Wisconsin Farmers' Institutes : a hand-book of agriculture. A report of the twenty-fourth annual closing Farmers' Institute, held at Two Rivers, Wisconsin, March 15, 16, 17, 1910. Bulletin No. 24 1910

Wisconsin Farmers' Institutes
Madison, Wisconsin: Democat [Democrat] Ptg. Co., State Printer, 1910

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Give fools their gold, and knaves their power,
Let fortune's bubbles rise and fall—
Who sows a field or trains a flower
Or plants a tree, is more than all.

—Whittier.

This leads to the further reflection, that no other human occupation opens so wide a field for the profitable and agreeable combination of labor with cultivated thought, as agriculture. I know nothing so pleasant to the mind, as the discovery of anything that is at once new and valuable—nothing that so lightens and sweetens toil, as the hopeful pursuit of such discovery. And how vast, how varied a field is agriculture, for such discovery. The mind, already trained to thought, in the country school, or higher school, cannot fail to find there an exhaustless source of enjoyment. Every blade of grass is a study; and to produce two, where there was but one, is both a profit and a pleasure. And not grass alone; but soils, seeds and seasons—hedges, ditches and fences, draining, drouths, and irrigation—plowing, hoeing and harrowing—reaping, mowing, threshing—saving crops, pests of crops, diseases of crops, and what will prevent or cure them—implements, utensils, and machines, their relative merits, and to improve them—hogs, horses and cattle—sheep, goats, and poultry—trees, shrubs, fruits, plants, and flowers—the thousand things of which these are specimens—each a world of study within itself.—Abraham Lincoln, at Wisconsin State Fair, Sept. 30, 1859.

WISCONSIN

Farmers' Institutes

A HAND-BOOK OF AGRICULTURE

BULLETIN No. 24
1910

A Report of the Twenty-Fourth Annual Closing Farmers' Institute, Held at Two Rivers, Wisconsin, March 15, 16, 17, 1910

"No other human occupation opens so wide a field for the profitable and agreeable combination of labor with cultivated thought as agriculture."
Abraham Lincoln

EDITED BY

GEO. McKERROW

SUPERINTENDENT

FIFTY THOUSAND COPIES ISSUED

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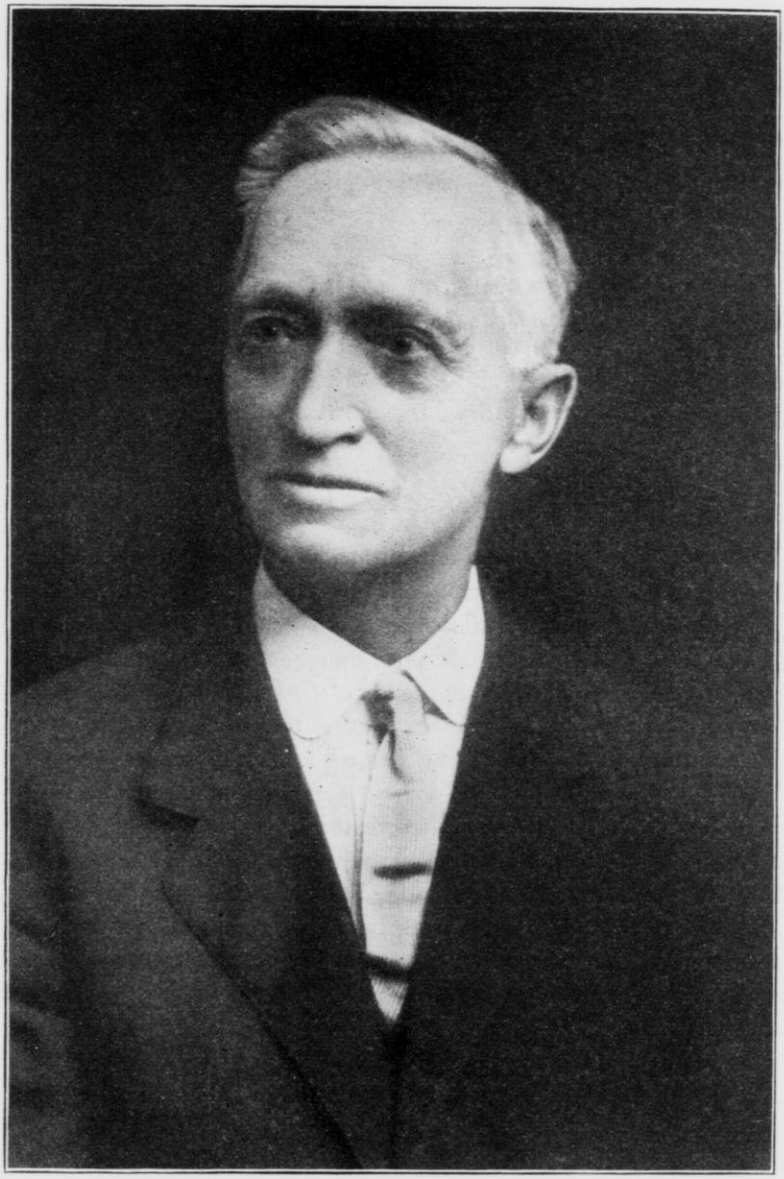
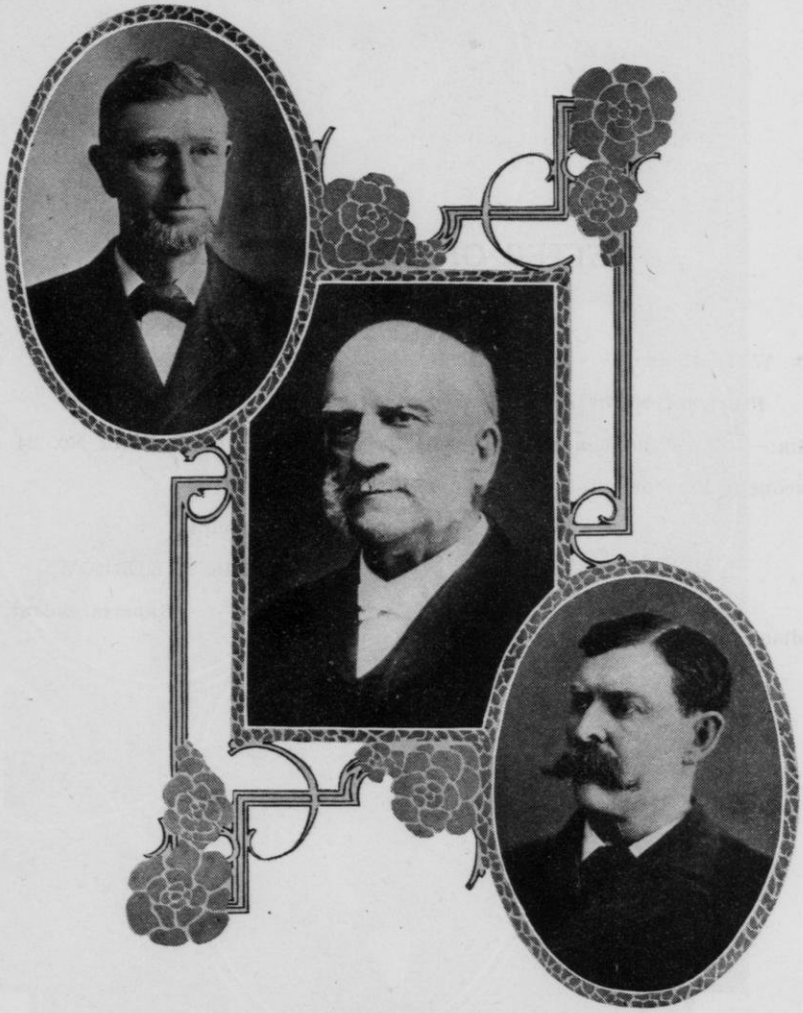


Hon. John M. True.

State Senator for Twenty-Seventh District. Served as Secretary of the Wisconsin State Agricultural Society from 1891 to 1894; President State Board of Agriculture 1897 to 1899; Secretary State Board of Agriculture 1899 to the present time, and conductor of Farmers' Institutes from 1887 to 1896.

TABLE OF CONTENTS



Geo. C. Hill. S. A. Knapp. H. A. Briggs.

Granted special recognition by the University of Wisconsin for their services in the upbuilding of agriculture.

LETTER OF TRANSMITTAL

HON. W. D. HOARD,

President of the Board of Regents, University of Wisconsin:

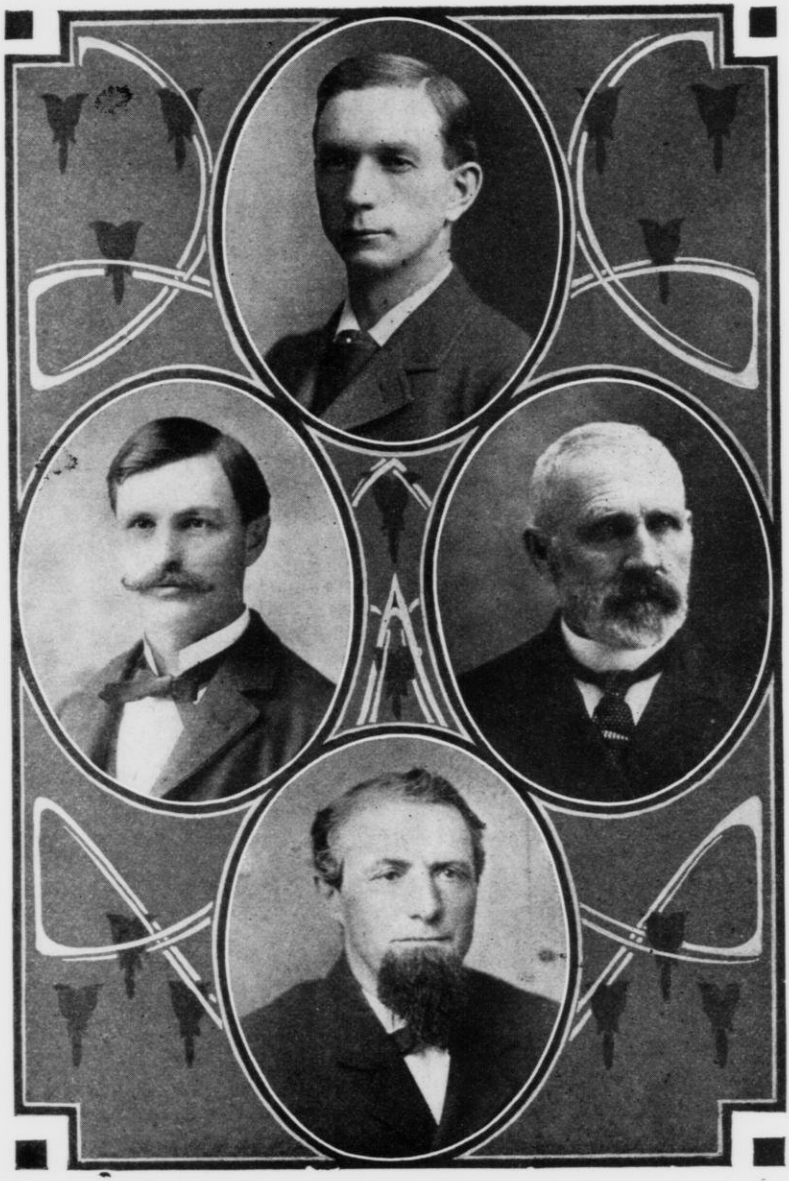
SIR:—I have the honor of herewith presenting to you Bulletin No. 24 of Wisconsin Farmers' Institutes.

Most respectfully yours,

GEORGE McKERROW,

Superintendent.

Madison, Wis., November, 1910.



Prof. John A. Craig.

Leslie Adams. S. D. Hubbard.

Chas. Linse.

Four men prominent in Wisconsin agriculture who have passed away during the year.

THE UNIVERSITY OF WISCONSIN

Board of Regents.

Charles R. Van Hise, President of the University, *ex-officio.*
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M. E. McCaffrey, Secretary.

Organization.

The University embraces—

The College of Letters and Science
The College of Engineering.
The Law School.
The College of Agriculture.
The Medical School.
The Graduate School.
The Extension Division.

The College of Letters and Science embraces—

General Courses in Liberal Arts.
Special Courses which include:
Course for Normal School Graduates.
Chemistry.
Commerce.
Journalism.
Pharmacy.
Music.
Training of Teachers.

The College of Engineering embraces—

The Civil Engineering Course.
The Mechanical Engineering Course.
The Electrical Engineering Course.
The Chemical Engineering Course.
The Mining Engineering Course.

The College of Agriculture embraces—

The Experiment Station.
The Long Agricultural Course.
The Middle Agricultural Course.
The Short Agricultural Course.
The Dairy Course.
The Farmers' Institutes.
Home Economics.

The Law School embraces—

A Three Years' Course.

The Medical School embraces—

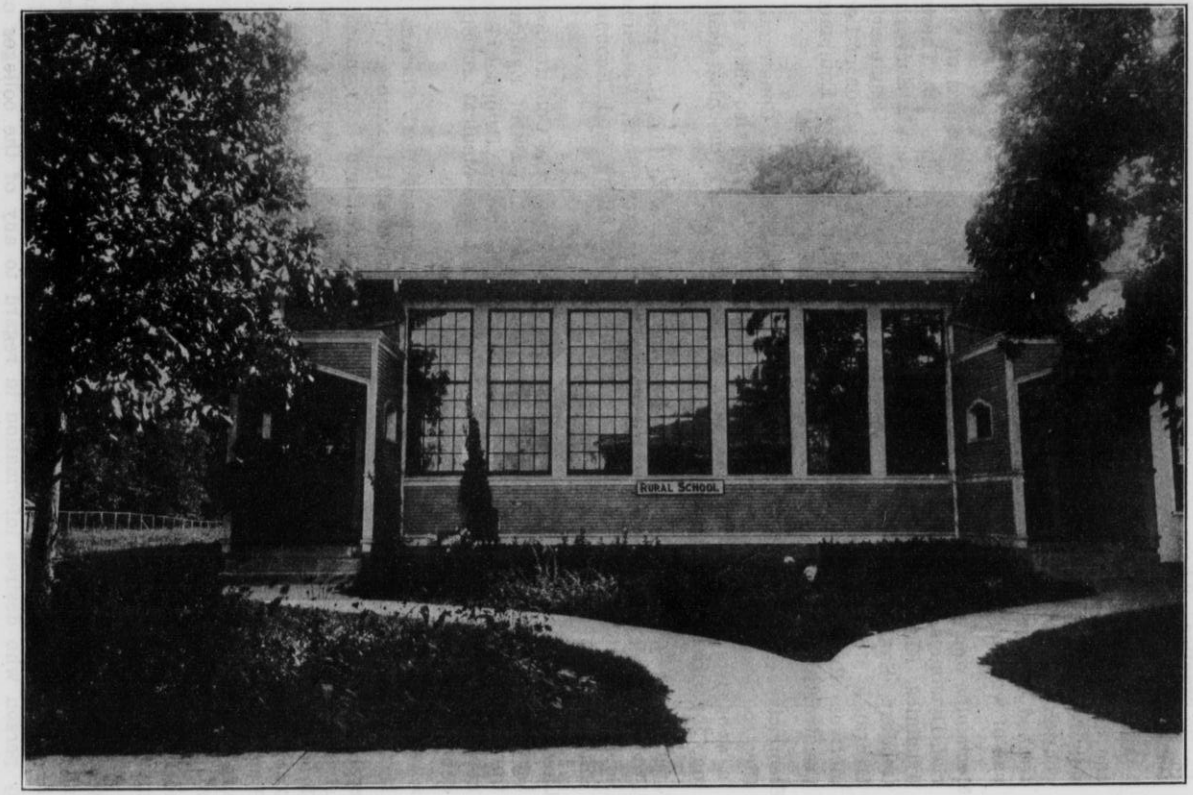
The First Two Years of a Medical Course.

The Extension Division embraces—

The Department of Instruction by Lectures.
The Department of Correspondence-Study.
The Department of General Information and Welfare.
The Department of Debating and Public Discussion.

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: Twelve languages are taught, viz.: Greek, Latin, Sanscrit, Hebrew, German, Russian, Norse, French, Italian, Spanish, Anglo-Saxon and English. In Mathematics there are thirty-five special courses. Under the Sciences there are a large number of courses in each of the following: Astronomy, Physics, Chemistry, Geology, Mineralogy, Zoology, Botany, Anatomy, Bacteriology, Pharmacy. In History there are forty-nine courses; in Political Economy, fifty-seven; in Political Science, forty-five; in Mental Sciences there are fifty-two, embracing Philosophy, Psychology, Ethics, Aesthetics, Logic and Education. There are seventeen courses in Music, and two courses each in Military Drill, and Gymnastics.



Model rural schoolhouse erected by Wisconsin S ta.e Board of Agriculture on State Fair grounds.

Physical Culture:—The Armory and Gymnasium is one of the largest buildings 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 exercise in all the forms of gymnastic practice. There are also the most abundant and approved facilities for shower, sponge and swimming baths.

Adequate accommodations are provided for the women's gymnastics by the completion of Lathrop Hall, which has been fully equipped and is now ready for occupancy. This furnishes ample facilities for systematic courses for young women, and is under the immediate direction of a trained instructor. This provides a new gymnasium for the exclusive use of women.

In Mechanics and Engineering:—Elementary Mechanics, Mechanics of Material, Dynamics, 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, Electrochemistry, 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, Soils, Veterinary Science, Agricultural Physics, Agronomy, Horticulture and Economic Entomology, Bacteriology, etc.

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

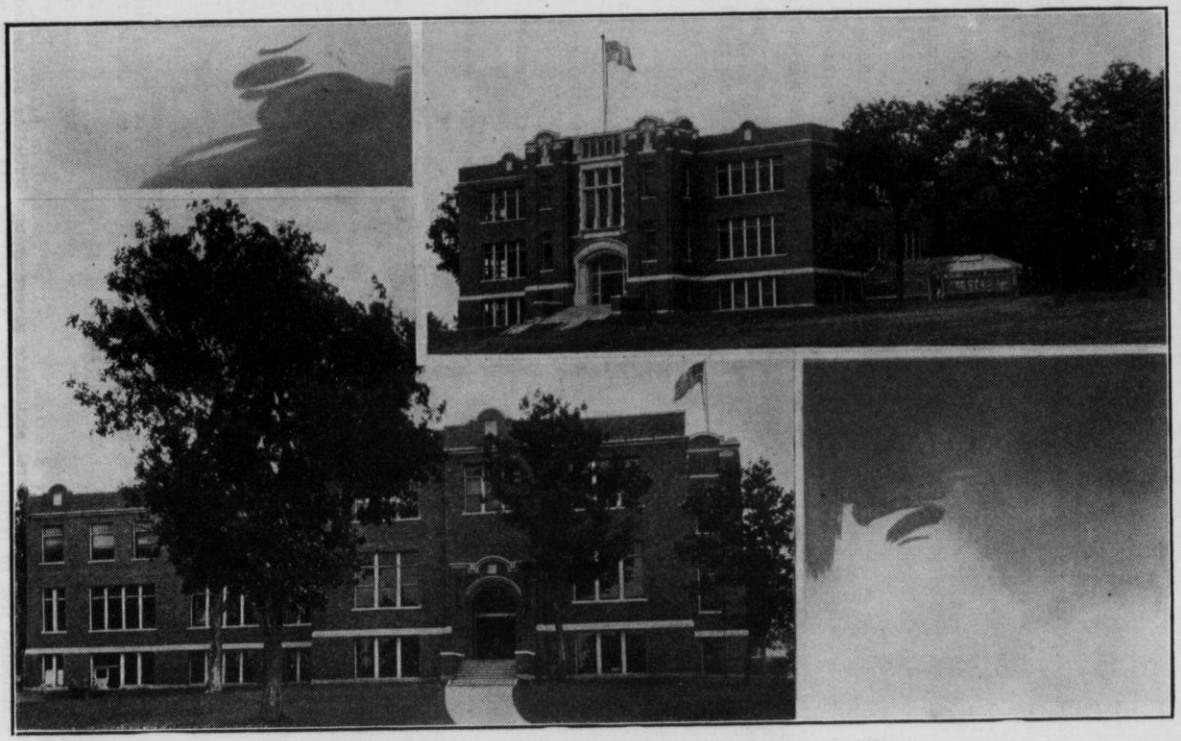
In Pharmacy:—Courses in Practical Pharmacy, Pharmaceutical Chemistry, Materia Medica, Pharmaceutical Botany and Practical Laboratory Work.

General Facilities:—The Faculty embraces four hundred and thirty-nine instructors. The laboratories are new, extensive and well equipped; embracing the Chemical, Physical, Metallurgical, Mineralogical, Geological, Zoological, Botanical, Bacteriological, Civil, Electrical and Mechanical Engineering, Agricultural and Pharmaceutical Laboratories. Seminaries are held for advanced study in History, Language, Literature, Mathematics, and other branches.

The libraries accessible to students embrace that of the University, 163,000 volumes; of the State Historical Society, 326,000 volumes, including pamphlets; of the State Law Department, 50,000 volumes; of the city, 23,875 volumes, besides special professional and technical libraries, making in all more than 606,000 volumes, including pamphlets, thus affording very exceptional opportunities for reading and special research.

Any person who desires information in regard to any of the colleges or schools, should apply to

W. D. HIESTAND,
Registrar.



La Crosse County School of Agriculture, Onalaska, Wis.
West View of Building.North View of Building.

The University of Wisconsin

COLLEGE OF AGRICULTURE

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B. D. LEITH, Agronomy
ALICE LOOMIS, Home Economics
O. G. MALDE, Cranberry Investigations, (Grand Rapids, Wis.)
J. C. MARQUIS, Agricultural Editor
J. G. MILWARD, Horticulture
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W. W. WEIR, Soils
F. WHITE, Agricultural Engineering
W. H. WRIGHT, Agricultural Bacteriology

Farmers' Institutes

GEORGE MCKERROW, Superintendent
NELLIE E. GRIFFITHS, Clerk

The College of Agriculture offers the following courses of instruction in agriculture to meet the needs of various classes of students:

Graduate Courses in Agriculture.
The Long Course in Agriculture, four years undergraduate study, leading to the degree of Bachelor of Science.
The Middle Course in Agriculture, two years of study, including practical work and applied science.
The Short Course in Agriculture, two winter terms of fourteen weeks each.
The Winter Dairy Course, one term of twelve weeks.
The Summer Dairy Course, for beginners in creameries and cheese factories.
The Farmers' Course, a two weeks' series of lectures for busy farmers.
The Women's Course, a week's course of lectures for women in Home Economics.
The Special Dairy Course, ten days' instruction for creamery and cheese factory operators and managers.
The Boys' Course, a week's lectures on agriculture for farm boys.

For information concerning these courses, address Dean H. L. Russell, College of Agriculture, Madison, Wisconsin.

The Agricultural Experiment Station, devoted to research in agricultural problems, is supported jointly by the Federal and State governments. Bulletins are issued frequently and distributed free to farmers of the state. Any farmer may receive these on request to Director, Agricultural Experiment Station, Madison, Wis.

The Farmers' Institutes Department conducts over 140 meetings in various sections of the state where practical lectures and conferences on subjects pertaining to farm life and operations are presented. Over 40 Cooking Schools are conducted for the women. The Farmers' Institute bulletin is issued annually in an edition of 50,000 copies, and distributed at Institutes and by mail. Any community can secure an Institute upon proper application to the Superintendent. For further information address Superintendent George McKerrow, Madison, Wis.

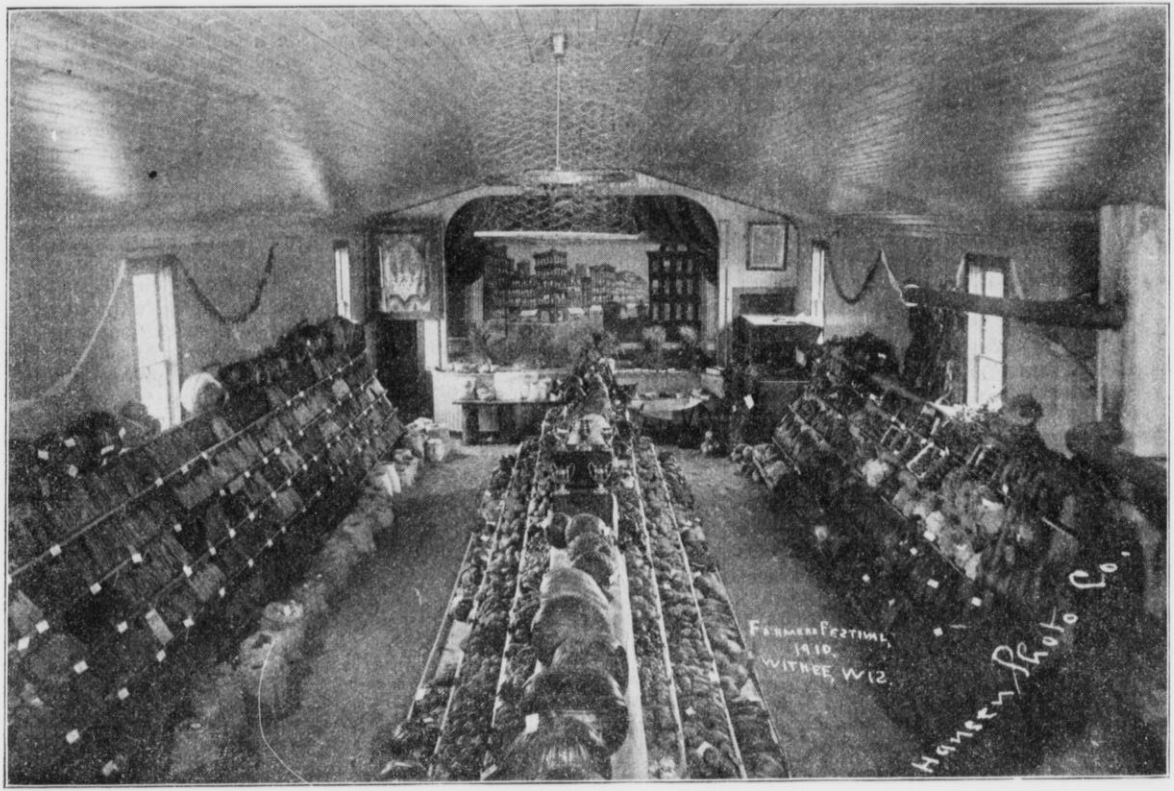


Exhibit of farm products at 1910 Withee, Clark County, Farmers' Festival under auspices of Farmers' Institute and Festival Association.

WISCONSIN FARMERS' INSTITUTES FOR 1910–1911.

ARRANGED BY COUNTIES.

County.		County.	
Adams	Friendship.	Marquette	Briggsville.
Ashland	Mellen.	Milwaukee	Hales Corners, Keipper's Park.
Barron	Barron, Chetek, Reeve, Rice Lake.	Monroe	Kendall, Melvina.
Bayfield	Cable, Washburn.	Oconto	Abrams, Oconto.
Brown	Askeaton, Denmark, DePere, N'w Franken.	Outagamie	Kaukauna, Seymour, Welcome.
Buffalo	Mondovi, Nelson, Waumandee.	Ozaukee	Saukville.
Chippewa	Cadott, Jim Falls.	Pierce	Ellsworth, Plum City, Prescott.
Clark	Thorp, Unity, Withee.	Polk	Amery, Balsam Lake, Clayton, Frederic.
Columbia	Cambria.	Portage	Almond, Arnott.
Crawford	Prairie du Chien, Wauzeka.	Price	Prentice.
Dane	Cambridge, DeForest, Stoughton.	Racine	North Cape, Racine.
Dodge	Brownsville, Mayville.	Richland	Five Points, Sextonville, Viola, Woodstock.
Door	Forestville.		
Douglas	Bennett, Brule.	Rock	Footville.
Dunn	Fall City, Ridgeland, Sand Creek.	Rusk	Conrath, Hawkins, Weyerhauser.
Florence	Homestead.	St. Croix	Hammond, Hudson (Closing Institute), New Richmond, Wilson.
Fond du Lac	St. Peters, Waupun.		
Grant	Boscobel, Cassville, Louisburg.	Sauk	Witwen.
Green	Brooklyn, Juda, Monticello.	Sawyer	Winter.
Green Lake	Markesan, Princeton.	Shawano	Pulaski, Shawano, Wittenberg.
Iowa	Arena, Linden.	Sheboygan	Elkhart, Oostburg.
Jackson	Black River Falls, York.	Taylor	Stetsonville.
Jefferson	Johnson Creek, Palmyra.	Trempealeau	Osseo, Whitehall.
Juneau	Hustler, Necedah.	Vernon	Chaseburg, Hillsboro, Retreat, Westby.
Kenosha	New Munster.	Walworth	Lyons, Millard, Walworth.
Kewaunee	Kewaunee, Thiry Daems.	Washburn	Birchwood.
La Crosse	Holmen.	Washington	Kewaskum, South Germantown.
Langlade	Antigo.	Waukesha	Brookfield, Oconomowoc.
Lincoln	Bloomville.	Waupaca	Readfield, Symco, Weyauwega.
Manitowoc	Louis Corners, Mishicot, Whitelaw.	Waushara	Coloma, Wautoma.
Marathon	Edgar, Milan, Town of Plover, Stratford.	Winnebago	Neenah.
Marinette	Beaver, Wausaukee.	Wood	Lindsey, Pittsville.

INSTITUTES, WITH DATES AND CONDUCTORS.

Date.	W. C. Bradley, Conductor.	L. E. Scott, Conductor.	David Imrie, Conductor.	W. F. Stiles, Conductor.	E. Nordman, Conductor.	H. D. Gr'swold, Conductor.
1910.						
December.						
6- 7	Barron	Frederic	Ellsworth*	Clayton	Rice Lake	Amery.
8- 9	Ridgeland	Balsam Lake	Prescott	Reeve	Hammond*	Chetek.
13-14	Washburn	Brule	Birchwood	Hawkins*	Mellen	New Richmond.
15-16	Cable	Bennett	Winter	Conrath	Prentice*	Weyerhauser.
27-28	Necedah	Pittsville	Milan	Cadott	Bloomville	Thorp.*
29-30	Friendship	Lindsey	Stetsonville	Fall City	Stratford	Withee.*
1911.						
January.						
3- 4	Mondovi*	Osseo†	Plum City	Waumandee	Sand Creek	Whitehall.
5- 6	Blk. River Falls*	Wilson†	Nelson	Holmen	Jim Falls	York.
10-11	Almond	Symco	Readfield	Wittenberg†	Antigo	Welcome.*
12-13	Unity	Arnott	Weyauwega	Edgar†	Town of Plover	Shawano.*
17-18	Forestville	Seymour	Oconto*	Homestead	Wausaukee†	Kewaunee.
19-20	Thiry Daems	Pulaski†	Kaukauna*	Beaver	Abrams	New Franken.
24-25	Whitelaw†	Denmark	St. Peters	Elkhart*	Louis Corners	Neenah.
26-27	Oostburg†	Mishicot	Brownsville*	Kewaskum	Askeaton	De Pere.
February.						
Jan. 31-Feb. 1	Boscobel*	Arena	Retreat	Kendall	Wauzeka	Westby.†
2- 3	Prairie du Chien*	Five Points	Chaseburg†	Hillsboro	Viola	Melvina.
21-22	Juda*	Stoughton	Cambridge	Louisburg	De Forest†	Woodstock.
23-24	Linden	Witwen	Monticello*	Cassville	Hustler	Sextonville.†
March.						
Feb. 28-Mar. 1	Walworth†	Oconomowoc	Palmyra*	Brooklyn	Millard	Racine.
2- 3	New Munster	Johnson Creek†	Brookfield	Footville	Lyons*	North Cape.
7- 8	Mayville	Wautoma	Cambria*	Briggsville	Saukville†	Hales Corners.
9-10	Waupun*	Princeton†	Markesan	Coloma	So. Germantown	Keipper's Park.

Twenty-fifth Annual Closing Institute and Cooking School, Hudson, St. Croix Co., Wis., March 14, 15, 16, 1911.
All inquiries relative to Institutes will be answered promptly.
Cooking Schools conducted by Miss Edith L. Clift.*
Cooking Schools conducted by Miss Marie Fenton.†

GEORGE McKERROW, Supt.,
Madison, Wis.

PROCEEDINGS

OF THE

TWENTY-FOURTH ANNUAL

CLOSING FARMERS' INSTITUTE

HELD AT

TWO RIVERS, WIS., MARCH 15, 16, 17, 1910

The meeting was called to order by Dr. Currens, of Two Rivers, who introduced Superintendent McKerrow.

Invocation by Rev. N. Uebele, of Two Rivers.

Mayor Conrad Baetz.

ADDRESS OF WELCOME.

Mayor Conrad Baetz, Two Rivers, Wis.

When I was asked to make the address of welcome for this gathering, I was rather much in doubt as to whether or not to accept. I have always considered myself more competent to make the anvil ring than to attempt to address a gathering such as this, but since the saying is, success can never be attained unless you try, hence this effort.

About a year ago, under the administration of my predecessor, ex-Mayor Currens, Two Rivers, mainly through his efforts, held its first Farmers' Institute. It was considered by all present to have been one of the most successful ever held in the state; enthusiasm ran high. Immediate steps were taken to secure the Round-up for 1910. Again my worthy predecessor, with the ambition of an old warrior, used his utmost influence to secure it,

Class in Animal Husbandry at Medina High School, Marshall, Wis., judging horses. A practical way of teaching agriculture in high schools.

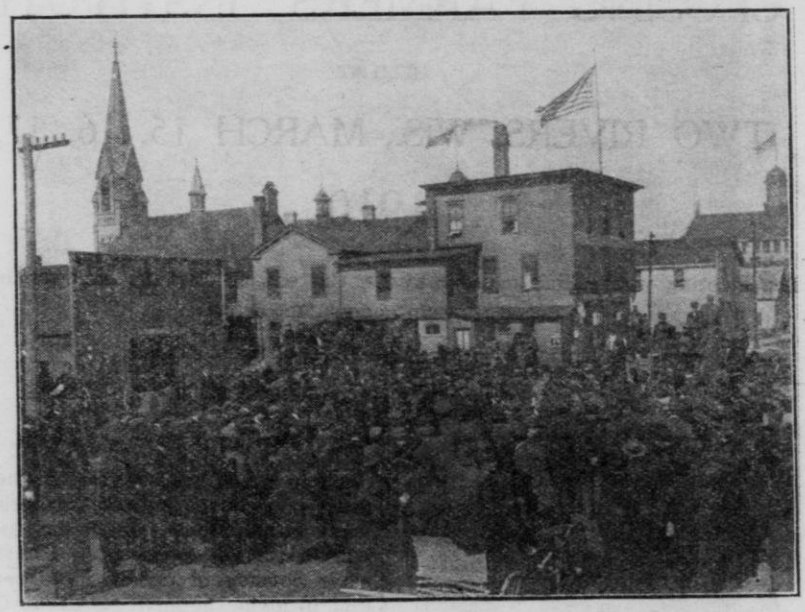
and from all appearances has met with success.

In the selection of Two Rivers as the place of the holding of the Farmers' Institute Round-up, I, as its chief executive, extend our most hearty thanks to the officials in charge and a warm greeting to the tillers of the soil, the men who produce the foods consumed by the American people, the greatest and most enlightened race in existence, a class of people constantly striving for a higher education and more knowledge in all industrial pursuits, but agriculture foremost.

Since the advent of rural free delivery, education has been brought to the very doors of the farmer, and I daresay that since the inauguration of this system and since the inauguration of the holding of Farmers' Institutes, the American farmer has advanced so far, that today he holds a position in the business world second to none.

Such a class of people for any city to entertain must certainly be a pleasure, and on behalf of the people of Two Rivers and vicinity, I extend to you a most hearty welcome and invite you to enjoy the hospitality of our people, who I know will be ready to extend all courtesies necessary to make your stay in our city a pleasant one, and assure the success of the Institute.

The freedom of the city I cheerfully grant; it is yours; enjoy yourselves. But, above all, reap the benefits to be derived from the educational institution which is now about to open. I thank you.



Judging horses in pulling contest at Round-up Institute at Two Rivers.

RESPONSE TO ADDRESS OF WELCOME.

Supt. George McKerrow, Madison, Wis.

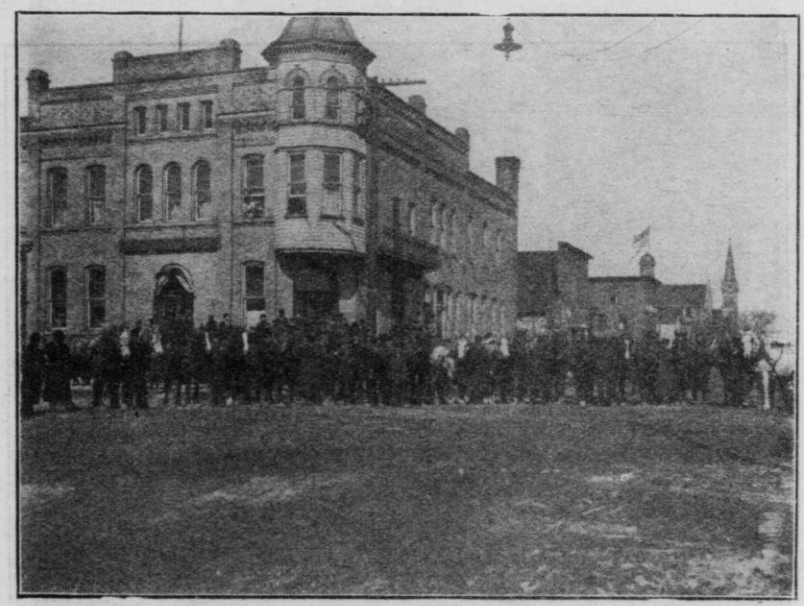
In opening our session today, I am going to take the privilege of saying just a few words inspired by the welcoming address of your mayor.

He told you that last year Two Rivers started in the very inception of their asking for this meeting with such an aggressive and progressive spirit that I felt they were entitled to the meeting, and they have kept that progressive and aggressive spirit up from that day to this.

When we came into your city late last night, near the midnight hour, we found it awake, we found your committee awaiting us, and they did not march us to the lockup either, they took us to the best hotel. They extended the glad hand of fellowship and informed us that everything was in readiness for this Institute.

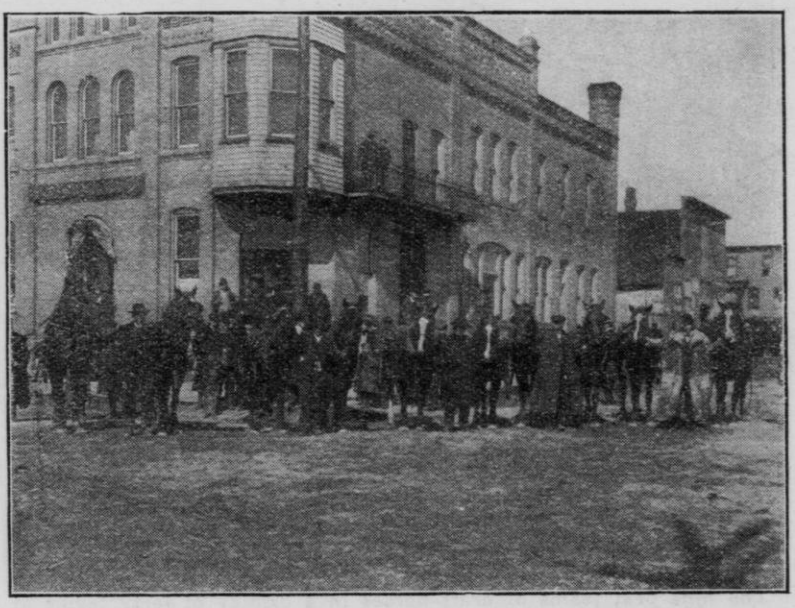
This morning when we stepped out upon your streets, we saw "Old Glory" waving everywhere and we knew we were in the United States of America, and that meant we were in the part of it where they wake up in the morning and get the flag up early, and therefore we feel we have made no mistake in coming to your city with this meeting.

Although the roads are bad—and of course we charge that up to the pathmasters in each locality instead of the Lord—yet we are pleased to see so many wideawake farmers here, and



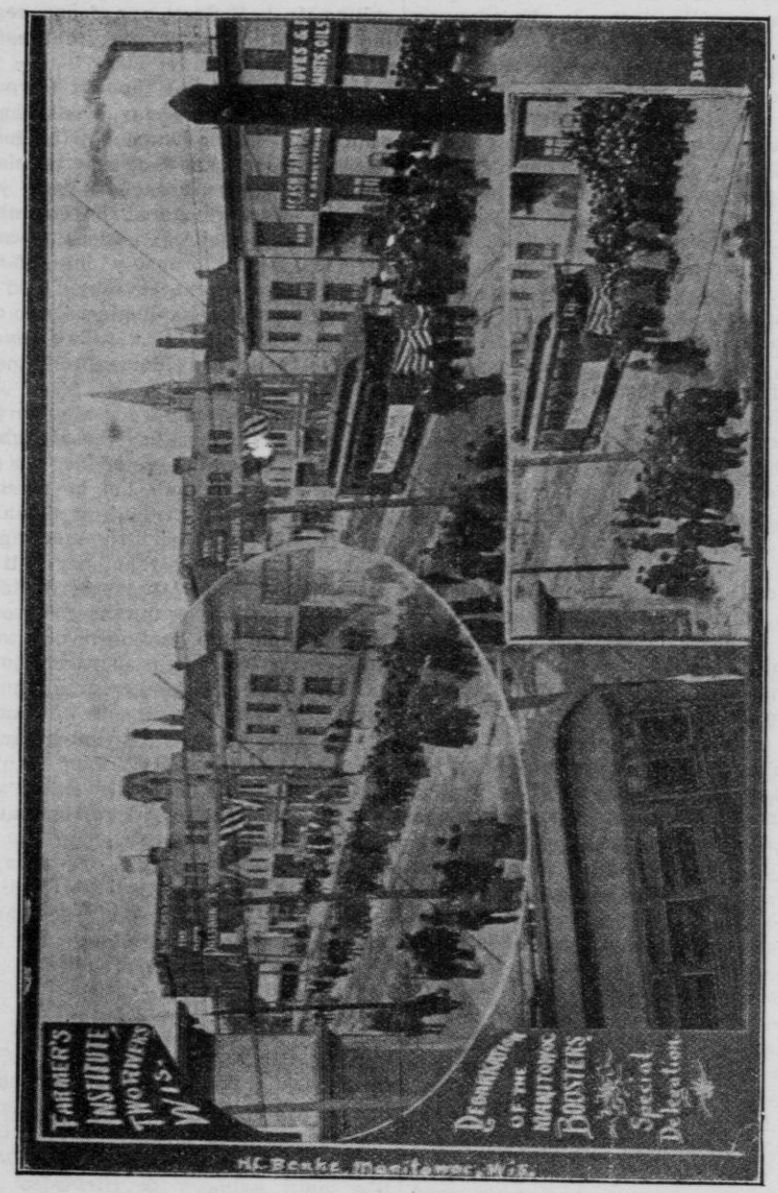
The nine best teams of draft horses in a display of forty teams at the Round-up Farmers' Institute, Two Rivers, March 15, 16, 17, 1910.

we hope our sessions right through will contain much lively discussion, discussion which will look well in Bulletin No. 24 of the Farmers' Institutes. I feel sure you will keep things moving lively. We will ask you to follow closely and be ready with your questions, not only to bring out things that are of special benefit to this locality, but to bring out such things as will be of benefit to all the farmers of Wisconsin. The Bulletin is one of the objects of this meeting.



