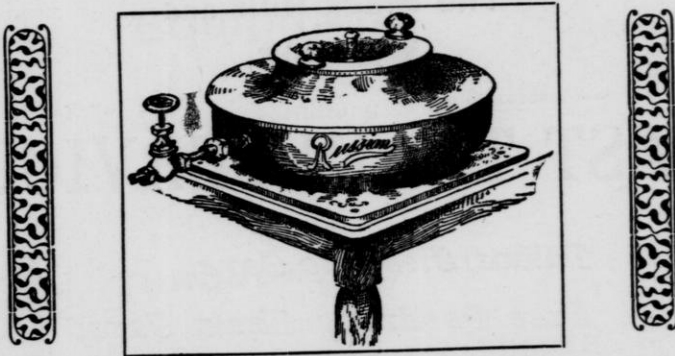
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It is the Most Accurate and Most Easily Handled
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THE FRAME IS OF CAST IRON AND ALL THE WEARING PARTS
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NOT HOW CHEAP, BUT HOW GOOD.

This test is made only in 12-bottle size, but is so conveniently
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any other of larger size.

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To Wisconsin Sheepmen!!

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These results are certain if you use the world-renowned

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Every user praises it. Its use is not an experiment but a profitable investment. A \$2.00 packet makes 100 gallons.

Reference: GEO. MCKERROW, Sussex, Wis., (Local Agent.)

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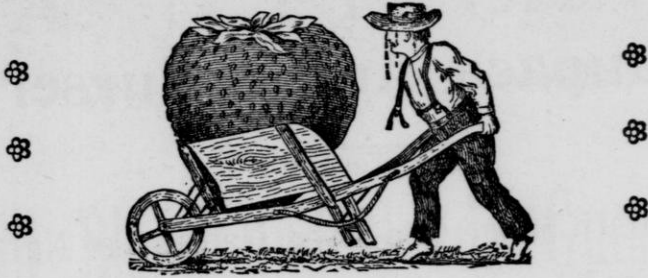
ATTENTION! FARMERS, DAIRYMEN AND STOCKMEN.

Have you thought anything about the value of **OLD PROCESS** Oil Meal as a food and a flesh producer for your live stock? Experienced feeders pronounce it to be the best and most profitable food for **BEEF, CATTLE, HORSES, SHEEP, HOGS, FOWLS**, etc. Keeps stock in a healthy condition and makes palatable meats. No food known will fatten cattle so rapidly for market as **Old Process** Oil Meal. A wonderful food for **Milch Cows**. Increases quantity and quality of **Milk, Butter and Cheese**. It acts like good pasture on the animal and is therefore a superior **Winter Feed** for all kinds of stock. A double gain in rich **Manure** that is left.

The most experienced feeders of the old country are buying large quantities of this food from us at a cost to them of about \$40 per ton. Don't you think you can make money to use it at a little over half this price?

Send us your address and we will forward you valuable matter pertaining to cattle food.

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Are Western Headquarters for the

Loudon Red Raspberries

Having made arrangements to ship direct from the originator's grounds this best of all red raspberries. The only prices for spring of '95 for **GENUINE** stock is

50c. Each, \$2.75 for Six, and \$5 per Dozen.

We also Grow Our Own

Fruit Trees and Acres and Acres of Strawberries

And other Small Fruits. We have now 75 **KINDS OF STRAWBERRIES** and can furnish for any soil and in any quantity by mail, express or freight. We have 15,000 Trees of our own growing, and especially invite the farmers to send direct to us for Fruit Trees and Plants, as we can furnish at less than **ONE HALF THE PRICE** of those who bum about the country to take orders.

GIVE US A TRIAL ORDER.

Send a stamp with any questions and get our Price-List and instructions. We have American and United States Express Companies; C. & N. W. Ry. and C. M. & St. P. Ry. companies and can ship at short notice in October or April and May.

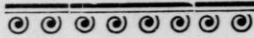
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Apple and Crab Trees.—Thousands of the famous Wolf River, Northwestern Greening, Duchess, Wealthy and McMahan's, and other leading varieties.

Blackberries.—Ancient Britton and other varieties.

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CURRANTS, GRAPES, GOOSEBERRIES, ETC., ALL VARIETIES.

My stock is especially adapted for the north and west. All orders or communications will receive prompt and courteous attention.