Five winning matched draft teams exhibited at Round-up Farmers' Institute at Two Rivers.

Now, without boasting, I believe I can safely say that since Farmers' Institutes were first organized in Wisconsin some twenty-five years ago, under the law which was introduced by Hon. C. E. Estabrook while a member from this county, the benefits of these Institutes, while they cannot be exactly figured in dollars and cents, are so great that no thinking farmer questions the outlay of the past twenty-five years. In one thing alone there has been brought back to the state of Wisconsin in dollars and cents more than enough to pay for the cost of all these twenty-five years' Institutes, and that one thing is the silo. Wisconsin has today more silos than any state in the American union, and the farmers who are using these silos, the most progressive and most careful figurers in the state of Wisconsin, tell me that those buildings on their farms are saving from two hundred to five hundred dollars a year, that is, increasing their products to that extent, and if this is true—and the statements are made by men who know—then I can say that Wisconsin has been repaid



Scenes at Round-up Farmers' Institute, Two Rivers, Wis.

twenty times over for all she has spent in Farmers' Institutes in the advancement of the silo alone.

Wisconsin grows more clover in proportion to her cultivated acreage than does any state in the American union, which means a better rotation of crops on all the farms of Wisconsin, and in that she has been repaid again.

Wisconsin today stands right at the front in her dairy industry, and in that line probably has more successful co-operative creameries and cheese factories than has any state in the union, and those are things that have been taught for twenty-five years in the Farmers' Institute, and I say, without boasting, we can claim the Institutes of Wisconsin have done much for this state, and when I go outside of Wisconsin into other states, to similar meetings, I often hear the fact mentioned that Wisconsin has been the leader in this Institute line of work, has been the leader in other lines of agricultural education, and then I say to myself again, the agricultural spirit or the spirit of agriculture in education has been so well fostered in Wisconsin, we ought to be drawing a bonus from some of the other states that we have started on the same lines.

But you are not here today to hear me talk, and so I am going to stop, calling Mr. L. E. Scott, one of our regular Institute conductors, to preside over this meeting.

Chairman Scott—I thought I would have a good time today, would have nothing to do but listen, but if I have to work I don't know of a better place than Two Rivers, because I know you are all workers here. I remember with great pleasure an Institute held here last year, probably one of the largest local Institutes ever held in the state, and it was due largely to the efforts of the citizens of Two Rivers in advertising and doing preliminary work.

I remember when we came to the hall here, Dr. Currens was inquired for and it was discovered he was out setting a broken limb, but he finished that work and hustled up to the hall, all out of breath, to call the meeting to order. I only hope that bone knit as expeditiously, and I presume it did.

I felt sure last year that you would get the Round-up because you were going after it so vigorously, and judging from the way you went after the local Institute, I was sure the same spirit would bring the Round-up, and I am glad we are here.

My work is to make the other fellows work, and we will go right at it.

HANDLING BROOD SOWS.

Thomas Convey, Ridgeway, Wis.

I am sorry I did not have time to prepare a paper on this topic, because it is a very important subject; the man who has been growing swine knows it is the foundation of success, that is, the feeding and care of the brood sow.

Too many people are inclined to think an animal does not need very much preparation along the line of doing high class work, but in the case of the brood sow, from the time she is farrowed,—yes, even before that, it is very necessary that you pay attention to her if you expect to get the best results.

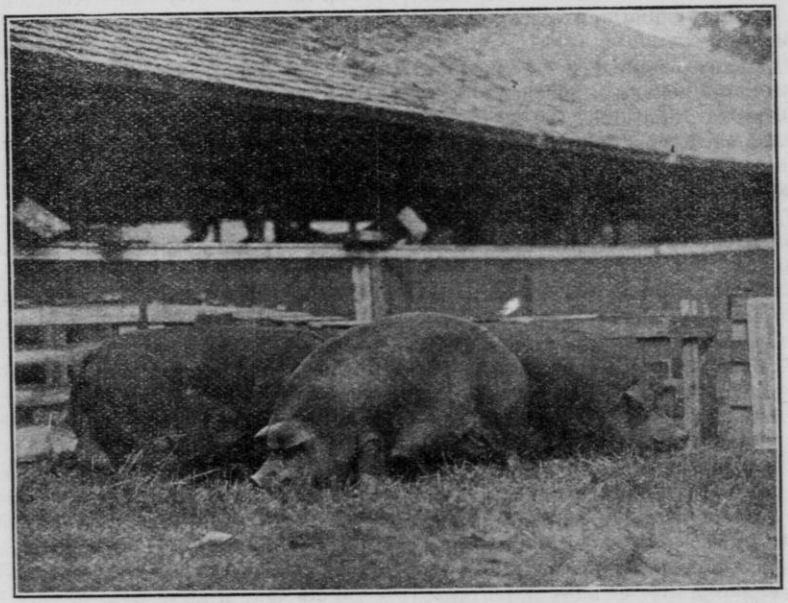
The young animal you expect to use for breeding purposes at a year old must be well grown; in fact, a great deal of the trouble we hear of in the line of handling stock is due to the fact that she does not receive sufficient care and attention. People complain of the lack of size of the class of swine they handle, they claim they are not as large as they would like to have them, and they are making special efforts to increase the size, and yet the matter of most importance to my mind is to grow the young sow right so she is vigorous and hearty. In order to do that, of course, it will include the whole swine question, growing the young pigs, as well as the looking after and care of them later on.

Weaning the Young Pigs.

The animal must be well fed at all times of her life; if she is stinted at any particular time in her life, it will show in the form and affect her growth materially. An animal that is stunted, especially at weaning time, will never acquire proper form afterwards. Many of you have noticed the form of a young animal nursing a sow and you see that she is just about right, but at weaning time with most farmers they do not pay as much attention as they should to keeping up that perfection of form and the continuous growth, so it is one of the most important things I know of in growing swine, that you do understand how to carry them through the weaning period.

In our case we do not attempt to wean our pigs. We have the sow in prime condition at farrowing time,—a thin sow will not stand heavy feeding or heavy nursing; she loses her appetite and will get out of condition, at least she will have an irregular appetite and the results are poor in that case. You need a good, vigorous constitution and a fair amount of flesh. It seems to be a provision of nature that animals should be in quite high condition at that time, but with an old sow we may err in allowing her too much condition during the summer season. For instance, where we wish to carry an animal over after the first year to use her for breeding purposes, we should take a great deal of care in seeing that she is not overfed during the latter part of the summer season; if she acquires too much flesh at that time, the chances are she will not be in as good condition for breeding purposes later on; an unnecessary amount of flesh will interfere with her desire to take active exercise and poor results will be obtained in a case of that kind. In fact, in any event where a sufficient amount of exercise is not taken by the brood animal, poor results are always obtained. Take a winter like this, when the snow has been heavy and an opportunity for an animal of the hog kind to take exercise is rather limited in very many cases, as a rule you will see in the

following spring that poor results have been obtained by the sows at farrowing time, so we should take special pains to see that they have an opportunity to take exercise, and that they are fed in such a manner as to induce them to take exercise. I have noticed in the northern part of the state that people are inclined to give a great lot of attention to hogs and in some cases neglect that matter of exercise. They erect small houses with small yards, make them comfortable, and in many cases, almost air-tight during the winter. Later on they get logy, or lazy, or inactive, they don't care to come out and stay out for any length of time, owing to the fact that their system is not in proper condition to stand exposure, and where people are foolish enough to handle stock in this way, they almost invariably obtain poor results later on. You keep an animal in a place where the atmosphere is impure, the first effort of nature is to throw off that poison, and the animal perspires heavily; in the case of the hog the animal is wet, the bed is wet, the windows are frosty, you induce them to come out to feed and they eat as fast as possible and hurry back again, and with animals kept under those conditions poor results will be obtained at farrowing time.



Prize winning Duroc Jersey swine at Wisconsin State Fair, 1910. Owned by W. H. Reed, Palmyra, Wis.

The health and activity of the sow have very much to do with the thrift of the young animals. Very many times the young animal is weakly and doesn't seem to have the vigor it ought to have, and this is due to the fact that we have not fed the mother a balanced ration, or have not fixed it so that she takes enough exercise.

So we want to be very careful that the conditions are as nearly right as we can have them. Of course in steady,

cold weather it is much more difficult to have the right conditions than it would be ordinarily.

Another fault that is very common with people who keep many hogs is to allow the brood sows to run together in the same building, in the same quarters, especially if the quarters are uncomfortable, there is considerable danger of their bunching up too closely together, in fact, in many instances they pile up in their sleeping quarters, and this is very injurious, and you will scarcely get good results when those conditions prevail. So, if we keep many of them, we should endeavor to separate them.

At Farrowing Time.

At farrowing time, if the sow has been properly cared for, she then really needs very little attention. However, it sometimes occurs that the sow is very sick and of course in that case she will not give the pigs the attention that is necessary in many cases. so at that time if you have an opportunity it is always wise to take the pigs away from the sow and put them in some comfortable place, a basket will do, with a warm rug underneath and a cloth over, and if you take the pigs from the sow when she is sick and not paying attention to the pigs that she ought to and keep them away from her until she is through farrowing then they can be returned to her, and in very many cases people have no loss. This is especially true of older brood sows, that are kept in quite high condition. After they are well again and show any disposition to nurse the pigs, of course I would not attempt to give them any further attention; as a rule the less handling you do the better the results are, but occasionally it pays to give them the attention I suggest to you.

A very nice thing in handling brood sows is to notice the difference in the nursing ability of the sow; that is, with regard to disposition and with regard to her ability to give milk.

We have a better opportunity with the two-year old sow than with the yearling sow. In quite a number of cases, although we have made every effort we could to have a high class animal for breeding purposes, we find some of them are indifferent nurses, they lack a disposition to care for their pigs and they lack the ability to nurse them. If you raise a few pigs in the litter and she does not develop the udder as she should in the first litter, it is better not to use that sow subsequently, so that with your two-year old sow you can always have one that has a good disposition and the ability to give a large amount of milk. That is really just of about as much importance in breeding hogs as it is in keeping dairy cows, that they shall be good nurses and shall show a good disposition, willing to care for their pigs, and the pigs will develop very much more rapidly and give better results ultimately. So, no matter how high the quality of the sow is. I would not reserve her for the second season unless she has both these qualities of which I speak.

DISCUSSION.

Mr. Imrie—Did you ever try some hot or warm sand in the bottom of a box for litle pigs?

Mr. Convey—I have not tried sand, but we sometimes put a stove lid, or something of that kind, under the cloth, something to furnish artificial heat.

Mr. Martiny—What way would you have of inducing the brood sow to take exercise in the winter when we have lots of snow?

Mr. Convey—We have the place for feeding the slop or any feed at some distance from their sleeping quarters. Another way is to feed them whole oats, it has a good effect on the animal, and it takes some time and some

exercise for the animal to pick them out of the straw.

Mr. Scribner—How old do you find it profitable to keep sows?

Mr. Convey—We sometimes keep them five or six years and when we obtain poor results from them, we discontinue their use as breeders, no matter what the quality may be. The trouble in keeping the old sows is we are inclined to over-feed them, and get them in too high a condition, especially in the earlier part of the season, and in that way we do not obtain the best results.

Mr. Imrie—You always keep some young sows each year?

Mr. Convey—Certainly. We aim to keep young ones from the best of the old sows in every case.

A Member—How soon would you breed the young sow?

Mr. Convey—A sow should not be expected to farrow a litter of pigs under a year old: as a rule we do not get good results from them, and it would be better to go a little later, but it is quite difficult to arrange matters in that respect, because you keep throwing your season later each succeeding season. I prefer that the pigs be farrowed in April rather than any other month in the year.

Mr. John Imrie—Do you raise two litters, or one?

Mr. Convey—We do not attempt to raise two litters in a year and yet I would not say anything against it. In some parts of the state it would certainly be more profitable, but I could not undertake to figure out that it is profitable with us I think we can keep our young sows in finer condition than where they raise two litters a year Attempting that kind of thing means that one litter is too early and the other is too late in our climate. A man carrying many pigs will hardly have the ability or opportunity to care for them as he would like to.

Mr. Jacobs—In the dairy business, where there is quite a good deal of milk to be fed, isn't it quite a good plan to have some old sows and some young sows and to select your breeding stock from the old ones?

Mr. Convey—In every case I would prefer that. I think milk is one of the finest hog feeds we have on the farm when it is in good condition. Quite a number of people have their milk in such condition that it is absolutely dangerous to feed I believe also that in every case it pays to feed some kind of animal food to hogs. If you haven't milk, by all means feed blood meal, or something of that kind; they seem to need a certain amount of animal food in connection with the other feed.

Mr. Imrie—If you were raising two litters a year, how would it do to save brood sows from the fall litters and breed them so they would be a year and a half old?

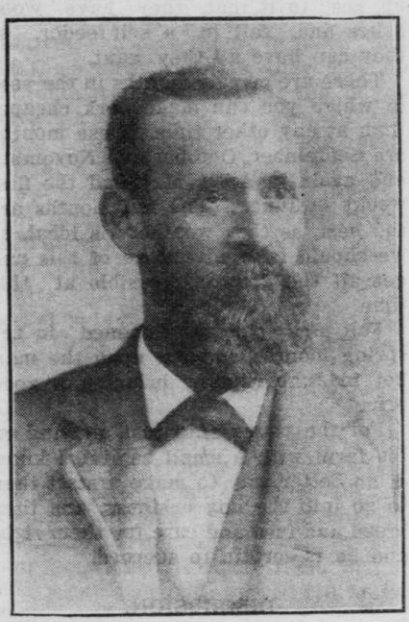
Mr. Convey—It is certainly an excellent suggestion, because in that case you would have time to have a sufficient size and better development of the animal and larger and better litter from animals of that kind. It had not occurred to me before to suggest anything of that kind, but I approve of that by all means.

A Member—What harm is there in having two broods sows lie together?

Mr. Convey—They are inclined to climb up and lie close together in one place. I would not object to two sows, but where there are several, they are always making a fuss, they are always uneasy, and in every case where I have seen it done they have poor results in the spring. In some cases, the biggest, laziest sows will farrow dead pigs.

PROFITS IN SWINE IN WISCONSIN.

David Imrie, Roberts, Wis.



Mr. Imrie.

The title given me for my paper is. "Profits in Swine in Wisconsin." Profits are easy to figure this year when hogs are selling for eleven cents, but when they are around the three-cent mark it is a different story.

We should try at all times to produce a pound of pork as cheaply as possible, as we will have low prices again and perhaps lose a little money, but the man who is going to succeed in any line of live stock cannot be a "quitter." He must first determine what his farm is adapted to, then build and fence for that line and stick to it through thick and thin, and his dish will be "right side up when it rains porridge," (as it is doing now for the hog man).

Establishing the Herd.

So long as the packers pay as much for the lard hog as for the bacon type, I am going to produce the fat-backed kind, as they are produced cheaper where we can raise corn as we can in Wisconsin.

There are four breeds of this type that are very popular: the Poland China, Berkshire, Duroc Jersey and Chester White. You can select from these and make no mistake.

After you have decided on your breed, do not make hash of it by breeding for a few years in one line and then switching over to another breed, as every time you change you commence again with half-breeds.

Cross bred hogs make pork as cheaply as any, but this necessitates the buying of your breeding stock, as some of your sows will not prove as good as you would like to have them.

Never use anything but a pure bred sire, so the little fellows may be well born.

I like old sows better than young ones (by old sows I mean two years or older), as their pigs are stronger and grow faster and they usually have larger litters; you are not so apt to get the sows off their feed by heavy feeding as with the young sow, and it takes no more feed to winter an old sow than a young one.

When the Young Pigs Come.

Be on hand when the little fellows come and see that everything is all right, then go away and let them alone for twenty-four hours.

Feed lightly at first, increasing it gradually for a week or ten days, until you have her on a full ration, giv-

ing her all she will eat up clean three times a day.

The little pigs are better when fed through the dam, rather than being obliged to eat too early on the side. Get them out on the ground as soon as possible, if it is dry.

As soon as they begin to eat, see that they have some feed for themselves in a separate pen or yard; some sweet skimmed milk and soaked corn makes an excellent dish. Let them have a good clover pasture with this and they ought to grow and thrive.

In the absence of clover, perhaps a seeding of barley, sown four bushels per acre, with about three or four pounds of dwarf essex rape seed and ten or twelve pounds of clover seed, would make the next best pasture, but you will need a larger acreage than if you have a clover pasture.

As a rule, we never wean our pigs, letting them follow their dams until the dams dry up. If we intend to breed some of the sows for fall litters, we will have to wean the pigs.

In doing so, shut up the sows (not the pigs). In this way the sows dry up easier and the pigs mind it less.

Fitting For Market.

We want to get the pigs on the market as soon as possible weighing two hundred pounds or more, as the price is usually better early in the fall.

I have never found a better way to feed in the fall than to "hog" off a piece of corn, having sown some rape at the last cultivation, and having some pumpkins and squash in the corn also, feeding some soaked ground barley in connection, and letting them have access to drinking water at all times. Of course you lose the corn fodder, but we think the loss is overbalanced by the saving in labor, as this is a very busy season—silos to fill and corn to cut and shock—and I have never been able to make hogs do better with any system of feeding I ever tried.

As a rule, we do not shut up our hogs to fatten them, unless it is a few weeks at the last. When they are shut up, see to it that they have wood ashes and salt in a self-feeder, so they can have all they want.

There are certain months in the year in which you can make pork cheaper than at any other time. These months are September, October and November and again in April, May and the first weeks in June. The fall months are the best, as the weather is ideal, so we should take advantage of this and get all the growth possible at this time.

Fall pigs can be fattened in the spring months and put upon the market in June, usually bringing a good price.

For the young man just starting on his farm with a small capital, I know of no better way to make a start than to go into the hog business and then breed and feed and care for them right and he is certain to succeed.

DISCUSSION.

Mr. Christman—Is there any object in having all the pigs born at the same time?

Mr. Imrie—Yes, it requires less labor at farrowing time, they feed better together and they sell better together, if they are all about one size. If there is very much variation in size, they should be separated in the pasture to have good results, and most farmers have not the pasture in which to separate them.

Mr. John Imrie—Is the question of having two litters a year influenced somewhat by the manner you suggest of hogging off corn? Won't those mothers and the little fellows get too much corn unless you have conveniences so you can keep them separate.

Mr. Imrie—As a rule, we raise very few fall pigs, some years a few and

other years none, but just as Mr. Imrie said, it will interfere unless you have different fields for them. Ideal conditions for these fall pigs and their mothers would be in an oat or barley field where it has been seeded to clover, if you have that field so fenced that you can turn them in there and let them have the oats, they pick up the oats from the ground, and if you have a considerable acreage of oats there is enough to keep these sows for three or four weeks at least. They won't hurt the young clover, they pick up the oats and barley and in that way the pigs will grow and the sows will be in perfect condition.

Mr. Convey—Do you attach any importance to having hogs ready for market at any particular time in the season?

Mr. Imrie—No, I never wait for the market. When they are ready we sell them. We can never tell whether the market is going up or down. This year we sold later than common, on account of the small number of hogs we had, and the amount of feed we had, and we wanted to make them just as heavy as we could, so we fed longer than usual.

Mr. Convey—Don't you find it profitable to avoid the general rush for market?

Mr. Imrie—Yes, it would be better to get them on the market earlier,—along about New Year's usually the price drops, because everybody is putting hogs on the market. If you could put them on the market early in the season, you would get a better price, as a rule.

Mr. Scribner—What system have you of marking your pigs to tell which are from the best sows?

Mr. Imrie—We use ear marks. These are litter marks, that is, all in that litter have the same mark, one ear mark in the lower right and another in the lower left and upper right and upper left, and so on, and then when we use them for breeders we put ear tags in their ears. (We use the Dana ear tag.) I find the little pigs will lose these ear tags, but if you wait until about breeding time, till fall, and then put the ear tags in, they stay pretty well. I find it is a great deal better not to excite and frighten the sows when putting in the tags. Take a gate and fasten it to a wall or side of the pen, spread the other end out from the wall, drive your sow in there and have a man pinch that sow behind the gate, then you put your hand through the gate and just punch the hole and put the tag in, there is no fighting with the animal and it is easily done.

Mr. Jacobs—Isn't it asking a good deal of the soil to grow a heavy crop of corn, a crop of rape and a crop of pumpkins all at the same time?

Mr. Imrie—It will do it on hog pastures.

Mr. Martiny—What type of hog do you prefer as the best feeder?

Mr. Imrie—I want a good growthy fellow, a good vigorous hog. I don't like a little, fine-boned, pretty fellow, but one of more vigorous growth. That is not saying they must be coarse. Our sows are getting too fine, is a complaint we hear from many people, they want something coarse, they say; but really they do not want a coarse hog at all, it is not profitable to raise a hog of that kind. They want a strong, vigorous hog.

Mr. Jacobs—I saw a razor-backed hog that looked as vigorous as anything in the hog line I ever saw, but he didn't suit me.

Mr. Imrie—He was a bacon hog, probably.

Mr. Roberts—You are not advocating eleven hundred-pound hogs?

Mr. Imrie—No, I am not, though I would like to have a lot of them that weigh eleven hundred pounds just now.

Mr. Roberts—But the strong, medium type is the most profitable.

Mr. Imrie—Yes, it is.

A Member—What do you think of barley, oats and peas for hog feed?

Mr. Imrie—Peas are almost too expensive by the time you get them fed. Barley is all right, if you can raise it cheap enough, barley makes very good feed. We grind it and soak it usually, and feed it to them as slop in connection with corn. I have never fattened hogs on barley alone, we have always had corn. Split peas at a cent a pound would be all right. Down here at Cedar Grove a man had split beans and peas at eighteen dollars a ton, and it makes the cheapest feed I know of. I suppose the beans would be better cooked. The peas could be soaked or fed dry. If I could have the split peas, I would feed split peas and some barley to my brood sows and that would make an excellent feed. Sometimes I am asked the question in regard to raising fall pigs so as to have them to feed the milk to. I never had results that were so good as when the sows got milk

Mr. Matteson—How about feeding clover hay or alfalfa hay to brood sows?

Mr Imrie—It is all right. We have fed clover chaff and with this alfalfa hay as you grow it in the eastern part of the state, I don't know anything better. Just put it in racks and let them eat it from the racks. We do not feed our sows much corn. They get whole oats in the morning; at noon they get ground barley and some ground oats, ground together in a slop. At night they get some corn, about one-third of the ration of corn. You cannot have good results if you feed your sows largely on corn in the winter.

Mr. Martiny—Perhaps you would have just as many pigs per litter if you fed on corn as on peas, but if you keep it up generation after generation, you will certainly have bad results.

Mr. Imrie—Yes, they would lack in vigor.

Mr. Convey—And I would hardly expect as many pigs, that is, I would expect a smaller number as well as a poorer quality.

Mr. Roberts—I have fed alfalfa cut finely, fed in the form of a slop, and I like it very much.

Mr. Imrie—I think one reason for expecting larger litters is to have the breeding stock at mating time in perfect condition. Feed them the best you know how before this time so they are in perfect health and vigor, strong. You will get larger litters than if they were fed on corn.

Mr. Scribner—Is it possible to overdo that matter of feeding, give them too much protein?

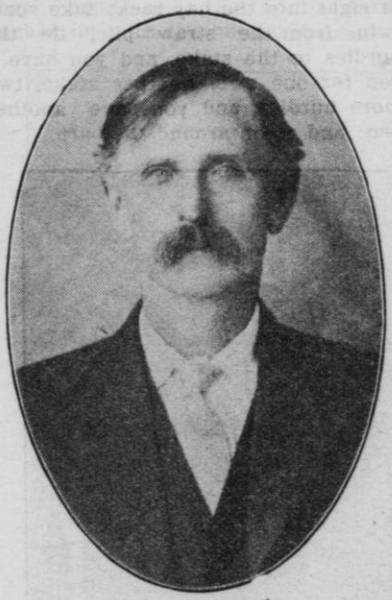
Mr. Imrie—It may be possible, but it is not probable that any one in Wisconsin will do that.

Mr. John Imrie—I think these litters would be not only smaller in number, but you would not be able to save anywhere near as large a percentage if the sows were fed on corn as compared with the results if they were fed properly. In other words, not only would the pigs be weaker and fewer in number, but they wouldn't stay with you.

Music by the orchestra.

SHEEP FOR PROFIT IN NORTHERN WISCONSIN.

W. Woodard, Bloomer, Wis.



Mr. Woodard.

In order to be successful in sheep breeding in northern Wisconsin, we must have good shelter for the sheep in the cold winter months, and we must keep them out of the cold rains in the late fall and early spring.

The Barn.

For this purpose, a good, dry shed, well boarded and facing the south or east will do, but if one can afford it, I would prefer a barn twenty-four feet wide and as long as need be to house the flock; the barn to always face the south or east, but south if possible.

I would build the walls of this barn twenty inches high and sixteen inches wide on top, and on this wall I would construct a frame building, with sixteen-foot posts and sixteen-foot rafters, as the sixteen-foot rafters would cover this barn, it being only twenty-four feet wide, and would give a little more than one-third pitch to the roof. This would give ample room for hay overhead to feed all the sheep the barn would hold.

On top of the beforementioned wall, I would place a feed trough, clear around the barn. On the sill I would construct racks for hay; the upper half of the rack to be boarded tight, and the lower twelve inches to be slatted with one by four-inch lumber, and toenailed to sill. This would give a feed trough and hay rack all the way around the barn and would be very convenient at lambing time. The door in the barn should be sufficiently wide to admit a manure spreader.

The lower story of the barn, where the sheep are to be housed, should be double boarded with tar paper between, and there should be plenty of windows so as to admit sufficient light.

I would prefer rolling doors for this barn, with two small hinged doors in these rolling doors, small doors to drop down. The small doors may be dropped or closed, as the weather will suggest.

Establishing a Flock.

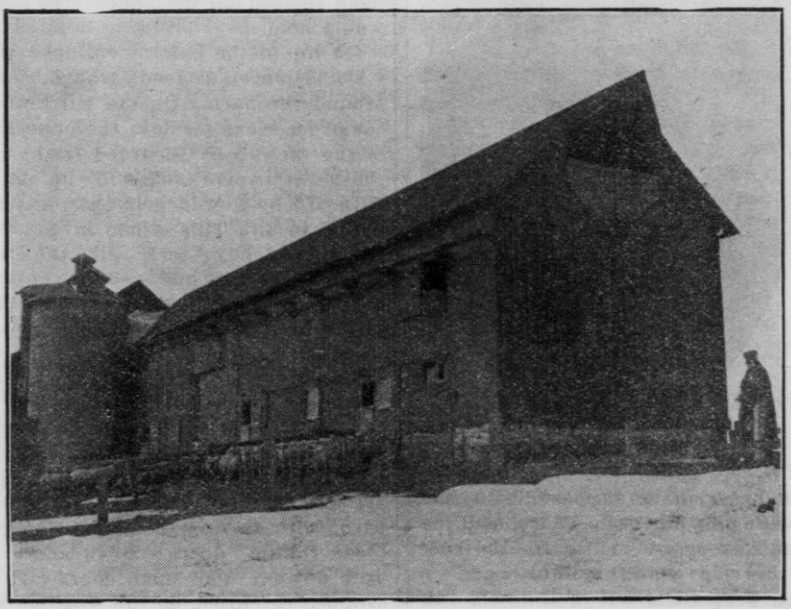
If you have not the ewes to start with, but must purchase them, purchase young ones, not more than three years old, and mate them with a good pure bred ram.

I would want the ram to be a good specimen of the breed he represents; he should have his head up, should be straight and level on his back, and carry up well at the tail head; he should have a wide, deep loin, and a good spring of rib; he should be wide

and deep through his heart girth, well let down in the flank and have a good, full chest, with his legs well out to the corners of his body. I would also have him have a good fleece of wool, long and thick.

Winter Care of Flock

Now, how shall we best feed and care for our flock in winter? For a grain ration, we always feed bran and oats mixed, with some roots or silage and for roughage, clover hay, or clover and timothy mixed, and at all times give them plenty of fresh water and salt.



Mr. Woodard's sheep barn with silo.

Care at Lambing Time.

As lambing time approaches, we must prepare small pens for our ewes and their lambs. For this purpose, nail together small hurdles about four feet long and three feet high, with the top board projecting fourteen inches longer than the other three. Start in on one corner of the barn I have described and drive a stake in the ground, now, the top board on the hurdle will fit right into the hay rack; take some twine from the straw pile, tie the hurdles to the stake, and you have a pen for one ewe. Another stake, two more hurdles, and you have another pen; and so on around the barn.

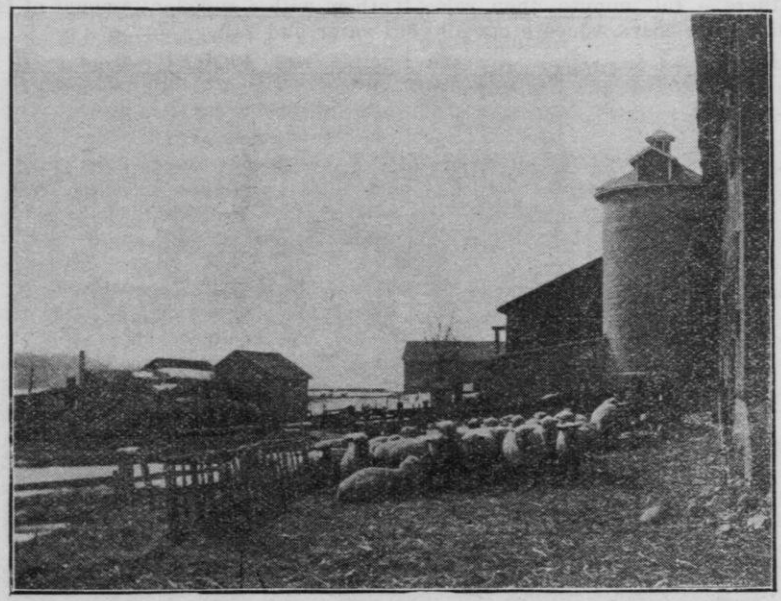
When we have four or five ewes which have lambs a week or ten days old, we turn them all together in a pen, and keep adding to them until we have ten to fifteen each, of ewes and lambs, in one pen. In one corner of this pen we place a trough with bran and oats in it, and fence the old ewes out. The little fellows like to hide, and they will sneak in there and eat.

When the lambs get strong, say three or four weeks old, they should be docked and castrated. I have tried

numerous tools for this purpose, but prefer the hot pinchers. An attendant catches the lamb, places its head between his legs, puts one hand on its back, takes hold of the tail with the other hand, and the tail is then pinched off with the hot pinchers.

mences to eat, he will resume his repast.

It also sometimes happens that you lose a lamb and wish the mother to adopt another, in which case you simply tie her front legs together, put her in a pen and hold her until the lamb



A flock of North Wisconsin Shropshires owned by W. Woodard.

Ewes Disowning Their Lambs.

It frequently happens that ewes will disown their lambs. I have tried a great variety of methods, and the one which suits me best is to tie her fore legs to each other, about four inches apart, so she is unable to run away or to bunt the lamb. Now you must watch her awhile, as she will jump around and may lie down; but if the lamb is strong, he will watch her and as soon as she gets up he will get up too and attempt to partake of his meal; and the sheep will either have to quit eating or permit the lamb to feed, for just as soon as she com-

sucks once or twice, and he will suck her after that. The only trouble is he will steal when he gets out with the other ewes. He will watch them, and while they are feeding will purloin his meal from the rear.

Shearing and Dipping.

As soon as the weather is warm and dry, shear the whole flock, and about two weeks after shearing they should be dipped for the purpose of killing all ticks and lice.

For dipping, we use a little, narrow box, about three feet long, two feet high and fourteen inches wide. We place the dipping box near the barn,

and attach a drain board about three feet square to the edge of the box and barn on a slant. We then catch the lamb, one man taking it by the hind legs and another man taking it by the fore legs and head, and put him into the bath, back down. Leave the lamb in there a full minute, then raise it to the drain board, squeeze out all you can of the dip and then let him go, catch another, etc., until they are all dipped. Then pen the old sheep up close in one corner of the barn or fence and with an old potato sprinkler spray them until they are thoroughly soaked. Care should be used that they are not rained on for a few days after this operation, as rain will spoil the dip.

A bunch of North Wisconsin lambs.

Summer Care of the Flock.

When the grass is sufficiently grown in the spring so the sheep can get a good bite, then turn them out to pasture, where they run until the hay is cut, when they are turned into the cut-over hayfield. It is advisable to have the pasture so arranged, if possible, that the sheep may run to the barns at will. But always supply them with a sufficient amount of fresh water and salt.

While the sheep are in the cut-over hayfield, we shut off the pasture, so as to give it a new start. After the grain is cut, we turn the sheep into the stubble. Sow a little rape and clover seed with your grain, and you will have a paradise for your lambs.

When you cultivate your corn for the last time, sow a little rape seed ahead of the cultivator and you will have a further supply of fine lamb pasture.

Lambs handled in this way should be ready for market with little or no extra feed.

DISCUSSION.

Mr. Scribner—What breeds do you find the most profitable in northern Wisconsin?

Mr. Woodard—That is a pretty hard question to answer, though some of the mutton breeds seem to do the best in our neighborhood, Oxfords, Southdowns and Shropshires.

Mr. Roberts—Wouldn't the Hampshires come in, too?

Mr. Woodard—I think likely they would, though I have not had any experience with them.

Mr. Jacobs—Wouldn't it make a difference in what way you were turning off your lambs, about which breed you used?

Mr. Woodard—Well, I don't think it would. I tell you honestly that not any of the long wool breeds are a profitable sheep for northern Wisconsin on account of the cold, late fall rains and the early rains in the spring. I am quite sure it is a good deal a matter of choice between the Oxfords and the Southdowns and Shropshires, whichever a man prefers. They are all mutton sheep; the Southdowns are a little smaller and I think you might feed them off a little quicker, they mature a little quicker, and make a little nicer mutton.

Mr. W. A. McKerrow—Have you ever had experience in feeding corn silage in the winter?

Mr. Woodard—Yes, I have fed some with good success. I feed not over three pounds, probably two, to breeding ewes. I do not think it would harm them, or any stock you were feeding for market, only you should not feed them too much on account of the laxative action on the bowels.

Mr. W. A. McKerrow—Do you think this has been a difficult winter to give your breeding ewes proper exercise?

Mr. Woodard—Yes, it certainly has.

Mr. Imrie—It has not been so difficult up at Bloomer as it was down in Waukesha county.

Mr. Woodard—We have had considerable snow.

Mr. W. A. McKerrow—You think exercise is an essential factor in producing good, strong lambs, do you?

Mr. Woodard—Yes, I think unless the ewes have a considerable amount of exercise they are liable to produce weak lambs.

Mr. Jones—Do you keep feed before your lambs so they can get it at all times; or do you have regular feeding times?

Mr. Woodard—We always keep feed in a little trough for the young lambs, but we change it once a day, and the old feed, what is left over, we give to the mothers.

Mr. Jones—What do you think is the best feed for those lambs?

Mr. Woodard—I should think whole oats, bran and a little bit of oil meal.

Chairman Scott—How about these split peas?

Mr. Woodard—All right, if they are cracked.

Mr. John Imrie—Would it be advisable to let your ewes run on timothy stubble in the winter?

Mr. Woodard—I don't think it would do any harm; if there was no snow, they would probably gnaw it down pretty close.

Mr. Jones—We have two sheep men in our country, and one of them, speaking of the other, said to me, "This man is going to make a mistake and lose a lot of lambs because he keeps his sheep out on an old timothy meadow." This same man had his sheep out and he saved one hundred and three lambs from one hundred ewes. I took note, watched to see if that made any difference. Nearly every day that the snow was not too deep, he had those ewes running on the meadow, and he came out far better than the other man, who saved about seventy per cent. Of course they had other feed.

Chairman Scott—Wouldn't a good—

deal depend on what the other feed was?

Mr. Woodard—I don't believe they got much nourishment out of that old grass.

Chairman Scott—Under those circumstances it would be specially necessary to give them some succulent feed, I think.

Mr. Woodard—Oh, certainly, we always feed some roots and silage, but the more exercise we can give our ewes without chasing them around, the better we think it is for them.

Mr. Jones—Perhaps they got more benefit from the exercise than from the stubble.

Mr. Woodard—I don't think the stubble would do more than kind of fill them up a little.

Mr. W. A. McKerrow—Here in Wisconsin farmers have a great deal of trouble with intestinal worms. What do you think is a cure for them?

Mr. Woodard—That is a pretty hard question to answer. Of course, the best thing is prevention, and that can be accomplished by changing them from one pasture to another. Of course there is a variety of medicine that claims to cure this trouble, and of course you can drench the lambs with some kind of medicine that will drive the worms out of them for the time, but if you put them on the same pasture they come again.

A Member—Have you any faith in tobacco as a cure for worms?

Mr. Woodard—No, sir, I have not. I don't know that we ever had any stomach worms up there, but I have seen coal tar, creosote, used in a one per cent solution, and I think that will destroy stomach worms in most cases, but if you put them on the same pasture they will become infected again.

A Member—How do you handle the tick proposition?

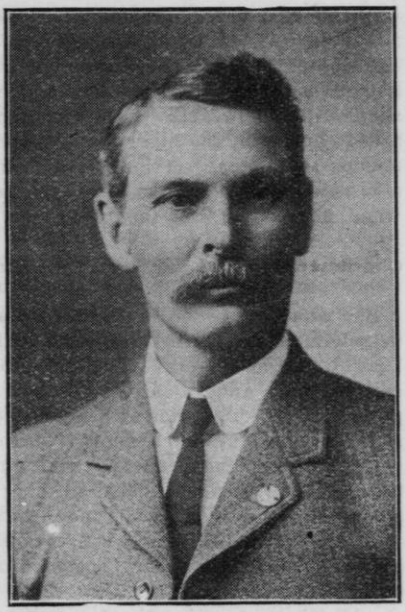
Mr. Woodard—We dip them. Take some of these dips, we have always used the Cooper; make a bath according to the directions and put them in all over.

A Member—Both spring and fall?

Mr. Woodard—No, we never dip but once, we give them a thorough dip and then we pen the old ewes up and spray them until they are thoroughly wet. After the sheep are shorn, the tick will almost all go on the lambs. There are many good dips, and if you make a thorough job with Cooper's dip, I don't think you will have any ticks. It will kill the nits and destroy all external parasites on the sheep.

SHEEP FOR PROFIT IN SOUTHERN WISCONSIN.

R. E. Roberts, Corliss, Wis.



Mr. Roberts.

Sheep raising in southern Wisconsin is entitled to more favorable consideration by a majority of farmers than it has generally received. At the present price of nine dollars and fifty cents per cwt. on foot for mutton, and the high level of prices for several years past, it is difficult for me to understand why so many farmers do not keep a few good mutton sheep upon their farms. It is true in the past the sheep industry, like all other kinds of live stock growing, has had its ups and downs, but the mutton sheep industry has passed the primitive stage here; it is now well established on a paying basis, for the American people are demanding more mutton each year, and those who have never eaten the meat of sheep before, once having tasted its fine flavor, highly nutritious and healthful qualities, think it the best of all fresh meat.

The demand is steadily increasing for good mutton, yet there are many farmers who claim they cannot afford to raise sheep on land worth one hundred dollars per acre or over; however, in England, upon land held several times more valuable than ours, the mutton sheep industry is recognized as the basis of their prosperity.

Sheep are regarded there as the farmers' friend, or the "rent payer." This is also true in Canada. The owners of the highest priced land there have become well-to-do by raising good mutton sheep and their land has become more productive.

Then, on the other hand, we hear many farmers lamenting on the fact of the boys leaving the farm; that they do not become interested in agriculture. I believe if the majority of those farmers would secure a few good sheep and place them under the care and management of the boys and allow them the proceeds from the sheep, they will receive valuable training in the use of money, its value and how to earn it, and the care of sheep and young lambs will develop and intensify the sympathetic side of their natures, to the extent that they will grow up to become good, useful, respectable citizens, at least will be more apt to become such than they would to buy them a fast horse to go upon the race track, for there is something about a sheep that appeals to a person's better nature and brings out of him the good that is in him. The care, management and proceeds of a few sheep will create a love for live stock growing to that extent that it will branch out to other kinds of

stock, and when the boy attains his majority he will be apt to be very reluctant about leaving the farm. With these facts in view, I have always advocated that the majority of farmers can keep a small flock of sheep with satisfactory results and their farms will be cleaner and more productive for their presence.

Start With a Small Flock.

Many of the failures invariably occur by starting with too large a flock by those who have had no experience with sheep. Where one may be successful with a small flock is no reason that he can be with a large one. Failure will surely occur with any kind of live stock should the farmer overstock the capacity of his farm. If one has had no experience with sheep, by starting with a small flock, as they increase, the farmer's experience also increases.

They also are the poor man's stock. from the fact that the cost to start a flock of good, common ewes is small compared with other kinds of live stock, and with proper management soon becomes a large one. They also can be quickly graded up and improved at a small expense.

Breed to an Ideal.

The first and essential principle of success in sheep raising is to have an ideal mutton sheep in mind. To make this improvement. to raise good mutton lambs, of the short-limbed, broad-backed, thick-fleshed kind, that are better individuals than their mothers, one must secure the right kind of a sire at the head of the flock.

To produce lambs possessing these qualities, a sire having this conformation must invariably be selected. With sheep, as in other kinds of live stock breeding, like produces like. The lambs will inherit the form and quality of their sire more than any other animal will.

The Best Breed An Open Question.

I have been asked many times which was the best breed of sheep. The old adage is, a good horse is never of a bad color; a good sheep does not belong to a particular breed; a good shepherd can invariably show a good breed; however, the black-faced breeds marble their meat very nicely and are always sought for upon the market when finished at the top price.

Characteristics to Look For in the Sire

But whatever breed is decided upon, in selecting a sire to head the flock, keep in mind general utility, vigor, constitution and quality. Select a pure bred, strong, wide-awake sheep, showing masculinity; short, strong neck; wide, deep chest; straight, broad, thickly-fleshed back, on short, strong limbs set out well under him, with a bright pink skin, well wooled over and under the body; possessing breed, character and quality. Such a sheep will produce lambs of good mutton conformation, having the quality that the market demands; the kind the buyers raise the price to the highest point in order to secure them. Raising such lambs is a joy and a profit to the owner.

On the other hand, a sire lacking constitution and breeding character, that is long-necked. long-legged, slab-sided. fish-backed, will produce lambs of poor feeding and mutton qualities, and necessarily must sell for the lowest price, consequently there is great virtue in good breeding when stock are placed on the market. So the profit from lambs for mutton depends very much upon the quality of the sire. One should always secure a pure bred sire from the breed of his choice for best results.

Have Ewes in Thrifty Condition.

Another essential to secure a good crop of strong lambs, the ewes should be carried through the winter in a thrifty condition. The old axiom, a sheep well summered is half wintered, well wintered is half summered, is absolutely true. The wise flockmaster feeds his lambs five months before he sees them. The ewes should be in a good, thrifty condition in the fall at mating time to insure a strong uniform lot of lambs the following spring.

The aim should be to feed the flock during the winter a variety of nutritious feed, such as every farmer has upon the farm, to keep them in good flesh. They should have daily a light ration of roots, to keep their systems in the best condition and to stimulate a good milk secretion when the lambs arrive; however, in the absence of roots, a little ensilage should be fed, from two to three pounds per head daily will answer in place of roots with good results.

Exercise is of great importance to the flock. If too closely confined during the winter, the result will be poor, weakly lambs. Abundance of exercise, a variety of feed, mongrel dogs and other kinds of stock kept out of their yards, success is assured.

Care at Lambing Time.

In the spring, as soon as a lamb arrives, or a pair of them, confine the ewe and lambs in a little portable pen for two or three days, as the ewe may devote her attention to one lamb to the neglect of the other if left in the flock. A few of these hinged panels are ample for a good sized flock and are very convenient.

If the milk supply is excessive at first, more than the lamb can take, remove it to avert trouble with her udder. Upon these little attentions during the lambing season depends the success of the industry, as the lamb crop is the main source of profit.

Feeding the Young Lambs.

As soon as the lambs can eat grain, they should be provided with a lamb creep, a small inclosure where they can creep in and the sheep cannot. Place in here a flat bottom trough sufficiently elevated from the ground, with a cover extending the entire length of the trough eight inches above the sides, to prevent the lambs from getting into the same with their feet. Here feed a little crushed oats, bran and a little oil meal. They will readily learn to eat it and it will greatly assist in growing larger and better lambs, also will reduce the drain upon the ewes, and for the grain consumed by the young lambs at this time, as with other kinds of live stock while young, will return a larger profit than when fed at any other age.

Those who wish to raise very early lambs for the Easter market, or the so-called out of season lamb, to make them ready for the market quickly, I would feed corn meal ground coarsely and oil meal, all they will consume, as a young lamb at this time plump and fat is preferable to a much larger one in thin condition, and owing to the fact that they can be marketed when lambs are scarce, they command a very high price.

Lambs should always be trimmed early, at two or three weeks of age. This is the main cause why native lambs are discriminated against upon the market. They cannot be properly fattened and finished, do not look inviting, and consequently must sell at a low price in comparison with those that are trimmed and fattened.

When Shall We Shear?

A question often asked is, when is the best time to shear? The successful sheep owner will shear early, or as

soon as the fleece becomes uncomfortable in the spring, about the first of May, or before the flock is turned out upon grass, as the early shorn ewe will always raise the best lamb and will do much better.

About a week after the ewes are shorn, they, with the lambs, should be dipped in one of the commercial sheep dips to free them from ticks, should there be any, as a lamb or sheep infected with ticks sapping out their life blood will never do well, no matter how well fed, and an unthrifty lamb or sheep can never return a maximum profit.

Summer Care.

The summer care is not difficult if provided with sufficient pasture and pure water; however, it is very unwise to pasture sheep year after year upon the same pasture, cropping the grass closely, as this greatly increases the possibility of infection with parasites. Every good sheep owner exercises every precaution to prevent this by feeding tobacco lightly sprinkled with salt. This is a good remedy for the dreaded stomach worms. There is also a medicated salt known as "Sal-Vet" that is recommended highly as a good remedy. While I have fed tobacco in a measure as a preventive, I believe the frequent change of pastures has been the means of keeping my flock healthful and thrifty.

Sheep should always have access to salt. They will consume less and it will be more beneficial. If salted irregularly, at long intervals, they are apt to over-eat of it, causing them to drink excessively, which is apt to cause bowel trouble.

Weaning the Lambs.

The weaning of the lambs should be done in the fall by turning them in a fresh grass field and feeding a light ration of grain. The ewe flock should be looked over and should there be any poor mothers and those that have passed their best days, these should be fattened and sold off and the best ewe lambs added to the flock. Cull closely and keep the flock young for best results; however, ewe lambs should not be bred, as it not only stunts the lamb, but the offspring will be inferior in comparison to what it would have been had the mother been matured.

Marketing the Lambs.

Marketing the lambs will depend upon the surroundings of the owner, the character of the lambs and the market, but when offered for sale they should always be well fattened and finished to realize the largest profit. By so doing, the farm products or grain consumed are marketed at an enhanced value.

There are other things I could mention connected with the sheep industry, but in closing I would say a good flock of sheep means two harvests in a year, wool and lambs, and as both products are commanding a good price and the farmers of southern Wisconsin are admirably located near large cities and the greatest live stock market in the world, and with the increasing and urgent demand for mutton, the future holds great encouragement for all who will engage in this industry. In my experience of over thirty years in raising sheep, for feed consumed capital invested and labor involved, sheep pay a larger profit than any other kind of stock, and to the young men who are soon to operate the farms in southern Wisconsin, permit me to say that should you engage in this industry and give it proper care, intelligently and persistently pursued, you will never have cause to regret it. They are the stock which pay one hundred per cent profit, and it is a clean, pleasant business. There is nothing upon the farm that will attract the

eye, or is more beautiful to look upon than a well bred, well-cared for flock of mutton sheep or lambs, a happy combination of beauty and utility. They are rightly called the farmer's friend, or the animal with the "golden hoof," and last, but not least, is the constant improvement of the farm they are kept upon.

DISCUSSION.

Mr. Scribner—Do you prefer lump salt, rock salt?

Mr. Roberts—I have always fed the common, coarse barrel salt. For feeding sheep salt in summer, I always make a V-shaped trough of two fence boards; take a lath and split it lengthwise and nail it half way up the trough and daub pine tar above that lath in the trough, then put the salt in the trough, and by that means the sheep will daub their noses in getting the salt.

Mr. Scribner—Is that the way you get black-faced sheep?

Mr. Roberts—Not exactly; however, it is a good thing to do

Mr. W. A. McKerrow—Don't you think you lose a good deal of that salt in leaving it out of doors in all kinds of weather?

Mr. Roberts—Yes, sir, you would. The trough should be under shelter.

Mr. W. A. McKerrow—We have a system by which the salt is covered and the sheep stick their heads in under and get it.

Mr. Woodard—Do you think Sal Vet, or tobacco stems, will drive worms out of sheep when they are once infected?

Mr. Roberts—I am unable to say. I have fed both, simply as a precaution, not as a cure. By a frequent change of pasture, I have had no trouble. Sheep should not graze over two seasons in the same pasture, and it would be better still to change them back and forth during the season.

Mr. Martiny—In southern Wisconsin do you make a practice of having your lambs come early or late?

Mr. Roberts—I always like lambs to come in March, because then we have the most time to give them attention, before the spring work comes on, and it is the earlier lamb that makes the best growth, as well as the best sheep.

Mr. Martiny—What time do you market your lambs?

Mr. Roberts—I formerly catered to the Easter market; I have done that for seventeen years, but for some years past raising pure bred stock I do not cater to an early market.

Mr. Imrie—Do you put March lambs on the Easter market?

Mr. Roberts—No, they should be February lambs.

Mr. Woodard—When you get nine and a half cents, you would sell most anywhere. I want to ask you how large should they be?

Mr. Roberts—A lamb weighing thirty-six pounds live weight will dress for the Easter market, a young lamb well covered with baby fat, weighing thirty-six pounds, is preferred to a fifty-pound thin lamb.

A Member—What prices do they most generally bring?

Mr. Roberts—That varies according to the supply; anywhere from twelve to eighteen cents a pound.

A Member—I have been asked at least a dozen times this winter how I would treat a ticky flock in the winter.

Mr. Roberts—If they were mine, they would have been dipped in the spring a week after they were sheared then they wouldn't have ticks in the winter.

A Member—Suppose you were buying some and they were covered with ticks?

Mr. Roberts—If I had a good, warm place for them and it was toward spring, I would take the wool off and dip them. If I couldn't do that, I would

try to provide a barn warm enough and dip them in the winter.

Mr. W. A. McKerrow—Have you ever tried parting the wool and pouring in the dip, about every three inches? I have done that, and I think it is a good system. Of course we want to put them in warm quarters after we have done that until they get thoroughly dried off.

Mr. Roberts—It seems to me that would not be as effective as dipping, because the dip would run out to the end of the wool.

Supt. McKerrow—You would kill a lot of the old ticks.

Mr. Roberts—Under those conditions, a man would have to do the best under the circumstances.

Mr. Imrie—Is there any powder you can buy and put in there that will do the work?

Mr. Roberts—I do not know of any.

THE OXFORD DOWN.

W. A. McKerrow, Pewaukee, Wis.

Mr. W. A. McKerrow.

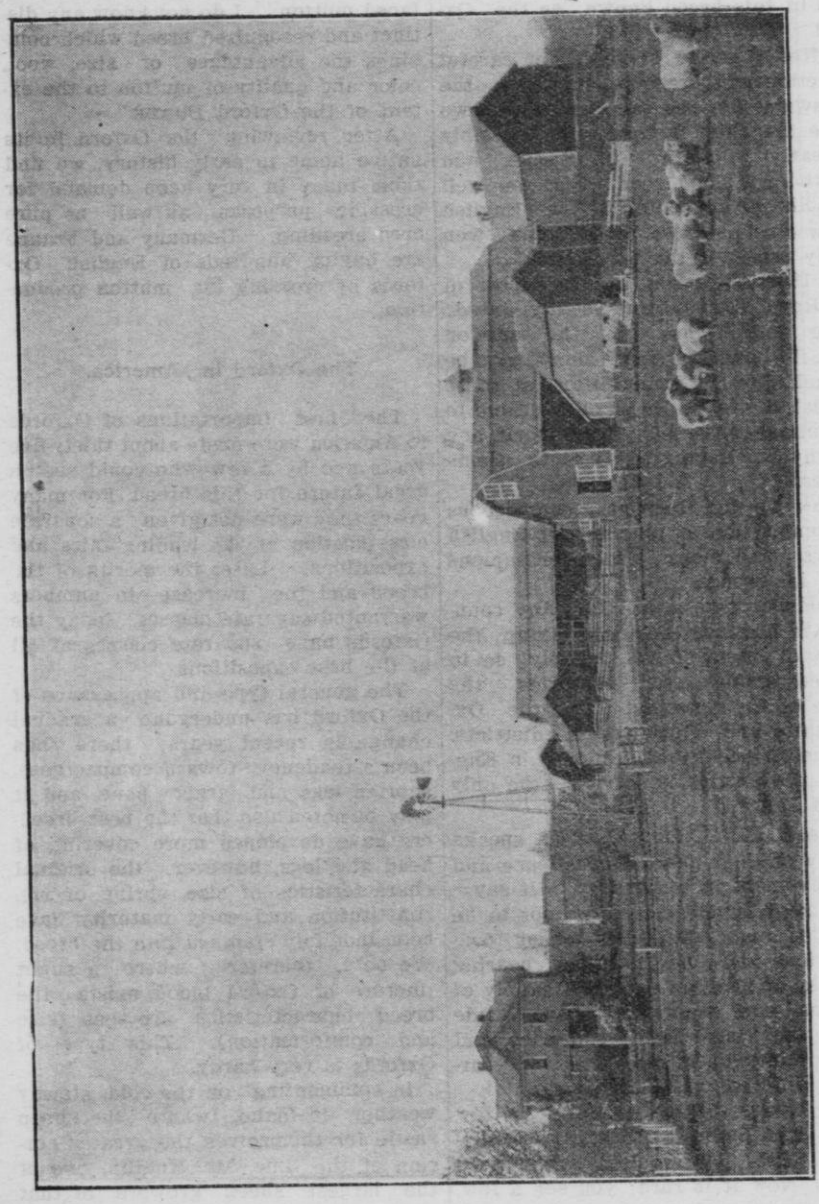
In studying the different breeds of live stock and their development, we find that climate, market and local conditions govern the blending of breeds and establishment of new breeds throughout the world; however, no country has taken such strides in the improvement of breeds of sheep in which both commodities, wool and mutton, are produced, as England.

We find the Cotswold in early history, even back in the fifteenth century. It has been improved by the use of Leicester blood. This breed shows great size, long staple of wool, a little coarse in quality.

The Southdowns, also the earliest of the Down breeds to be developed, are noted for their great thrift and exceptional quality of mutton; are easy keepers, but rather light weight and light shearers These two breeds are great factors in mutton and wool development; also the Oxfords, as well as other breeds.

Early History of the Oxford.

The history of the Oxford started about eighty years ago, when Messrs. Druce, of Eyman, Gillett, of South Leigh, Blake of Stauton, Harcourt and Lyman, of Hampshire, England, un-



The McKerrow farm buildings with some flock headers in the foreground.

dertook the foundation and construction of this breed known as the Oxford.

After a period of years of careful selection and breeding, in which the Cotswold ram and the Hampshire ewe were the chief factors, with possibly an early admixture of Sussex and Southdown blood, soon a type was well established and entered the English show ring as cross breeds and won many prizes in the fat classes.

In 1861 Stewards in the report of the Royal Agricultural Society stated: "The judges are of the opinion that the Oxford Downs should not be excluded from competition at these annual shows, as they believe them to be animals possessing great merit, and worthy of having a class to themselves."

Now we find them very conspicuous in competition at all the best English shows, and many times champions over all breeds.

Goldsborough says: "In many countries in England they are taking the place of other breeds, notably so in Gloucestershire, for centuries the home of the Cotswold. In the Oxfordshire and Buckingham districts, the best agricultural sections in England, the Oxford is almost the only breed kept."

The R. A. S. Journal, 1870, speaks highly of their general excellence and improvement in uniformity. It says: "For rent payers they are not to be excelled, and with their robust constitutions and early maturity, bearing as they do such an abundant supply of mutton and wool, they have made their way into most countries, and many hundreds of rams are sold yearly by different breeders."

Mr. George Strut writes: "A few years ago Bedford Market was supplied with long-wooled, white-faced sheep. Now it is rare; you see a few, and those that do appear do not make so much by several shillings as the Oxford; for nobody will eat the white-faced mutton. I do not know any distinct and recognized breed which combines the advantages of size, wool, color and quality of mutton to the extent of the Oxford Downs."

After reviewing the Oxford in its native home in early history, we find them today in very keen demand for crossing purposes, as well as pure bred breeding. Germany and France are buying hundreds of English Oxfords by crossing for mutton production.

The Oxford in America.

The first importations of Oxfords to America were made about thirty-five years ago by a few who could see a great future for this breed. For many years they were not given a separate classification at the leading fairs and expositions. Later the merits of the breed and the increase in numbers warranted separate classes. Today the Oxfords have separate classes at all of the best expositions.

The general type and appearance of the Oxford has undergone a gradual change in recent years; there has been a tendency toward compactness, shorter legs and larger bone, and it may be noted also that the best breeders have developed more covering of head and legs, however, the original characteristics of size, spring of rib, constitution and early maturity have been indelibly stamped into the breed. We note, therefore, where a slight tincture of Oxford blood exists the breed characteristics are seen (size and comformation). This type of Oxfords is very hardy.

In commenting on the cold, stormy weather in Idaho, where the sheep rustle for themselves the greater portion of the time, Mr. Knollin, one of the largest sheep growers of that state, said: "We think the Oxford is a hardy sheep; during the recent bad

Champion flock Oxford Down sheep at Minnesota, Missouri and Wisconsin State Fairs, 1910, that defeated the English champions. Owned by Geo. McKerrow & Sons, Pewaukee, Wis.

storm we found the Oxford ewes rustling like a band of Angus steers." In speaking further of the Oxford for range purposes, Mr. Knollin said: "They are a sheep which are especially adapted for crossing on the grade Rambouillet or merino ewes."

In conversation with many large sheep breeders at the recent National Wool Growers' Convention held at Ogden, Utah, I found the Oxford ram used on western ewes was giving excellent results. The dense, short staple of wool on the western ewe, coupled with the longer fleece of the Oxford, gave a heavy shearing, good quality fibre on the offspring, and the early maturing, hardy chaacteristic of the Oxford crossed with a smaller western ewe, gave most desirable results.

Never in the history of the breed have they been in so great demand for crossing purposes. They are also a farmer's sheep, having the requisites for producing market toppers. The Grand Champion carload of lambs at the 1908, also 1909, International Show, Chicago, were sired by Oxford rams.

Breed Characteristics.

In summing up the characteristics of the Oxford, we have a sheep that is the largest of Down breeds, producing a heavier shearing fleece; a farmers' sheep, because they cross well with the native ewe producing an early maturing, dark-faced lamb with great weight; a sheep of great constitution and very prolific; a ranchman's sheep, because they produce a heavier fleece and mutton carcass when crossed with the western ewe than any of the dark-faced breeds.

It is plainly evident that in the future the most profitable breed of sheep will be that breed which will produce a prime fleece from a prime carcass, or, stated plainly, one that will produce a fleece and carcass which will bring the most money. Dollars and cents is the standard by which to judge the value of all breeds. In this the Oxford is a strong factor.

DISCUSSION.

A Member—What is the difference botween the Oxford and the Shropshire?

Mr. W. A. McKerrow—Well, we find there are a few characteristic differences. You will find that the Shropshire is a smaller sheep, having a denser fleece of wool but not as long staple, therefore not quite as heavy shearing. In the Shropshire we have a sheep covered with wool to the tip of the nose, with wool on the legs, a finer ear, as a general rule, than the Oxford, and finer bone, naturally being a smaller sheep.

Mr. Scribner—Are they better suited for our northern conditions?

Mr. W. A. McKerrow—No, I wouldn't say they were better suited. I believe breeds should be selected according to our own liking. I wouldn't like any one to select Oxfords because I happen to like them; I believe, however, that the medium wool sheep, or the Down breeds, are best for Wisconsin, for this latitude and this climate, and the Oxford is one of the Down breeds.

Mr. Roberts—The Southdowns are considered the aristocratic mutton sheep.

A Member—How many pounds of wool should a sheep shear?

Mr. W. A. McKerrow—That depends, of course, on the breed of sheep. We find that a good Oxford flock will possibly shear from ten to twelve pounds Our Shropshire sheep will shear close to ten pounds. I should say the difference between the Shropshire and Oxford is possibly a pound and a half in shearing quali-

ties. That is pretty good, as an average.

A Member—Can common sheep shear that?

Mr. W. A. McKerrow—They are an extra good lot of common sheep if they average twelve pounds.

Mr. Roberts—Eight and a half pounds per head is a good average for a good flock of Shropshires

Mr. W. A. McKerrow—Yes, eight pounds is a good average.

A Member—Isn't there a difference, whether they are kept in a close barn; that is, if moisture lodges in the wool?

Mr. W. A. McKerrow—I think there is more difference in reference to the shearing qualities of our sheep probably in the kind of feed that we feed them; however, out in the high altitude of Idaho and Wyoming, the climate is so dry the sheep do not shear as much as they do in Wisconsin in our lower altitude.

Mr. Martiny—Is there any difference in the percentage of lambs raised by the Oxford, and in the development of those lambs than from any other breed.

Mr. W. A. McKerrow—We do not see much difference in the percentage of lambs from the Oxford in comparison with the other Downs breeds, but they grow faster.

Mr. Imrie—Tell us how you feed your breeding ewes, starting with them in the winter, in order to get a good, strong, thrifty crop of lambs.

Mr. W. A. McKerrow—In the first place, I recommend breeding ewes to have an abundance of exercise. We have them a quarter of a mile away from the home farm; they come to the home farm and get their grain feed and their silage every day. For grain feed this winter we are feeding about one-fifth corn, a small quantity of oil meal, about one-half oats, and make up the rest of the grain feed with bran. We are feeding them about three-quarters of a pound per day per head of grain. They get also about three pounds each of pea vine ensilage. The peas are taken out of it and canned and the pea vines were put in the silo, and we have used this as succulent feed We have for roughage this winter, clover hay. We are feeding the breeding ewes clover altogether, and feeding all they will eat up nicely.

Chairman Scott—How are you pleased with this pea vine ensilage for feeding sheep?

Mr. W. A. McKerrow—We are very much pleased with it, it makes fine ensilage. We do not find it quite as strong in grain feed as corn ensilage having corn in it, but we find it heavy in protein, and it furnishes an excellent feed for growing young stock, an excellent feed for breeding ewes with lamb and mares with foal, etc., and we find it will keep just as well as the corn ensilage we put in.

Mr. Martiny—Do you find any difference on the digestive apparatus of the animal?

Mr. W. A. McKerrow—I have not noticed practically any difference in the effects of the silage on the digestion of the animals.

Mr. Martiny—Do you buy your vines at the factory?

Mr. W. A. McKerrow—We grow the peas on our own farm, and had a viner there. Peas are harvested, put through the viner and the vines are put into the silo.

Mr. Convey—Don't you feed any roots?

Mr. W. A. McKerrow—We feed roots after lambing time, all the ewes will eat.

Mr. Convey—What kind of roots do you prefer?

Mr. W. A. McKerrow—We prefer the Swedish turnip. However, we are like a good many of the rest of the American farmers, we do not like to get down and weed roots too much;

therefore, we are in the habit of growing a good many mangels, we are growing from one to two acres of the mangelwurzel for sheep feed, together with the growing of the Swede turnips, each year.

A Member—How about common turnips?

Mr. W. A. McKerrow—The turnip varieties are all good, but the common white turnip will not keep as well as the other kinds. We put in white turnips for early feeding.

A Member—What time do you market your lambs?

Mr. W. A. McKerrow—Of course our lambs are all pure bred lambs and are sold for breeding purposes. If we were producing market lambs, I think we should try to get them on the early market, or possibly the month of December. Of course our local conditions would govern that. If we could have our lambs dropped in March and well forced ahead so we could have them finished up and market them the first of December, that would be all right. If you winter your lambs, of course the June or July market would be all right.

Supt. McKerrow—How about the spring lamb, three or four months old, for the June or July market?

Mr. W. A. McKerrow—Of course we find a very good market at this time, and if we were feeding them, forcing them ahead according to the instructions of Mr. Roberts, I presume we would have a very good lot of lambs and get a good income from those lambs.

Mr. Convey—How heavy would you expect a lamb to be for the December market?

Mr. W. A. McKerrow—I would expect those lambs, the way we would feed them, to weight about one hundred to one hundred and twenty pounds.

Supt. McKerrow—You are talking about Oxfords now?

Mr. W. A. McKerrow—Yes.

Supt. McKerrow—How do you get around the parasites?

Mr. W. A. McKerrow—We have fed tobacco. I think if you are going to try to prevent parasites in sheep, you must feed them all they will eat to get results. We get stems and refuse leaves from a Milwaukee sorting house, it costs about three cents a pound. In feeding that, we sprinkle water on the leaves and then sprinkle on a little salt and feed them in this way once a week.

Chairman Scott—Do you feed any Duke's mixture?

Mr. W. A. McKerow—That is too expensive. In feeding for the prevention of parasites or intestinal worms, I think probably one thing that is giving us good results is the feeding of copperas and salt. I think I have heard more farmers in the state of Wisconsin say they are getting good results from copperas than anything else they use. Of course this Sal Vet and other chemical salts have a good deal of copperas in them, but I think the changing of pastures for lambs is the most important factor in keeping our sheep free from worms. We have got to put those lambs on fresh clover pasture, and not let them remain on that pasture for more than three weeks. We fence off a small plot, probably five or six acres, for a hundred ewes and a hundred lambs; after that is pastured off, we put them on another fresh plat and do not put them back on the old place again, and we can summer through our lambs without losing any of them in following such a system.

A Member—Do you have any trouble with ewes having caked bags?

Mr W. A. McKerrow—We sometimes do, yes, from lack of attention, probably, when the lamb is first dropped, and sometimes when the lamb is two or three weeks old. The best thing we can do is to take some lard or un-

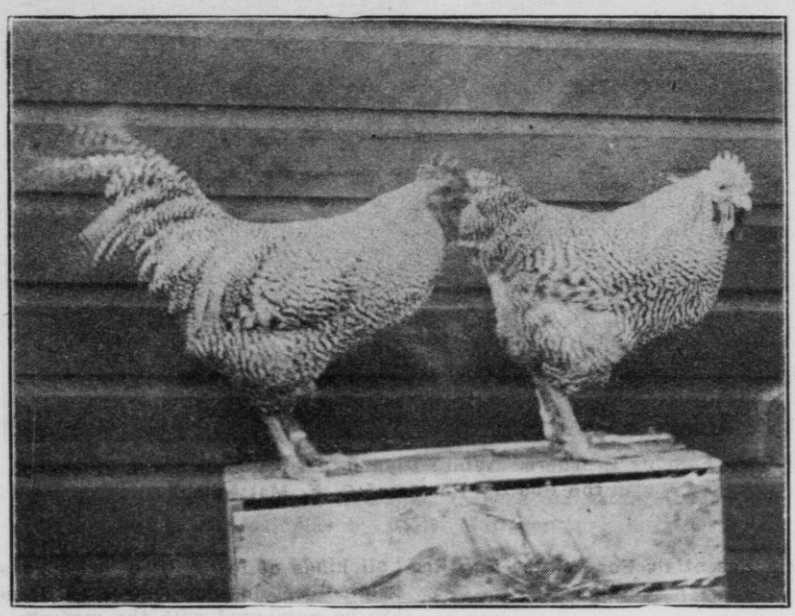
salted butter and run the bag and keep rubbing. The first twenty-four hours is the most important time to watch, but even if we do not notice it for two or three days, a thorough rubbing of the udder is about the only way we can eliminate that trouble.

Music by the orchestra.

WINTER EGGS.

C. E. Matteson, Pewaukee, Wis.

The production of eggs in winter has absorbed the attention of more people this past winter than ever before, so far as my observations have day from his flock could almost say he had found fifty cents. Of course it was not all profit, but the fabulous prices that have been paid for eggs



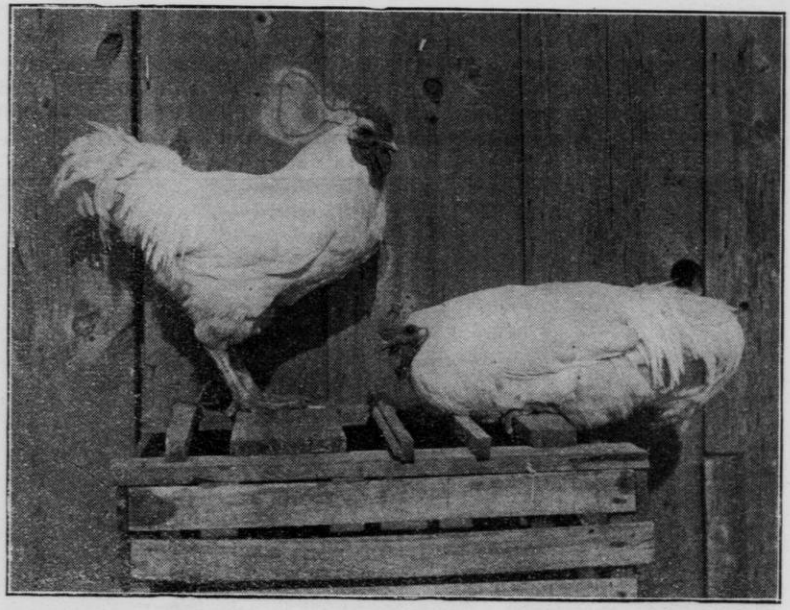
Two Barred Plymouth Rock cock birds at the Poultry Farm of C. E. Matteson.

taken me. Some have been successful, others have not, so it is not the successful ones to whom I am offering a helping hand, but rather to those who did not succeed. Any one who was fortunate enough this past winter to get a few dozen eggs each this past year have left a nice margin of profit to the producer, and there is not so much to this either, if we only think about it far enough in advance. the same as we do our other lines of work. But right there is the difficulty. We are too busy with our

other farm work until the price of eggs begins to soar away up in the fifties and then we try to patch up our mistakes, but it is too late, however, for real practical work. A full-fledged poultryman would not think of doing that and if anything should happen to put him in such a predicament he would know his finish in advance.

The Breed.

In mentioning the breed, probably I might as well say the fowls with which we are going to do business, because that is really what I mean, for there is but little room left for doubt, if we make the mistakes so many commonly do, that is, using any and all kinds of fowls, bred with no special object in view, our fate is sure to be numbered with the majority.



Two Famous Breeders. White Plymouth Rock cock birds at one of the Poultry Farms of C. E. Matteson.

Some Essentials For Winter Egg Production.

Now, what is real preparation for the production of winter eggs? I would place it in this order: First, the breed; second, proper housing; third, good care and feeding.

Just which is the most important of the three is pretty hard for me to say, in fact, I should very much dislike to try to do a profitable business in winter without bringing to my assistance all three of them.

No one can afford today, with the present high prices of grain and still higher price of labor, to even atempt to do business with the common barnyard fowl. You would no more get an experienced poultryman to do this than you would get some noted turfman to attempt a two-minute gait with a scrub horse. Special purpose, by all means, is my advice to all.

Proper Housing.

Now, when we are sure we have made a proper selection of our stock, let us take up the second proposition, which is proper housing, and this is no small part of my talk, which I fully realize.

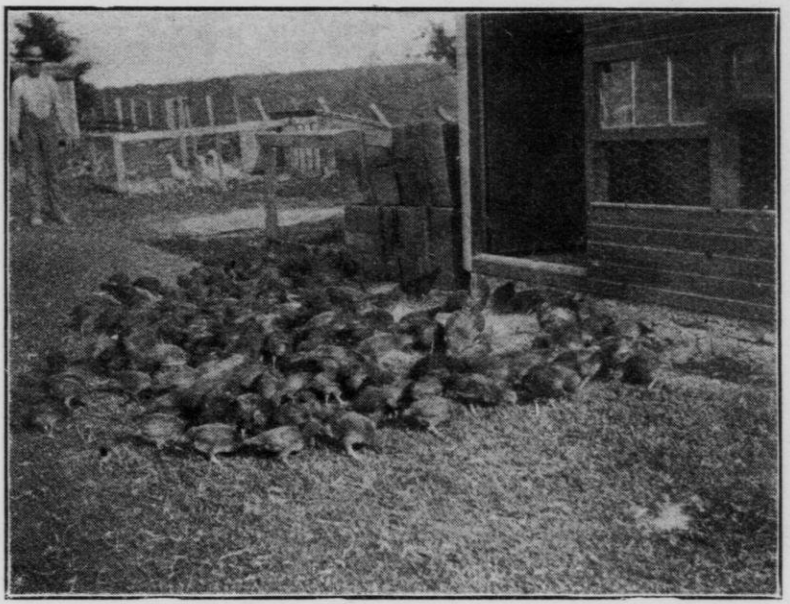
Many years ago we thought we had the matter pretty well settled, but today with modern advancement and so much agitation going on in regard to the fresh air movement, I hesitate somewhat to recommend as infallible the same style of house I did fifteen or twenty years ago. My recommendation has always been that a warm roost room for our fowls to spend the cold winter nights in was the only practical method (and I am going to stick right to my convictions until fully convinced otherwise), and a scratching shed attachment twice as large as the roost room, with a sufficient amount of light in both (but put the windows in for light instead of heat). These houses should be light enough so the fowls have plenty of room to scratch and work for their grain at all times, whether it is cold and stormy out of doors or not. We all know that out in our rigorous Wisconsin winter weather is no fit place for a fowl to produce eggs; she must be comfortably sheltered both night and day.

A colony of Buff Plymouth Rocks .2 months old as farmed out in colonies by C. E. Matteson.

Good Care and Feeding.

Now, the third requirement, namely, good care and feeding, brings us right to the point where most people fall down. When people become infatuated with this line of work, they commence to study the balanced ration, etc., which is all right so far as it

goes, but this alone is not sufficient. There are always two ends to a string and I am sure this rule holds good right here, and the other end of this string is exercise. I wish to bring this out in the strongest terms possible, that besides the balanced ration, a fowl must have an abundance of exercise if we expect her to be a profitable producer.



A colony of Single Comb Brown Leghorns 2 months old as farmed out in colonies by C. E. Matteson.

Briefly I wish to explain why this is so important. As is very well known, nature has not provided a fowl with teeth with which to masticate her food, as all other farm animals have, but instead of this process of mastication properly done, it must be seen to first that some kind of good, sharp grit is provided for her; just give her the opportunity, she will do the rest. Now, when a supply of this grit is stowed away into the corrugated muscles of the gizzard and by the almost constant exercise which a fowl should be compelled to take at all times, a proper mastication of the foods may be expected, and by this method only may we expect a fowl to make profitable use of her foods. I am sorry to say but few people heed this all important point in the feeding of fowls; they seem to think if they only have the right kinds of food they ought to produce. A fowl is not a machine; you cannot expect by the simple process of feeding to induce her to lay at once, but instead, in connection with the proper foods, proper methods should be employed to stimulate her maternal organs, which ultimately ends in the production of eggs. and as winter is not the natural season for a fowl to reproduce herself, artificial methods must be brought into

use to induce her to change her decision. So in feeding, use your first energies to promote exercise, and do that just as early in the morning as you can. This stimulates the blood into activity, which conditions them to make the best use of the rest of the food ration they are to get during the day. This should not only consist of a variety of grains, but at least ten per cent of all the food they get each day should be animal food of some kind.

Do not forget to supply your fowls with green food; this is essential. In summer, while on the range, under normal conditions, probably half of their whole day's ration is the green, succulent grasses, and they are much healthier by partaking of such a ration; a bulky food is always the best. Cut clover and either cabbage or mangels are what we depend on to supply this green food.

Now, just a word about our young chicks. They are to be our future flock and it is absolutely necessary that they get full growth if we expect them to do their best. Get them out early, give them as much unlimited range as possible. Much, and in fact I might say everything, depends upon that. The farm is the ideal spot on which to grow poultry because of the wonderful opportunity for this unlimited range.

And last, but not least by any means, see to it that they are kept free from vermin.

What others have done, you can do likewise.

DISCUSSION.

A Member—What breed would you select for winter layers?

Mr. Matteson—Oh, if you can furnish the ideal conditions as far as housing is concerned, so you are sure you are going to keep them warm enough, I think I would recommend the Leghorns.

A Member—How about color, under the same conditions, I mean?

Mr. Matteson—When I say Leghorns I draw no distinctions as to color. One variety of Leghorns, or of any other breed, should be just as good as the other. The difference, if there is any, must be attributed to the way they have been handled and bred. A fowl is just what you make it.

A Member—When would you have your chickens hatched?

Mr. Matteson—In May, or the first of June, for Leghorns, and in four or four and a half months they ought to be laying easily.

A Member—Can your heavy breeds be handled in such a way that you can make heavy winter layers of them?

Mr. Matteson—Decidedly so, under ordinary conditions. I am recommending American breeds, because experience has taught me we could make them lay as many eggs in the first six months of their lives as the Leghorns, but of course those eggs will cost considerable more; they are a larger fowl and it takes more to feed them, but today with market poultry the Americans will more than make up for this.

A Member—What are the American breeds?

Mr. Matteson—The Plymouth Rocks, the Wyandottes, Rhode Island Reds, Javas, Dominiques and Buckeyes. I recommend them in the order named.

Mr. Martiny—What do you think of Rhode Island Reds as a breed?

Mr. Matteson—I think they are a coming breed. At present, of course, they are not as thoroughly established as the Plymouth Rocks and Wyandottes, but they are growing into popularity.

Mr. Martiny—What seem to be their principal strong points and their principal weaknesses?

Mr. Matteson—In the establishment of all new breeds, we realize in or-

der to establish a certain type, that breeders must resort more or less to inbreeding, hence the reason why they are not quite as great a utility fowl until they are more thoroughly established.

Mr. Imrie—How do they excel the Plymouth Rocks?

Mr. Matteson—I don't think they do.

Mr. Imrie—I thought you said they were the coming breed.

Mr. Matteson—They are a coming breed; they are not as popular as the Plymouth Rocks or Wyandottes.

Mr. Martiny—In comformation and general characteristics they are like the Wyandottes.

Mr. Matteson—Yes, they are quite a little bit longer bodied and rangy.

Mr. Stiles—Aren't they considered extra good winter layers?

Mr. Matteson—Decidedly, and that is one advantage that the American classes have, they are larger bodied, heavy feathered, more liable to withstand our rigorous winters.

A Member—Is it a fact that the Plymouth Rock lays smaller eggs than the Leghorns?

Mr. Matteson—Yes, supposed to be, when in abnormal condition, but if they are too fat, as the Plymouth Rocks are more liable to be, then you get the great, large, abnormal eggs.

Mr. Martiny—Isn't it a fact that the Rhode Island Reds mature a little earlier than the Plymouth Rocks?

Mr. Matteson—All of the other American classes are supposed to mature a week or ten days earlier than the barred Plymouth Rock.

Mr. Convey—How do you make winter layers out of the American breeds?

Mr. Matteson—Handle them along certain lines. In my paper I placed a lot of stress upon the conditions that we subject our young stock to. They must be handled in such a way that you get them away from the older stock, it gives them the benefit of the range, the right kind of feed, etc.

Mr. Convey—I have always heard stress laid on the fact of their early maturity.

Mr. Matteson—Oh, yes, at least six weeks earlier than the Leghorn.

Mr. Convey—That brings them about the last of March?

Mr. Matteson—Yes, I have about four hundred and fifty eggs down now.

Mr. Convey—Do you count all you put down this winter when you were around in Institute work?

Mr. Matteson—No, they would be too stale for incubating just now.

Supt. McKerrow—Those do not produce anything.

Mr. Matteson—Yes, they do.

Mr. Herbst—Don't you make some distinction in your breeders?

Mr. Matteson—Yes, I think we would. Of course we have got to conform to the standard requirements, but we recognize that a more rangy, a less compactly built fowl, is supposed to be a heavier layer than a short built, compact bird. There is one point we want to understand thoroughly. If we get out these small breeds too early, they are going to lay the last of July or August and lay two or three clutches of eggs, and then they are but little better than an older fowl, because they go through a slight molting process, and then you are the same as you would be if you had older fowls.

A Member—What would you feed them to help secure an early layer?

Mr. Matteson—Why, a variety of grain, as little corn as possible. We have been obliged the last year or two, because of the high price of grain, to feed more corn than we wanted to. I like to keep before my pullets a dish of bran mixed with twenty per cent beef scraps, keep that before them in their little colony houses all the time.

A Member—What is your opinion of fresh cut bone?

Mr. Matteson—It is one of the best. Probably ordinary people in using it

will get better results out of that than some of the other animal feeds, because there is no danger of their overfeeding.

A Member—What is the best grit for chickens?

Mr. Matteson—If I was going to choose the very best, I would say some pounded crockery, or granite or glass, something of that kind. Fine, sharp gravel is splendid grit; something that is of the proper size and the sharper and harder it is, the better service it will do, the less they will consume.

A Member—Do you consider oyster shell good?

Mr. Matteson—Now, that is a point I wish to bring out with emphasis. Under no conditions would I depend on oyster shells to take the place of grit. At this season of the year, now that the breeding season is upon us, oyster shells are apt to do a great deal more harm than good, owing to the fact that you get too hard a shell and in many an incubator bad results will be seen at hatching time. You take where a fowl's digestion is good, and she has plenty of exercise, etc.. and you feed oyster shells in great quantities, the result will be you get such a hard, compact shell on your eggs that you must have a very strong chicken in that shell, or it cannot break the shell to come out.

Chairman Scott—Is there a benefit in feeding it where the shell is too soft?

Mr. Matteson—That condition should not exist. The ration I would recommend, as I did in my paper, contains a sufficient quantity of lime so you will have all the lime necessary to impart to those eggs the proper kind of shell, if you observe the rule of exercise, etc.

A Member—What is the cause of hens eating eggs?

Mr. Matteson—Overfed, idle fowls are generally the ones that resort to such a practice. It is a mischievous act, and when you see fowls eating eggs, they will generally be feather-pulling, etc., and it is the result of over-feeding and keeping your fowls in idleness. Under such circumstances, they, like people, will contract some bad habits. Gather your eggs often, do not leave any cracked or frosted ones around, and it is well to throw a few decoys around the house, which will accustom them to eggs laying around.

A Member—Which is the most practicable, incubating eggs in a machine or with hens?

Mr. Matteson—There is no doubt about it, that so far as real practical work is concerned, and if you are doing early work, you should bring to your assistance the incubator.

Recess to 1:30 p. m.

AFTERNOON SESSION.

Convention met at 1:30 o'clock. Mr. David Imrie called to the chair.

COMMERCIAL FRUIT GROWING IN WISCONSIN.

Frederic Cranefield, Secretary Wisconsin State Horticultural Society, Madison, Wis.

My purpose is to better acquaint the people of Wisconsin with the resources of their own state. Except among the comparatively few who are engaged in raising fruit for market and finding it extremely profitable, the erroneous notion prevails that conditions in Wisconsin are not well adapted to this business. So widely has this idea prevailed, that any recital of facts concerning even ordinary crops and prices are quite apt to be set down as incredulous

These ill-founded notions may be ascribed to different causes: First, the somewhat disastrous experience of the early settlers who planted varieties which have since proven to be unsuitable to our conditions. It required about fifty years to learn this lesson of varieties and there are still a few who need to review it occasionally. It may be set down as a fact that we cannot raise successfully such apples as Albermarle Pippin, Baldwin, Rhode Island Greening and others that are standard winter apples in eastern markets; at least we have not yet learned how to raise them. This, however, need cause us no concern except that the failure to produce these kinds was the cause of one of the set-backs to fruit raising in Wisconsin. We can raise better and more profitable kinds, as will be shown later.

Secondly: Most of the fruit trees, probably ninety-five per cent, that are planted each year are planted in small lots in farm orchards; many of these die and it is surprising indeed that any of them live, as the average planter cannot or will not understand that a fruit tree requires care or cultivation after planting. If perchance some of these trees survive and bear, the fruit is so badly defaced by insects and disease that it is unsalable.

A third reason, and one that exerted a very marked influence in the past, was the indifferent, not to say discouraging attitude of those directing agricultural education and development in Wisconsin.

The splendid progress made in this state in dairying is due not more to our natural advantages than to the men who pointed out these advantages and enlisted the aid of the state in developing them. No one will doubt that the results have more than justified the effort and expense and every good citizen, even the fruit enthusiasts, should feel proud of Wisconsin's record in dairying and stock raising. That a similar, if not so extensive development might have been possible in fruit raising if similar encouragement had been given, no one doubts. We cite these facts and probabilities to explain the widespread notion that Wisconsin is not a fruit state, but directly in connection with this it should be said that the recognition of the possibilities in fruit raising and an effort to develop the business on a commercial scale on the part of all

concerned in agricultural uplift at the present time is the most encouraging feature of the present situation.

Butter, beef and bacon are very substantial factors both in domestic economy as well as in trade and commerce, but strawberry shortcake, cherry pie and apple "sass" are not to be despised.

Dairying and stock raising have been the dominant industries in Wisconsin, but fruit raising will soon rank with these in importance if not in extent.

Assertions.

(1) The conditions of soil and climate are quite as favorable in Wisconsin for the raising of all small fruits, apples and cherries on a commercial or market basis as in Michigan, Indiana, Illinois, Iowa, Missouri, Nebraska or any central western state.

(2) In many respects, as markets, high color of fruit and freedom from frosts, the conditions are more favorable than in any of the states named.

(3) Taking into consideration the capital invested, the raising of apples or cherries in Wisconsin is quite as profitable as in any other state east or west.

(4) Land can be bought in Wisconsin, an orchard planted thereon and brought to profitable bearing age for one-fourth to one-half the price asked for western irrigated orchard tracts.

While other favorable conditions might be cited, these are omitted to give space for the following:

Opinions.

At the Annual Convention of the State Horticultural Society held in Madison, January 1909, Professor E. P. Sandsten delivered an excellent address on "The Possibilities for Commercial Fruit Growing in Wisconsin." Mr. Sandsten, who is now connected with the Bitter Root (Montana) Valley Irrigation Co., was for seven years professor of horticulture in the University of Wisconsin and by training and experience well qualified to judge of the comparative merits of different sections, having traveled extensively.