The following is a synopsis of my prices:

Apples and Crabs—4-5 ft., 1st class, 20c each, \$2.00 per doz., \$15.00 per 100.
Pears, Plums and Cherries—4-5 ft., 40c each, \$4.00 per doz., \$35.00 per 100 and everything else according.

Order Early. First come, first served.

A personal inspection of my orchard and nurseries is cordially extended.

Don't forget the mark on the gate: "**Nursery goods at Retail at Wholesale Prices.**"

A. D. BARNES, Waupaca, Wis.

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MALES ONLY FOR SALE.

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AVISTA AND EUREKA APPLES

Also proprietor of one of the largest and oldest apple orchards in Northwestern Wisconsin. A nursery of the Hardest Varieties yet discovered adjoins the orchard where trees can be bought that are hardy, productive, and thoroughly acclimated. I have given the subject of Hardy Trees and New Seedlings much study and am prepared to furnish at reasonable rates either trees suitable for trying localities or can give a list and name a place where they can be bought direct from the growers and save planters from being swindled by tender, new or untried varieties. Correspondence solicited. The Avista, a winter apple, has borne fruit in my orchard for 28 years. Can give information of how you can surely raise apples in a cold climate.

A. J. PHILIPS,

WEST SALEM, † † † † WISCONSIN.

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YOU CAN REACH QUICKLY AND COMFORTABLY

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ITS SOLID VESTIBULE TRAIN,

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With its Northern and Eastern Terminals
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From the Great Lakes

With connections from the North, West and
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South to the Gulf of Mexico,

Reaching direct such important points as Springfield, Ill., St. Louis, Mo.,
Memphis, Tenn., Vicksburg, Miss., and New Orleans, La., with connec-
tions to all principal points in Florida, Georgia, Alabama, Mississippi,
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Reaching direct such important points as Rockford and Freeport, Ill.,
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 PULLMAN SLEEPING CAR SERVICE. 

See that your Tickets read via the Illinois Central Railroad. They can
be obtained of any ticket agent of its own or connecting lines

J. T. HARAHAH,
Second Vice-President.

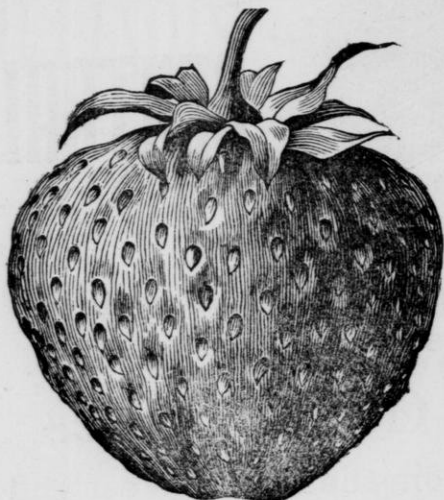
T. J. HUDSON,
Traffic Manager.

M. C. MARKHAM,
Assistant Traffic Manager.

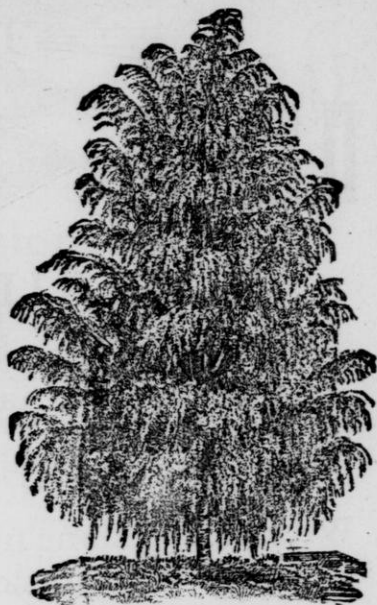
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Jessie.



Cut Leaf Weeping Birch.

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Cut Leaved Weeping Birch, Horse Chestnut, Catalpa, Norway Maple, Hydrangea, Yuzza, Purple Fringe, Clematis, Honey-Suckle, Gladiolas, Roses, Evergreens, Linden, Etc.

Small Fruits and Ornamentals a Specialty. Great Care Given to Cultivating. Everything Strictly First-Class.