The following is quoted from his address:

"In the past I have been somewhat skeptical as to the outlook for commercial fruit growing in Wisconsin. This early impression I gained not only from the discussions in this Society, but from actual observations in the state. A great deal of emphasis, I might even say too much emphasis has been placed upon the all absorbing question of hardiness. In fact, this nightmare has so overshadowed all other factors in fruit growing that many of us have been unable to properly appreciate many of the advantages that Wisconsin really offers along many lines of commercial orcharding.

I am convinced not only from our own experience at the Experiment Station, but from actual observations all over the state, that commercial orcharding can be made as profitable and safe an occupation in Wisconsin as anywhere in the United States. I make this statement with a full knowledge of the marvelous results and profits obtained in other apple-producing states. These statements are backed by facts and not by fancy.

No one can deny but what crab apples and summer and fall apples can be grown in Wisconsin, and can be grown with success. As for winter apples, we can well afford to let them alone for the present, but even in this, we can be dangerous competitors with other states. When we can grow apples like the Wealthy, we can also provide for cold storage, so that these can be marketed during the months of December and January, and thus compete with the eastern apples that are shipped into the state. Fur-

ther, it is recognized among eastern fruit growers that the Wealthy apple is equal and in many cases superior to the standard winter apples of the east. In fact, the Wealthy is now planted extensively in the east, and is recognized to be the leading fall variety. Further, large quantities are held in cold storage for the winter market, selling at prices equal to the best."

My purpose is to exploit the resources of Wisconsin as a fruit state rather than to discuss the merits or deficiences of other sections, yet in view of the tremendous activity of promoters of western irrigated orchard schemes and the very large sums of Wisconsin money being invested in these, the following unsolicited opinion would seem to be pertinent:

"I am familiar with conditions in Virginia, North Carolina, Illinois, Missouri, Michigan, Washington and Williamette Valley, Oregon. I was in Washington and Oregon the past spring and summer, traveled several thousand miles by team and auto, made a thorough investigation of numerous propositions, also of 'Business Men's Associations' and real estate promoters, and am sure that any person who investigated intelligently should be in a position to dissuade any

orchardist in the central, western states from attempting to make even a living from the much advertised 'Ten Acre Tracts,' or any of the high-priced lands. The advertising given those western lands by railroad interests, and recently by Chicago papers, is, in my opinion, an attempt to obtain money by false pretenses and there is no doubt in my mind that the people of limited means investing in Washington or Oregon fruit land at present prices, will in less than five years stand to lose all they have invested."

F. J. Toland.

La Crosse, January 1, 1910.

Unsolicited letters similar to the above are received almost daily, but further consideration of this subject is deferred that attention may be given to statements concerning Wisconsin crops and prices.

Apples.

The Orange Judd Farmer estimated the yield of apples in Wisconsin for 1909 at 250,000 barrels. About two hundred report blanks were sent out from the office of the secretary of this society last November for the purpose of testing the accuracy of this estimate, as well as to gather other information. From the fifty-nine reports received, it seems plain that the statement was conservative. The reports showed further; that 50,700 barrels of apples were packed and shipped the present season from the fifty-nine points reporting; that fall apples were grown almost exclusively for market; that prices ranged from $2.75 to $4.00 per barrel, net, for No. 1 apples.

Crops and Prices.

The following report of yields and prices for three years was submitted by Albert Reis, of Ithaca, Richland Co.

"Following I give reports of a few orchards located in Ithaca Township, Richland County, Wisconsin:

No. 1. Report for three years of one and one-quarter (1¼) acres of Wealthys in orchard of Paul Weitzel.

Gross receipts, 1907, 95 lbs. at $4.50 ..... $427.50
Gross receipts, 1908, 20 bbls. at $4.00 ..... 80.00
Gross receipts, 1909, 130 bbls. at $4.50 ..... 585.00
Average gross income per acre each year 291.33

No. 2. Seven-acre orchard owned by Roscoe Davis. Age of orchard twelve years, varieties, Lubsk Queen, Wealthy, McMahan, Newell, N. W. Greening.

Gross receipts, 1907, 400 bbls. at $4.50 ..... $1,800.00
Gross receipts, 1908, 100 bbls. at $4.00 ..... 400.00
Gross receipts, 1909, 450 bbls. at $4.50 ..... 2,025.00
Average gross income per acre each year 201.19

No. 3. Ten-acre orchard owned by A. J. Weitzel. Varieties, Wealthy, McMahan, Wolf River, N. W. Greening and Newell.

Gross income, 1907, 400 bbls at $4.50 ..... $1,800.00
Gross income, 1908, 425 bbls. at $4.00 ..... 1,700.00
Gross income, 1909, 500 bbls. at $4.50 ..... 2,250.00
Gross income per acre each year 191.66

In the Pioneer Fruit Farm orchards owned by John Reis, single acres of Duchess apples have brought in one year a gross income of $475.00, while single acres of McMahan, white, have produced in one year as high as $675.00 gross receipts. Single acres of McMahan's white could be given from orchards Nos. 2 and 3 of this report, which would equal these figures."

In the orchard of L. H. Palmer, of Baraboo, thirty Fameuse trees, twenty-

three years old, yielded $220.00 net, and twenty McMahan trees, ten years old, $91.00 net for the No. 1 fruit, which sold for $3.50 per barrel net. Mr. Palmer sold two hundred and fifty barrels from one hundred trees.

ceeded 1,600 bushels, that of 1908 five hundred bushels and the 1909 crop, 2,113 bushels, the bulk of which (1909) brought a dollar a bushel, a considerable portion selling for $1.50 a bushel.

Wealthy apple tree 4 years old, Antigo, Wis.

Mr. J. H. Palmer, of Baraboo, sold one thousand barrels from four hundred trees.

The trial orchard of this society at Wausau, planted in 1897, contains six and one-third acres of apples of sixty-three varieties, planted purely for experimental purposes. The 1907 crop ex-

Cherries.

The following reports of yields and prices for the season of 1909 were furnished by D. E. Bingham, of Sturgeon Bay:

A. L. Hatch, 700 trees, 12 yrs. old, 8 acres, 3,529 cases, $4,058.35.

W. I. Lawrence, 600 trees, 12 yrs. old, 3,449 cases, $3,966. 35.

D. E. Bingham, 630 trees, av. 7 yrs., 1,800 cases, $2,070.00.

Strawberries.

Mr. E. A. Richardson, Manager of the Sparta Fruit Growers' Association, submits the following on request:

"In regard to the yield of strawberries, Mr. John P. Peterson gathered 500 16 qt. cases from an acre the past season which sold for an average of a little over $1.15 per case ($575.00 per A.). Mr. A. J. Wyman sold over 115 cases from one-fourth acre, which sold for $132.03. There are several others whose acreage yielded as well as the above, but the average yield per acre of all members of our association is about 150 cases per acre ($127.50 per A.). This we consider a very good yield when we take into consideration the varieties of soil which are devoted to the raising of the strawberry, and the fact that we have been unable to get a full stand of plants for the last three or four years. However, I think that the coming year will see a large increase per acre over the last three or four, as fruiting beds have made a full row and are looking much better than for some time."

Cost of Production.

In considering the expense required to bring an orchard to profitable bearing, we must consider, briefly at least, certain recognized methods of culture.

Clean culture plan: By this plan the orchard is given clean cultivation until midsummer, when a cover crop is planted, such as oats, vetch or clover: this crop to be turned under the following spring. Following this system no "catch crops" can be grown and consequently there will be no returns whatever from the land until the trees begin to bear. On the other hand, no manure should be required and it is assumed that the growth and vigor of the trees will fully repay the additional cost over the second or:—

Cropping plan: In this case one-half or two-thirds of the land is planted to some crop requiring cultivation, as potatoes, beans, etc., leaving a space of four to six feet on each side of the tree rows which is cultivated without cropping. The space cropped, if not the entire area, should be manured each season, as in the case of other cultivated farm land.

The first method will involve a considerable outlay each year. The cultivation, pruning, seed and planting of cover crops, replacing trees and all other probable expense in connection with a forty-acre apple orchard by this plan has been estimated at two thousand dollars for the first six years, or $8.33 per acre per year. (Average estimates of five of the best informed orchardists in different parts of the state.)

This estimate is all on the basis of cash paid for labor at two dollars a day for a man and four dollars for man and team. In the case of a large fruit farm where no manures are made or available, this would seem to be the only rational method of procedure and the few cases where it has been practiced in this state furnish evidence that the results will fully warrant the outlay.

By the second method an orchard can be brought to profitable bearing entirely without expense aside from the cost of the trees and the land may even be a source of revenue, as the income from crops grown between the trees for the first six to eight years will more than pay for all labor on the orchard. This is not guess work, but has been repeatedly demonstrated by different growers in this state.

This is a safe, practical and economical method of bringing an orchard to a bearing age and is especially adapted to the raising of commercial or-

chards of ten to forty acres, where plenty of barnyard manure is available.

Cost of Maintenance.

Tree Fruits.

Reliable data concerning the cost of maintenance of orchards in Wisconsin is difficult to obtain, owing to the fact that there are but few commercial orchards in the state, and the further fact that few of these are well cared for.

The expense of maintenance of a cherry orchard at Sturgeon Bay has been estimated at $16.50 per acre per year, which includes: Pruning and removal of brush, cultivating ten times and spraying five times. The expense for crates, picking, packing and delivery has been estimated at seventy-five cents per bushel.

McMahan apple tree 12 years old, trial orchard W. S. H. S., Wausau. A similar tree bore 14½ bushels in 1909.

The expense for care of an apple orchard with similar treatment will be about the same; the expense for marketing about sixty-five cents per barrel for labor and barrel.

The five-acre trial orchard of the

society at Sturgeon Bay furnishes a concrete example. In 1909 the expense up to harvesting amounted to $44.50, which included pruning, cultivation and spraying. The crop was picked, packed and delivered on contract for thirty cents per barrel, the barrels costing thirty-six cents each.

Small Fruit.

The Sparta Fruit Growers' Association handles the crop from about six hundred acres of small fruits, largely strawberries. Mr. E. A. Richardson writes as follows regarding cost of production:

"Regarding your inquiry as to the cost of production of a case of strawberries: There is a great difference in the net returns received by the different growers; this all depends on the number of cases which they receive from one acre. From accounts carefully kept by some growers, and from estimates made by others, I find that the expense for preparing the ground, plants, planting, cultivating, hoeing, mulching and rent of one acre to be aproximately forty-five dollars. The greater number of cases that are grown per acre will lessen the initial cost per case, as this cost will apply to an acre which will not produce one hundred cases, as well as to the acre which will produce two hundred cases. To the cost we will have to add about forty-five cents per case for picking, boxing, packing and delivery; this price will not vary much, as we pay for picking by the box, and the price of boxing remains about the same whether bought in large or small quantities. Through a series of years, the actual cost of the production of an acre of bush berries will not vary greatly from that of the strawberry, and I think that the net returns will be equally as good."

Fruit Districts.

Small Fruits.

Strawberries and bush fruits may be grown successfully in any part of the state. These fruits are now grown more extensively in Monroe county than elsewhere, but probably not on account of any particularly favorable factors of soil or climate. It would appear that a few well informed men engaged in the business there many years ago and as a result of close application and intelligent direction, were successful and an extensive development of the business followed as a natural result.

The present very satisfactory condition of the business in the vicinity of Sparta is due to the fact that the growers are well organized for disposing of their crops, as the Sparta Fruit Growers' Association, a purely co-operative company, handles practically the entire crop grown near Sparta.

During the last three or four seasons strawberries have been planted extensively near Bayfield and this promises to be one of the small fruit centers of the state. This region possesses peculiar advantages for the raising of strawberries on account of the late ripening season of the crop, thus affording an excellent market; the firmness of the fruit, the never failing snow blanket for winter protection and freedom from late spring frosts.

These conditions, which also prevail in parts of Douglas, Bayfield, Iron and Vilas counties, and probably farther south, afford opportunities for the profitable production of small fruits unsurpassed by any other section of the state.

Other excellent opportunities now exist near hundreds of the larger towns and cities throughout the state, where the demand for fresh, home-grown berries always exceeds the supply.

Apples.

The localities best adapted to the raising of apples on a commercial scale have been outlined in a general way by Professor Sandsten. The district including portions of Sauk, Richland, La Fayette, Grant, Crawford and Vernon counties possesses exceptional advantages for commercial apple raising as, character of soil, elevation, nearness to market and present price of land.

Waupaca county ranks next to Richland in acreage of commercial orchards and yield of apples.

Some of the finest apples grown in Wisconsin come from Wood county, near Marshfield.

Much excellent apple land may be found in southern Winnebago county.

Early apples, such as Duchess, Yellow Transparent, McMahan, Patten's Greening and Wealthy, ripen perfectly and yield abundantly at Bayfield and on Madeline Island, and it is probable that a strip from three to five miles wide along the south shore of Lake Superior, from Superior to Ashland, will prove equally well adapted to apple raising when developed.

Wisconsin State Horticultural Society's trial orchard, Wausau, October, 1909. This orchard produced 2113 bushels from 6½ acres.

The lake shore counties north of Milwaukee and including all of Door county are also recognized as apple counties.

Excellent apple land may be found in Dunn, St. Croix, Pierce and Pepin counties.

The high rolling lands in Monroe, La Crosse, Trempealeau, Eau Claire and Chippewa counties are also well adapted to apple raising.

This Society has demonstrated quite fully that apples can be grown profitably in Marathon county.

Several promising apple orchards are being developed in Shawano, Langlade and Oconto counties.

Cherries.

The best cherry orchards in Wisconsin are near Sturgeon Bay, and conditions in Door county seem to be especially favorable for cherries. It should be said, however, that the excellent yields reported are quite as fully the results of excellent cultural methods as of soil or climate.

Cherries succeed very well in any of the southern counties, but it is very doubtful if this fruit can be grown profitably anywhere in central Wisconsin north of Oshkosh, with the exception of Door county, and the possible exception of a limited area near Bayfield.

Plums.

So far as present knowledge extends, neither the European nor the Japanese plums thrive in Wisconsin and neither should be planted extensively. The one exception to this is the Sturgeon Bay district; there trees of the Japanese varieties are hardy and bear occasional crops.

Land Prices.

Land in Wisconsin adapted to fruit raising may be had at any price the buyer chooses to pay between ten dollars and five hundred dollars per acre. Very good fruit land may be bought in many of the northern counties for ten to twenty dollars per acre, and expense of clearing will vary from fifteen to fifty dollars per acre, while "eighties" with twenty to thirty acres cleared and other improvements sell for twenty-five to seventy-five dollars per acre, depending on character of soil and nearness to market.

Good fruit land, cleared, near Sturgeon Bay, commands from one hundred to two hundred and fifty dollars per acre, while unimproved farms in Door county may be had from forty to fifty dollars per acre.

Conclusions.

This was not written for the purpose of convincing any one that opportunities for fruit raising are better in Wisconsin than in any other state, because it is very doubtful if this is true.

We do claim, however, that Wisconsin presents exceptional opportunities along certain lines and an attempt has been made to enumerate these without exaggeration.

The figures given herein may appear extravagant to certain farmers in Manitowoc county, for instance, who the past season brought to market wormy, gnarly apples and received but twenty-five cents per bushel. The answer to this must be that it was purely a question of quality, for at the same time apples of the same varieties found a ready sale in Madison, La Crosse, Eau Claire and other Wisconsin cities at one dollar to one dollar and twenty-five cents per bushel and Wisconsin Duchess and McMahan sold for four dollars and fifty cents per barrel in Chicago.

Fruit raising is not a short and easy road to unlimited wealth in Wisconsin or elsewhere; strawberries offer the quickest returns, one year, bush fruits next, two or three years, while an apple orchard requires six to eight years before bearing profitable crops. Quite often, however, all of these may be grown to advantage as well as vegetable crops.

The need now is for young men who will take up fruit growing as a business and not the indiscriminate planting of mixed farm orchards, merely as a side line to general farming.

If the regular farm work receives the attention it deserves, the orchard is apt to be neglected and neglect means loss. Every farm should be provided with an orchard sufficient for family needs, but aside from this none should be planted. Fruit raising in Wisconsin must be in the hands of

specialists, as the raising of high class fruit and marketing it to advantage will require about all the brains ordinarily allotted to one person.

Any person who can acquire forty to eighty acres of suitable land in Wisconsin accessible to markets can plant one-half of it to fruit and be assured of a good living, in old age a competence and at all times an inspiration offered by no other line of agriculture.

Fruit growing also provides a season of comparative leisure, the midwinter months.

Finally it is here repeated that this article is intended as a protest against the "one idea" as applied to agriculture in Wisconsin.

DISCUSSION.

Mr. Ribault—What is the right time for pruning trees?

Mr. Cranefield—We advise pruning in March or April, before the sap starts.

Mr. Ribault—Some prune in June.

Mr. Cranefield—That is the next best time. It is not advisable to prune in the fall heavily, because the wood is apt to check and split. We prefer to do our cutting in the spring.

Mr. Ribault—What kind of cherry trees would you recommend for our locality?

Mr. Cranefield—The Early Richmond and Montmorency, one for early and the other for late.

Mr. Ribault—Last summer, some agents talked cherry trees onto some of our farmers and they sold them at fifty-five dollars a hundred to plant an acre. I was one of the weak ones who bought a hundred trees, and I am afraid they got ahead of us.

Mr. Cranefield—You can buy very nice cherry trees today at twenty-five dollars a hundred at several different nurseries in the state, I think. I am not an agent for a nursery. We hope the farmers will buy lots of cherry trees and apple trees, but we ask them to exercise the same common sense they do in other business transactions. There are just as many honest nurserymen as there are honest farmers in proportion to numbers, and all you need is to exercise that same hard sense that you show in your other business transactions. I hold no brief for the nurseryman.

Mr. Thomas—I wish you would name the varieties of apples good for this county.

Mr. Cranefield—I would not advise the planting of apple trees for market for the ordinary farmer, because there is a better market for them usually. We are in a class by ourselves; we are not obliged to come into competition with the winter apple producing states. We recommend such varieties of apples as the McMahan, the Wealthy and the Northwestern Greening for winter apples. Almost any apple that will grow anywhere in Wisconsin will grow in Manitowoc county. We have planted in our trial orchard on the county farm the Wealthy, the McMahan, the Fameuse and Duchess.

Mr. Ribault—What distance apart did you plant apple trees?

Mr. Cranefield—Twenty-four by twenty-four. Twenty by twenty gives one hundred trees to the acre and with small growing varieties this will do, but with the average mixed orchard, the trees will certainly crowd within a few years.

Mr. Arnold—When should you spray apple trees?

Mr. Cranefield—We must spray at least three times during the season and we advise spraying the first time just when you see the first pink blossoms, again after the blossoms have fallen, and the third time about two weeks later, but if you can spray but once, let it be after the blossoms have fallen and do a thorough job.

Mr. Ryan—What is the right age of cherry trees to plant?

Mr. Cranefield—A two-year old tree, one or two years old.

Supt. McKerrow—I want to ask Mr. Bingham what cherry trees are worth by the hundred?

Mr. Bingham—That depends on the grade of stock you get. You can get very good trees for twenty-five or thirty-five dollars a hundred, depending on the size and quality of stock. You can get very good trees for twenty-five dollars.

CULTIVATION OF THE ORCHARD.

D. E. Bingham, Sturgeon Bay, Wis.

Mr. Bingham.

To cultivate means to improve by care and study, and as applied to the orchard it may be by a system of stirring the soil frequently, or by some other method, which feeds the trees and improves their condition. That there is room for improvement in our orchards no one can question.

The system to follow depends upon location, soil and climatic conditions; varying somewhat with the seasons and conditions generally.

When To Begin Cultivation.

When should the cultivation of the orchard begin? It seems to me it should begin away back with the nurseryman whose business it is to propagate and grow trees for the orchard, for we know that a well-grown tree has a better chance than a neglected, poorly grown tree. Nurserymen realize the importance of cultivation as it applies to the stirring of the soil and use their best endeavors to produce a tree in the shortest time possible. Perhaps paying too much attention to the top of the tree rather than root development, fertilization takes the place of cultivation, and cultivation of the proper kind will develop root growth more than fertilization, consequently cultivation of a thorough and practical value should be begun for the orchard back in the nursery that the tree may have a well developed root system when transplanted to the orchard.

Orchard cultivation varies somewhat according to the age of the trees, variety, soil conditions, amount of moisture, etc.

The first few years of cultivation, the orchardist is more interested in wood growth well ripened up than

anything else, but as the trees get older and of bearing age, some attention should be given to proper fertilization and cultivation to get fruit as well as wood growth.

Our trees need lots of moisture and fertility and any method we employ to save both plant food and moisture must, of necessity, aid materially in the growth and vigor of the trees.

producing heavy crops, the cultivation should, in my mind, continue pretty well through the growing season of the fruit.

The young orchard, however, should be cultivated thoroughly the fore part of the season and discontinued in time to allow thorough ripening of the wood. Even this method varies on different soils and one is to judge

Branch of 8-year-old cherry tree, orchard of D. E. Bingham, Sturgeon Bay, July 20, 1910.

The amount of cultivation depends somewhat on the location, soil and amount of rainfall. A strong, rich soil, with an abundance of moisture, may not need as much cultivation as some soils that are poorer and more liable to become dry too early in the season.

The season of cultivation should begin early, as early as conditions will permit, and continue until the growth has ceased; and when the trees are

partly by local conditions and seasons when to stop cultivating.

Methods Employed.

The manner in which the orchard is cultivated, or the system followed, varies somewhat according to local conditions and the object sought by the owner.

If it is his object to grow crops to pay cost of maintaining the orchard,

then a system of cropping for a term of years can be followed, selecting crops that need cultivating, and good cultivation, to produce results.

Should this system be followed, it should be borne in mind that the orchard is the principal feature and should not be crowded too much with the crop.

Rotation of crops should be employed as much as possible to get best results in the crop grown and also for the orchard. Potatoes, beans and corn can be used, corn least preferred. Fertility should be added at least to the amount removed by the crops grown.

This system of cultivating cannot be profitably carried on longer than four or five years in the cherry orchard, and not longer than seven or eight years in the apple orchard. At this time the orchard should be paying sufficiently to enable the owner to abandon the crop growing in the orchard and devote the entire ground to the trees.

Implements Employed in Cultivation.

The implements employed in cultivating the ground where crops are grown, must, of necessity, be the turning plow, harrow, disc and cultivator. In using all these tools in the orchard, we must endeavor to keep the ground level.

The disc harrow, if not used with care, will work too much dirt toward the tree and ridge the ground along the rows; the turning plow, also, if not used with caution, will do the same.

After the cropping of the orchard is discontinued, it is easier to handle the orchard and keep it level by employing different tools to do the work. The pony gang plow does excellent work in the orchard, cutting off and turning over all weeds, sods, etc., that the harrow or disc will not get. The plow should not be set too deep, not over four inches, and can be run close to the trees when young, following with the harrow crosswise, which levels the ground very nicely.

The next cultivation, the plowing and harrowing should be reversed. The third cultivation can be the same as the first, only throwing the dirt in the opposite direction, and the fourth may be the same as the second, only throwing the dirt in the opposite direction again. This method keeps the orchard level, free from sod, weeds, etc.

The harrowing can be done with a smoothing harrow, covering a great deal of ground in a day. The pony plow is also a tool that will cover lots of ground in a day; from five to seven acres can be turned over in a day with one team.

There are some orchards in Wisconsin which it is not practical to cultivate through the entire season, on account of washing. For orchards on steep slopes, I would use a different method; cultivating every other strip between the trees crosswise of the slope one year, and the following year reverse the strips and sow clover on them, cultivating and cutting it early as a mulch and fertilizer.

The depth of cultivation has much to do with the amount of moisture conserved. A three-inch mulch will conserve more moisture than a two-inch, and a two-inch more than a one-inch, consequently in time of cultivating this point should be borne in mind.

The frequency of cultivation has lots to do with conserving moisture; a three-inch dust mulch conserves, with two cultivations per week, one-third of an inch more moisture than when cultivated once a week, and that stirring once a week, one-half inch more moisture than when stirred once in two weeks.

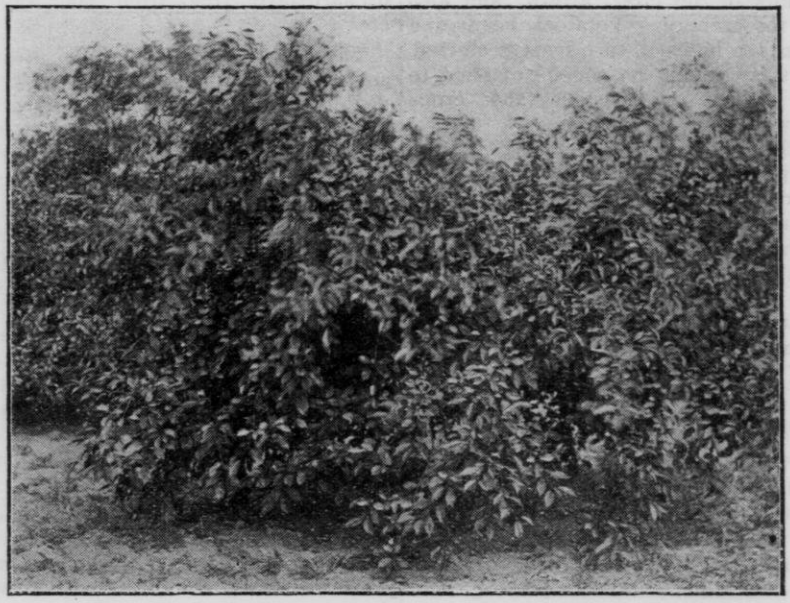
Cultivation should be often enough to break the upper soil into a fine dust mulch and keep it so. In dry weather less cultivation will do, but stirring

after every shower is necessary to conserve the moisture.

Cultivate Without Ceasing.

Continue to cultivate year after year without any rest, or growing crops will have a tendency to use up all the humus in the soil, making it more difficult to hold moisture, and aerate the soil, consequently with cultivation we must grow something on the land a part of the season, and as we wish the growth of the trees to be normal every year, we preferably use the latter part of the season for growing the crop, checking the growth of the trees, and ripening the wood as well.

The depth of cultivation should be considered important. Like all other crops, the fruit tree gets most of its plant food from near the surface and must not be disturbed during the growing season if we wish the best results. The first ten inches of soil contain about all the feeding roots, and if the ground is stirred constantly to a depth of more than three or four inches, it tends to force the feeding roots downward, too far below the surface, where heat and moisture are not combined in the right proportions to make plant food most available.



Eight-year-old cherry orchard, Sturgeon Bay, branches bending with load of fruit. The fruiting branch shown on page 68 is one of the branches of the tree in foreground of this picture, July 20, 1910. This tree bore 68 quarts, which sold for $6.98.

The mulch system of cultivation I do not consider as good as stirring of the soil, and should only be followed where cultivation is not practical, like very steep slopes, stony soil, etc., and

then the mulch should be of sufficient quantity to retain moisture and keep the sod from forming too much.

The cultivation of the orchard is only one phase of successful orchard management and must be coupled with the others in order to get results.

DISCUSSION.

Mr. Ribault—In the case of an old orchard, where you have a heavy sod, would you advise plowing it?

Mr. Bingham—I think I would use either very shallow plowing or harrow with a spring tooth harrow. By keeping it up and getting the sod broken up, perhaps by the end of the season you would have a pretty fair mulch over the orchard by a little extra work.

Mr. Ribault—Have you had any experience with mulching?

Mr. Bingham—Yes, and we find we cannot mulch and save the moisture and get as good results as we can by cultivation. We have mulched quite heavy with the Japanese plum, and we find, digging down under a foot of mulch, it is very dry there, there is not near as much moisture as there would be just outside the mulch in cultivated land.

Mr. Jacobs—I think you said it required a good deal of fertility for an orchard. In a commercial orchard, would it be necessary to provide manure in some way, either by keeping live stock or some other method?

Mr. Bingham—It may not take as much fertility for an orchard as it does for some farm crops, but we need some certain amount of fertility, and by constant cultivation we get more of the plant food that is in the soil made available. I think we ought to plow under green clover, peas, rape, etc., after they have made some growth and after the trees have been cultivated sufficient to make a good growth. In cherries we ought to apply farm manures or fertilizers in some form to the trees.

Mr. Jacobs—That leads me to a proposition that comes to me very often in regard to these very high priced lands in the west all planted to fruit. What is the future of the man who owns that land who has no means of supplying manure?

Mr. Bingham—He will have to buy commercial fertilizers.

Mr. Matteson—Would you prefer in buying your trees to buy eastern grown trees or those grown in Wisconsin?

Mr. Bingham—I would take a well grown tree and I would cut out all other points.

Mr. Ribault—Would you leave all the apples growing, or would you pick off some before they mature? In the west they always thin them out.

Mr. Bingham—I think we can get just as good results thinning here as they can in the west. If your tree is over-laden with fruit, it certainly is a great help to your tree and a great help to the fruit that is left on it to take off part of it.

Mr. Ribault—Wouldn't your tree bear more every year if it was thinned out in the heavy years?

Mr. Bingham—Yes, I think if we do not allow our trees to bear much, our crop will be more even year after year than if it is allowed to over-bear and weaken the tree.

A Member—Can you raise a good orchard tree in Wisconsin?

Mr. Bingham—Yes, we can raise just as good orchard trees as they can anywhere.

Mr. Matteson—What is the cause of so much blackheart in Wisconsin trees?

Mr. Bingham—I do not think they are any more subject to it than some of the eastern trees

Mr. Matteson—I have often thought they were a great deal more so.

Mr. Bingham—I think blackheart

comes from winter injury when the tree is young, and if you grow trees on the right kind of soil and keep them cultivated and do not have any winter injury, they won't have any blackheart.

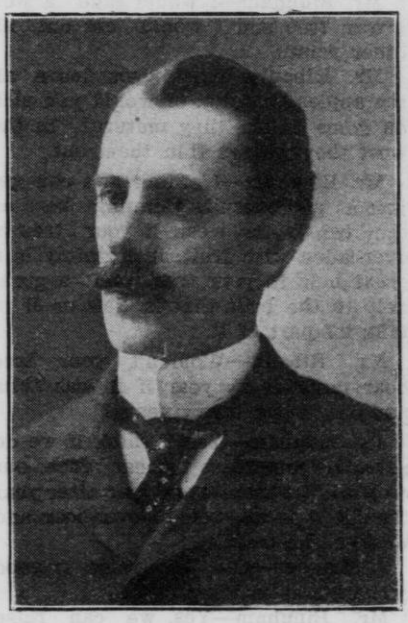
Mr. Matteson—Don't you think our hot summers have something to do with the blackhearted trees?

Mr. Bingham—No, I do not think so, I think it is the hard winters.

Music, Orchestra.

THE FRUIT MARKET.

J. L. Herbst, Sparta, Wis.



Mr. Herbst.

Probably no one factor is more important to successful fruit growing than the marketing of a crop in a manner to bring the producer best and quickest returns.

While the care and cultivation of the orchard and plantation are very important in order to produce quantity and quality, if the product is not handled properly and put up in neat and attractive packages in order to attract the attention of the purchaser, it will be a slow seller and bring poor returns.

There was a time when fruit could be placed upon our markets in most any style of package, in most any condition, and bring a fairly good figure, but that time has passed and purchasers are making a distinction. The demand for good fruit is increasing, more acres are being cultivated each year, increasing competition, and the fruit grower, in order to be successful, must not only grow and produce the best quality of fruit, but place it upon the market in first-class condition, in the quickest and best manner possible.

Finding a Market.

While a good many growers are able to give the proper care and attention to the growing of their product, not every one has the business ability to market his crop so that he gets the proper returns for it. Especially is this true where competition is strong. Unlike most products which are raised upon the farm, the fruit crop is one which must be disposed of when matured and done quickly, or be an entire loss. Unlike most products,

small fruits will not stand storage any length of time and the quicker they are placed upon the market the bet ter will be the returns. The growing of fruit in a good many localities is carried on in connection with other agricultural lines of work and the marketing of this crop comes at a time when other farm products need care and attention; one or the other must be neglected.

firms were willing to offer for their crop. I have seen the time when a grower has waited three to five hours each day, expecting a better offer for his load, and finally was compelled to take the first offer or consign through the express company or to some commission house, and wait from a week to months before getting his returns. I have seen the time when under such conditions growers began to get care-

Growing cantaloupes for market. Wisconsin No. 7 Corn in distance.

It requires a considerable portion of the grower's time to look up his market and to deliver his product, and where there is no system of co-operation on the part of the growers, where a large number are engaged in the business, the market can be easily demoralized by the buyers.

Probably the largest fruit growing section in the state is at Sparta and I have seen the time when growers at this point were compelled to take whatever the buyer and commission less in putting up the product and delivering it to the purchaser. I have seen the time when growers with inferior stock received as much per case as did the one who had best quality stock. Under these conditions, growers became discouraged and went out of the business.

Co-operative Marketing.

Probably no better example of what co-operation can do in such a case can

be cited than the system which is in use by the Sparta Fruit Growers' Association for disposing of the immense crops of fruit which are produced annually in this section. Probably no other association is carrying on its work so successfully as has this association since its re-organization in 1906.

In 1896 the Sparta Fruit Growers' Association was formed. We were organized poorly; all that was necessary for the grower to do was to pay one dollar for his membership and this entitled him to the privileges of loading his product in the refrigerator cars. He had, however, the right to dispose of his crop to any one he saw fit. This did not help matters in regard to price, grade of fruit or finding a suitable market, and as the acreage increased each year, things began to look gloomy for the growers who were already in the business.

In 1906 there was a re-organization of the association, making it an incorporated association, with a capital stock of one hundred and twenty-five shares at two dollars per share. No one was allowed to take a share unless actively engaged in the growing of the various products which are handled. No member was allowed to dispose of his crop except through the association and his product was graded according to quality, neatness of package and time of delivery.

The Home of the Sparta Co-operative Fruit Growers' Association, Sparta, Wis.

The president, vice-president and board of directors elect a manager, whose business is to look up markets and dispose of the various products, and prices are governed according to the conditions of the markets. The grower under this system does not

need to worry about disposing of his crop. He delivers his crop each day to headquarters, gets his receipt for the number of cases and grade of the product for each day, and returns home feeling safe that he will get the proper figure for his product.

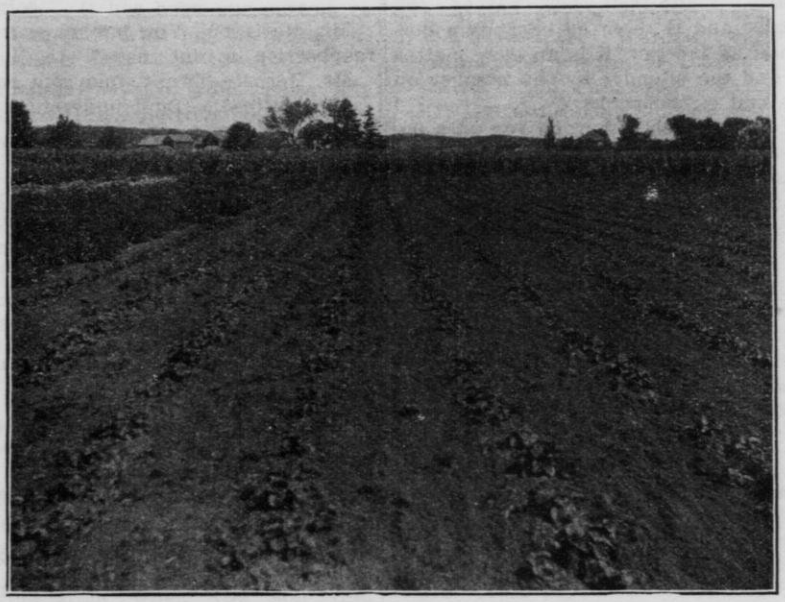
The increase in the number of growers and acres, owing to the demand for fruit, made it necessary to increase the membership and capital stock, and the stock of the association was increased to six thousand dollars in 1908, with three thousand shares at two dollars each. The membership at the present time is two hundred and eighty-one, who hold the three thousand shares.

Under the present system prices have increased as well as the grade of the product.

Handling the Crop.

The method of handling the various products is as follows:

Each member is numbered and holds this number so long as he is a member. All fruit is delivered the day it is picked, boxes well filled, inferior stock kept out. The grower's number, with "Sparta Fruit Growers' Association," must be stamped on each end of the package and the product delivered at the shipping station in ample time for loading, where it is graded by a competent grader, and the grower is given a receipt for the number and grade of cases delivered. A duplicate of this receipt goes on record in the office and at the end of each day's sales the total of both receipts and sales must agree. In this way an ac-



A new start for a 1911 strawberry crop.

curate account is kept of amounts received and disposed of each day.

The grower is paid an average per case of each day's sales. No one grower receives more per case than the other for each day's delivery. The grower is paid according to grade, receiving twenty-five cents less for B grade than the average price of the A grade. Since the grading began, less B grade fruit is delivered each year. If any fruit has passed the grader and is reported back by a customer as inferior, it is an easy matter to find the offender by the number on the end of the package.

I do not wish to burden you with figures, but will give you an idea of the amount of fruit shipped by the association the past three years and the average price per case received by the grower.

1907.....	30,556	16 qt. cases..	Strawberries.....	Average..	$1 09	Total 3 years.
1908.....	42,284	" " "	"	"	1 10	102,004 cases.
1909.....	29,164	" " "	"	"	1 21	Average $1.13.
1907.....	3,430	24 pint cases	Red Raspberries	"	1 68	
1908.....	3,400	" " "	" "	"	1 76	10,219 cases.
1909.....	3,389	" " "	" "	"	1 86	Average $1.76.
1907.....	1,628	" " "	Black Raspberries..	"	1 64	
1908.....	1,135	" " "	" " ..	"	1 89	4,396 cases.
1909.....	1,633	" " "	" " ..	"	2 05	Average $1.86.
1907.....	7,437	" " "	Black Berries.....	"	1 55	
1908.....	7,516	" " "	" "	"	1 59	20,675 cases.
1909.....	5,722	" " "	" "	"	1 54	Average $1.56.

The past season the total of products sold by the association was $58,940.01, at a cost of $3,135.31, the cost including salary of manager, office force, icing and loading cars, inspection and salesmen.

The association not only handles fruit, but grows and ships various products, such as tomatoes, cabbage, cantaloupe and potatoes.

All packages are bought in the flat, made up and sold to the members at a small margin.

A majority of the members are dairymen and feed is bought in carlots and sold to members at a small margin.

These profits, along with the profits made on sales of fruit and produce bought of non-members, have enabled the association to build a home of its own at a cost of fourteen thousand dollars, which it now occupies.

DISCUSSION.

Mr. Matteson—You put up your red raspberries in pint cases?

Mr. Herbst—Twenty-four pint cases.

Mr. Matteson—Do I understand the black raspberries brought more per case than the red raspberries?

Mr. Herbst—Yes, I suppose that was owing to the fact that a smaller amount of fruit of that kind was grown than of the red.

Mr. Matteson—What variety of black caps is grown?

Mr. Herbst—Mostly Nemeha; in past years a considerable quantity of Plum Farmer. It comes in a little earlier than the Nemeha.

Mr. Martiny—To whom do you sell your fruits?

Mr. Herbst—To buyers who represent commission houses. The fruit is also distributed all through the west, through towns in Minnesota and both North and South Dakota, and the manager is and must be a man who can handle the crop in such a way that

there is no large amount of fruit going to come in competition. He has got to spread it out in considerable territory; he has got to be careful where he is sending carlots, not to send an over-supply to those districts, and you must have a man managing the business who understands these things—about where to place his fruit. He must also keep in touch with the principal markets in regard to price. It has been our custom to distribute this fruit just as widely as we possibly can.

Mr. Martiny—Do you have any trouble with the patrons of your organization in getting them to put up their goods in first-class condition?

Mr. Herbst—The first year we were organized we had some trouble, but we made a distinction in the grade of the fruit. Fruit that was put up in first-class condition and in an attractive shape was given an A grade, and the inferior fruit was marked B grade, and the B grades were always twenty-five cents less than the average price of A grades, which would of course make the grower take a little better care in packing his fruit. If he got his fruit graded as B grade, he would go home with the determination to put up better stock and get a better price.

A Member—Do you make that same discrimination when you sell that fruit?

Mr. Herbst—Yes, we have to.

Chairman Imrie—The other fellow would make the discrimination if the organization didn't; the fellow who bought.

Mr. Herbst—Yes, he would, if we didn't. But you might ask the question, if we have any trouble in holding our members together. To that I would answer that we do not. There are two hundred and eighty-one members in the association at the present time and there is not a dissatisfied member. We have a rule that no grower shall dispose of any part of his crop to any one outside the association; he must dispose of it all through the association. In case he disposes of part of the crop, without the consent of the board of directors, his stock reverts to the association and he is not allowed to ship any more fruit out through the association.

A Member—What variety is mostly grown in strawberries?

Mr. Herbst—Probably three-quarters of the berries shipped out of Sparta are of the Warfield variety, fertilized mostly with the Dunlap. The Warfield is the main crop.

Mr. Matteson—How do you find the Warfield to compare in yielding qualities with the Dunlap?

Mr. Herbst—We consider the Warfield a safer cropper than the Dunlap. There are often some years when the Dunlap has failed us.

Mr. Matteson—How many years would you leave the strawberry beds?

Mr. Herbst—That depends on the stand of vines you have on the bed. If you have a real good growth of vines, then it will pay you to clean out that bed and use it for two years, but I would not use it any longer.

Mr. Martiny—Have you had any trouble with commission men coming into your territory and offering higher prices for your fruit than your association could pay?

Mr. Herbst—No, sir, we have not; we are on pretty good terms with the commission men. The commission men come right over to the association and buy their berries now in carlots; we are not troubled with them coming in there and trying to raise the price of fruit. We find out that if you treat a commission man who has won good rating right, meet him half way, he is all right, and we dispose of a large amount of our fruit to the commission house, we did in 1907 and 1908, we sold a considerable amount of fruit to commission men outright. Their men were there and

bought the fruit by carlots and we found out there was not much difference between their price and where we shipped them on consignment, and the season of 1909 most of our fruit was consigned to commission houses in Minneapolis and St. Paul. We, however, have only four firms in Minneapolis to which we consign; we do not consign to every commission house. We pick out the commission houses which we know are of good standing.

Mr. Matteson—In regard to the varieties of blackberries?

Mr. Herbst—We are growing now the Eldorado and the Ancient Briton.

THE PERCHERON HORSE.

Thomas Convey, Ridgeway, Wis.

In discussing the subject of Percheron horses, there is no occasion to reflect on other breeds, as the short supply of good horses indicates a need for all, but the popularity of Percherons is little short of marvelous; I do not consider it a modern fad, as it has existed since draft horses were first imported, and the demand is gradually increasing as compared with the introduction of other draft breeds. This is especially true in regard to this state. In 1906, when stallions were registered for the first time by the state, there were almost two and one-half times as many Percherons as all other draft breeds combined; I believe the percentage of pure bred mares was just as large.

There are many breeders of Percherons in the state and several more are anxious to start if mares could be obtained. What is the cause of preference for the breed? It is due mostly to the fact that they appear to nick better with our common stock than any other breed. It certainly was not because they could be bought at lower prices, as such was not the case. The grades were of good size, good movers, nice disposition and good handlers. They not only pleased the breeders, but suited the buyers, who evidently had no trouble in finding customers, as they paid good prices and returned frequently.