A Few Items Worth Remembering, viz—Work your garden of small fruits of all sorts with cultivator and horse; do not fail in this. Do planting in early spring always. Invest a small amount in your garden and be sure and let your horse tend it, as there will be horses living after we are numbered in the past. We have the largest and finest stock of plants we ever raised. Strawberries, 1c. each; raspberries, 1 to 3c. each; currants 10 to 15c. each; gooseberries, 10 to 25c. each; grapes, 10 to 25c. each, according to age and variety. Write and get prices and sizes on the small fruits, vines, trees, roses, shades and ornamentals. All orders must reach at least \$1.00 in value. Plant according to the size of your family; 100 to 300 strawberries, 50 to 150 raspberries (red and black), 12 to 36 currants (red, white and black), 6 to 12 gooseberries (American and English), blackberries 50 to 150 (early and late), 20 to 50 grape vines (black, red and white); not using over one eighth of an acre of your soil and producing all you and your family can consume in one year. Decorate your home with trees and vines to make it pleasant. Home ought to be the nearest type of Heaven.

All Questions Cheerfully Answered. Please state what stock you want and all particulars, and I will see that you get it. Yours very truly,

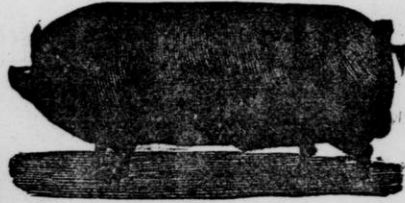
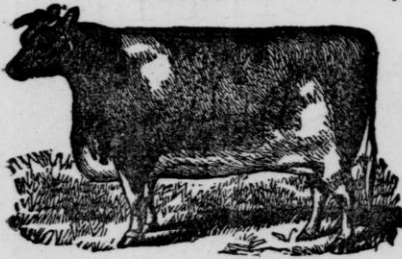
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OF ALL AGES AND SEX, CONSTANTLY ON HAND.

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(303)

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— OF —

GUERNSEY CATTLE.

First Prize Herd, Wisconsin State Fair, 1894.



BENJAMAN, 1931.

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Our herd is tuberculin tested and a certificate can be given with each animal sold.

Mature cows must make 350 lbs. of butter per year if they expect to board with us.

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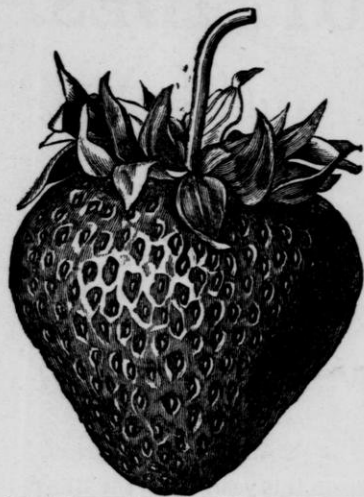
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Our illustrated descriptive Catalogue tells all about it, and gives right prices. Send for one to-day. We send it free.

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Ornamental Trees, Flowering Shrubs, Evergreens and Roses.

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This illustration is an exact reproduction of a photograph taken in July. The bush was then 11 feet high and 21 feet around, and was covered with very large delicious berries from the ground up. We also list the new Wisconsin raspberry, the **LOUDON**. If you want plants, few or many, be sure and send for our catalogue. Yours to serve,

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OLDS' SEED POTATOES.

The following are our principal varieties for the season of 1895:

Early Ohio,	Signal,	WORLD'S FAIR,
Ohio Junior,	Early Puritan,	Irish Daisy,
Early Market,	Polaris,	Maggie Murphy,
Six Weeks Market,	Arizona,	American Wonder,
Early Walton,	Freeman,	Rural N.Yorker No.2.

WORLD'S FAIR POTATO.

Introduced by us in 1893, is right at the front again this year. It is the **BEST VARIETY WE EVER GREW**, all things considered. Try it.

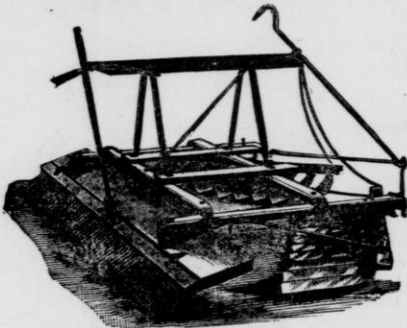
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A postal will bring you our ILLUSTRATED CATALOGUE, telling you all about the potatoes and other seeds.