There were some things that interfered with greater success, one being the poor quality of dams, of no particular breeding, and generally undersized. The wonder was that results were at all satisfactory. With the better class of mares we now have, or ought to have, if we are at all progressive, and also with better stallions, which adds also better prices, the man who cannot make money raising good grade Percherons is certainly defective in his make-up.

Within my recollection, the Percheron has improved very much. The class of horses we purchased or patronized formerly are not satisfactory now. No doubt many of you have seen that noted picture "The Horse Fair," by Rosa Bonheur. This created a sensation when first exhibited in 1855, and yet it does not contain a single animal of desirable type. I do not consider it the fault of the artist, I believe she did the best she could with the material she had. The horses were round bodied, leggy and rough, with bulging shoulders and no quality. Compared with the class of Percherons shown at Chicago last fall, it would be difficult to identify them as the same breed.

The Type of Modern Percheron.

The modern Percheron must have quality, a good body on strong, short, flat legs, with good feet, and a good head, indicating intelligence and courage; not the old-styled horse with round, fleshy legs, with too much daylight under him, with short neck and straight shoulders, coarse of hair, coarse of bone, and indicating in every manner low quality in muscle, bone and hoof.

This low quality was prevalent in most, if not all of the draft breeds. The draft horse with short neck, straight shoulders and upright pastern (they usually go together), is not desirable for either city or country use. In the former, they are sluggish and inactive; besides, owing to their conformation, they pound themselves to uselessness in a short time. In the country they do not have the ability to pick their feet up and move them forward in mud, snow or plowed ground. You hurry them and they play out. The draft horse should be a good walker.

Instead of criticising other breeds or breeders, it will be more profitable to discover or uncover our own errors. Dealers in pure bred animals use every scheme to get them in high condition. This has done, and is yet doing mischief. Flesh put on by excessive feeding and without exercise, is decidedly dangerous. Get your hand on a horse and if he is flabby and soft, avoid him, he is neither safe to buy nor patronize Excessive use of a horse is equally dangerous; we are having too large a percentage of idle mares and weakling colts.

Convey's Percheron brood mares now in use on the farm.

The Percheron breeders of this country should get together and establish a single record. One of the best means possible to improve a breed is to have a reliable record, and every dollar in the treasury should be expended, if necessary, to expose any attempt at fraud. There are too many

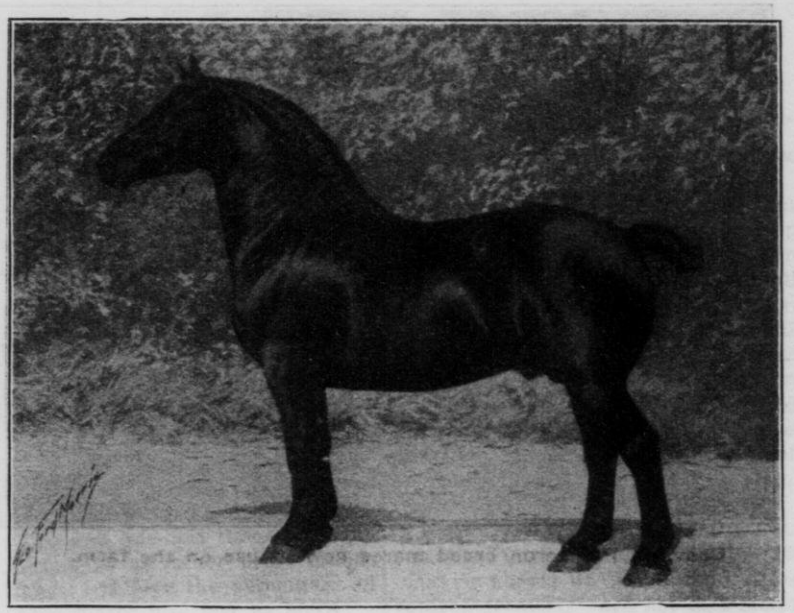
records recognized. As long as the national government gives them a standing, it is difficult to exclude them in this state. Our Horse Breeding Department at the State University is doing all it can to enable every one to get justice.

DISCUSSION.

Mr. Woodard—About what size would you like to have your sires?

Mr. Woodard—Is that a good picture of the type you want, on that chart?

Mr. Convey—That was a fine horse and very many people looking at this picture now would claim he was a fine looking horse, although there are quite a number of faults I would find with the picture. As a rule, you do not find a horse with so short a back as this horse has. If you want to judge as to the conformation of a horse, it is well to keep in mind that the horse's



Hotman, imported Percheron stallion, owned by Thos. Convey, Ridgeway, Wis.

Mr. Convey—Just as large as I can have them and have quality.

Mr. Woodard—You would not throw away quality then for the sake of getting them heavy?

Mr. Convey—Why, I would include quality in any case. You want the weight and you want the quality and you can get both now. Formerly it was quite difficult to get good weight with high quality.

body could be about evenly divided into three parts. Take from the point of the breast bone—and a good horse should always have a prominent breast, take this as the first point to reckon from, and then go to the back of the withers for the first third. When you have a horse of that kind he has quite a deep shoulder and full chest. He also has a long neck, because if he had not his withers would not ex-

tend back far enough to give him the third of the length here. The long neck is always indicative of a better moving horse than a short-necked horse. Of course it is possible for a horse to have too much slope in the shoulder, but it is not often so with a draft horse. The line of draft should be at right angles with the shoulder, so the horse with a fairly sloping shoulder would have a good shoulder to carry the collar as the hitch is usually low.

What constitutes the second third would be from the withers to the point on the hip. In this picture it is not one-third.

The latter third would be from the point of the hip to the rear part of the thigh, so when you find a well proportioned horse, you should find a horse that will develop in that way. this one has too short a neck; there is lack of depth in the hock; it should be wide across the hock and wide across the front. It should be reasonably long and also quite low.

A horse should have a short, strong pastern, but in the case of this picture the pastern is entirely too short. Another thing that is very necessary with a horse and a thing in which very many are defective, because of lack of exercise, which results in his not having sufficient weight in the fore arm: there is no appearance of muscle too often. There is also a deficiency of muscle in the gaskin or second thigh. Quite a number of horses are deficient there because of lack of exercise.

Mr. Jacobs—Isn't it possible for a horse to have too long a neck?

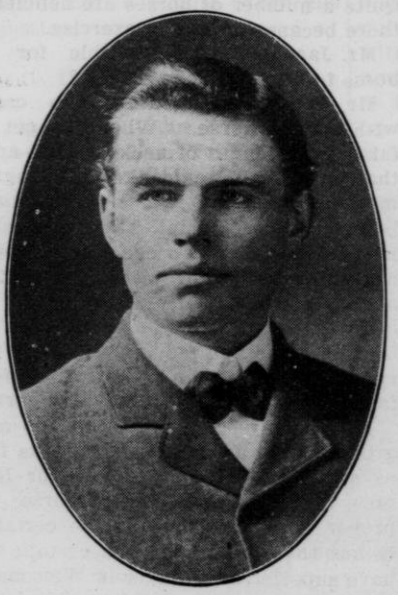
Mr. Convey—It is rarely the case with a draft horse. When you get a fairly good length of neck on top—and that is where I would like that length in every case, you get a very much better type of animal. Then they are made up so they can see where they are going, and they also have better action in the majority of cases.

Mr. Woodard—Do you think a horse that is raised and fed in northern Wisconsin is better than one that is fed farther south largely on hay and corn?

Mr. Convey—We know we do not grow as high a quality of horse, as far as appearance goes, as Iowa or Illinois, but when you get a horse of proper type in Wisconsin, he certainly has the quality, so I am certain we have superior advantages in Wisconsin for growing any type of horse, and especially the draft type.

RAISING THE HORSE.

L. P. Martiny, Chippewa Falls, Wis.



Mr. Martiny.

I think Mr. Convey in his talk on the Percheron horse has described the type of horse that is the draft type we, as farmers, should all tie to.

We have several different types of horses, but at this day and age there seems to be more profit in draft horses and more steady demand, and we know now that horses are very high-priced, especially if we have a good team of drafters to sell, and more especially if we have to go out and buy a team. A great many farmers are realizing the profits to be derived at the present time in horse breeding and as we travel about the state we find that every mare which will raise a colt is being used for that purpose; we also find that a great many mongrels and unsound stallions are being used. I look for high prices to remain some years, but I think the man who is raising a colt from a mare of no particular type and a stallion that is unsound and of no particular breed, will have to sell for less than it costs to produce that colt. So it is not a question of price, but we want to raise a better class of horses and raise them better.

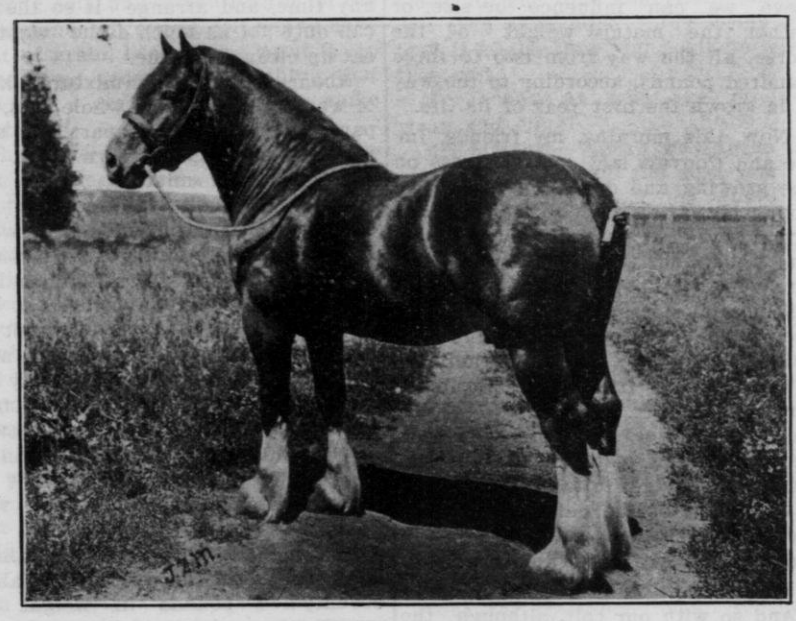
Two Main Considerations in Horse Raising.

There are two things we want to take into consideration in raising our horse, that is, the type and the soundness. Those are the two principal things.

In regard to the type, as I said, the draft horse, a horse that will weigh not less than sixteen hundred pounds and as much over that as you can get him. The more they weigh, provided they have the same amount of quality, the more it adds to their value.

Another great drawback in the production of good horses is in the use of inferior breeding stock. Our Department of Horse Breeding at the University has taken this matter up and they have accomplished a great deal of good. A few years ago we had a great many unsound and mongrel stallions being used in the state; today they are being reduced in number so the percentage is not nearly so great as it was years ago. I believe that we, as farmers, ought to support that department through the legislators we send to the legislature and induce our legislators to be willing to strengthen these laws, because I believe it is through a concerted action all over the state that our horse business will be improved, and only in that way.

Some will say, do you mean to say that because my mare has a spavin or ringbone, or a curb, or she is blind, or she is broken-winded, that she is unsound and that her colts are going to have those same defects? What I do mean to say is this: We have more difficulty with unsoundness in horses than any other animal we have and duced a tendency to these defects of which I have spoken. Now, by breeding from a class of animals that already have these defects bred into them and adding to it unsoundness, we are increasing that tendency and when we put it to service and work these defects are liable to develop, so we say they are liable to be inherited.



Kelvin Chief, 15164.
A well-grown Clydesdale stallion; champion at Wisconsin State Fair, 1910. Imported and owned by McLay Bros., Janesville, Wis.

there is a reason for this. The horse was naturally a wild animal; all nature ever intended the horse should do was just to carry his own body, but when we domesticated him, we interfered with nature and now we not only want him to carry his own body, but to carry a weight three times as heavy as his body; we are putting an extra tax onto those limbs and onto those lungs, etc., which he has to use in pulling big loads, and in some cases we have overstrained the horse and pro-

The Proper Growing of the Colt.

Another thing we should bear carefully in mind is the proper growing of the colt. It does not necessarily follow that if you have the proper type of brood mare and you have a good draft sire you are going to raise a good draft horse; you have only done part of that which is necessary. From the beginning we are working against nature; we never find a horse in the wild natural state weighing eigh-

teen hundred pounds or a ton, this has been accomplished only by good feeding and careful selection and breeding for a long number of generations. If we take our colt that is well bred and do not supplement that by the right kind of feeding, there is a tendency for that colt to go back to his original ancestry and degenerate. I believe we can influence the size, or rather the mature weight of the horse, all the way from two to three hundred pounds, according to the way it is grown the first year of its life.

Now, this morning, my friends, Imrie and Convey, laid special stress on the growing and development of the young pig if you want to make a good brood sow of it, or make a good hog, and my friends, Mr. McKerrow and Mr. Woodard, in speaking of the sheep, laid special stress on the feeding of the lamb you should grow and develop for breeding or for marketing.

You take my friends, Mr. Scribner, Mr. Bradley, Mr. Scott, Mr. Parrish and Mr. Griswold, they are very cool-headed looking men you will notice, but when they get to talking about the development of the dairy calf they lay special stress on the importance of growing that calf very rapidly when it is young.

And so with our colt, although the colt differs from our other live stock. In growing the calf, I have known of parties who allowed that calf to nurse its mother twice a day, and it will make a very good growth and development, but with the horse it is different, he is more delicately constituted in his habits, it is more necessary that he should be fed often. We know it is practical to water a dairy cow twice a or even once a day, and we get the very best results sometimes watering only once, but we also know we could not get the most amount of work out of a horse if we watered it once a day, we would soon have trouble on our hands, and it is the same way with the colt nursing; nature has provided that the colt shall nurse very often while it is young, and we should observe nature and feed that colt very often when it is young. I believe one of the best ways to feed a colt is by the use of the self-feeder, by erecting some kind of a box in the horse stable where the colt can go and help itself any time, and arrange it so the colt can only get as much as he wants to eat up clean at a time.

About the best grain mixture I know of would be four parts whole oats, two parts wheat bran, one part oil meal and one part shelled corn. That is a very good grain mixture.

After the colt gets four or five months old, it is old enough to wean. In the dairy sections of Wisconsin, where we have plenty of skim milk, I believe it is very advisable at the time you begin to wean the colt to teach that colt to drink skim milk. Begin by feeding a small quantity and increasing till you feed the colt from six to eight pounds of skim milk twice a day, and feed it a liberal grain ration; in fact, if you want to get the best results, it should be fed very heavily.

You ought to keep that colt gaining so it will gain an average of about seventy-five pounds in weight per month. If you want to grow a horse that will weigh at mature weight somewhere around eighteen hundred pounds, you ought to grow that colt so it will weigh one thousand pounds or over by the time it is a year old, something over half its weigh when it is a year old, and you will see in order to do that you have got to feed it very heavily.

DISCUSSION.

Chairman Imrie—You said six or eight pounds of skim milk. Will it do any harm to feed them more?

Mr. Martiny—Yes, I think you can

feed too much skim milk; it will get so it will live entirely on that and will not eat grain enough; that refers to the young colt when it gets to be six or seven months old.

A Member—Isn't there danger of over-feeding if you give them all they will eat?

Mr. Martiny—I don't think so, with a young colt, unless you feed it on the wrong kinds of feed. A colt has to have a lot of grain, because we want it to make rapid growth, and I think that is where a great many farmers make a mistake.

There are two or three conditions that operate against the proper development of that colt. Up to the time he is three or four months old, he is nursing the brood mare and is out on pasture, the weather is warm and he makes nice growth, but when the cold weather comes on, there is where the trouble begins. First, he is weaned, and that gives him a setback; then he is put onto dry feed; nature intends that colt should grow, make rapid gain, and that colt will eat lots of hay, he will get big around the middle. Then the average farmer feeds that colt the same way he does a horse, on oats and hay, and the colt does not get concentrates enough to develop him properly, and he eats more hay than he ought to and he keeps getting bigger around the middle, and by the time spring comes his frame is too big for his body, his ribs are pretty near on the outside.

A Member—I think I have overfed colts; that is, where I fed them all the oats they wanted to eat after I weaned them, and after they were four or five years old they were not as good horses as if I gave them just their share so they would keep on growing nicely.

Mr. Martiny—I do not advocate fattening them; I wouldn't feed them on corn, but I would feed them so there would be quite a covering over the ribs and the skin would be loose over the ribs; feed them on oats and bran and oil meal and then see that they get plenty of exercise.

Mr. Jacobs—Would not the skim milk tend to prevent any harm coming from excessive feeding on grain?

Mr. Martiny—Yes, I think so. I do not know of anything that will put more life and tone and vitality into a colt than skim milk. Just begin to feed it at the time you begin to wean that colt.

Mr. Jacobs—At what age do you wean the colt?

Mr. Martiny—Where we expect the mare to raise a colt the next year, at about four months old, but where we do not, it is immaterial.

A Member—How soon do you breed your mare after foaling?

Mr. Martiny—Well, sometimes on the ninth day, but more often on the thirtieth day.

Mr. Jacobs—Couldn't you even use skim milk for the colt before it is weaned?

Mr. Martiny—Yes, it is a good idea.

Mr. Jacobs—We have had excellent results doing that, especially with mares that were not good milkers. Is there any trouble in getting the colt to drink skim milk?

Mr. Martiny—Sometimes. We have had them where they were actually afraid of the smell of it. In a case of that kind, we just mix a little skim milk with the grain, just dampen it, and then the next time put in a little more and a little more, until it becomes to be slop, keep making it thinner and thinner, until you put the full skim milk in the manger; you can get them feeding on the skim milk in a few days in that way and you will have no more trouble.

A Member—When would you breed your mare the first time?

Mr. Martiny—Take these Percherons, they are very quick maturers, and you can do it at two years, but I

would rather wait until they were three years old as a rule, particularly where they were working on the farm.

Mr. Roberts—Would not a horse weighing fifteen hundred pounds, with good quality, be preferable to a horse weighing more, lacking quality?

Mr. Martiny—Yes, but we want to get all the size we can. We will take, for instance, a horse that weighs fifteen hundred pounds in its working condition. If he is of the draft type, broad, muscular, a good body, well put up, that horse can be fattened up and you can put on that horse in that condition about two hundred pounds of flesh, that will make him seventeen hundred pounds, and he will be a larger horse, a great deal smoother looking and find a better market, and it will add about fifty dollars to his market value.

DIFFICULTIES IN HIGHWAY WORK IN WISCONSIN.

A. R. Hirst, Highway Engineer, Wisconsin Geological and Natural History Survey, Madison, Wis.

Mr. Hirst.

Every business and profession has its drawbacks and its troubles. The manufacturer has labor troubles, trouble getting materials and trouble selling the finished product; the lawyer has trouble getting clients and the clients have trouble when the lawyer gets them; the farmer has trouble with rain, trouble with drouth, and if the papers are to be believed, trouble with too much money; the undertaker has trouble because communities are too healthy or the doctors are too good, but we sometimes think that the road builder has about as many trials and tribulations as any of them.

There is no profession which touches more intimately the pocketbooks or comfort of more people among the rural population, or no profession which is subjected to more criticism or gets less praise. We have never seen a piece of work done on the public roads which pleased in all respects much more than fifty per cent of the people affected. If the work is good, it is taken as a matter of course, if it is bad, it is taken as a public calamity. The doctor buries his mistakes, the lawyer can salve his wounded feelings by blaming judge or jury, the surgeon performs a successful operation, even if the patient dies or he sews a sponge inside one by mistake, but the road builder's work must

stand or fall on its own merits or demerits, both plain to the public eye, and as that public has paid out its good money for improvement, it feels free to criticise and does criticise insistently.

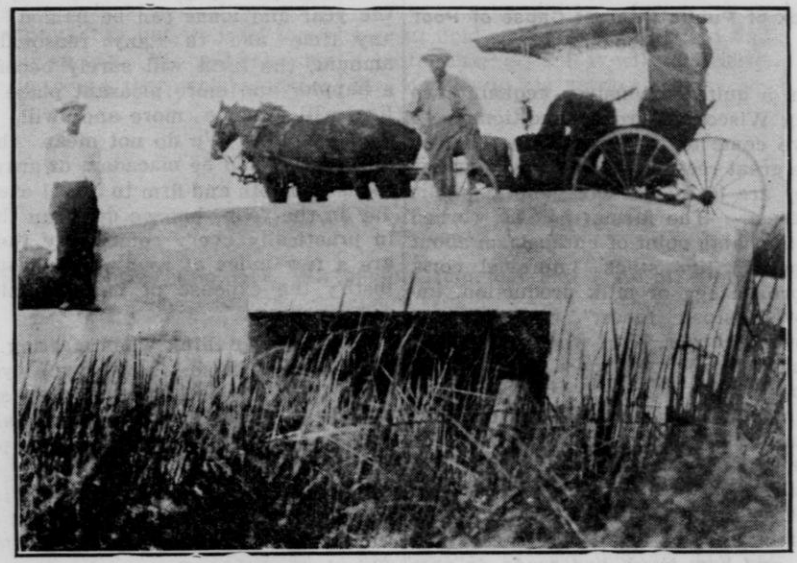
Lack of Public Interest Cause of Poor Roads.

In a quite extensive acquaintance with Wisconsin road conditions, we have come to the conclusion that the one great reason why our roads are as they are is the lack of general public interest. The farmer can be worked up to a high point of enthusiasm about improved live stock, improved corn, improved egg or milk production, improved "stock foods," or even improved schools, but when any one starts to talk improved roads, the temperature suffers a decided drop and the speaker is sized up as either a crank or a job seeker. We think the farmer fails to realize what good roads would mean to him, how little they cost each individual man when the cost is prorated among all the taxpayers, and how much bad roads do cost him if there is counted in loss of time, loss of temper, loss in money, and loss in the social and educational advantages that go with good roads. The statement is often made that "we cannot afford good roads," but the experience of communities which do have them shouts that you cannot afford not to have them. The attitude of too many of our communities is like that of the old New England farmer who was kicking about a tax for improved roads. He said he would have certainly been at the town meeting to vote against this foolish idea of improving the roads if his road hadn't been so danged bad that day that he could neither ride nor walk to the meeting.

The cry goes up from the country districts, "how can we keep our boys and girls on the farm?" It can only be done by raising the general standard of farm life, and there has been found no better way of doing this than that of improving the condition of our country roads. If the whole family can drive where they please any day in the year and loads can be hauled at any time and to any reasonable amount, the farm will surely become a happier and more pleasant place to live, will produce more and will be worth more. We do not mean that all roads should be macadam or gravel roads—smooth and firm to travel every day in the year—but we do mean that in practically every community there are a few miles of road which would justify the expense of macadamizing or gravelling.

Did you ever think when starting to your market place, how much you would give if you had a good hard road the whole way? Practically everybody would give some sum per mile for the privilege of travelling a good road rather than a poor one. Let us assume that this privilege would be worth one cent per mile travelled. This is probably low, as in sections where toll roads have been operated the charge is from three cents to six cents a mile, and since the farmers willingly pay this toll, the privilege must be worth these amounts or they would travel the adjacent non-toll dirt roads. Taking, however, this low value of one cent a mile as a basis and considering that the gravel or stone road would be worth this difference for only two hundred and forty days in the year in Wisconsin, we find that allowing for five per cent interest on first cost and an annual sum sufficient to keep the road in continuous good repair it would require approximately a travel of only forty-two teams a day to justify the expenditure of one thousand dollars per mile, a travel of seventy-three teams daily to justify two thousand dollars per mile, and of

one hundred and five teams to justify spending three thousand dollars per mile. Such a method is, of course, only approximate and applies to clay or loam roads. On sandy roads which are always bad, except when snow covered, the number of teams required to justify any especial expenditure would be less than for clay or loamy roads, which are good more days in the year. The character of traffic also has a large influence in the matter. This method of reasoning is simply useful in coming to a tentative conclusion as to whether or not certain roads would justify improvement. Investigated by such a method, it is believed that most towns would find a few miles of road in their limits which would economically justify the cost of gravelling or stoning them and in addition pay back tremendous dividends in the general welfare and happiness of the community.

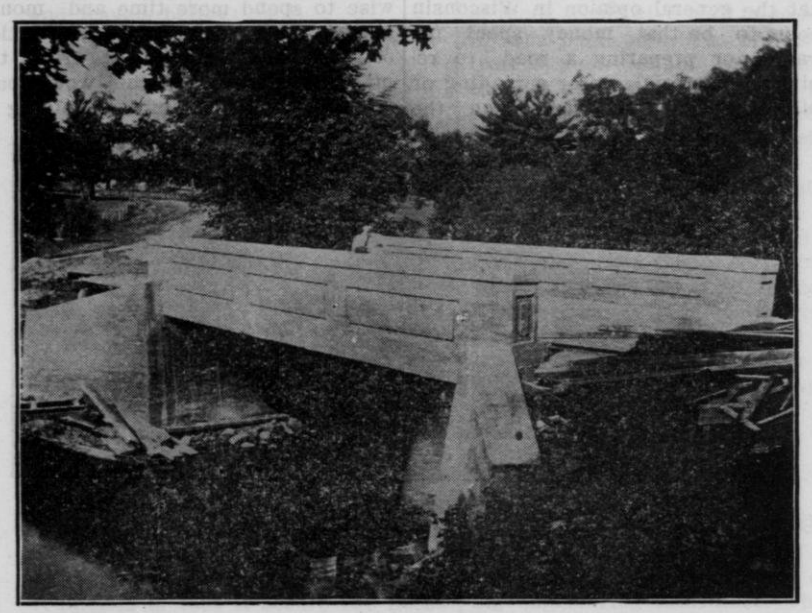


Concrete culvert 10-ft. span in the Town of Christiana, Dane Co. This town is now building all culverts of concrete with flat tops, using the reinforcement and general plans recommended by the Highway Division. Mr. Onstad, Town Chairman, considers them cheaper than any other kind of culvert and has built dozens of such culverts with complete success and satisfaction to the town.

The Proper Location of Roads.

One great difficulty in all classes of road construction is the difficulty of getting communities to see the value of proper location of roads. The whole state seems possessed with the idea that section line roads are the only proper ones and continue to put new roads on them or keep old ones there, or transfer old roads to new locations on section lines, with entire disregard

as to whether it puts the road through swamps or hollows or over hills, or across rivers at hard and impracticable places to maintain bridges. The Lord made the natural locations for roads long before the government ran the section lines, and the closer we stick to the natural locations and avoid the artificial lines, the better and cheaper roads we will have. Section line roads do not shorten distance, they lengthen it in many cases. If a place is ten miles to the east and ten miles to the north of a certain point, any one driving section line roads has to travel twenty miles to reach that place. If there was a diagonal road he would travel about fourteen and one-half miles, allowing even for slight deviations from a straight course. This saving of nearly six miles means a saving of at least two hours time in making the round trip, and two hours sometimes count. There is seldom any great saving in distance made by placing roads on section lines and there is often great loss by reason of rough and improper locations. There has been too much consideration for the neighbor's feeling involved in road location, and too little regard for the common good. Roads should be located where they belong, let it hurt whom it may, the community can afford to pay all proper damages to get good locations rather than travel roads located without reference to public convenience. Keep the roads and place the roads where nature expected them to go. Unfortunately there are more changes made for the worse in our road loca-



The Wilson bridge, Town of Lincoln, Polk Co. Span 30 feet; roadway 16 feet; cost $1375. The lowest bid on a steel girder bridge of the same span and roadway was also $1375.

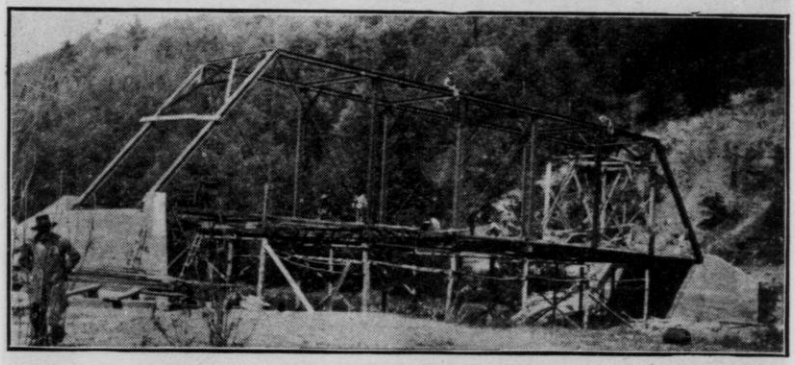
tions today than there are for the better. This should not be allowed to continue, as some day the roads must be placed where they belong and it will cost more to do it then than now.

Road Material.

When the time comes to build stone or gravel roads, we regret to state that the general opinion in Wisconsin seems to be that money spent for grading or preparing a road to receive the material, or for spreading or rolling it after it is placed on the road, is money wasted. There seems to be also a feeling that material should be used invariably just as it occurs in the gravel pit. In short, the general spirit seems to be millions of dollars for material, but not one cent for its proper selection or application. We believe in the old-fashioned theory that anything worth doing is worth doing well. We give credit to those pioneers who settled the state and built the roads, and in some cases gravelled them, at great expenditure of much needed time and money. They took the material at hand and used it in accordance with the best methods and with the best tools known at that time. But the methods of twenty years ago have been superseded by better, and we believe more economical tools and methods.

Gravel is more expensive than it used to be. The more accessible pits and the best ones are becoming exhausted in some localities, and with long hauls and expensive labor it would seem wise to spend more time and money in the proper sizing and preparation of gravel before hauling it from the pit. In some cases this would only mean careful selection and mixing of the material as it is shoveled from the pit. In some cases it might mean screening out some excess sand or clay, in some cases it might mean crushing the gravel and sending it through screens. In every case it should be the idea to send the gravel out of the pit with as nearly as possible thirty-five per cent of clay and sixty-five per cent of gravel in its make-up, for that is the mixture that gives the best results on the road.

Gravel or stone is not often laid in a trench as it should be to get the best results. We think it is a mistake to throw stone or gravel on top of the grade where it can be kicked out in-



Wooden floored steel truss bridge with concrete abutments, built in Town of Salem, Pierce Co., under plans of the Highway Division. Span 126 feet; total cost $3,931.00

to the ditches, ground up by wheels and washed away by every rain, or blown away by every wind. It looks more reasonable to put the material, whether stone or gravel, in a trench. This prevents its spreading at the sides, gives you all your machinery in place in the compacted road, makes it safe and easy for teams to turn out, and gives you a road that lasts longer and travels better.

Road Machinery.

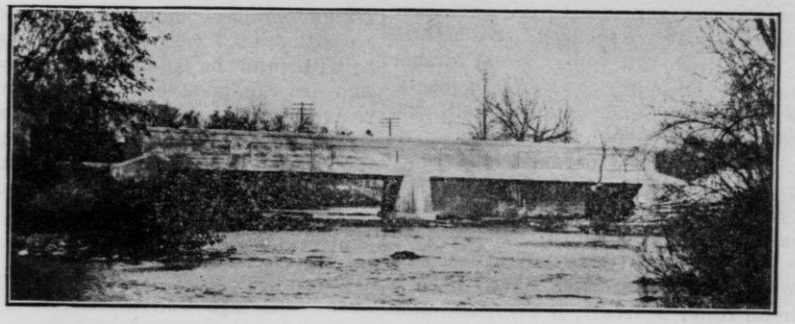
With proper selection of materials and the placing of the material in a trench, two very essential features of a good road are secured. We believe it pays them to go one step farther and roll the material after it is placed in the trench and also to roll the trench before placing the material in it. This rolling produces a good, firm road quickly, packs all the material you put in the road without any loss, and adds at least two dollars value to a road for every dollar it costs. Communities that have once used a steam roller scarcely, if ever, abandon its use afterwards, because they found it paid them to use it. When any county starts out to pursue a system of road improvement, one of the first requisites is that it secure the necessary machinery to build all the stone or gravel roads built under county aid and to build them properly. The cost of the modern machinery would be too heavy to be borne by the ordinary town, but distributed among the taxpayers of a county, it doesn't hurt any one. Such machinery can be used by all the towns.

The experience of Europe and the older parts of the country bears out our statement that it pays when building roads to build them right. We believe that any county in Wisconsin that has started road building with proper machinery and proper methods would be unwilling to go back to the old methods of building. Other communities will learn the same thing as soon as they try the newer methods. We find that the general tendency about the state is to consider the use of modern tools or technical assistance in road construction an extravagance. It would seem that the realization would be forced upon the people soon that the proper construction of roads would give play in some cases to the best abilities of technically trained men. This realization has come in other states, and it is now becoming a recognized fact throughout the country. The time of slip-shod road building is about past. Modern traffic requires modern construction to withstand it. Roads good enough to withstand the travel of twenty years ago are not good enough to bear the heavier and more varied traffic of today. Only the best construction can be economically maintained under present traffic conditions; the poorly constructed roads cost entirely too much to keep in repair.

Bridge Construction.

In the construction of rural highway bridges, we find the same general disregard of the necessity of employing engineering assistance. This matter, requiring in many cases a high degree of engineering skill and experience, is left, usually, entirely in the hands of public officers who have had no training or experience along the line of bridge design or construction. They select and purchase bridges, costing in some cases several thousand dollars, without having any one to help them who knows how to design or check the design of such a bridge, or who can figure within seventy-five per cent of what it should cost to erect the plan selected. As a result many of the bridges in the state are of weak and poor design, and many of them were erected, to say the least, under

conditions extremely favorable to large profits for the bridge companies. It may be true, as we are often told, that the farmer is competent to tend to his own business and build his own roads to suit himself, but it is surely true that the farmer is not competent to deal on an equal basis with the bridge companies' agents when it comes time to erect steel bridges. High prices and poor bridges, one or both, have frequently been the result of such deals in the past, and will be in the future until the people demand that the town boards and county committees call in some bridge engineer to help them get a square deal in their bridge purchases.



Side view, Tubbs bridge, Town of Pewaukee, Waukesha Co. Two 36-foot spans of reinforced concrete, built complete with abutments and pier for about $1900.

The energies of the Highway Division have been directed during the past two and one-half years with a view of helping the people of the state to improve their roads and bridges. During this period we have been able to arouse some interest in the subject by road talks at various Farmers' Institutes and other public meetings, and by the distribution of pamphlets descriptive of road and bridge construction. The practical work of furnishing road and bridge plans and advice has been quite extensive, involving work of various kinds in about three hundred and fifty towns, villages and cities. These services in all cases have been furnished free of cost to the various communities requesting them.

We hope a start has been made along the lines of more businesslike methods of road and bridge construction in the state. What is now needed is a public spirit which demands good roads and bridges and a determination to get them. Enough money is now being spent to secure in a few years thousands of miles of good roads and thousands of good culverts and bridges with proper care and proper methods in the spending of the money now raised. Wisconsin is recognized as a representative state, in politics, in legislation, in education, in nearly all lines of action that make for good citizenship and for the welfare of its people. We believe that in due time it will solve as well its road problems and become as noted for its roads as it is for many other public institutions. Her people are conservative, and sometimes slow to act, but when they do determine upon a course of action it is usually a model for other states to follow. Let us hope that it will follow precedent and in a few years be known as the state with the best road and

bridge laws and the best roads and bridges of any state in the union. The right people, the right material, and the necessary money are here,—it only requires concentrated effort to bring about such a result.

DISCUSSION.

Mr. Woodard—How wide and how deep would you place this gravel?

Mr. Hirst—It depends on the soil. Usually we put in about ten inches of gravel in two courses. We advocate narrow roads, about ten feet wide. The first mile out of a village we might put in a fourteen-foot road.

Mr. Woodard—This clay you spoke of, would you mix that right in with the gravel?

Mr. Hirst—I would rather combine it right in the pit. The ideal material is gravel that is mixed with clay right in the pit. If we can't do that, we mix it after we get it on the road.

A Member—How soon would you advise putting the gravel on after you get the roads graded?

Mr. Hirst—If I was just grading it lightly and not making any extensive fills, I would want to put it right on the bed. If I was grading down a hill, I would rather do that this year and put the gravel on when it becomes seasonable the next spring. That is not necessary if you have a roller.

Mr. Woodard—As I understand it, if you were going to make a road, you would use a road grader?

Mr. Hirst—Yes, we would plow it up on each side.

Mr. Woodard—And that would act as a shoulder to keep this gravel in?

Mr. Hirst—Yes, it is absolutely necessary where you are using a roller and it is just as necessary when you don't use a roller.

Mr. Woodard—Don't you think a ten-foot road would be pretty narrow?

Mr. Hirst—Every place we go to talk road improvement, we have to scrap that out with the community. It is a peculiar thing that a community that has been hauling through mud holes at a gait that would make one think they were constantly going to a funeral for years, when it begins to talk of getting a stone road, wants it wide enough for two loaded hay wagons to pass. Every additional foot of road costs at least two hundred dollars a mile, a sixteen-foot road would cost about $1,200.00 a mile extra over a ten-foot road, and the whole question is whether it is worth that difference for the sake of an occasional meeting.

Dr. Kutchin—The trouble is the farmers' horses have to give the right of way to automobiles.

Mr. Martiny—Not if the horses are properly broken, they don't have to.

Mr. Blunde—Wouldn't it be all right to have a man cultivate up to the ditch if the man didn't have any fences?

Mr. Hirst—We would like to see that. I would like to see the roads narrowed down to two rods if it would be possible to hold the extra land so the public could get it back if it was needed. If we had the road narrowed down, we would have less weeds on the farm. In that case, we would make the road twenty to thirty feet between ditches, according to circumstances. Of course this ten feet I speak of is just the width of gravel in the center of the grade.

A Member—How much higher do you want the center of the road than the ditches?

Mr. Hirst—That varies somewhat with the soil; never less than fifteen inches and hardly ever more than two and a half feet.

Mr. Convey—How can you keep a dirt road in the best condition?

Mr. Hirst—With a split log drag. We have been talking drag now for three years. There are five or six hundred of them in use in the state and there are five or six thousand of

them standing around in fence corners because the farmers took them out and gave fifty cents' worth of use and didn't get five hundred dollars' worth of improvement on the road; but the fact remains that if the drag is used persistently every year, you will get a lot of good out of it.

MODERN ROADS.

W. O. Hotchkiss, Chief of Highway Division, Wisconsin Geological and Natural History Survey, Madison, Wis.

Mr. Hotchkiss.

This is the time of year when the man who travels the roads is likely to be reminded of Bobby Burns' experience. He had traveled a hard day's journey over roads deep with Scotch mud. He finally got to the little road-house where he was to spend the night and sat down and wrote this little verse. You can almost see his relief.

"I've arrived, thank the gods,
Altho the path was rough and muddy:
A certain sign that makin' roads
Is no' these peoples' study.
Altho I'm not with scripture crammed
I'm sure the bible says
The heedless sinner shall be damned
Unless he mends his ways."

So, if you will carefully mend your "ways," you can hope to escape eternal damnation.

We are the only civilized country rich enough to afford bad roads. In Norway and Switzerland, where they set out with a bag over their shoulder and a hand sickle to gather their hay crop, and where they milk the nimble little goat for its few pints instead of our big Wisconsin cows, they have found that they must have good roads so the cost of marketing their crops shall be as low as possible.

I have often heard it said in this section of the state that these good roads will cost more than the farms are worth. Let us look into this.

Some years ago I sent out some lists of questions to prominent farmers in this county to get their estimate of what bad roads cost them. Their esti-

mates averaged a cost of thirty-five dollars to each of them each year. They also said that good roads would raise the value of their lands from five to twenty dollars per acre. Supposing we take the lowest estimate of five dollars per acre; this would mean an increase in value in one township of one hundred and fifteen thousand dollars. If we were to build thirty-six miles of high grade modern roads, so each section would have a permanent road on two sides of it, the total cost would be about seventy-five thousand dollars, leaving a clear profit of forty thousand dollars for that town. This shows effectively what one southern farmer said—that if you only knew it, you could tax yourselves rich for building roads.

If this county, with its taxable property worth fifty-one million dollars, were to start out to build two hundred miles of modern roads, they could do it in one year and the cost to the farmers would be only nine-tenths of one per cent of the value of their farms. If these two hundred miles were to be built in a period of ten years, the farmer who pays fifty dollars a year tax now would only have to pay fifty-four dollars.

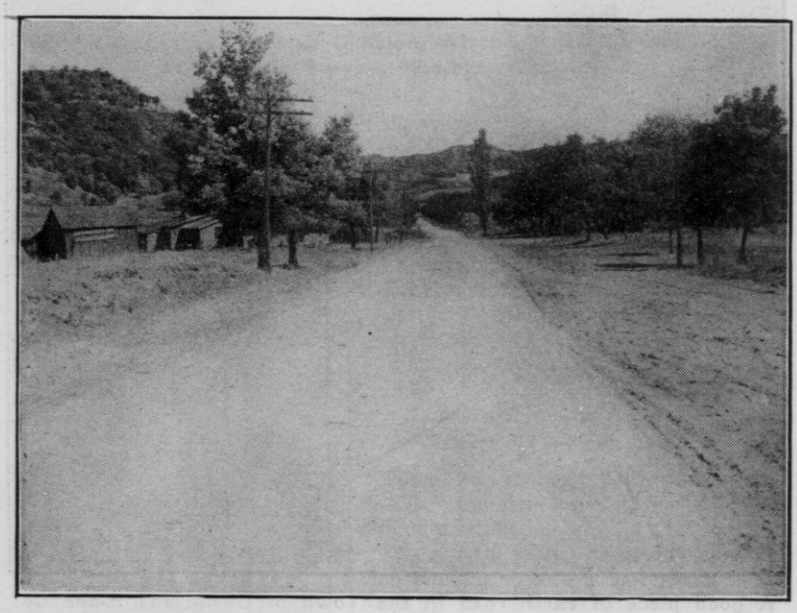
A good piece of earth road in the Town of Christiana, Dane Co. Graded with traction engine and kept in shape with road drag. This town has many miles of such roads.

Truly good roads do not seem to be such expensive luxuries as they have been called. The real truth of the matter is that our bad roads are what cost us the money.

As an illustration of this, I want to tell you the story of something that happened over in Sauk county. That county, you know, is the best in the state in building modern roads. One

town, against the chairman's wishes, voted one thousand dollars two years ago to put with one thousand dollars from the county and build a piece of stone road. While the road was being built, this chairman drove by and, after watching the work for awhile, turned to the county highway commissioner and said: "Well, Donaghey, I've changed my mind on this stone road business." "That's good," said Donaghey, "how did it happen?" "Well, it was dollars and cents—what'll change any sensible man's mind," said the chairman; "I had a thousand bushels of potatoes in the cellar last March and was offered ninety-two cents for them, but I couldn't get my empty wagon to town. When I could get them in to sell them, I got thirty cents for them. I figure I lost just six hundred and twenty dollars on that deal—more than my share of the tax to build stone roads all over the county. You can't build 'em fast enough to suit me after this."

This instance could be duplicated on a smaller or larger scale in the experience of almost every farmer of the state if he would but think back.



The State road near La Crosse, built by La Crosse Co., under state plans and with state machinery. This was an old worn-out stone road about 18 feet wide and was resurfaced with about 5 inches of stone.

How to Get Good Roads.

But how are we to get good roads? We have a system here under which we often have forty road superintendents in a single town and we get "57 varieties" of roads as a result. This system is bad, and we must have a better one before we can get the kind of roads we need.

The kind of system we should have can be best appreciated from a comparison with a system we have in the state of which we have the best reasons to be proud—our school system. Now let us look into the method of operation of this public school business and see how it compares with the road business. The public school business is thoroughly organized from the botto... up. You have first your district boards, then your township high schools, then your county superintendents .and then the state superintendent with his corps of assistants and inspectors. You have money coming from state, county and town taxes to support these schools. Now where has the up-building of these schools come from—from the local boards, the county superintendent, or state superintendent? It has come from all three, but it has come about in proportion to the experience in educational matters possessed by each. The local boards are least experienced and have furnished least of the betterment. The county superintendent has been more experienced and has furnished more of the improvement. But the state of-

West Sauk road, Town of Baraboo, Sauk Co., showing effect of relocation. Note the old road in upper right hand corner. Steepest grade on old road 12%, on new 7%. Surveyed and planned by the Highway Division, as have all macadam roads built in Sauk Co. in 1909 and 1910. Mr. J. T. Donaghey, the County Highway Commissioner, considers rightly that surveys are in most cases necessary to obtain the best results in county road construction.

ficers at the head, being most experienced, have been the source of most of the improvement which has resulted in our fine school system of which we have such good reason to be proud. Now, how have the state officers accomplished this work? Have they come to the county superintendent and the local board and said, "Here, gentlemen, we in our greater wisdom see that it will result in better education for your children if you employ teachers who shall pass an examination to show their fitness and who teach certain fundamental subjects. We know from our superior knowledge that it will result in better health for your children if you erect school buildings that are properly warmed, ventilated and lighted. And, furthermore, if you will provide good maps and charts and blackboards, etc., that the time of the pupils will be saved and they will require less time to attain the desired knowledge."

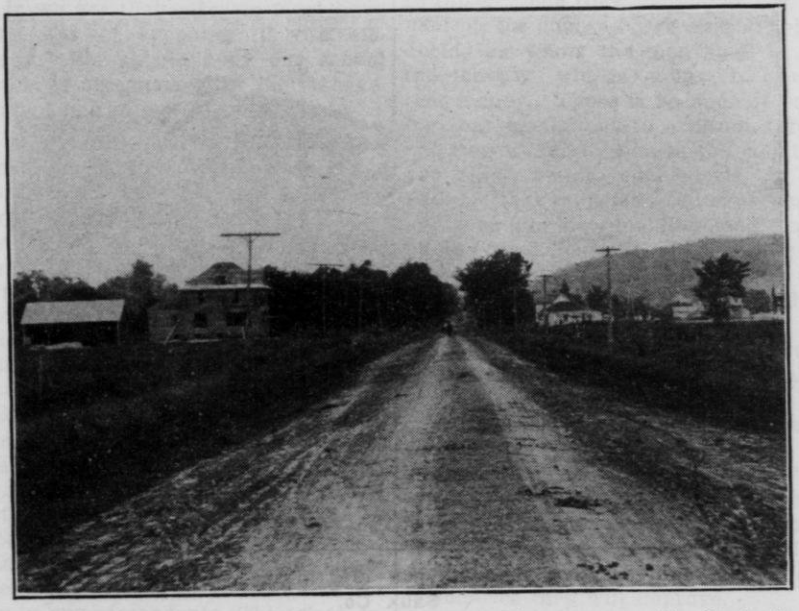
If they had proceeded in this way, every local school board and school meeting would have been from Missouri and answered back, "You'll have to show us." But they knew more of human nature. They said here—we will get the legislature to tax these people and distribute the money back to them on condition that they hire competent teachers and teach certain fundamental subjects. We will give them more if they will build properly planned schoolhouses, with sufficient heating, lighting and ventilating facilities. And we will also help them to pay for good maps and charts and apparatus to use in teaching.

North Freedom road before improvement after a rain.

Now there is not a man here who knows anything about the way in which our schools have improved in the last forty years who is the least

bit sorry that this has been done. Some may object that the practical working of the distribution of the money has not been equitable, but even then he must admit that, inequity and all, the system has been of far greater benefit than harm.

Now let us see what we have done with road business—the next in importance of those with which you deal.



North Freedom road after improvement under county aid. Cost of this road about $2200 per mile.

We have our town boards that would compare with the district school boards. In this county and a few others there are recently appointed county highway commissioners that compare with the county school superintendents, but there our comparison ends. We have no state road superintendent to compare with the state superintendent of education. Practically our comparison ends with the town board, for most counties have no county highway commissioner. From this statement it is easily seen why our roads have not improved in general to the same degree as our schools. We have depended too much on a local public spirit and have failed, as might have been expected. But, you say, schools are a matter necessary for the preservation of the state, while roads are purely a matter of local concern. Is that true? If you could get the pitiful letters I do from parents who write me that the roads are bad, and the town refuses to fix them so their children can get to school, you might begin to think that roads are sometimes a necessity before education. But roads are not a matter of local concern only. The man in a Dane county city who cannot get eggs or butter or potatoes because the roads are bad all over the state, would be

glad to have a good system of roads in Rock county, so the farmers there could market their produce and give him a chance to get some. Every citizen in the state is interested in getting just as many other people here and just as much property as he can on the tax rolls to help him bear the burden of taxation. What we need in the way of a system has been very well expressed in a letter which I have had printed in the front of our road pamphlets which have been distributed at the Farmers' Institutes.

County and macadam road built in 1910 in the Town of Sumpter, Sauk Co.

Extract From Letter of William Schmoldt, Taylor County.

"I emigrated from Germany, made a farm here, and lived on this farm twenty-three years and one-half. I have seen in these years hundreds of thousands of dollars of tax payers' money expended on the roads in town and county, but after all our roads are still as bad as ever. Not the scarcity of money, but the system is to blame for this state of affairs. We need men in charge of road building and road maintenance who are trained for this sort of work and understand what to do in a proper way, and who should hold their positions for a succession of years. Let us have a state road commissioner, county and town road engineers all well trained men and not elected but appointed, and then let them work systematically. Not money alone makes good roads or makes the roads better, but skill in plans and labor."

A Feasible System.

We have, in the past twenty years, spent enough to have good roads if it

had been properly expended. We want to arrange matters so that at the end of the next twenty years we can look back and say we have got what we paid for.

We need to have a system in which the town, county and state join in paying for the roads. I have often heard it said that if we paid all our taxes in cash our road troubles would end. But this is only part of the story. After we get that cash we must have some way of spending it with efficiency. We should copy our school system of management or the management of one of our large railroads.

I will outline briefly what this system must be. In the first place, since town, county and state are to join in paying for the roads, each should have a voice in the management. The county board should select the system of main traveled roads to be first improved and employ a foreman or county engineer to look after the construction the same as the county school superintendent looks after the schools of the county. The town should decide what part of this system they will improve first, and how much money they will spend. The state should have a state engineer to supervise the work of the county foreman or engineers, as the state superintendent looks after the work of the county superintendents. This state engineer should have authority to see that the state's money is spent in the most efficient manner possible.

Such a plan would divide the cost and the authority between the towns, counties and state in the most sensible and efficient manner possible. Such a plan is necessary if we are to get a dollar's worth of road for every dollar of tax, and be able at the end of the next twenty years to look back with satisfaction at what we have spent and be able to say that it was well spent.

DISCUSSION.

Mr. Woodard—In this system, where does the town come in?

Mr. Hotchkiss—The town selects the part of the road they want to improve.

Mr. Woodard—They will have to pay part of the tax, won't they?

Mr. Hotchkiss—Yes, they will have to decide how much money they want to raise. The town, of course, has a man on the county board and he helps decide on whom the man shall be in the county who is going to spend that money. There is no need of paying that money out to a dozen different men to build roads in the county; you might better concentrate it on one, let that man get the experience and keep him busy building good roads all the time, instead of spreading it around among a lot of fellows who do not know anything about building roads.

Mr. Martiny—I thought you suggested that the county board usually located these roads?

Mr. Hotchkiss—The county board selects the prospective system of roads to include the main traveled roads, just as at present under our County Aid Law; then it rests with the people of the town to say which part of this system lying within their boundaries they will improve.

A Member—Suppose there is a main thoroughfare between two important towns, and it will have to go to two or three towns, and one town would agree on one place for the road and another wanted it somewhere else?

Mr. Woodard—I don't think the gentleman understands the system. County Boards select a system of roads.

Mr. Martiny—And in that way it will be taken out of the hands of the town.

Mr. Hotchkiss—If it were left to each town, one town would build the piece that goes in front of Mr. Chair-

man's house, and another town would build a piece somebody else prefers, and another would build a piece of the main traveled road, and so on. But under this system, the County Board says, Here, these roads are the main traveled roads; we will limit the improving of roads to these particular roads. The towns can build any other roads they want, but if they want county and state aid, they must build the roads that are going to be some good to other towns in the county. There will be perhaps six or twelve miles of road in each town designated under the County System, and it is up to the town to say whether they will improve that or this particular half-mile stretch this year. They can pick any piece of road they want to improve this year.

Dr. Kutchin—If the County Highway Superintendent was appointed by the County Board, wouldn't it be difficult to keep it out of politics and therefore would not incompetent men be likely to be put into the place?

Mr. Hotchkiss—That could be helped. It is an unfortunate thing that so large a number of such men have been appointed, but that trouble can be overcome, and is in some of the states. In New York, for instance, the County Superintendent is required to pass a civil service examination; in other words, to prove his efficiency. Under that system he gets credit not only for what he knows, but what he has done; about forty per cent of his total mark is given for what he knows and sixty per cent on some road that he has built, by which he shows his practical efficiency.

Mr. Convey—There is one feature of this question I would like to have on record, and that is, the farmers of the state do not seem to understand the conditions. In the first place, they refuse to have state aid, have voted against it in many cases. On the other hand, the cities practically voted state aid, voted that the state legislature should appropriate state aid. In the former case under the old law, the city people were not called upon to help build our old roads; under the new law they will be called upon to pay a tax for that purpose, all the citizens of the cities and villages will be taxed for the roads they are inclined to use and they are going to be taxed. It would seem that if the farmers of the state understood the situation, they would not oppose this new law.

Mr. Hotchkiss—Yes, and in addition to that, there is another benefit in this question of state aid. Every railroad president in the United States will tell you that his road depends largely upon the condition of the country roads for its traffic; if the country roads are bad, the traffic falls off a half, and when the roads are good they have so much traffic the roads cannot handle it, it all comes at one time. Therefore, good roads mean the shipping of diversified farm products and evenly distributed business for the railroads, a decided benefit to them. Now, railroads only pay taxes to the state, and it is only by having a state appropriation for this purpose that we can get the railroads to pay for the benefits accruing to them. They certainly should pay a part of it, as should every one who is benefited. The cities are benefited and they will pay under the State Aid Law as well as the railroads.

Mr. Parrish—We find down in our county that the question is, what is to become of our regular road tax? Will the payment of this tax annul the old road tax?

Mr. Hotchkiss—Most certainly not. I said we will have to have a change in the system, but I do not think you can change a system all over at once without danger; you have got to go about it gradually, and say, Here, we want to start in with our main trav-

cled roads first; as we get these completed we will go ahead and complete some of the other roads. When this has been going on for some time most of the roads will have been built by state aid and will be maintained by the county with no expense to the town. The town is too small a unit to build roads cheaply, they cannot afford to own and operate modern road-making machinery; they haven't money enough in most cases. The only thing for them to do under this system is first to have their main roads cared for under county and state aid. Now, the main roads in many towns are the biggest expense of the local road tax. If they raise a special tax in cash for that purpose and improve that road, then they have all of their regular road tax to apply on the side roads; they are released from the burden of some of the hardest roads they have to keep up.

Mr. Parrish—Your argument would be that the regular road tax would gradually decrease?

Mr. Hotchkiss—Yes, as this other road system extended, it would decrease.

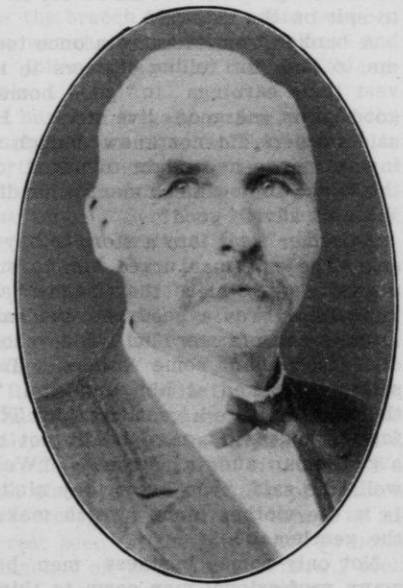
Adjourned to 7:30 p. m., same day.

EVENING SESSION.

The convention met at 7:30 p. m. same day. Mr. Thomas Convey in the chair. Music, Orchestra. Chorus, High School Students.

AS OTHERS SEE US.

W. C. Bradley, Hudson, Wis.



Mr. Bradley.

Burns says:

"Oh, wad some power the giftie gie us,
To see oursel's as others see us!"

How easy it is for us to see the faults in others and how hard to find them in ourselves.

While this country is recognized as a great nation, we are not a great people but a mixture of good and bad from all nations, mostly the good, for the bad usually are too shiftless to leave their native haunts, although many succeed in getting here and make us trouble that we are ashamed of, but it is not always the class we would call bad or undesirable citizens that bring us the censure from other countries which we sometimes deserve.

About five or six years ago, a great French liner was crossing to New York and when out the third or fourth day some one on board proposed that each nationality get together on the deck

and sing their national or home songs. As they were on a French ship, the Frenchmen gathered together and sang the "Marseillaise," a song which sets on fire the heart of every loyal Frenchman, and when they finished a great cheer went up for the singers as well as the song.

Then the Germans sang "Die Wacht am Rhine," the song they love so well, until the waves rolled back the echo.

Then the few Scotch people on board in a little group sang the sweetest love song ever written:

"Maxwelton's braes are bonnie,
Where early falls the dew,
'Twas there that Annie Laurie
Gave me her promise true,
Gave me her promise true,
Which ne'er forgot will be."

Oh, the trouble with so many Americans is, we give the promise and then forget,—and then forget. But those Scotch people do not forget as we do, and they sang it well, because they loved the song and the sentiment embodied in it.

Then the Americans, several hundreds of them, because Americans are the greatest travelers in the world, sang "America":

"My country, 'tis of thee,
Sweet land of liberty,
Of thee I sing——"

And then they did not sing, as no one seemed to know what came next, and they got what they deserved—the jeers and gibes of all the others who had done so well.

Then in the matter of marriage and divorce, this country is getting and deserves the censure from other countries. Mrs. Humphrey Ward has lately written a very strong story showing this evil as the English people see it in us. Would that we could see it ourselves.

Then, instead of our people setting a good example in honest business methods to new comers, they tell us we have more water in our stocks than any other nation in the world, and are doing unto others as we expect them to do unto us, only trying to do them first, and ought to be ashamed of many of our Captains of Industry, instead of lauding them to the skies.

As farmers, we get and deserve a great deal of criticism and get a great deal we do not deserve. The farmer has been called "hayseed" and "mossback" so long by a class of people who think they raise themselves in the estimation of men by poking fun at the farmer, who sees more, knows more and does more than those who make fun of him.

Henry Clews & Co., who furnish editorial matter for the financial columns of the big eastern dailies, unjustly censures the farmers by calling them lazy and attributes the high price of living to lazy farmers. If Mr. Clews, or any of his force, would follow the farmer of the west from 4:30 a. m. to 8:00 p. m. in his round of ceaseless toil, he would be too tired to spit on the sidewalk.

A banker from Minnesota once took me to task for telling farmers to invest their earnings in good homes, good barns and good live stock. He said farmers did not know enough to invest money and ought to put it in the banks for business men to handle. Was his advice good?

A farmer went into a store to buy a coat. The salesman urged him to buy a good coat, which the farmer acknowledged was a good one, but said as he was a farmer it would show dirt easier than some others. The salesman looked at him and said, "I thought you were a gentleman." The farmer asked if a man might not be a gentleman and a farmer. "Well, well," he said, "you know they ain't." Is it the clothes alone which makes the gentleman?

Not only some business men, but many professional men seem to think

it impossible for a farmer to be a gentleman. A college president in a nearby state, hearing a boy who had just entered college making some noise, said, "John, you act like a farmer." John said, "I am a farmer." The president said, "While you are here, you will act like a gentleman, not like a farmer." No conception in that man's brain that by any means a man might be a farmer and a gentleman.

This same man issued a circular card to attract young men to his college on which was written, "Send us men that we may educate them for lawyers, doctors and ministers. Send the lazy man to the farm and forge and reformatory where he belongs,"—placing the man, who with his brains and hands feeds the world, who with his brains and hands forges the wheels and crankshafts of commerce, in the same category as the criminal in the prison, poisoning the minds of young men with the idea that work with the hands is degrading! No wonder the breech becomes wider between the wealthy and educated class and the toilers who make that wealth possible.

A bunch of traveling men were in the smoking-room on a "Soo" train in northern Wisconsin early one summer morning. Looking out of the window, one said, "See that Mossback going to milk. Pretty small business, isn't it? But I suppose he is as big as his job." The speaker's business was selling the farmer's product, yet he held the farmer in contempt.

Riding on a train through Montana, I had talked with a hotelman from Illinois, a banker from Buffalo, and a soap manufacturer from Pittsburg. We had discussed conservation of western resources, the tariff, and things of interest seen on the journey. The hotel man got off at Billings, where I took some exercise on the platform. On coming back into the car, the banker said, "Would you mind telling us your business? I thought you a manufacturer." I said I was. Then he said to his companion, "I thought so, and that man who just got off said you were nothing but a damn farmer." Then I told them my factory turned out the finest food product in the world, "Jersey Cream," and he said, "You are a farmer?" "Yes, but I do not think a man ought to be damned for being a farmer."

Sometimes the farmers and their wives receive unjust criticism from some of our papers and magazines. In a series of articles in the "Delineator" for the past summer, the life of the farmer's wife was depicted as a life of absolute drudgery from five to nine. Now, there may be a few such cases, but the majority of farmers' wives are as happy as women in any other walk of life. There is surely more discontent, and surely ten times as many divorce cases among the idle rich as among farmers. Criticism that is deserved ought to teach us to see our shortcomings as farmers and not have the faults of a few cast unjust reflection on farmers as a class.

At a county school convention in the western part of the state, there was a large attendance. Among the clerks present, were four ladies. The superintendent called the meeting to order. Fully half of the men were smoking and spitting tobacco juice on the floor until it became unbearable and the ladies had to leave the hall. Would any other class of people have been so ungentlemanly?

I went into a new hall in a small town in northern Wisconsin to hold a meeting and found the floor covered with sawdust. I asked the owner if he kept it covered all the time. He said "No, I do not have to cover it for the village people, but the farmers will spit tobacco juice all over it." Just think of it as others see us; see ourselves as our wives see us.

I remember years ago we had a lit-

tle fellow at our house about fifteen or twenty inches long and sometimes when his mother was busy I would try to dress the child and would manage to get his shirt on wrong side out and upside down. Then the child would get uneasy and I would say things I ought not to, when the mother would take the child, put on the shirt right side up and inside out and never take it off the child's back. There isn't a man on earth who could do it. Oh, the patience of the mothers!

I sometimes wonder if in this practical age of ours, when our whole attention is paid to the getting of money and we scoff at anything sentimental and cast aside as foolish some of the old traditions which our forefathers cherished, if we have not lost more than we have gained in the shuffle. I asked an educated Swiss engineer lately if his people still believed in the tradition of William Tell, and he said, "No, they know better now," and I was sorry they did not cling to the old belief, for such sentiment would do more good than harm.

In mythology we read of the ball of gold which hung suspended in the heavens to be given to any one who could reach it, and great ladders were built and towers, great crowds gathered to devise ways to reach the ball, but all efforts failed. It kept just out of reach, until a peasant, an unlettered, uneducated man, but with an unselfish heart, lifted up a little child, who reached and got the ball.

Joe Wing recently told the story of the beautiful faith the Normandy peasants still have in the casting of their church bells. He said he listened one night to the chimes of the village bells and remarked to his guide, "How beautiful the tone." The guide said, "Sure, when they are ready to cast the bell, all the people bring their money, the rich their gold and the poor people their silver and copper, and they throw it into the melting furnace with their love and then all the children sing the beautiful hymns of praise and their song fuses with the metal and the bell rings out the happy strains ever after."

Foolish, you say? No, not foolish, but beautiful. Would we could believe such things today.

ADDRESS.

Supt. Geo. McKerrow, Madison, Wis.

We are always pleased to see the girls and boys; at least I am, because I was a boy once myself, and because I always liked the girls pretty well, too.

Mr. Chairman, I do not know what to talk about tonight; I cannot fill the place of the gentleman who failed to come, because he is an editor, and I am simply a farmer.

My friend, Mr. Bradley, has told you some of the things that others see in us as farmers, and some of his remarks reminded me of my boyhood days on a farm. In those days, you know, people used to talk about the farmer more than they do today, and even in these days I have heard people say that "any fool could farm." I heard that when I was a boy, too, and I concluded that as soon as I was large enough to earn my living away from the farm I would go away from it, because I didn't like to be called a fool. And yet, as I think back forty years and more, I think we did some foolish things in those days and perhaps they were right about the fools. I can re-

member when we, with all the neighboring farmers, were trying to make a living by raising wheat, crop after crop of wheat was raised on land that had already grown ten, fifteen, twenty crops of wheat, until they had cropped out practically all the available fertility suitable to wheat growing, until the weeds that naturally grew with wheat had developed so well that they had moved in and occupied the land; with them came the chinch bug as a tenant to claim his share, and the wheat crops were so small and light it was very hard work to get a living on the farms of southern Wisconsin, especially on such farms as I was raised on, eighty acres pretty well covered with stumps, stones and a good-sized mortgage, which meant that after this poor wheat crop was harvested and sold in the market there was barely enough money left to pay the taxes, and sometimes not sufficient to pay the interest on the mortgage.

Selling a Load of Hay.

When I was getting to be about thirteen years old, the farmers were learning a little bit about rotation of crops and were changing over to potatoes and other crops. We grew timothy hay and not having live stock we had to find a market for that hay, and I remember very distinctly getting up at two o'clock in the morning to feed my team, harness them and hitch them onto a load of hay to drive to Milwaukee, a five hours' drive, twenty miles distant, and some days I had to stand on the hay market six or eight hours before that load could be sold.

Human nature then was just the same as it is today. Today we talk about Rockefeller, Morgan and Harriman and the big packers squeezing us, taking advantage of us, driving us out of competition, but in those days the fellows who bought the hay would come onto the market the year around, and if there was a surplus of hay on the market, they would give you half price, and the full price was only eight or ten dollars a ton, which was not any too much after hauling it twenty miles. I have actually stood on the market until the lamps were lighted in the evening and then sold my load at five to eight dollars a ton, and I had to hitch up my team and go home after dark, because there was not enough money to pay the expense of staying over night, so I wended my way homeward, and after I got there and got my team fed and cleaned, it was two o'clock in the morning again, and so I put in twenty-four hours that day.

Now, I didn't hear the people in Milwaukee who bought my hay at five, six, eight, or even ten dollars a ton grumbling very much about the high cost of living those days, and I think they had the right to call the farmer a fool who would put in his time making hay, harvesting it, putting it in the stack and then hauling it and spending twenty-four hours on that part of the job, that they might buy it at five dollars a ton. I think they were right when they called him a fool, but conditions have changed; farmers have learned some things, though they have not learned all the things they should. Those I am sorry for are those farmers who need to learn many things, some things which Mr. Bradley has pointed out right here tonight, but that is one trouble we find in meetings of this kind, the fellows who ought to be here are not here, but we hope some of them will read what Mr. Bradley said in the next Bulletin, and we may get at them in that way.

Now, today, thinking, business men, do not so often say that any fool can farm, because they recognize the fact that under present conditions it requires brains to farm and farm well.

I was down in Walworth county last

week, and I inquired about the price of land in that county. I was told that only a few days before a farm of two hundred acres seven miles from a railroad station, naturally good land that had been rented until it was pretty well cropped out, with poor fences and poor buildings, had been sold at auction and brought $151.00 an acre. The man who bought this farm already owned nine hundred acres. He had expected to pay about $110.00 an acre, but with other bidders he found he had to pay $151.00. When some of his neighbors suggested that he had paid a pretty good price for it, he said, "Yes, but I ought to have it; I have sold five thousand dollars' worth of pork during the last year, and I ought to have some place to invest the five thousand dollars, and so I had to buy a farm."

Now, do you think it is possible for a man in the state of Wisconsin to pay $151.00 an acre for an investment for his money and get a return for that investment unless he uses his brains as well as his hands? Can he be a fool and get along? Not at all; he must be a thinking man.

The Need of Agricultural Education.

Why do the farmers today, not only in Wisconsin, but in practically every state in this union and in every province of Canada, turn out by the thousands to these Farmers' Institutes? Is it for fun? Is it to spend a day or two away from home? I think not, because these men who attend the Institutes are the hardest headed farmers in the communities. No, they have reached the conclusion that they must think, as well as work with the hands, and they come together, not so much to get entirely new thought as to get the thoughts of others and couple them with their own, and by thus getting new thought, or a new impetus for what they already know, they are enabled to go ahead and work a little better with both their heads and their hands.

A few years ago, while I was attending a Farmers' Institute in one of the flourishing cities of central Wisconsin, I had a leading business man present this matter pretty clearly to me in discussing the question whether the farmer needed any education or not. He said, "I have varied lines of business and have made considerable money in these lines." At that time he was mayor of the city where we were holding our meeting. He said, "I have timber lands; I have two large sawmills; I have two large stores, I am interested in a bank, and I have opened up three large farms on cut-over lands. When I want a man to put in the woods as a camp foreman, I can find one to fill the bill pretty well; when I need a man to put into one of my sawmills as foreman, I can find him; when I need a man to put into the store or the bank, I can find him; these men all have to be skilled in one particular line, but when I look for a man to put on one of these farms, then I have the biggest job of all: he has to be skilled in all the lines that the other men have to be skilled in; he must know how to handle men, how to handle machinery, how to buy and sell; he must be a financier, because I haven't time to attend to the details of this business, and so he must be as broad a man as all the other four, and it is the hardest job of all to secure him, because he needs the best and most liberal education of all, and a practical education at that." And I have concluded and I believe that you will conclude that this gentleman was right.

How to Secure an Agricultural Education.

Now, if the farmer needs education, how is he going to get it? The farmers are getting education; they are getting it by coming together in meet-

ings like this; they are getting it by going to the Short Courses at our Agricultural College, and they are getting it for their sons by sending them to the Agricultural College; they are getting it through the agricultural press; they are getting it by their own thought and their own broad and wide investigation and practice, they are becoming thinkers and investigators. We are getting a little of it now worked into our rural schools, our high schools, and even into the normal schools and colleges, because we are demanding that agricultural education be taught in the district schools, in the high schools and in the normal schools. As yet this particular matter is in a very primitive condition, and yet there are counties in Wisconsin and counties in many of the leading agricultural states of the west where questions asked of the teachers at teachers' examinations, where questions asked of pupils in their examinations, are practical farm questions, and these questions, when they are studied, will bring culture along the lines of agriculture.

So we believe that the world moves along, especially along these agricultural lines; we believe the farmers are growing better; we believe they are getting to think more, which is right.

The Farmer's Duty to the World.

Farmers have a duty that they owe to everybody else. It is true, of course, that the people in the cities and villages have a duty toward the farmer, and we are always pleased to see these two classes working harmoniously together. That is one thing I am very much pleased with in this town, to see the citizens of Two Rivers taking such an active interest in these farmers' meetings, and it is very well that this is the feeling. I believe the thinking citizens of this city recognize the fact that they are dependent upon the farmers for what they eat and largely for what they wear; the responsibility rests upon the farmer's shoulders in this respect. He feeds the world and he clothes the world, and when he stops producing, stops doing his best toward making his acres produce the best he can, then he is neglecting that duty. We have heard some farmers talking a few years back when prices were so low of curtailing production, raising less acres of everything, wheat, corn, oats, rye and barley; of raising less dairy cows, producing less milk, less beef, less pork; but they are not talking very much along that line now, because prices are remunerative, and, in fact, the talking is on the other side, the people of the cities are talking about the high cost of living and some of them are foolish enough to lay that to the farmers. As Mr. Bradley said, one firm in the city of New York reported the reason of prices being so high was because the farmer was so lazy, and I liked his suggestion that Mr. Henry Clews, or some of his agents, come out and follow the farmers for a day. I would like to have had one of them with me when I put in twenty-four hours selling that load of hay; I would like to have one of them go up and work for my friend Bradley, because he sometimes cannot get men enough to milk the forty cows he manufactures cream with, and he has to work at the milking himself, and I have heard the neighbors tell that Bradley often, when he goes from milking his cows at night, meets Bradley coming out to milk in the morning. If the people who think the farmer is getting too much for what he produces will just step out in the country here, we can find employment for them. Bradley will take a couple of them and we will take a man or two; we will make producers of them that will help to produce more and then the prices of living may go down.

Era of Low Prices a Thing of the Past.

But let me say honestly and fairly to you people here, whether you come from farms or from the town, I believe, after looking over the conditions of things in the old countries, after studying their markets, studying their lands, and reviewing our exports of agricultural products for the past ten, fifteen and twenty years, noting the increase of population as we see it today, I thoroughly believe we have passed the stage of low prices; that never again, barring some unusual commercial depressions, or some overproduction of one particular thing in agricultural lines, never again will we see prices where they have been in the past. We have reached the point of high prices in this country, because we are fast reaching the conditions of an old country, and in all old countries, Germany, France, Sweden, Denmark, Norway, England, all the countries I know anything about, high prices prevail. It is true that people in those countries are better economists than we are. The American housewife probably is as good an economist as she can be under the conditions under which we have grown up, but she will have to study economy as her sisters in Europe do if she is going to keep the family expenses within the income, and that should be the object of every good housewife and of every good business man, of every family, to keep the expenses within the income, and it can be done. But we American people have been the most extravagant people on earth. This nation was the richest inheritance God ever handed out to any people. Never to the people of any country as to our American people was He so bountiful in His gifts. It is just like giving our sons and daughters a lot of money, they want to use it, though they do not need it, and they soon grow extravagant. The good Lord handed out to this people immense resources and we became too liberal; we are all too busy making money to watch the other fellow very much, our laws are made liberal, and so our Rockefellers, Morgans, Harrimans, Carnegies, Weyerhausers, Armours and Hills gathered in a little more than their share, but we must give them the credit of saying it was brain work that did it, not one of those men has been lazy.

Now the time has come to call a halt; we have given away too much, Uncle Sam has not only been liberal with his mines, timber and water powers, that we have felt were almost inexhaustible in this country, but he has been liberal with the American farm land. He has stood ready to give every man a homestead, and the man who has taken the homestead first has cropped out the fertility and then sold out that homestead and moved on to take the fertility out of another. But the day has passed when we can be so liberal and we have got to get down to the conditions that govern in an old nation, because a great deal of this original wealth has passed into the hands of private individuals. We must begin to call a halt, to conserve, to call upon the farmer as well as others to do his duty, and that is one reason why our farmers gather together, that is, to discuss how to conserve the fertility of the soil. It is the farmer's duty to hand down to his sons and daughters acres that are just as fertile as they were when he took them and to do it by a system of good farming, intelligent culture, and it never again can be done under this system which we have followed so largely in the past, of squandering these resources.

A Word to the Boys and Girls.

Now I am going to say a few words to these boys and girls, a very patient lot of boys and girls; they have listened very quietly and steadily to what we have been saying. There are

very many here that are school boys and school girls; I do not know whether any of them live on farms or not; they look smart enough to be farmers' boys and girls and I hope a good many of them will be farmers, because there is no question about it, there is no better place for a boy or a girl to grow up than on a farm. If we follow up the statistics of the business people of this country, the latest statistics go to show that eighty-eight per cent of the leading business men and women in every line of life in this country were once farmers' boys and farmers' girls. If the farmer has been called upon in the past to furnish eighty-eight percent of the motive power, the brain power of this country, he will be called upon to furnish just as much in the future, and therefore he should do his very best for his boys and girls.

Now if the boys and girls of the country have made such a mark in the world, even if you are raised in town, why can't you go back to the farm?

You are in school; you sometimes think your teachers are a little hard on you when they urge you to get better lessons, to store more up in your minds, when they urge you to open up your eyes and see things as you go along, as you walk through your parks and streets they want you to open up your eyes and see the trees, the flowers, the birds, all the wonderful processes of nature, and come back to school and tell them what you have seen; when they do that they are teaching you a great principle, the great principle of seeing things, of hearing things as you go through the world. Go back to school tomorrow morning with your mind made up that you are going to strive to learn your lessons better, that you are going to open your eyes wider to see the things that the great God has planted all around you, to watch the opening of the buds, the leaves coming out, to watch the flowers as they develop into fruit, watch the raindrops as they fall and go into the soil and think how they go down there to feed the grass roots and the flower roots and the tree roots, and when you get to thinking along those lines, with your eyes open, then you are beginning to gather in an education that you cannot always get in books.

Do not be discouraged, though your parents may be poor, though you know that after you get through a few of these grades in the city schools you may not go any farther; go as far as you can, get all the education you can in the school and from books, but do not be discouraged if you have to stop before you get very much of that.

You have heard of Thomas A. Edison, the electrical wizard, the greatest inventor the world has ever seen. Do you know that he only spent three months of his life in school, but he kept studying as he went on and earned his living, and by this study and investigation and by doing the thing he had to do the very best he knew how, by learning little by little, he has become the great inventor he is and today, Harvard, Yale, Oxford, any of the great universities in the world, would be glad to claim Thomas A. Edison as one of their productions.

Abraham Lincoln had practically no education in schools, but he had the great practical education of life, because he gathered it in by opening his eyes to see things; by taking the best books he could get hold of, reading, studying them; when other boys were fooling away their time Abraham Lincoln was storing away knowledge in his mind.

You hear a good deal about John D. Rockefeller. We are not praising him because he is rich; he only spent a few months in school, but he always had a purpose in life.

James J. Hill left school when he was twelve years old; his people were

poor, Mr. Hill was sent into a store in the city of Guelph, Ontario, to work for very small wages, but he kept busy, he kept thinking, he kept reading, he read about the advantages of the great northwestern country, and he came over to St. Paul, but he kept thinking and working, and now he is known as the greatest railroad builder the world has ever seen. I am not praising Mr. Hill because of his wealth, but because he had a purpose in life and because he worked to that purpose.

There are many other men whose names are familiar to you who have educated themselves in the same way, therefore do not be discouraged if you cannot go through high school or college or university, but remember that many young men have procured an education outside of the schools, have helped themselves. Many a one has worked his way through college and has made the greatest success in life. Do not think that all of the success there is in life is in making millions like our Rockefellers, Morgans and Harrimans, do not think that all the success there is in life is in making an honored name, even like the name of Washington or Lincoln. Success in life comes from doing the things you find to do in the very best possible manner; in making yourself a necessity wherever you are. The world will pay you for your services and pay you well if you prove to the world that you are a necessity in the position which you are filling. It is honorable to dig a ditch straight; it is honorable to keep a few miles of railroad track in repair; it is honorable to farm ten acres or fifteen or a hundred—a thousand, acres of land well, and it is dishonorable to do any of these things poorly, and if you keep in your mind as you learn your lessons, as you do your work, that everything that is worth doing at all is worth doing well, then you will be a success in life.

I thank you.

Music, Orchestra.

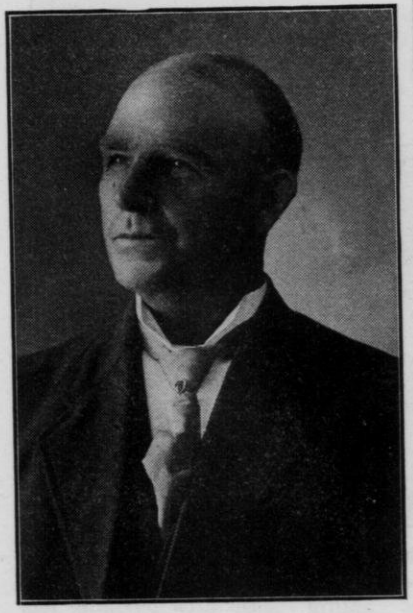
Adjourned till next morning, Wednesday, March 16, 9:00 a. m.

SECOND DAY.

The Convention met at 9:00 o'clock, Wednesday morning, March 16, 1910. Mr. F. H. Scribner in the chair. Prayer by Rev. G. A. Anderson.

SEED G RAINS.

J. O. Parrish, Plymouth, Wis.



Mr. Parrish.

In these days when the dairy cow looms so large as a source of farm income, many are tempted to neglect another and a very important factor in farm economy, to put all their eggs in one basket.

I believe every farm should produce the grain that is fed on it, or grain that can be turned into cash to bring back to the farm such feed as has to be purchased, and in order to do this profitably, only the best grain must be sown; indeed we cannot afford to sow anything but the best.

How to Secure Good Seed.

The question of good seed has always been an important one, and with the increasing demand and the advance in land values, it is of increasing importance.

The question is: How to secure and keep good seed.

The man is always the important factor in every farm operation. He must have initiative and power and character in order to be successful.

There is, as most of you know, an experimental farm in this state, maintained at public expense, for the propagation of good grains and corn that can be profitably grown in Wisconsin, and the methods employed are worthy of note.

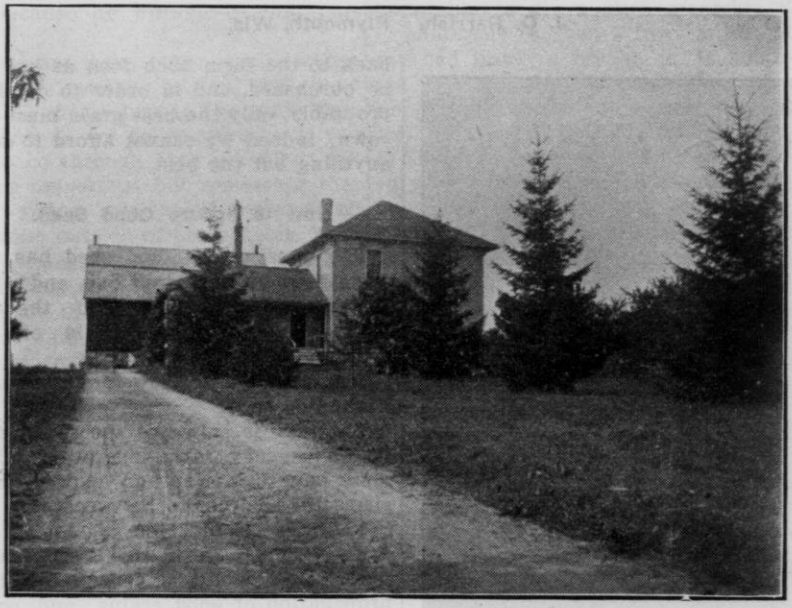
Barley.

We will consider the method em ployed in the propagation of barley, which is our chief export grain, and I may say the same methods are employed with all small grains.

Professor Moore secured seed of a barley raised in Germany and known as "Oderbrucker" barley. This grain was sown in a carefully prepared plot.

From this plot at harvest time the finest heads were selected and sown again the next year. This process was repeated for three or four years and the product was a grain that easily outstripped in yield and quality all other grain of its kind, and fully eighty per cent of the barley sown in the state today is this excellent variety.

Noting this improvement, Mr. Moore continued this process for a period of twelve years and the result was the splendid product known as Wisconsin Pedigree barley.



Farm home of J. O. Parrish, Plymouth, Wis.

You will remember I said something about character. Those of us who are parents like to instill in the hearts of our children so much of good character as shall make them noticeable men and women when we send them out into the world.

These men who have this work in hand have done this with this splendid grain. At the Corn Show, held in Omaha, Neb., this winter, this barley carried off first, second, third and fourth prizes for threshed grain and the Grand Sweepstakes for sheaf barley. A row of sheaves of barley more than half a block long was exhibited and as the judges passed down the row and came to this barley, they stopped, attracted by its excellence, went on over the rest, but came back and unhesitatingly awarded the prize to the Wisconsin Pedigree barley. It had excellence, which easily distinguished it, character, if you please.

This barley is already famous and orders are pouring in for this grain to every man who has been fortunate enough to secure the seed.

Corn.

In the propagation of corn, an attempt has been made to produce va-

rieties that will ripen in the different portions of the state. The "ear to the row" method has been followed. A number of good ears are selected and after discarding the imperfect kernels from butt and tip, the perfect kernels on each ear are planted, each in a row. The seed corn is saved from the rows that produce the finest ears. This process is carried on until the desired perfection is attained and the result has been the production of three splendid varieties of corn: (1) Wisconsin No. 8, suitable for the lake shore and northern counties, a sure ripener and a very fair producer; (2) "Golden Glow," or Wisconsin No. 12, about five days later than No. 8, a larger stalked variety and a better yielder, and (3) "Silver King," or Wisconsin No. 7, a variety a little later, but a sure winner in the localities in which it will ripen. All three of these varieties are corn of character.

Care of Seed.

Now, as to these methods. The best thing about them is there is no patent on them and any man who is willing to exercise the same loving faithfulness may have the same results, or results as good.

All may not wish to go into the same detail, but each farmer should have a seed plat, if he is not willing to keep his entire crop clean, which can be kept free from noxious weeds, and unmixed with other grains, and from which next year's seed can be saved.

All grain should be carefully cleaned and graded for seed, and oats and barley should be treated with a formaldehyde solution for the prevention of smut. This is very cheap insurance against loss and should not be neglected. It is not necessary to repeat this every year but under ordinary conditions once in two or three years is sufficient.

All grain and corn should be subjected to a germination test before sowing to find if it will surely grow.

The grains thus propagated are distributed through the agency of the Experiment Association, which is composed of members who have had some University training. The organization numbers sixteen hundred at present and the farms of these men are intended to be distributing centers.

Very beneficial results have come to both the individuals and their communities by this means. One boy of eighteen sold in a single year three hundred bushels of Silver King corn at three dollars per bushel. The best is always worth a premium, and the live producer can always find a market at a premium. The careless farmer is a tax upon his careful neighbor, for he not only cheats himself by his careless methods, but his community is affected. If the first carload of barley shipped from a station is of inferior quality, the matter is noted by the wholesale or commission man and future shipments from that point are watched.

Farmers must come to be better business men and more alive to the possibilities of their business. Too many are simply hitting the high places and dollars that are theirs by right are escaping them. The world looks to the farmer for food and clothing, yes, but they look for more. They look to the farms of the nation for character, for good citizenship. Let us so conduct our farm operations that they shall be fully assured of the former and let us exceed their expectations in the latter.

DISCUSSION.

Mr. Martiny—What is the most practical way for a farmer to prepare his seed oats?

Mr. Parrish—We treat ours with formaldehyde before sowing and clean them.

Mr. Bradley—Do you turn the fanning mill fast or slow?

Mr. Parrish—We try to use our brains with our muscle in this matter.

Supt. McKerrow—Does that mean fast or slow; does your brain work fast?

Mr. Parrish—We turn our fanning mill and use our screens so we shall get only the very best seed and fast enough to throw all light grain over and screen it so all small, imperfect grain shall drop through.

Mr. Bardley—When it is average oats, about what percentage do you expect to get out of it for seed?

Mr. Parrish—About seventy-five per cent of our oats I think we use for seed. We are raising Swedish select oats and we find we have a good proportion of very sound seed.

A Member—Do you find the Swedish select the best oats in your vicinity?

Mr. Parrish—The very best oats I have ever raised. We grade by using the screen, that removes the small oats.

A Member—After treating the oats, how long will that treatment last?

Mr. Parrish—From one to three years, according to conditions. You know weather conditions sometimes are better for the growth of the smut than they are at other times, but if it is done thoroughly, once in two years is enough.

A Member—How do you treat your oats for smut?