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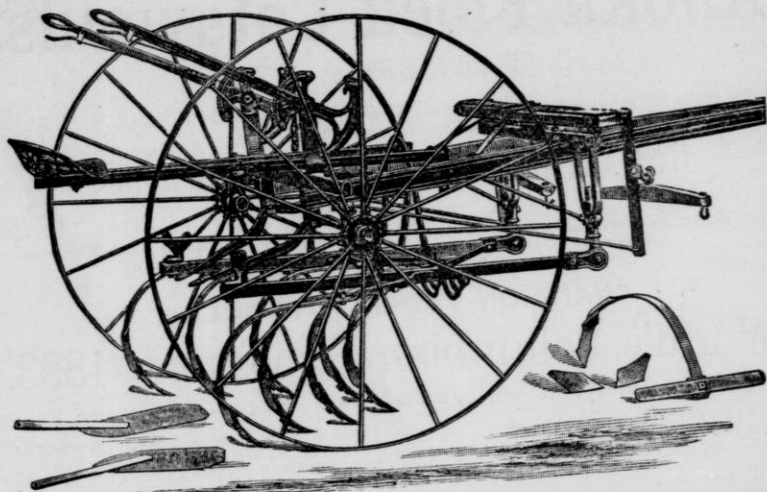
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WAUKESHA, WIS.

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Farm one-quarter mile from town.

GEO. HARDING & SON, Proprietors.

Largest Assortment of Rams and Ewes of Choice Breeding and Merit in America. Largest Short Horn Herd in the State, of best Bates & Cruikshank families.

▲ ▲ CHAMPION FLOCK COTSWOLDS. ▲ ▲

World's Columbian Exposition, 1893.

The following Prizes won by our Sheep and others now our Property:

Ram, 3 years or over, 1st, 2d and 3d.
Ram, 2 years, 1st, 2d and 3d.
Ram, 1 year, 1st, 2d and 3d.
Ram, lamb, 1st, 2d, 3d and 4th.
Ewe, 3 years or over, 1st, 2d, 3d and 4th.
Ewe, 2 years, 1st, 2d, 3d and 4 h.
Ewe, 1 year, 1st, 2d, 3d and 4th.
Ewe, lamb, 1st, 2d, 3d and 4th.

Flock, Ram and three Ewes, 2 years or over,
1st, 2d, 3d and 4th.
Pen, five Ewes, 2 years or over, 1st, 2d and 3d.
Flock, two Rams and three Ewes, under 2 years
(bred by exhibitors), 1st, 2d, 3d and 4th.
Champion Ram and winner of Silver Cup.
Champion Ewe.

A Total of 43 Prizes out of a possible 46.

Cotswolds from Anoka Flock have won at State Fairs during past five years 250 First Premium out of a possible 300, and the usual number during 1894.

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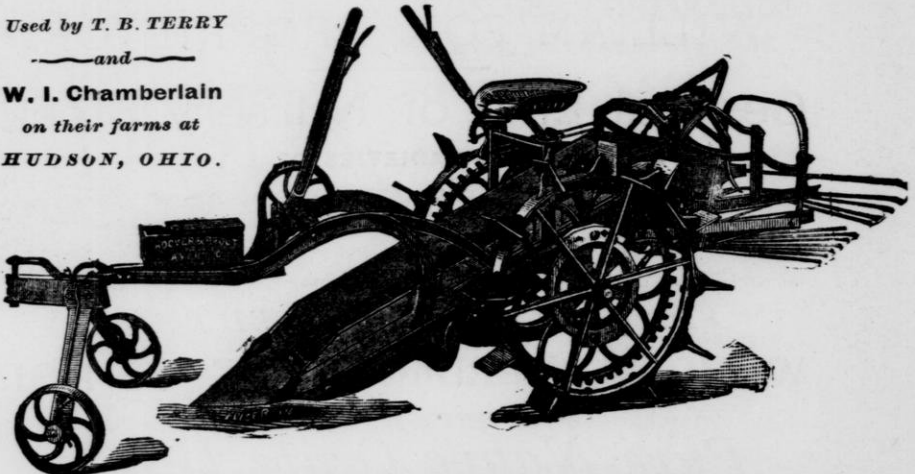
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A DOZEN OR A MILLION.

The "Sparta" Strawberry, a wonderful new seedling, originated on our farms by Mr. T. L. Herbst our assistant superintendent; also Cor. Sec. of Wis. Hort. Soc. and a short course agricultural student at Wis. University, is being introduced by us in fall '94 and spring '95

We Have the Largest Acreage of Ancient Briton Blackberries in America. They lead all varieties. We have picked two thousand bushels from 10 acres. We have 100,000 plants to sell.



THE

**Nemeha
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is the best of all black caps We have over 10 acres of them and 50,000 plants to sell.

Prof. Goff says: "The thorough culture practice on the Thayer Fruit Farms would do credit to any Exper. Station in our country."

We grow and sell the Plants of that great new Red Raspberry that Wisconsin is proud of

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Originated by F. W. Loudon.

Send for Price List of Plants. Any of our Berry Garden Collections from 50c. to \$10 00; also Mr. Thayers' book "How Big Berries are Grown and Lots of Them," (new edition) all free.

Thayer Fruit Farm,

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RASPB
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GOOSE

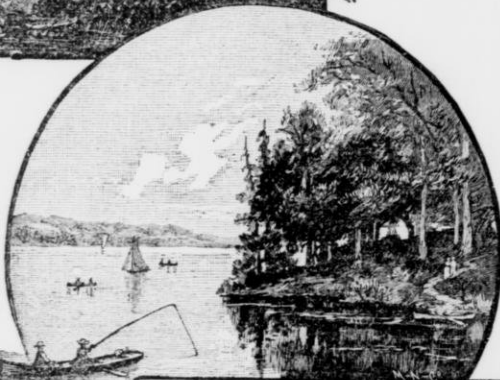
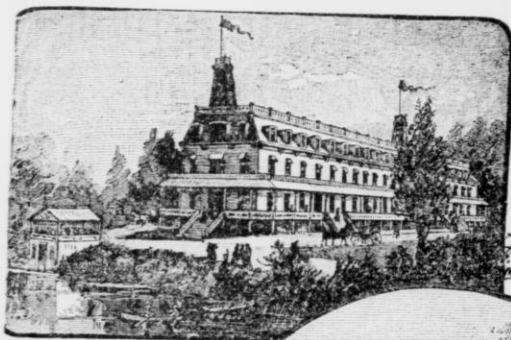
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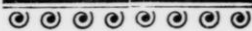
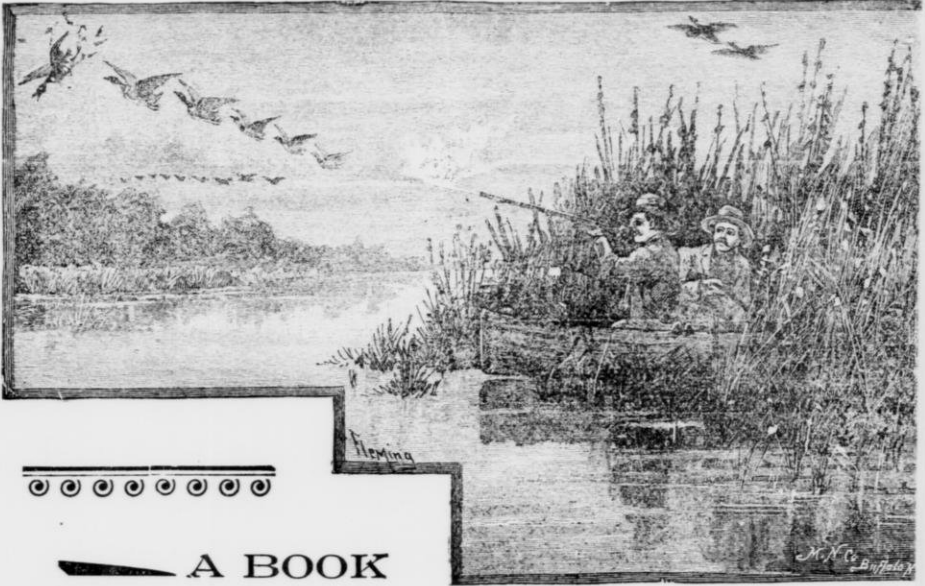