Mr. Parrish—We have a tank which we place under a beam to which we attach a rope and pulley. Our outfit consists of a tank and an old door, which we use as a draining table, and two gunny sacks. We take about one hundred pounds in a sack, we can handle that easily; we fill the sack nearly full of grain, attach that to this pulley rope, draw it up and dip it in the solution in the tank. The solution consists of a mixture of fifty gallons of water and one pint of formaldehyde, that is for oats. We use it a little stronger for barley, but we don't use it too strong. One pint to fifty gallons of water is strong enough for oats. The oats are immersed in that for three minutes; and it will remove all the smut. Then the bag is drawn out and put on the draining table, which is placed in such a way that the water drops back into the tank again. We have two sacks and keep them going. The oats are taken out of the sack and spread out on the floor of the barn, which has a southern exposure, we open the doors, spread them out on the floor, and the oats are shoveled over until they are pretty well dried.

Chairman Scribner—Do not make the mistake that one of my neighbors did; he put in two pounds of formaldehyde and killed every oat. He seeded them with grass seed and he had to put another crop on.

Mr. Parrish—It costs me forty cents for formaldehyde and about two hours' work to treat my seed oats, and I consider that good, cheap insurance.

A Member—Do you have to regulate the seeder specially for planting after treating your seed?

Mr. Parrish—Yes, you know if oats are wet, they will swell up, and so you want to open up the seeder a little bit, but you can get a quicker germination if you do not try to dry them out thoroughly.

A Member—I think the weather and the soil have a good deal to do with this oat smut. I never treated my oats for smut, but I notice some years in one particular field I will have oats that are pretty smutty, while in another field there will not be any smut at all. How is that, do you suppose—seeded out of the same lot of oats?

Supt. McKerrow—The gentleman answers his own questions; in the conditions of seed or soil, or both. You

and I may be exposed to small pox, I may take the disease and you may not, because you are not in the condition to take it. If conditions are not right for smut, you get very little, but at the same time if you treat the oats for smut, you make sure there will be none at all.

Mr. Parrish—I have never seen smut appear the first year in oats that had been properly treated.

A Member—Can you kill smut entirely?

Mr. Parrish—Yes, on oats. On barley you cannot, with the formaldehyde treatment; that is, there is a free smut that cannot be killed with formaldehyde. That has to have what is known as the hot water treatment, which is a little more work than most farmers care to attempt.

Supt. McKerrow—It seems to me that where oats are sown on old oat land that there will be a little of the spore living there in the soil. Perhaps that was what was the matter with our friend over here.

A Member—I do not sow oats on the same land two years in succession.

A Member—What precautions would you take to prevent smut on corn?

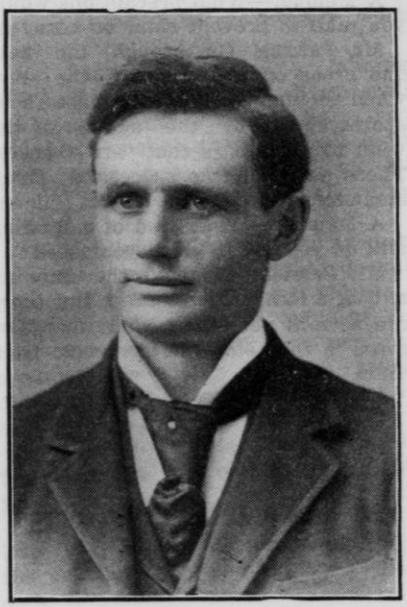
Mr. Parrish—Go through the field and break off and destroy the ears when the smut appears, because these spores spread by the action of the wind to other ears that are exposed. There has been no successful treatment for seed corn.

A Member—What kind of a fanning mill do you use to clean your seed?

Mr. Parrish—We have the fanning mill of a local manufacturer, but there are several very good kinds manufactured in the state. I have not tried them.

CORN CULTURE.

W. F. Stiles, Lake Mills, Wis.



Mr. Stiles.

Corn, or maize, as it is more properly called, is a semi-tropical plant, but by selecting and breeding, varieties have been secured which yield profitably far to the north of its natural home. Much of our own state is not in what is termed the corn belt, still we find this crop is profitably grown in nearly every county.

Season and Condition of Soil Govern Maturity.

The development and maturity of the crop depend primarily upon the season and the condition of the soil. By condition of the soil is meant not only its chemical but its mechanical composition as well.

In regard to the season, the farmer has no control, but the condition of the soil is to a marked extent in his hands.

Three of the main essentials of the soil in order that it produce a good corn crop are warmth, power to absorb and hold for future use a certain amount of water, and that it contains the proper elements of plant food in an available form.

Corn, like all other farm crops, requires a large amount of water during its growth. The farmer has no control over the amount of water which falls on his farm, but he can, if he employes proper methods, control to a marked extent the distribution and movements of the water in the soil.

Now, as corn requires a comparatively warm soil for germination and growth and an abundance of water and available fertility to mature it properly, our work as farmers in growing this, the greatest of all our crops, is to so handle the soil as to obtain as nearly as possible these results.

Two ways that will aid in increasing the temperature of the soil are, first, to have a certain amount of decaying vegetable matter incorporated in it, and secondly, because dry soil warms up much more readily than wet, it aids greatly in increasing the temperature to remove some of the water. This is especially necessary in the surface portion where the seed is to germinate.

Corn Should be Grown in Rotation.

As an aid in securing the results which have been mentioned, I have adopted the following method in growing the crop.

Grow in a rotation with the other crops, in my case it is a three-year rotation, corn, small grain and clover. The farm manure is drawn during the winter and spread, not too thick, on the fields which produced clover the previous season and are intended for the corn crop. My practice is to plow in the spring, but I believe that in many cases it is advisable to fall plow, and where the land has not been previously manured, to top-dress it with a coat of fine manure and mix it in the soil in the spring with a disk harrow or some similar tool.

Heavy clay soils should not be plowed when they are too wet in the spring. Do not get in too great a rush with the corn crop; remember it requires a warm soil for its germination and growth.

Preparing the Soil for Corn.

In preparing the soil for corn, it is usually best to follow the plow with a spike-tooth harrow as soon as the soil is sufficiently dry to crumble nicely, always harrowing the first time the same way the land is plowed.

Plant in checks for husking corn and in drills for the silo or fodder. The surface should be thoroughly pulverized and mellow before the seed is planted and sufficiently warm to insure rapid germination.

Unless prevented by rain, the field should be thoroughly harrowed just before the plants come up, thus killing the weeds and breaking up the crust if it has formed at the surface.

Cultivation.

After the corn has come up, do not harrow for a few days; be guided by the growth of the plants and condition of the soil. Some fields never get in proper condition. In most cases it is advisable to harrow when the plants are from two to four inches high. I prefer to harrow just after noon, using a straight, fine-tooth harrow.

The rule to be guided by in cultivation in most cases is to keep the surface loose and mellow in order that it may act as a mulch to prevent the water in the soil from coming to the surface and being evaporated. The crop in most cases will need this surplus water later in its growth and by proper cultivation of the surface, much of it can be held in store for future need.

Farmers often cultivate to eradicate weeds, and certainly this is a good practice, as it requires a good soil to produce a good corn crop and a crop of weeds at the same time, yet the destruction of the weeds should not be the primary cause for cultivation. The conservation of soil moisture should be the first consideration in the cultivation of the crop, and the killing of the weeds the second.

To keep a surface mulch on the fields during the greater part of the season, most years, is one of the secrets of successful corn culture. This mulch should not be deep, but it is essential to see that when it is destroyed in any way it is again renewed. One of the ways by which it is most easily destroyed is by rain. Water falling on the soil compacts it and except the farmer in some way loosens it, the capillaries in the lower portion of the soil become united with those at the surface and in a dry time the water from below is pumped to the surface at a rapid rate and lost.

A cultivator with many small shovels is preferable to one with large ones. Never is it wise to cultivate deep close to the corn, and during the last part of the season all of the cultivation should be shallow.

How late it is advisable to continue the cultivation will depend upon the season. The rule should be in a dry season to keep a dirt mulch or blanket at the surface as much of the time as possible.

Harvesting the Crop.

When to harvest will depend to some extent upon the purpose for which the crop is intended. If the grain is the chief consideration, then it should be allowed to ripen sufficiently to insure its keeping qualities, but as the stalks contain over thirty per cent of the feeding value of the crop, it should not be left in the field until the stalks become worthless. When it is intended for the silo, it should be harvested when the grain is just starting to dent and the lower portion of the stalks are beginning to dry. Corn intended for fodder, especially in the southern part of the state, should be planted later than when intended for grain for the reason that then it need not be cut until after the warm, rainy weather of September.

DISCUSSION.

A Member—If there is any quack grass in the soil, do you think it is advisable to plant corn in drills for the silo?

Mr. Stiles—I cannot answer from experience, I never have been troubled with quack grass, but I should judge, if you think you can kill the quack grass by planting in checks, it would be advisable to plant a few more kernels in hills. Why I prefer to plant in drills is because I want to get as large a tonnage as possible, not as large a proportion of ears.

Mr. John Imrie—Some of us plant about two and a half feet apart one way and three and a half the other, because we find by checking that way we can get rid of the quack grass; that is, we can keep the quack grass out of the rows. I think it would be pretty hard to do anything with quack grass in drilled corn, and we have found it necessary to do something about it in St. Croix county. How deep would you cultivate corn the first time?

Mr. Stiles—I wouldn't like to have it more than two or two and a half inches.

Mr. Jacobs—You said it was important to remove the moisture. Now, doesn't it make a difference how that moisture is removed, whether it sinks away into the ground or whether it evaporates into the air?

Mr. Stiles—I mean removed from the surface soil. For instance, you plow it; that checks the capillary action and by cultivating the surface the sunshine and air enter and gradually warms the upper portion where the corn is to be planted, thus insuring a much more rapid germination of the seed. At the same time it checks the evaporation from below.

Mr. Jacobs—Does not checking of evaporation tend to warm up the soil, whereas if it was allowed to evaporate from the surface that evaporation cools the soil? Suppose we had fall plowed, wouldn't the working of that soil in the spring, the stopping of evaporation, make that soil warmer than if the evaporation had continued?

Mr. Stiles—That is just what I have been trying to tell you.

Mr. John Imrie—Isn't that also a reason why a good many practice fall plowing, because we think we get a little more rapid action in that particular? By keeping the soil stirred in the spring, we think we can conserve the moisture better where there has been fall plowing. That is my idea.

A Member—How deep do you plant your corn?

Mr. Stiles—It depends somewhat upon the kind of soil. I like to plant it deep enough to get down into the moist earth so it will germinate.

A Member—What is the difference between check rowing and drilling in tonnage?

Mr. Stiles—It is pretty hard work to figure that out, but as a rule one could get about ten per cent more in tonnage by drilling than by putting in

in checks. It will depend on how thick you can plant in the checks and how far apart. I think I can get from ten to fifteen per cent more by drilling, in tonnage, than by checking. By checking in a dry season you can keep the weeds down better and you can conserve moisture better.

A Member—How much seed do you use per acre in drilling?

Mr. Stiles—About a peck, depending on the size of the kernel.

A Member—Don't you think you get rather better ears for your silo in proportion to the stalk in checking than from drilled corn?

Mr. Stiles—Perhaps you might get better ears, but I never have practiced that method. I work the soil up thoroughly before planting, so I do not need to cultivate the soil as much as would be necessary if planted sooner.

SMALL GRAINS.

Supt. Geo. McKerrow, Madison, Wis.

Wisconsin has passed out of the class of small grain producing states for the market, and yet Wisconsin does and will continue to produce a good deal of small grain, for feeding purposes we hope, mainly.

Wisconsin, when we look the records over back a good many years and average up the yields of the different kinds of small grains that we grow in Wisconsin, stands in the front rank of states for producing an average per acre equal to the best; in fact, surpassing most of the states when we take all classes of small grains, excepting the states in which irrigation is used in the production of these small grains. Yet that fact should not prompt Wisconsin farmers to go back to the old methods of thirty and forty years ago to try to make a living in producing small grains, because we would again impoverish our farms as we did in that period of long ago, and we do not want to go back to those conditions. Notwithstanding the fact that Wisconsin seems pretty well adapted to the growing of small grains, yet the Wisconsin farmer has to be careful; in fact, it has been his carefulness that has increased these yields until we stand up in the front rank.

We find in the state of Wisconsin more clover in proportion to the cultivated acreage than any state in the union; we find live stock husbandry has forged to the front until we stand in the front rank of dairy states, and the reason we stand so high in the average per acre in these products is because of rotation of crops, dairying, and the use of farm manures on our soils. Now, we do not want to lose sight of that and we want to apply those principles as individual farmers.

Three Things to Consider in Growing Grain.

There are at least three things we must consider in growing a good crop of small grains, first, the seed—that was mentioned here by Mr. Parrish; second, the soil, because the soil has to feed the seed;—and we understand, just as do all live stock breeders, that with seed there is as much in the feed as there is in the breed—yes, more, because you can take the best bred live stock and in a very short time make the meanest kind of scrubs out of them by a poor system of feeding,— **starvation, if** you please,—and so you can take the best bred grain (and we have had **grain**

breeders the world over as long as we have had stock breeders), you can take the best bred grains, not only the grains that have been developed in one, two, five or ten years, but lines that have been developed by careful selection for fifty years, and you put that grain on poor soil lacking in the feed elements which that grain needs, and you can make the meanest kind of a scrub grain of it in one or two generations.

So I am here to say while I believe in breed, I believe still more in feed, and the feed for our grain must come through the soil.

Then, thirdly, there is culture, cultivation. In other words, we must put the feed product which is in the soil into favorable form so these plants can drink it in in the form of soup, if you please, for a plant eats no solid matter, it can only take the elements needed to build it up in a diluted form, as it is carried into the little rootlets by water, and cultivation has a great deal to do with that operation. So those are the things we must consider.

The Seed and the Soil.

First, as to the seed and its adaptation to the particular soils on which you are farming. Wisconsin has varied soils, here along the lake shore we find heavy clays and in some parts of the center of the state heavy clays, hardwood ridges, and then in other parts of the state we find prairie loam, the south particularly, and as we go northward, we find a great deal of sand and sand loams, and those are mixed in with the clays clear to Lake Superior, which is bordered with a heavy red clay, and the adaptation of the grain to the kind of soil and the adaptation of the seed to the richness of your soil are things you should very carefully consider.

True, we have an Experiment Station down at Madison, and we have others in the north. Soils differ, climatic conditions differ and they find that some of the grains that succeed best at our Experiment Station at Madison do not do so well away in the north and yet some of them do.

Now, the farmer must study that question for himself and adapt the grain he grows to his own particular farm.

We hear a great deal about No. 7 corn, or, properly speaking, Iowa Silver Mine corn, corn that made a reputation in Iowa before it came to Wisconsin, and in many parts of Wisconsin, and presumably it is one of the best corns we can grow, but it is not the only corn. On the Experiment Station at Iron River, which is a light, sandy soil, a flint outyields that No. 7 dent, or Iowa Silver Mine. Those of you who read the "Wisconsin Farmer" —and I suppose you all do—remember about that, at this Experiment Station at Iron River. Mr. Delwiche, the superintendent of that Station, writes in an issue of the "Wisconsin Farmer" a few weeks ago that a flint corn—we call it Michigan Smut Nose on our farm, I think Professor Moore now calls it Wisconsin No. 15, if I remember right —but he writes that that corn grown at that Station yielded fifty bushels of shelled corn per acre; the No. 7, or Iowa Silver Mine, a dent corn which is generally considered a better yielding corn under southern Wisconsin conditions, yielded only thirty-seven bushels to the acre.

The No. 8, an early yellow dent which is considered the dent corn for the northern regions, yielded forty-seven bushels per acre.

Now, what made the difference? I do not stand here to claim that flint corn is a better corn for Wisconsin than these other corns, but it evidently is better adapted to those peculiar conditions, and so I say the farmer must study.

The oats mentioned here this morn-

ing as yielding well on Mr. Parrish's farm, the Swedish Select, were sent out originally, I think, as Wisconsin No. 4, but have got back to the old name given them by the Department of Agriculture, by whom they were imported, the Swedish Select, and which are pretty well known all over the Mississippi Valley, those oats on our farm proved a failure, grew too rank, lodged down, and we had several kinds of oats that outyielded them, and so they have proven on some other farms in Wisconsin, because, evidently, the soil was too rich, particularly in nitrogen, for that rank growing oat. Even the Kherson, the early short-strawed oat, will yield better on our land than will this Swedish variety, so you see the farmer must particularly study for himself; watch the Experiment Station, watch the seeds they send out, try them, watch the seedsmen, even, read their catalogues, but do not always buy the highest-priced seed.

I have a German farmer friend over in Milwaukee county; he used to come to our farm about once in two years to purchase a pig and while he was there, if I were home, we always had a visit, looked the crops over and discussed everything. We were looking at a very nice field of oats one day and he said. "What kind of oats is that? It looks pretty good." I said, "Yes, we call those the Clydesdale, because the seed was imported from Scotland with an importation of horses, and a friend of mine having them to feed the horses coming across sowed them; they grew well and he gave me enough seed to sow this field." He said, "Well, that looks good. Did you ever try Bonanza oats?" I said, "No, I had not." "Well," he said, "that was a kind that wouldn't lodge, that wouldn't rust and that gives big yields." I asked if he grew it, and he said, yes. I asked how long he had been growing it, and he said, "Well, this is the first year." Then he went on to explain that he had paid a seedsman two dollars a bushel for enough to sow ten acres. I said, "Now if those oats do not lodge and do not rust and yield well for you, I want forty bushels of that seed." He looked at me and said, "I got to get a good price for that seed." I said, "I know that." "I guess I have to have a dollar a bushel." I said, "All right, I will give you forty dollars for forty bushels, provided they don't rust or lodge." "Well, I see you in the State Fair and I tell you how they come out."

But the State Fair came and I didn't see my friend; it ran on into the winter and I sat down and wrote him a letter, and asked how the oats turned out, and he wrote me a lengthy answer; he explained that as his good wife was sick at the time of the State Fair he could not get there. Then he went on to talk about the oats, and he said, "Them oats lodged; them oats rusted; them oats didn't yield so good as my old oats, and I think you don't want the seed," and he wound up by saying, "It is strange what kind of a God them seedsmen will make out of the devil."

Mr. Parrish touched upon the fact that we should have good seed, a good quality of seed, and he said in answer to a question that about seventy-five per cent of his oats were all he aimed to sow. I can remember very distinctly a great many years ago when, as a farmer's boy, I prepared a half bushel of spring wheat to exhibit at the State Fair in Milwaukee with the purpose of winning, not only the first prize, but a special prize of twenty-five dollars which was offered by the Chamber of Commerce, and that half bushel of wheat took some five or six bushels of the best of the wheat that grew—because we cut the wheat with a cradle, shocked it up carefully and kept it in that shape to keep it dry, and then with the old-fashioned flail

took a few raps at each bundle, so the big kernels that were bursting out fell out. We had five or six bushels of these large kernels, we put it through a fanning mill and blew it and graded it and re-graded it, until we had it down, I presume, to about two-thirds or three-quarters of a bushel, and then we hand-picked it to get the poorest out, and sent only the best, and before sending it we scoured it, not through a scouring mill, but in a sack, by tramping and drying by the kitchen stove, and it won easily.

Mr. Jacobs—No wonder you have been getting premiums on sheep a good many times since.

Supt. McKerrow—I was getting my education then.

The point I wish to make is, we sowed that wheat with good wheat of the same variety which had not been so well graded down in cleaning, and the difference in the yield was at the rate of some eight or nine bushels per acre. I believe we should get our grain down and not sow over forty or fifty per cent of the very best, because the best is none too good. Our choicest breeding animals are not over ten per cent in the best bred herds and flocks.

Well, the chairman calls time and I must stop; I suppose I must set a good example.

DISCUSSION.

Mr. Hopkins—How do you like the Kherson oats?

Supt. McKerrow—We have oats we like a little better than the Kherson, and still they do fairly well. The Lincoln oats we consider better, the Probster are good, though not the best with us.

Mr. Martiny—Have you had any experience in getting oats from the irrigated districts of the west and sowing those?

Supt. McKerrow—We have not, and I believe from my experience in getting all kinds of grain, that we should aim to get our grains from nearly the same class of soil that we are going to sow on, nearly the same conditions. We might experiment with grains from other conditions, but I would not buy them and put in a full crop and expect the best results.

Mr. John Imrie—We sowed Canadian Banner oats. With us Canadian oats are way ahead of the other varieties.

Supt. McKerrow—The Banner have yielded well at the Ontario Station at Guelph.

Mr. John Imrie—On my brother's farm and mine, we threshed out somewhere about seventy-three bushels per acre.

Mr. Roberts—I tried the Wisconsin No. 4 two years ago with the same treatment which Mr. McKerrow gave on his farm, and they did not do well for me at all, they all went down.

A Member—Do you find any danger in using seed oats raised on sand, or clay?

Supt. McKerrow—Ours is all clay and I never have bought from a sandy district, because, as a rule, they do not have good oats in a sandy district.

Chairman Scribner—Is there any one in the audience who has had any experience along that line?

Mr. Bussey—We have black soil and also clay, and in the rotation it goes from one to the other and it works out all right from the clay to the black.

A Member—Have you ever tried the sixty-day oats?

Supt. McKerrow—Isn't that another name for the Kherson?

Mr. Convey—There are two kinds of sixty-day oats—the sixty-day oats put out by the Iowa Experiment Station are just the same as the Kherson. There is another one put out by North Dakota.

Supt. McKerrow—Like some other seeds which go the rounds of seedsmen

and some of the professors at our Agricultural Colleges, they change in name but the oats have not changed much. Our sixty-day oats from North Dakota are the same as the Kherson we bought from Mr. Convey.

A Member—Doesn't that straw grow a little fine?

Supt. McKerrow—Yes, the straw grows rather fine. If your land is very rich, it is apt to grow rank enough but they do not lodge badly.

Music, Orchestra.

MIXING CONCRETE.

L. E. Scott, Stanley, Wis.

In twenty-eight years, or within the remembrance of a comparatively young man, the use of concrete has increased from forty-two thousand to more than fifty-one million barrels, or over twelve hundred per cent. While the greater part of this is used in the larger construction, such as dams, retaining walls, bridges and sky scrapers, the farmer is fast learning that for many purposes on the farm it is both the cheapest and the most durable material to use, and that, with a little easily attained knowledge and native gumption, he can himself construct many useful things with it without the employment of the artisan or expensive labor.

Materials.

Concrete is a mixture of cement and aggregate. Cement is of two kinds—natural and Portland. Portland cement is the stronger and more uniform and is the only one recommended for the farmer's use, and it is probably safe to take any one of the leading brands now upon the market.

Aggregate is the coarser material used in concrete and may be sand and crushed rock, or gravel. Sand or gravel should, in all cases, be clean and free from clay. Bank sand is to be preferred to that from beds of streams, as it is sharper and will make a better bond. Coarse sand is better than fine and requires less cement. The coarser stones should be reasonably hard. Rotten sandstone prevailing in some parts of the state should not be used. Crushed lime rock makes a very good concrete, but for a given amount of cement, bank gravel will make more and better concrete and is good enough for any farm work, if properly mixed and placed.

A Concrete Mixer.

I have a mixer which any farmer can build. Make two round heads of ordinary two-inch plank thirty-six inches in diameter and nail a sheet of galvanized iron around it. The common size of a sheet of galvanized iron is twenty-eight inches by eight feet. Lap it one inch on each plank and it will leave twenty-six inches in the clear and lack about sixteen inches of coming together at the ends, leaving an opening through which the material may be put in or taken out.

Over the iron, spike two by fours cut thirty inches long, making a lid of the same material to fill the opening which is buttoned firmly in place. Have the blacksmith shrink on a flat iron hoop on each end, through one of which have him bore twelve one-half inch holes and drive in some pieces of iron rods for sprockets, around which place a sprocket chain, gearing down to a seven or eight-inch sprocket

wheel at the opposite end of the frame. This shaft may be turned by hand, but it is better to put on a large pulley and run it with a small engine.

The gudgeons are three-inch gas pipe nipples screwed into a flange coupling with iron plates on the inside. Dry, hardwood plugs are driven into these nipples to stiffen them, boring an auger hole in one, through which to admit the water.

ficient water for the mixture without stopping the machine. By the time it is run in, the mixing is complete. We have a slush-box on skids, which we slip under the mixer and dump the whole batch into it, pulling it with a horse to where we wish to use it.

Molds.

The molds or forms may be either of metal or of wood and should be

Mr. Scott's concrete mixer.

This is done by having a shelf even with it, upon which is a large pail or keg with a three-fourths inch gas pipe reaching the length of the mixer, with small holes bored in the bottom of it for its entire length.

Now, put in as much gravel as you wish to mix with a bag of cement one-sixth or one-fifth of a yard, according to the richness of the mixture. Fasten the lid and start the engine. A few revolutions will mix it dry and then slip in the gas pipe and pour in sufsmooth if you wish a smooth finish. If of wood, green lumber is better, as it is not so apt to buckle or warp.

Placing.

Concrete should be placed at once after mixing, sufficiently wet to leave the shovel and settle to place readily with but little tamping. Shoving a straight spade or shovel down next the form will serve to force back the coarser stones and insure a smooth surface.

If for any reason there is a delay in placing a batch of concrete after mixing, it should be constantly shoveled over and more water added if it becomes too stiff.

Forms should be removed as soon as the concrete is sufficiently set to keep its shape (ordinarily in twenty-four hours), and the surface brushed with a steel brush to remove any form marks.

Storing Cement.

We always feel a little safer if we have fairly fresh cement, but if you have any left over at the close of the season, store it in a dry room and in about a month roll each sack on the floor and repile. If it works up fine by this process, it is not hurt in the least. If hard lumps form which will not readily break up, then more of it should be used, if used at all.

A Sewer.

We have a sewer pipe 264 feet long as straight as a gun barrel, without a crack or a joint in it, for the purpose of carrying off slops from the kitchen, milkroom and bathroom. We dug a trench from the house to a ravine with proper grade, then placed a piece of four-inch gas pipe about ten feet long about two inches above the bottom and tramped the concrete around it. We first bolted a lever to the end of the gas pipe and, as the cement began to set, we turned this backward and forward, which smoothed and troweled the inside of the concrete, and at the same time, with a rope and pulley, pulled the pipe forward and laid another section, terminating in a man-hole (also of concrete) at the house into which all pipes empty.

This made a sewer nearly five inches in diameter, which is of adequate size if occasionally flushed.

Concrete Corner Posts.

While concrete line posts of various styles are now being successfully used by many, the corner post is of much more importance. Line posts may be easily replaced, but if your corner posts are racked, your whole fence is slacked. We have made some by digging a square hole in the ground fourteen inches square, five feet deep, with trenches on the outer sides six inches wide and three feet long, extending from the surface down into the ground at an angle of forty-five degrees, a little wider at the end. We lay in a couple of three-eighths-inch rods within an inch of the bottom of the trench, extending up into the post hole for reinforcement. We dig out a little at the bottom of the hole on the outer sides for an anchorage. We also put up a couple of rods vertically near the outer corner. To save material, we put a green sapling in the center of this hole and fill with concrete, putting a box of boards above ground for a form, entirely surrounding the sapling on sides and top with concrete. If the sapling ever rots out, we simply have a hollow post.

As this is a corner post, we fasten the wires by wrapping them entirely around it.

This post is rooted like a tree, but much more deeply and no strain of the wires will ever move it a fraction of an inch. It looks better and is better than one braced above ground.

A post may be made with even less material, without the sapling, by making it smaller. One eight by eight inches, nine feet long, with braces, if made solid would contain but six cubic feet of concrete. For the smaller post, I would suggest that in

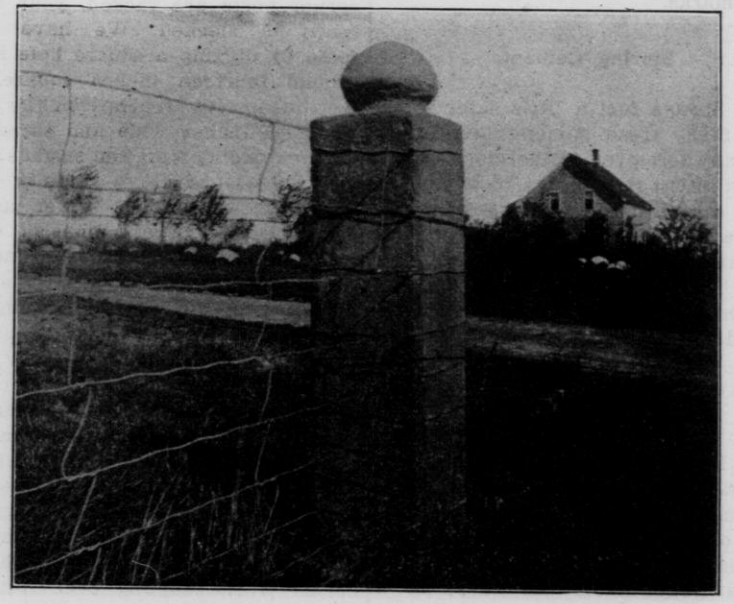
soft ground a larger face can be secured by cutting out the surface foot of earth on either side of the post before filling in the concrete, forming wings on the post.

If hooks, or, better yet, five-eighths-inch iron, are inserted in the concrete at time of making, a hinge may be made that will swing any gate and defy any amount of spooning.

the posts described above.

For foundations and basement walls, one to seven is sufficiently rich if materials are good. The latter is all right for stable floors, finishing the top inch with one to two for cow stables and one to one for horse stables of coarse sand or fine gravel.

It is unnecessary to put a finishing coat on platforms where animals



Corner post for fence and also permanently marks the corner of the homestead.

Mixtures.

One to two to four is considered a standard mixture; that is, one of cement, two of sand and four of crushed rock or gravel stone, if the gravel is screened. If unscreened, this would equal about one to five and would take about one and one-half barrels of cement to the cubic yard of concrete. This would be about right for

stand, but they should in all cases be covered with the plank, for the concrete is altogether too cold for the animals to lie upon, as it conducts the heat from the animal's body to the colder earth below, and many animals have been injured from this cause.

Work above ground requires richer mixtures than that in the ground which remains damp.

DISCUSSION.

Mr. Martiny—Can you give a simple rule to tell how much cement mixture should be put in the different kinds of gravel?

Mr. Scott—Why, that can be done by screening the gravel and weighing and then filling with water and weighing that, so as to get the proportions, but I do not think it practicable for farmers to bother with any such performance, it takes too much time. It is our practice to use just a little more cement, so as to be safe.

Mr. Martiny—We take a bushel basket, a galvanized measure, and shake it full of gravel, then take a quart cup and fill it with water and see how many quarts of water will shake into that gravel, and the water will represent the amount of cement you should have in there.

Mr. Scott—The trouble is, Mr. Martiny, you cannot fill all those spaces with water by pouring water into the gravel and sand. You have to be careful, otherwise there will be air spaces there that the water will not fill. There is nothing correct in that kind of a test.

Mr. Martiny—Do you mean to say that the water would not drive the air out?

Mr. Scott—I do. There will be some air that the water will not drive out. Then again, gravel varies so much that one would have to test each load to be absolutely correct.

Mr Martiny—But the water would fill that gravel better than the cement would.

Mr. Scott—Not so when the cement is properly mixed.

Mr. Aderhold—The void spaces usually take up about one-third of the volume, don't they?

Mr. Scott—Why, the usual mixture, where great strength is required, is one of cement, two of sand and four of the crushed rock, or gravel stones, screened gravel.

Chairman Scribner—Does most ordinary concrete work need reinforcement?

Mr. Scott—Not for basement walls or floors, no sir; but for fence posts. To illustrate where the reinforcement should be, I would say it should be on the opposite side from where the pressure comes. For silos, it should be near the outside, as the pressure is from the inside. For a corner post of the fence, it should be near the outer corner. To make the thing absolutely safe, I would put a rod near each corner and put it near the outside, as of course the pressure is inward.

Mr. Nordman—In regard to this matter of reinforcement, I do not care what kind of a structure above ground I am building with concrete, after this I shall always reinforce it, just as a matter of safety. It doesn't cost very much and it insures a good, stiff wall. We were building a wall not many years ago of concrete principally, when a heavy shower came along and while we had gone down in the ground about two feet, still that wall shook enough so it cracked some, which it would not have done if we had reinforcement in there, and the reinforcement costs very little.

Just another point, which would not apply in Mr. Scott's locality, because he doesn't have these little cobble stones which we are blessed or cursed with in our part of the country. In building our walls up there, we are able to use cobble stones to fill about a half of the space in those walls, so we can cheapen the concrete mixture by a good deal. They have to be clean, of course, as cement will not adhere to stone when there is clay on it.

Mr. Scott—I would call such a wall cement rubble, not concrete, and it is

all right for heavy walls, but large stone should not be used in light work.

Mr. Jacobs—Right along this line, at St. Croix Falls this winter, in talking with an inspector who was engaged to inspect the construction of the dam, he said the contractors were allowed to use forty per cent of stone in addition to this regular mixture of crushed stone, so they did not consider it weakened the structure in any respect to use forty per cent.

Mr. Scott—That is where the wall is large. If you were building a large basement wall, you could use quite large stone, but you could not use very large stone in a narrow wall. Those stones must be well covered and well bound.

Mr. Nordman—And as a precaution in using those stones, they ought to be washed and put in wet.

Mr. Scott—Yes, indeed. This is a comparatively new business; many things have not been worked out, but I am inclined to build walls of the lighter mixture and use good reinforcement.

A Member—Unless a man had lots of work to do, it wouldn't pay him to build a mixer, would it?

Mr. Scott—The farmer has a lengthy job, a job extending over a good many years. There is always something to do with concrete. I have planned several years' work, not constant, of course, but we plan to do a little something next year and a little more the year after. You will be making posts and you will be putting in floors, or building some new building, possibly a milk house, or something like that, of concrete. Now, this mixer is cheap. I happened to have some of the things that entered into the construction, such as sprocket wheels and chains, and I do not think it cost me over seven or eight dollars, but if you have to buy everything new, that mixer wouldn't cost you over fifteen dollars, and it would save you a great deal of hard labor.

Mr. Martiny—What would be the objection of letting the gas pipe run clear through?

Mr. Scott—It is not as easily cleaned up. It is a very simple thing to slip that in after it is partially mixed and turn on the water. It is just a drum lined with galvanized iron and the heads are about twenty-six inches apart in the clear; outside it is thirty inches. You have to make a lid of two by four's and spike them together.

Mr. Martiny—Wouldn't that run easier if you had that drum smaller in diameter and longer?

Mr. Scott—Yes, it would run easier, but it wouldn't mix as well; there wouldn't be room there for it to tumble over.

Chairman Scribner—It is the same principle as churning cream to make butter.

A Member—Is there an opening, a door there?

Mr. Scott—Yes, sir.

THE CONCRETE SILO.

John Imrie, Roberts, Wis.

The solid concrete silo has now passed the experimental stage and is coming rapidly into favor on account of its durability and cheapness. We have quite a number of these silos in our neighborhood and they are giving universal satisfaction.

We find it advisable to go into the ground at least six feet below the feeding floor, digging outward on a slant, say fifteen inches from the bottom, to give a wider footing for the wall. I have here a small model of the inside and outside forms used in building, also some cuts.

To Make Inside Form.

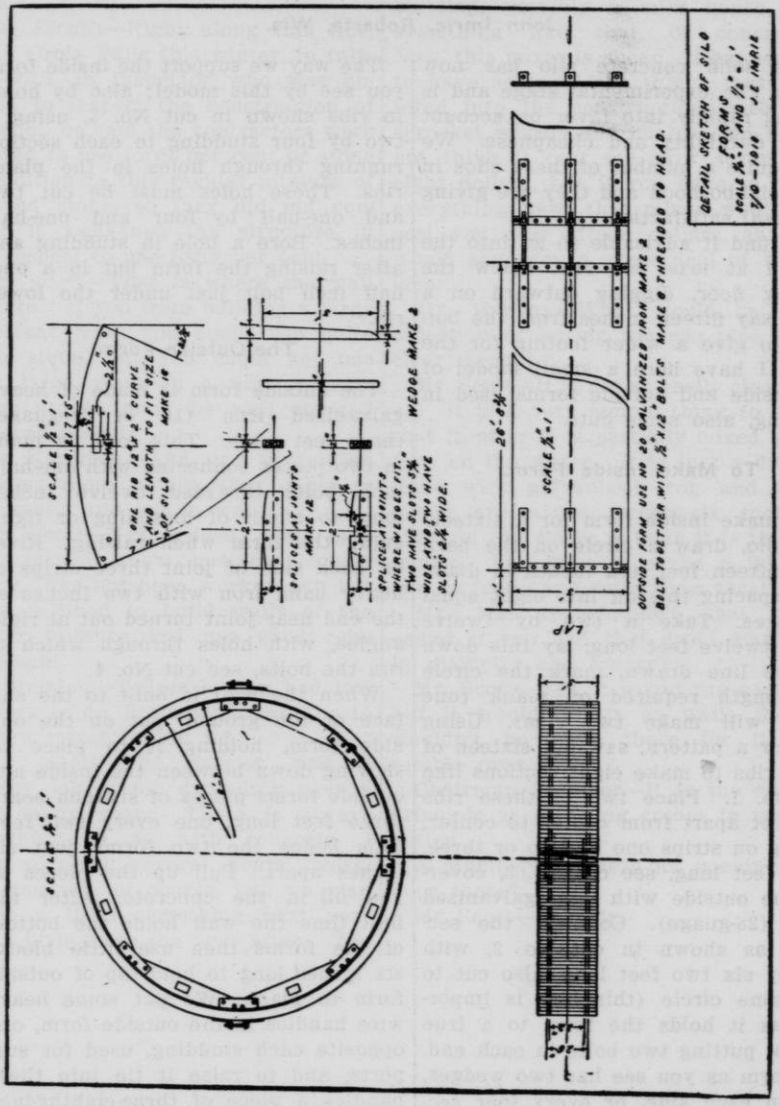
To make inside form for a sixteen-foot silo, draw a circle on the barn floor fifteen feet, ten inches in diameter, spacing this off into eight equal distances. Take a two by twelve plank twelve feet long, lay this down on the line drawn, mark the circle and length required on plank (one plank will make two ribs). Using this for a pattern, saw out sixteen of these ribs to make eight sections like cut No. 1. Place two of these ribs two feet apart from center to center, nailing on strips one by two or three, three feet long, see cut No. 2, covering the outside with light galvanized iron (28-guage). Connect the sections, as shown in cut No. 3, with two by six two feet long, also cut to the same circle (this last is important as it holds the form to a true circle), putting two bolts in each end. The form as you see has two wedges, one on each side, or every four sections, made of two by four three feet long, to tighten and loosen the form. After bolting the form together drive down the wedges.

The way we support the inside form you see by this model; also by holes in ribs shown in cut No. 3, using a two by four studding to each section running through holes in the plank ribs. These holes must be cut two and one-half by four and one-half inches. Bore a hole in studding and after raising the form put in a one-half inch bolt just under the lower rib.

The Outside Form.

The outside form is made of heavy galvanized iron (18 or 20-guage) three feet wide. This form is made in two pieces connected with one-half-inch bolts threaded twelve inches long, to admit of loosening or tightening the form when raising. Rivet on each side of joint three strips of heavy band iron with two inches at the end near joint turned out at right angles, with holes through which to run the bolts, see cut No. 4.

When the wall is built to the surface of the ground, put on the outside form, holding it to place by shoving down between the inside and outside forms pieces of six-inch board three feet long, one every two feet. This keeps the two forms just six inches apart. Pull up the pieces as you fill in the concrete. After the first time the wall holds the bottom of the forms then use little blocks six inches long to hold top of outside form to place. We put some heavy wire handles in the outside form, one opposite each studding, used for supports, and to raise it tie into these handles a piece of three-eighths-inch rope six feet long, running this rope through a little holder or bracket which slides up the studding. This holds all you raise.



Detail sketch of silo forms.

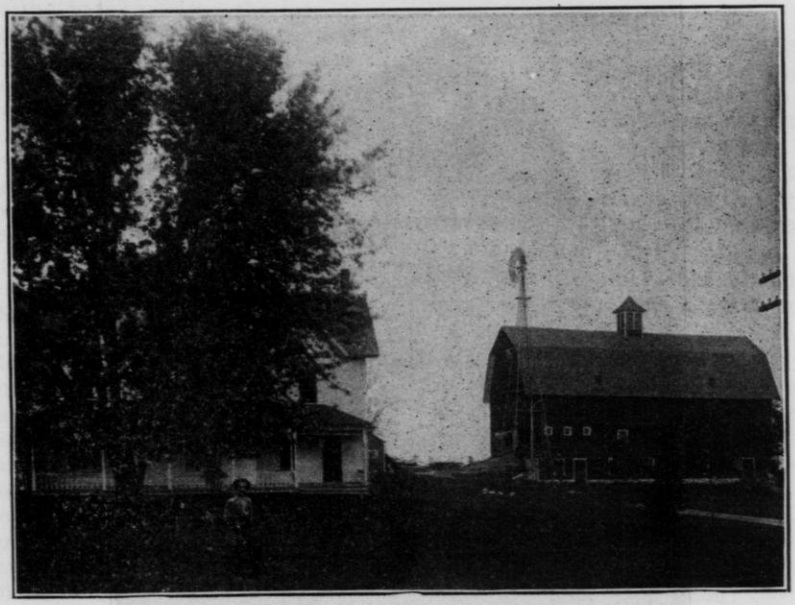
Mixing the Concrete.

As to mixing the concrete, we use four parts of sand to one of cement (the best Portland), pour in five or six inches of concrete, then put in all the small rock we can cover nicely, making the whole one part of cement to seven or eight of sand and rock. We wet the rock and tamp in thoroughly.

each side of door. We use one-fourth-inch wire for reinforcing, one every foot, for the first sixteen feet, then one for every ladder rod.

Cost of Material.

The cost of material for a silo sixteen by thirty feet is about eighty-five dollars. This includes roof, floor, reinforcing iron and ladder irons.



Farm buildings of John Imrie, Roberts, Wis.

When the forms are full, let the concrete set at least twelve hours before raising. Raise the inside form first.

The Continuous Door.

Make a continuous door, running three-fourths-inch iron rods across every two feet with one inch at each end turned up to loop the reinforcing wire over. These rods should extend into the wall about eight inches on

The forms cost about thirty-five dollars for material. These you can always sell as soon as you are through with them.

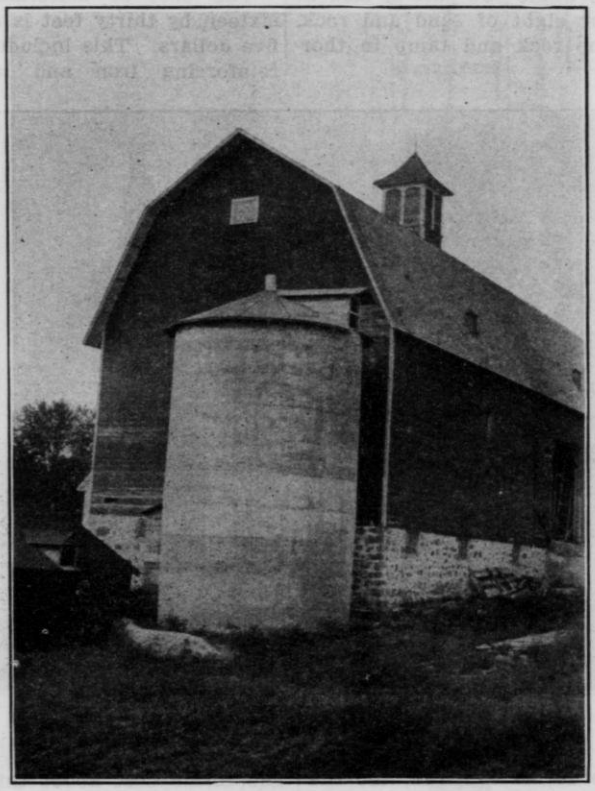
DISCUSSION.