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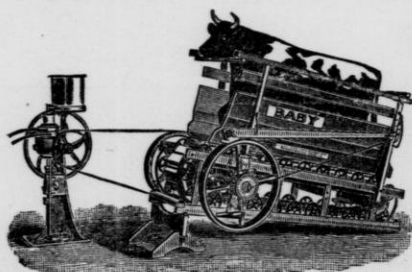
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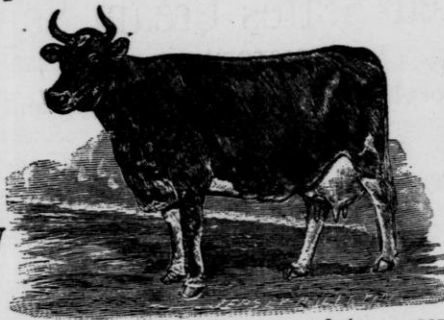
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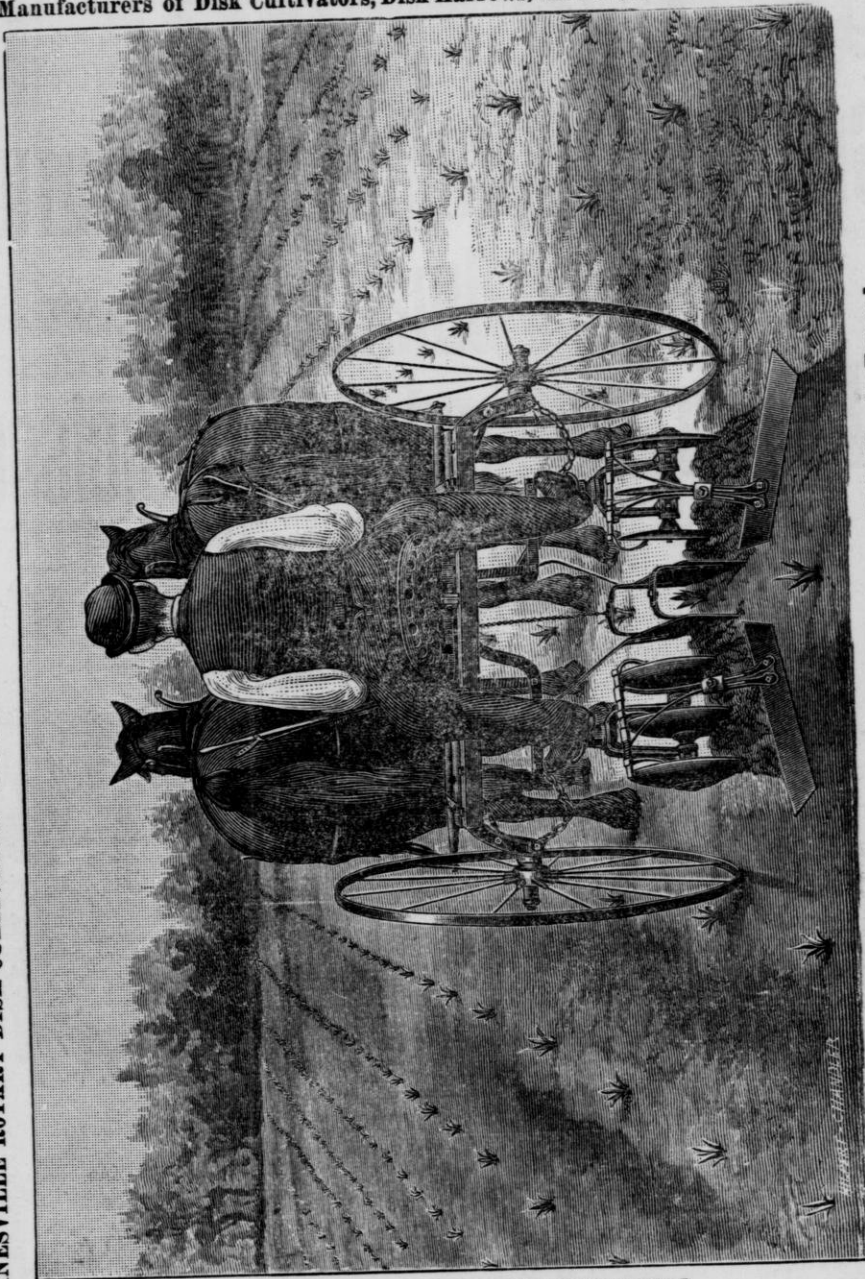
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After an exhaustive, practical running test at the 1894 State Fair, Des Moines, Iowa, the "Baby" separator completely distanced all would-be competitors in the race, and was awarded the

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BABY 3.

Are you still a doubter? If you intend purchasing you can have the evidence of its practicability in your own dairy, as the "Baby" Separators are sold **ON THEIR MERIT!**

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From a Mechanic as well as Dairyman.

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M. H. SMITH.

Five Good Reasons.

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JOHN GROVER.

Wanted Only the Best.

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