A Member—What do you use for a roof?

Mr. Imrie—We used a board roof covered with roofing. I think if I build another I should make a concrete roof.

Mr. Martiny—How do you arrange for the scaffolding?

Mr. Imrie—We use a two by fou in each of these sections; that makes eight of them. A great many people make the mistake of laying the platform they are going to stand on on below the form. We use four pieces of eight-foot fence boards, nailing from one studding to the other, then miss one space, and so on around. The next time you raise the form, nail to the opposite ones. The reason for doing this is that if you get up



John Imrie's concrete silo completed.

top of this frame. As we must remove the scaffolding before they can raise the form, we keep ours below the form all the time. It is just three feet high, so it is just right for pouring in your concrete; you do not have to bend your back, you can work very easily if you keep your scaffolding twenty feet or so your supports will be wobbly. If you nail to the opposite ones each time, it makes it rigid enough for you to work on. You do not need anything in the center of the silo, just lay short pieces of plank around the edge to walk on, and you are all ready to go to work.

A Member—You do not have any scaffolding on the outside?

Mr. Imrie—No, just on the inside. I used for studding four 18s, four 14s, four 16s and four 12s. When I got to the top of the 18s I put on the 12s, then by putting the 16s on top of the 14s they were all just thirty feet high.

Mr. Martiny—How did you hoist up your concrete?

Mr. Imrie—We used a telephone pole as the upright of our derrick, guyed to the barn, running the arm of the derrick slightly upward, to make it higher than the top of our silo will be, then we put a pulley at the bottom of pole, using horse to raise the concrete. We use a platform two by two and one-half feet with a two by four nailed flat-wise around the edge to keep the pails from slipping off. We use four or five good, strong, heavy galvanized pails, which should last to build a couple of silos. We did not use a mixer like Mr. Scott's, but I should have something of that kind if I were going to build another silo. I should set the mortar box we use to dump into within two feet of the silo, and have a little box between that and the silo to rest the platform on while filling the pails. I know of no way that is better, unless you make it expensive and use an elevator, as they do on large jobs sometimes.

Mr. Nordman—In that event, wouldn't you be filling it faster than it would dry out?

Mr. Imrie—You can only fill one form a day, you can only build three feet each day; must let it set twelve hours.

Mr. Martiny—Did you have any difficulty in raising your inside form to place it again?

Mr. Imrie—Not a bit.

Mr. Martiny—After we got it loose and raised it up, it seemed almost impossible to get it out again and get the form together again on the inside. The top of the hole seemed to be too small.

Mr. Imrie—We had no such trouble; if the diameter at the bottom is the same as at the top of your inside form, you should have no such trouble.

Mr. Martiny—There would be maybe a quarter of an inch that would not quite fill up with concrete, on this other side it would touch, and so on.

Mr. Imrie—Of course, if you get it out of the circle, it will be getting worse and worse the higher up you go. You must get it true each time. We take a piece of two by four, just long enough to drop in on top of the upper ribs, each time, to true it. If you start right, you will be right to the top.

Mr. Martiny—That looks all right in theory, but in practice it never works out quite so easily.

Mr. Imrie—We never had your trouble. There may have been a little gravel-stone stuck between your frame and the concrete; if that was so and you did not notice and rectify it, it would put the whole form out of plumb; it would spoil your true circle.

Dr. Kutchin—I understand you only put stone in the foundation?

Mr. Imrie—No, all the way up. I said I would not put it into the mixer, but every time we poured in concrete six or eight inches deep we sent up a lot of stone and tamped into the concrete, and by so doing you save a vast amount of mixing. You can put in not only cobble stone, but stones as big as your two fists. We have those little rock and can get them by screening gravel, and you can put in quite large stones, but I would want about half an inch between that and the edge.

Mr. Aderhold—In what part of the wall did you put your reinforcing?

Mr. Imrie—Near the outside, as close to the outside as you can, one every foot until we get half way up, and then two feet apart. The Atlas Concrete book says there is no need of having the top of a concrete silo over two and one-half inches thick; it says it would be a waste of material to make it thicker.

Mr. Scott—And still you would put in stones as big as your head?

Mr. Imrie—They could be as big as your head one way, Mr. Scott, but not near so thick the other.

Mr. Scott—My head is just thick enough so I do not understand how Mr. Imrie gets a smoother surface by his way of mixing than by mine. The surface is just as smooth as the frame anyway.

Mr. Imrie—Certainly. The only difference is you do not have to handle these stones over by putting them into the mixer. I know Mr. Scott has different conditions, if I had gravel just to suit me I might prefer his way, but where we have a preponderance of cobble stones in the gravel, I find it makes a very uncouth looking silo.

Mr. Scott—Not if you spade it, and of course that should be done.

Mr. Imrie—Of course, but unless you are very careful, it will show.

Mr. Nordman—I know we had that trouble in ours.

Mr. Imrie—I came to the conclusion, especially where you are mixing by hand, that it is best to mix it as evenly as possible, and then put in all the stone you can, and you will have a good job.

A Member—What is the cost of those forms?

Mr. Imrie—We made two sets at our place and they cost us about thirty or thirty-five dollars each. We made them ourselves and sold them for thirty-five dollars each when we got through. No one need be afraid of making a set of forms, because there will be a dozen ready to buy them when you get through.

Mr. Nordman—When we built our silo, we had a little tamper and we used that to tamp the stones lightly, and in that way the whole mass settled evenly.

Mr. Imrie—Yes, we did the same. Here is a little piece such as we used, to hold the outside form out to its place. The first time you use a piece three feet long, six inches wide and shove that down between the forms to hold the outside form in place. After that the bottom is held by your concrete wall and you slip in these little blocks between the top of your inside and outside forms. This holds the top of your outside form.

A Member—Would you give it a coat of plaster?

Mr. Imrie—We just whitewashed, using pure cement and water. By this means you shut off all pores, and that is all that is necessary.

A Member—Some tell me that in a stave silo the silage will not freeze as much as in concrete or stone?

Mr. Imrie—I have not had personal experience, but I have seen silage in a stave silo. The only difference would be in a time when we had one or two nights of very cold weather, then when the sun came out warm, of course the frost would come out of the staves quicker than the concrete walls and your silage would loosen up a little, probably take out the frost near the outside; in that way it might not freeze so much, but it certainly will if there is a long cold spell like we had in December, about three weeks, it certainly will freeze just as much from the outside as in the concrete silo.

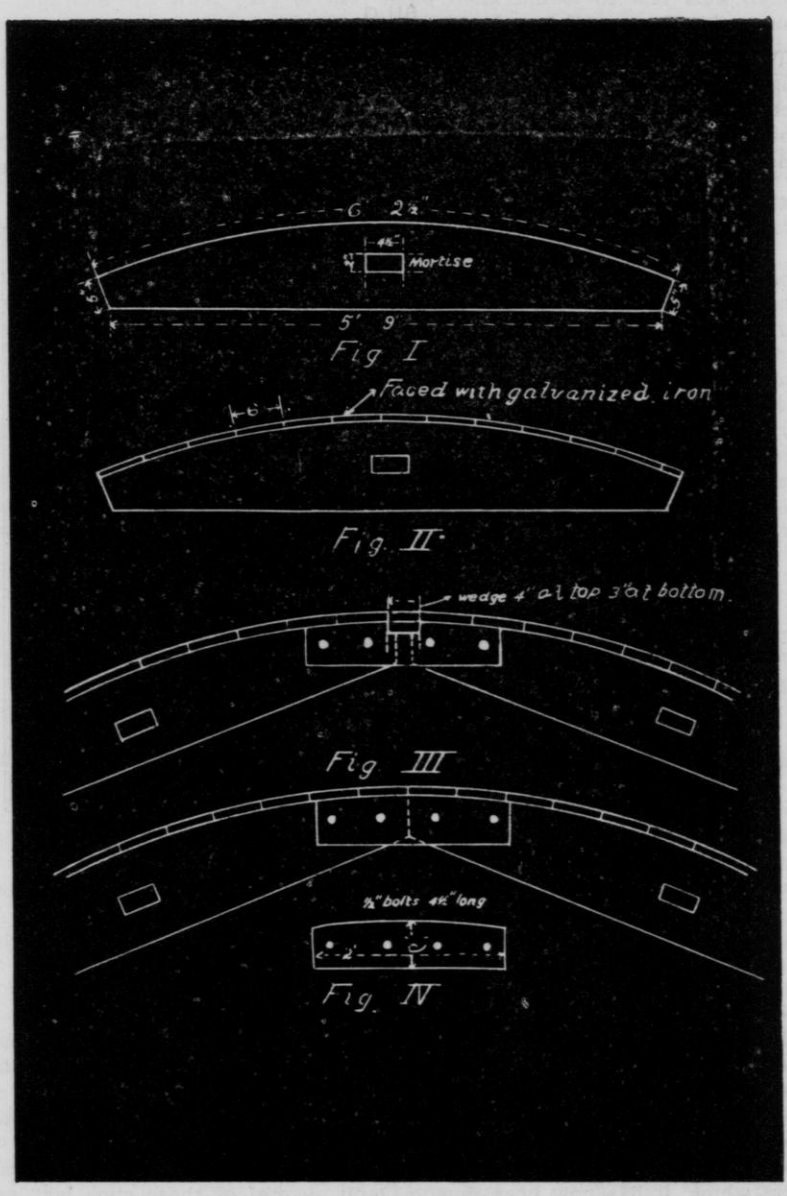
HOW TO MAKE THE FORMS AND BUILD THE FARMERS' INSTITUTE SILO.

The Farmers' Institute silo is a single, reinforced, concrete wall 6 inches thick, with continuous doors crossed every 2 feet with ⅞-inch steel rods, which lock into the reinforcing wire. The door frame used while building this silo is taken out, so there is nothing to rot. Silos of this type have been built in Canada for 10 or 12 years and in this state for several years, but most of them have been built of walls 8 to 12 inches thick, which, it has now been demonstrated, is a useless waste of material.

A number of the Farmers' Institute workers by their suggestions perfected the plans and forms of this silo. The most credit probably is due Messrs. David and John Imrie, of Roberts, St. Croix Co., for getting the forms in the most practical shape. The Dunn County Agricultural School secured outlines of these forms and with Mr. John Imrie's aid and suggestions, through the work of the students, directed by Prof. Crane, built several of these silos last year.

Farmers' Institute silo being built by students at Dunn Co. School of Agriculture. The inside form in place for the second section of the silo and everything in readiness to raise the outside form. (Photo courtesy "Wisconsin Farmer.")

The description of the forms and


6 2½
Mortise
5' 9
Fig I
Faced with galvanized iron
Fig II
wedge 4" at top 3" at bottom
Fig III
⅞" bolts 4½" long
Fig IV

how to build them by David Imrie which follows should enable any good mechanic, or a farmer who has some mechanical ability, to construct the forms and build the silo. Some farmers have put on concrete roofs, which practically makes this silo an everlasting one. The description is for a silo 16 feet in diameter.

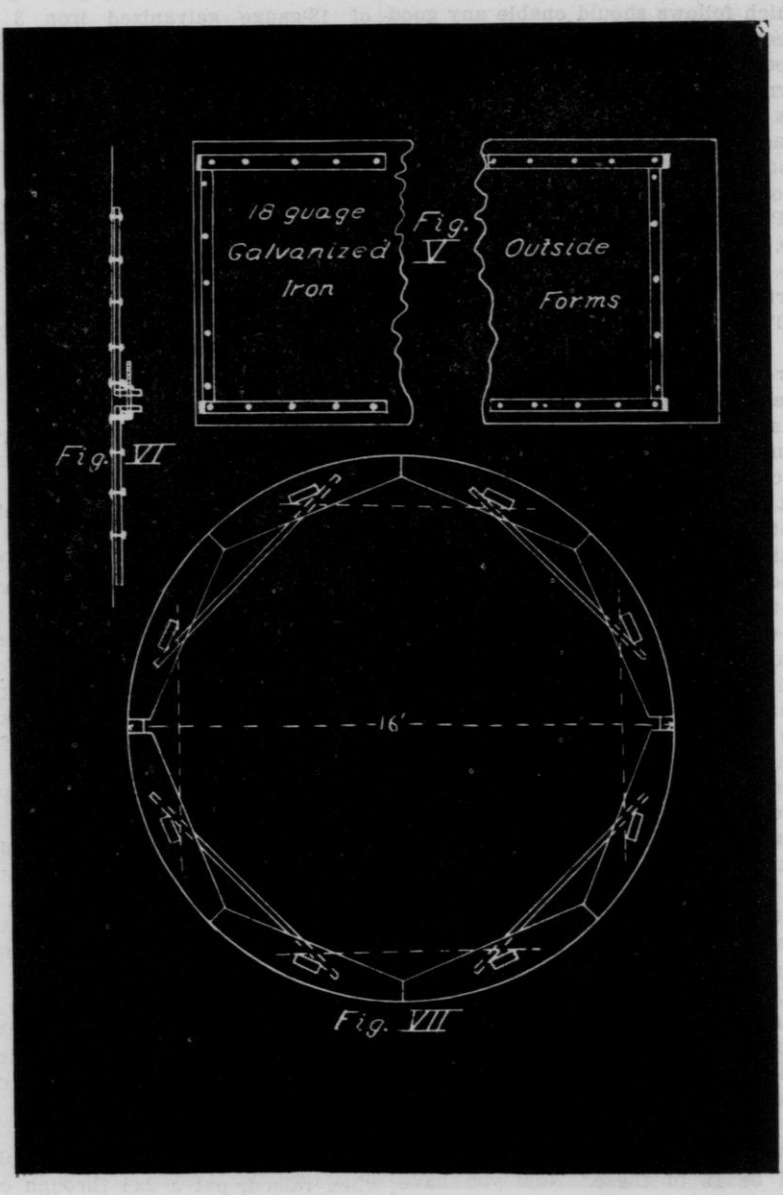
Procure 8 pieces 2x12, 12 feet long No. 2 Com., 2 pieces 2x6, 16 feet long No. 2 Com., and 150 feet ⅞x6 fencing surfaced one side.

Take a narrow strip of board 1½ or 2 inches wide and 8½ feet long, bore a hole for a lead pencil near one end, measure from the center of this hole 7 feet, 11 inches and drive a nail through. This will make the circle. Then from the 2x12 plank cut 16 pieces like Fig. 1. Cut the 150 feet of fencing into 3-foot lengths, making the ends square and the pieces of even length. Next take 2 of these pieces (Fig. 1), place them on their straight edge 2 feet, 8 inches apart, outside measure, and board over the circular side (Fig. 2), letting the ends of the board project beyond the Fig. 1 pieces on each end. After you have boarded 4 sections, cut off about 2 inches from one end of 4 pieces (of Fig. 1), cut out a piece from the outside corner of the 8 remaining pieces for wedge, as shown in Fig. 3. This wedge is 2x4 inches at the top and 2x3 inches at the bottom. Of course the board that adjoins this wedge must have the same cut, being 1 inch wider at the bottom than at the top. There are only 2 wedges directly opposite each other, dividing the form in two. Now board over the remaining sections. Next cut out the short pieces to join the sections together (see Fig. 4). There will be 16 of these. Now you have the wood work for the inside form. Cover each section with light galvanized iron 30-gauge 3 feet wide.

For the outside form, get 2 pieces of 18-gauge galvanized iron 3 feet wide and 27 feet long. To these rivet 8 lugs made of 7-16-inch x 2-inch iron about 2 feet long, as in Fig. 5. Rivet a piece of the same sized iron between the lugs, to keep the form straight, also shown in Fig. 5. Have the lugs turned at right angles about 6 inches from the end (see Fig. 6) and a hole for a ⅝ bolt. Make the bolts 12 inches long, with a good long thread. Place the lugs on one end of each back from the end 8 inches, so this end will slip inside of the other piece and make a tight joint. You now have your forms.

Dig the hole for the silo, going down where there is no danger of water, from 4 to 8 feet below the feeding floor. Make it 17 feet in diameter. If the soil is clay, dig under the bank, commencing up about a foot and slanting it in so that at the bottom it is under the bank 8 or 10 inches to give a wider footing. Use the earth for the outside form. Place the inside form in the bottom so it is 6 inches from the bank on all sides. Be sure to get the form level.

Mix the concrete, 1 part best Portland cement, 2 parts clean sand and 4 parts gravel or crushed rock. Make this quite thin and pour in 1 foot all around, then lay in a No. 2 wire, letting the ends lap about 2 feet, then another foot of concrete, then another wire, until the forms are full. Let this stand over night to set. In the morning raise the forms by knocking out the wedges, take off the pieces that join the sections together only where the wedges are, leaving the form in two pieces, 3 or 4 men can lift each half. To hold these in place when raised, put a 2x4 through each set of mortices in the form. There will be 8 2x4's. These should be of different lengths so the splices will


18 guage
Galvanized
Iron
Fig. V
Outside
Forms
Fig. VI
16'
Fig. VII

not all come at the same place. Put a piece of plank under the bottoms of the 2x4's, so they will not settle in the ground when the weight of the forms comes on them. Raise the forms 2 feet, 10 inches, so they will be inside of the completed wall 2 inches. Bore a hole in each 2x4 and put in a pin in just under the forms. Next put in the staging. Nail 4 pieces of 8-inch boards 7 feet long to the 2x4's close under the forms to lay the plank on for the staging (see Fig. 7). Next time you raise the forms, nail boards as shown in dotted lines Fig 7.

When level with the feeding floor, commence the door opening, which is continuous from there up. The opening should be 2 feet 6 inches wide. For the door jam molds nail 2 pieces 2x4 together by nailing one on the edge of the other (see cross section Fig. 8). Place these 2 feet 8 inches apart, see that they are plumb and cut some pieces 2 feet 2 inches long and toe nail between them to keep them in place. Cut notches in the outside edge of these 2x4's, first one 2 feet above the feeding floor and every 2 feet to the top of the silo. Make the notches 1 inch wide and 2½ inches deep for the rods that cross the door. The rods are of ⅞-inch steel extending into the wall about 8 or 10 inches each side of the door opening, with a hook on each end to receive the No. 2 wire. The first two rods above the feeding floor should have turn buckles on them so they can be removed, making a door 6 feet high (see Fig. 8).

For the door simply use 2x6 or 2x8 pieces cut to the right length and place a piece of tarred felt or roofing felt across the door, letting it extend a foot on each side of the opening.

When you get to the surface of the ground, put on the outside form. As the silo gets higher, make 8 brackets like that shown in Fig. 10. These brackets rest loosely on top of the inside form and slide up when the forms are raised. They should stand out over the outside form so a rope attached to this form can be brought over the point of the bracket and tied to the post to keep it in position until it is tightened up and the small pieces put on (Fig. 9).

To keep the lower edge of the outside form just 6 inches from the inside form, cut some 6-inch boards 3 feet long and place between the two forms 2 or 3 feet apart and as the concrete is put in these can be drawn up and they will not be used again. Make 20 or 24 pieces like Fig. 9 from 2x4 just 6 inches from the shoulder to where sawed in, the shoulder to rest on the inside form and where sawed to catch the outside form.

You can put in 30 or 40 per cent of small stones in the silo walls if you wish. Place them in the center of the wall, tamp down into the soft concrete and pour more concrete on them. The concrete needs no tamping if made thin enough. Take a spade and churn along the sides of the forms, so as to drive the gravel stones back and let the thin concrete down beside the forms.

After raising the forms, to make a nice finish where the joints are, take a trowel and point up any holes and rub down with a brick or piece of board, using water with it.

To raise the concrete as the silo gets higher, use a mast staid to the barn and raise it with a horse, taking 4 or 5 pails at a time.

When the walls are high enough finish off level and while the concrete is still soft shove into the top of the wall some ⅜x8 bolts every 3 or 4 feet, putting the head down into the concrete, leaving the thread end above the wall 2½ inches. This is to

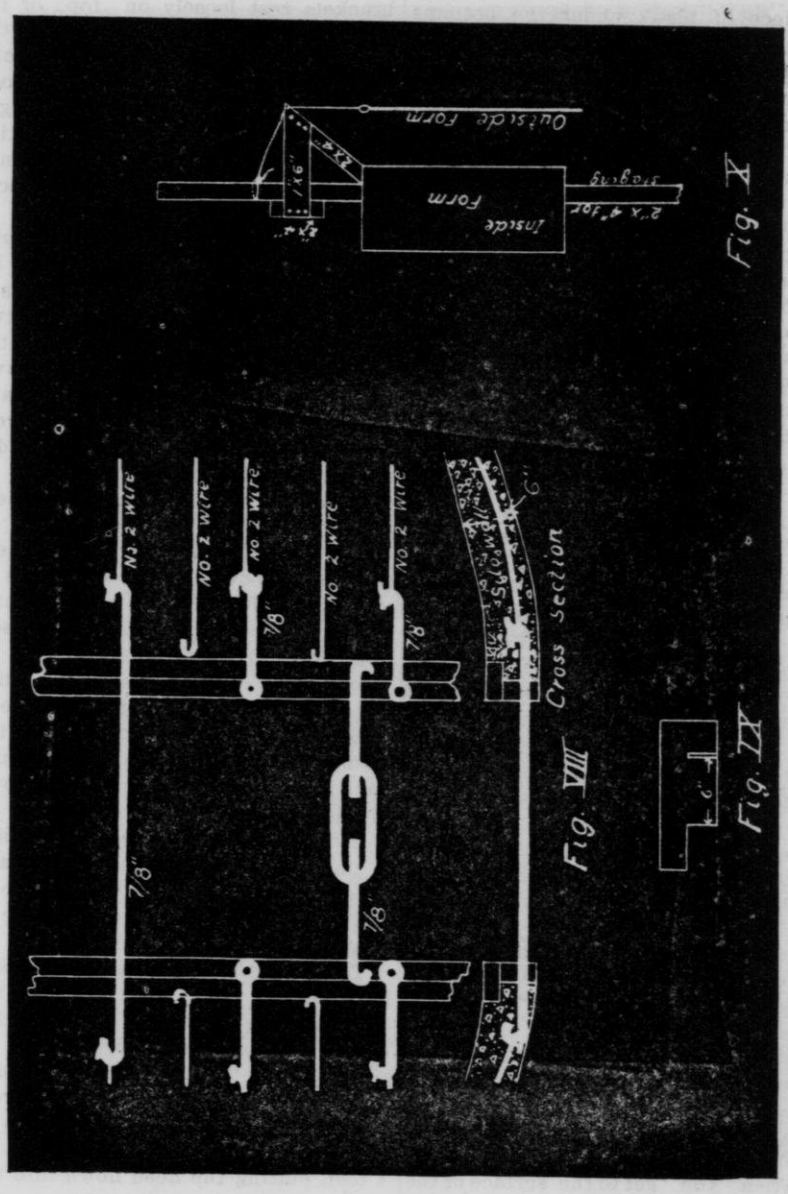


Fig. X

Fig. VIII

Fig. IX

fasten the plates on, and you will have a silo that will last forever.

Now take out the inside forms and lower them over the wall on the outside, also the outside form. Before taking out the staging, give the inside at least 2 good coats of wash made of cement and water of about the consistency of cream.

You can put on any kind of roof you desire.

A silo 35 feet high, 12 feet in diameter will take 30 cubic yards of gravel and 30 barrels of cement; 14 feet in diameter, 35 yards gravel, 35 barrels cement; 16 feet in diameter, 40 yards of gravel, 40 barrels cement; 18 feet in diameter, 45 yards gravel and 45 barrels cement.

The silo herein described should cost complete for work of building, cement, reinforcing and a common roof, after you have the sand and gravel on the ground, a little less than $150.00. The material for the forms in this locality (St. Croix Co.) costs about $35.00. The forms will build a great many silos and a number of neighbors can make them in company, or if one man makes the forms he can sell to the next man wanting to build.

In this locality there are between 15 and 20 silos of this kind, and more going up this year, and they are all giving good service. This is no experiment, as silos of this kind have been in use for 8 or 10 years.

RESIDENTIAL SEPTIC TANKS.

W. G. Kirchoffer, Consulting Engineer, Madison, Wis.

With the advance of civilization in all lines, and with the increase of wealth generally, there is no reason why the farmers, agriculturists as some call them, should not have all modern conveniences and safeguard against disease.

It has been known for a long time and well understood by some that the disposal of sewage on the farm is not satisfactory, either from the standpoint of convenience, or from the standpoint of sanitation. The modern means of sewage disposal are, the discharge of sewage into streams, cess-pools, maceraction tanks, as they were once called, and the modern septic or bacterial tank. The relative merits of these different systems depend largely upon local conditions. Where the streams are large and the amount of sewage small, this is perhaps the most satisfactory means of sewage disposal, as it requires absolutely no attention after it is once put in. The well known cess-pool is more or less successful for a few years, but sooner or later requires attention. The septic, or bacterial tanks, are the most modern and scientific and the safest of all from the standpoint of transmitting disease.

The principles of operation of these tanks are very simple. There are really three processes which take place in the tank—that of sedimentation, chemical transformation and bacteriological. The latter two are intimately connected. The bacteria that perform the work in these tanks are known as Aneraeobic—that is, those which work in the absence of light and air.

The chemical process that takes place is the breaking down of solid organic matter into gases, liquids and

salts. The sedimentation is the simple process, as you all know, of the settling out of the coarser materials in the water, the action being the same as that which takes place when a pail full of muddy water is allowed to stand for any length of time. What really happens in these tanks is the process of sedimentation starts in first, then the forms of gases due to chemical changes brings some of the material which has fallen to the bottom of the tank to the surface. Here the gas is liberated and the material again falls to the bottom of the tank. This process is exceedingly slow and cannot be observed by a casual inspection of the tank. The result of these processes is, the effluent from the tank contains only a portion of the organic matter which went into the tank and thus a certain amount of purification has been effected, all due to the natural process.

The essential principles to be followed out in the construction and operation of one of these septic or bacterial tanks are these, the motion through the tank must be slow and as uniform as possible. The best results are obtained when the process takes place in the dark and without air. The inlet and outlet to the tank should preferably be below the surface of the water, so as not to disturb the scum which forms on these tanks.

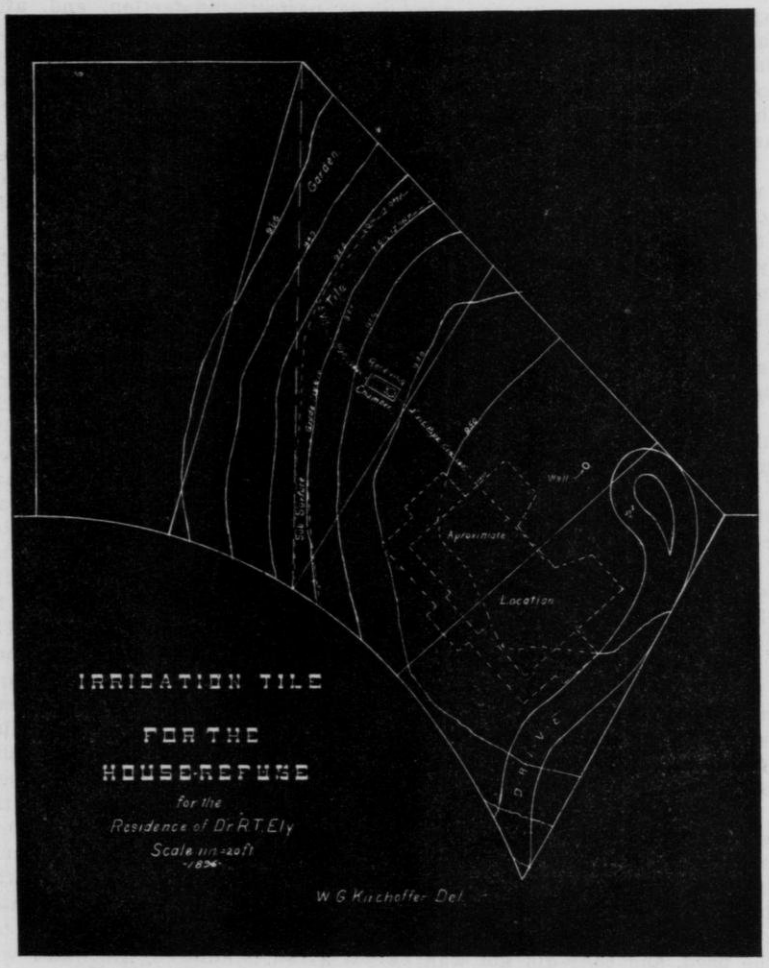
These tanks, when properly designed, will care for the ordinary sewage which would be discharged from a house having all the modern conveniences. They will not, however, care for storm water, such as would be discharged from the downspouts of a house or barn, overflows from cisterns, tanks or pumping plants. Neither will they digest the garbage and tin cans to the same degree that Billy goats will. If there is a laundry in connection with the house, the tank should be designed particularly to care for the water from such a plant, the idea being that laundries discharge large quantities of water in a short space of time and have a tendency to upset the process which takes place in the tank.

These tanks are practically automatic, but not absolutely so. They will need cleaning out occasionally, depending on how close the design has been made to fit the actual conditions. Also the character of the sewage will have some effect upon the frequency of cleaning. These are all things which have to be estimated more or less when the tank is designed; also the chemical contents of the water which is used in the kitchen, bath-room and laundry have a great effect upon the successful operation of the tank.

At Centerville, Iowa, where a deep well water is used containing large quantities of various salts, it has been almost impossible to secure satisfactory results with the septic tank.

If only a septic tank is used for the disposal of sewage, it will effect only a partial purification—that is to say, the water leaving the septic tank contains a sufficient amount of organic matter, which would purify if left standing in a pool or allowed to seep slowly over the surface of the ground. It must, therefore, be discharged into some stream or dry run, an open bottom cess-pool, or drain tile. In the summer time, the effluent could be used for irrigation. As an illustration of the use of an open bottom cess-pool, I will call your attention to the plans which I prepared for a sewage disposal plant for the Oregon High School.

Here the sewage from the school passes into the septic tank and the effluent from this passes into the cess-pool, which is jug-like in shape and



Use of drainage tile together with the septic tank.

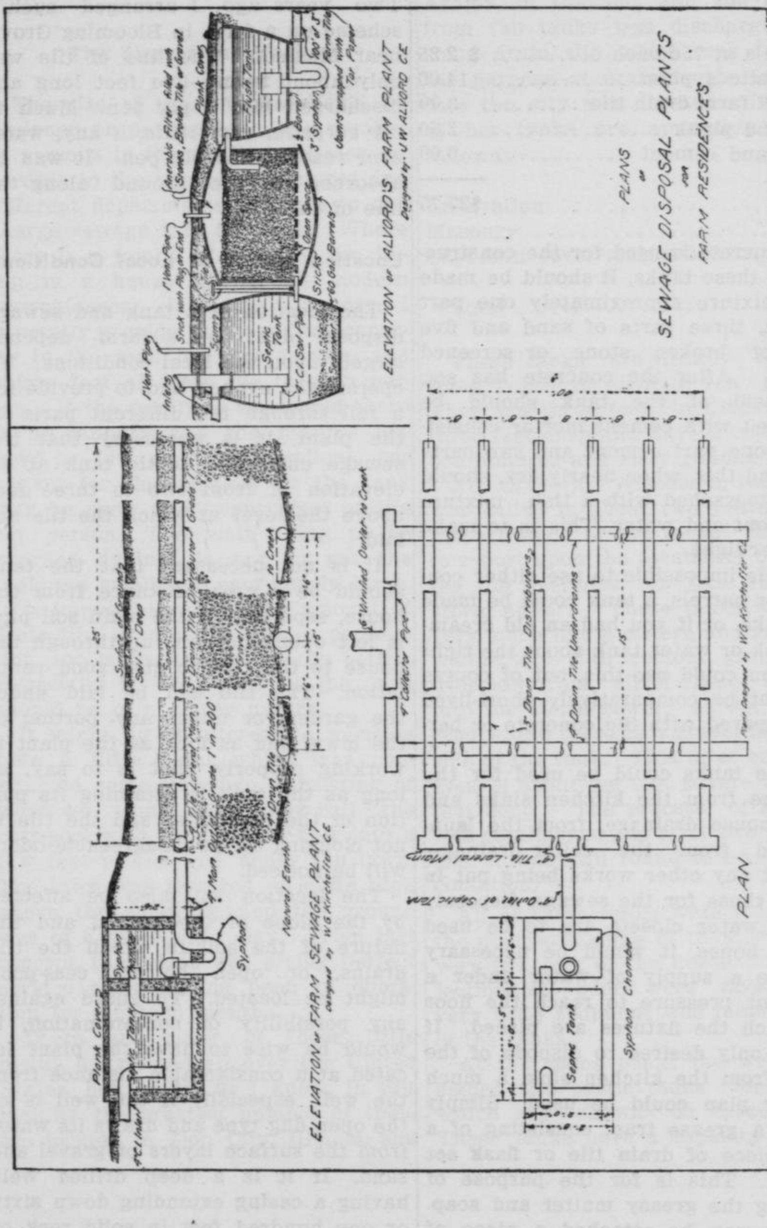
which has an open bottom, and the side walls laid up so that seepage can take place.

As an illustration of the use of drainage tile together with the septic tank, I will call your attention to the plans for Dr. Ely's residence in Madison, and the Wales Sanitarium. In both of these plants, the sewage, after passing through the tanks, is collected in a syphon chamber. When this has filled up to the proper level, it automatically discharges into the drain tile. The reason for the use of this syphon is to make the saturation of the tile intermittent. As the process of purification which goes on in the tile is one of nitrification, requiring the presence of air, it is essential that the effluent from the tank which is discharged into it should be intermittent, or have some means of drawing air in at the same time. While the syphon is not absolutely necessary, its use will give the tile a longer life—that is, it will not clog up so soon.

In locations where it would be impossible to use any of the above mentioned methods in connection with the septic tank, it is possible to build small filter beds, either on the surface or just beneath the surface. This plan, which I show you, is an illustration of a little plant I designed for Mr. Jockel for his residence in Lake Mills, Wisconsin. The plant consists of a septic tank and syphon chamber, a system of distributing tile and underdrains. At this location there was no suitable material so that the ordinary methods of subsurface tile could be used, and they did not want to turn the sewage into the lake near by. The ground which he had for a garden was filled in with coarse gravel and sand. During the process of filling, these pipes were put in place. Over the surface of the sand about the distributing tile was placed a layer of garden soil about one foot thick. The underdrain was connected with a pipe which led to the lake. This little plant has been in operation now for about two years and a half and has given perfect satisfaction, and, after it had been in operation for a year and a half, I found, much to my surprise, that Mr. Jockel had given it no attention whatever, and there was no evidence of poor operation.

These septic tanks can be constructed of wood, concrete or barrels. On the plan just shown you of the little plant at Lake Mills, is a plant designed by Mr. J. W. Alvord, of Chicago, for some cottages on the grounds of the Shorewood Association at Sangatuck, Michigan. The septic tank consists of a water-tight barrel of about sixty gallons capacity. An ordinary vinegar or linseed oil barrel will answer the purpose. Those who are not prohibitionists, I presume, will know where to find their barrels. The septic tank is connected to a filter formed by another barrel laid on its side and filled with broken stone, tile or gravel. This filter is connected to the flush tank, which is formed of a half barrel fitted with a three-inch syphon. The discharge from the syphon runs into one hundred feet of three-inch farm drain tile. There should be at least one foot of tile laid for each gallon of water used daily from the flush tank. These tiles are laid loosely from ten to sixteen inches below the surface of the ground and on a very slight down grade from the flush tank. A fall of three-eighths of an inch to the rod would be sufficient. A greater fall would be permissible, but, if too great a fall is allowed, the water will all run to the lower end. The soil at this end will become over-charged and clog up, while the upper end will not be worked as hard as it ought to be; therefore, if the tile is laid on a side hill, the lines of tile should be approximately perpendicular to the slope.

The cost of one of these little plants



Plans for sewage disposal plants for farm residences.

of Mr. Alvord's has been estimated as follows:

3 barrels at 75c each	$ 2.25
Automatic syphon	14.00
100 feet farm drain tile	3.00
Pipe and plank	2.50
Labor and cement	6.00
	$27.75

If concrete is used for the construction of these tanks, it should be made of a mixture approximately one part cement, three parts of sand and five parts of broken stone or screened gravel. After the concrete has set, the inside of the tank should be plastered with cement mortar consisting of one part cement and two parts sand and this, when nearly dry, should be white-washed with a thin mixture of cement and water. This is to make it water-tight.

If it is impossible to use either concrete or barrels, a tank could be made of planks, or if you had an old creamery tank or water tank about the right size, you could use this, but of course it might be comparatively short-lived as compared with the concrete or barrels.

These tanks could be used for the drainage from the kitchen sinks and other house drainage, from the laundry and from the cellar drainage, without any other works being put in except those for the sewage disposal; but, if water closets are to be used in the house, it would be necessary to have a supply of water under a sufficient pressure to reach the floor on which the fixtures are placed. If it was only desired to dispose of the water from the kitchen sink, a much simpler plan could be used. Simply put in a grease trap, consisting of a large piece of drain tile or flask set on end. This is for the purpose of catching the greasy matter and soap. To this can be attached a piece of drain tile running under the ground. Two years ago I arranged such a scheme on a farm in Blooming Grove, near Madison. The line of tile was only about twenty-five feet long and discharged into a pig pen. Much to my surprise, very little, if any, water ever reached the pig pen. It was all absorbed by the ground along the line of the tile.

Location Matter of Local Conditions.

The location of a tank and sewage disposal plant on a farm depends largely upon the local conditions. To operate the syphon and to provide for a fall through the different parts of the plant, it is necessary that the sewage enter the septic tank at an elevation of from two to three feet above the level at which the tile are laid.

It is not necessary that the tank should be a great distance from the house, especially if the main soil pipe is left open and runs up through the house to the roof to give good ventilation. The tile can be laid under the garden, or under any portion of the lawn, and as long as the plant is working properly, that is to say, as long as the tank is retaining its portion of the impurities and the tile is not clogging up, no disagreeable odors will be noticed.

The location will also be affected by the slope of the ground and the nature of the soil in which the tile drains, or open bottom cess-pool, might be located. To guard against any possibility of contamination, it would be wise to have the plant located at a considerable distance from the well, especially if the well is of the open dug type and draws its water from the surface layers of gravel and sand. If it is a deep drilled well, having a casing extending down sixty or one hundred feet in solid rock or

other hard materials, it will not be so important to get away from the well.

The Size of the Tanks.

The size of these tanks should be designed proportionate to the number of persons in the family, and also according to the number of fixtures and different departments that are to discharge sewage into the tank. Where there is a family of eight or ten living in a house having all modern conveniences, including laundry, I generally provide thirty gallons capacity in the tank for .ch person, and thirty feet of drain .ile to each person. If the family is small and there is no laundry and the fixtures are few, as low as twelve gallons per person for the capacity of the tank may be used, and twenty feet of tile per person. The main thing to be guarded against is not to get the tank too small nor enormously large. It is impossible to get the amount of drain tile, or other means of percolation, too large—the more the better. Especially is this true if the soil should be of a clayey nature.

It might be of interest to mention here a little plant which was constructed some time ago, consisting of what we would ordinarily call the cess-pool with just an over-flow into a few feet of tile laid under the lawn. The lawn was terraced up quite high above the sidewalk, and the ground was of a quite solid clay. From last reports, this plant was giving perfect service after having been in operation for eighteen months.

There are many of these little plants distributed all over the United States, but, so far as I know, in this vicinity the greatest number of them are located in Zion City, Illinois, and in Elkhorn, Wisconsin. Zion City tanks were designed by Mr. Burton Ashley, of Chicago, and the effluent from the tanks was discharged into some drain tile which was laid for the purpose of draining the land before the city was located. The cost of his tanks are approximately as follows:

Excavation	$ 2.00
Masonry	30.00
Cast iron cover and outlet trap	6.00
Total	$38.00

These tanks are usually designed for a family of eight or ten persons. They are three feet in diameter by three feet deep and have a capacity of one hundred and sixty gallons.

At Elkhorn, Wisconsin, the writer was called in about two years ago to inspect some of the tanks there and to report upon the feasibility of allowing the over-flow to pass into the storm sewer. These tanks are built very much like a cistern and are made water-tight with cement grout. The over-flow from all of these tanks is into the storm sewer, except in one case where there is a gravel filter outside of the tank. This filter covers an area of about ten feet square by three feet deep. The process of filtration was continuous, and after two years of use, it was still found to be in good condition.

All of these tanks were located in the dooryard, some of them within a very few feet of the house. No objectionable odors were noticed, and very little sediment was found in any of the tanks.

At this same place, the writer designed two septic tanks for hotels, which are shown on these plans. These tanks have a capacity of 2,170

gallons each and were designed for sixty persons at the hotel.

In conclusion I will say that to secure the best results, every case should be studied out to meet the local conditions—the amount of sewage, its character, the condition of the soil, the cost of the materials to be used and the ultimate disposal of the water should be noted. It should, however, be possible for almost every farmer to use some barrel, concrete or wooden tank for the reception of the crude sewage and then from this discharge it into the ordinary type of open cess-pool, drainage tile or nearby stream. If he did not get his tank the right size and constructed properly as to the trapping of the inlet and outlet, he probably would find it filling up, or he might find his drain pipe filling up, but if he gets everything about right, it will be like a great many other things in this world, he will not know it exists.

I have given you a little data regarding the cost of some of these plants which have been put in, but I presume in a great many cases a farmer with a little ingenuity could put in one of these plants himself, and to do so he would only be to the expense of securing his materials, principally the drain tile, cement, the syphon and either a plank or iron cover for the tank.

I have not said anything about house plumbing, as I am not a plumber and do not know a great deal about the cost of such work, which would depend, of course, upon the amount of piping necessary to connect up the different fixtures, their number and quality. It is, however, safe to say that a farmer could install a complete sanitary sewage disposal plant with a single set of ordinary fixtures for less than two hundred dollars.

Convention adjourned to meet at 1:30 p. m.

AFTERNOON SESSION.

The convention met at 1:30 o'clock same day, Superintendent McKerrow presiding.

Dr. Currens—Our committee have some visitors here from a sister city, and we haven't yet found them asleep at the switch, they are all wide awake. They came up here to greet us, to see how we act when we have a Farmers' Institute, and I have no doubt they will make applicatio.. themselves for one next year, and if they do we will go down and give them the glad hand. These gentlemen, while they are not farmers, are interested in farming, and we know they are interested in your work, Mr. Superintendent McKerrow.

We know you will have to go on with your regular program and that your time is limited, but I want to say to these friends that we have other interests here in the city, and if you wish to slip out quietly and look about, we will gladly give you the freedom of the city; at least, that is what the Mayor said, though he told me not to tell anybody, because he has already given it to these other people, but I guess our city is large enpugh for you all. It gives me pleasure to introduce these gentlemen, Mr. McKerrow.

Supt. McKerrow—On behalf of the Wisconsin Farmers' Institute, we are pleased to welcome the business men of Manitowoc, and we shall be very pleased to have them remain during this session, because we know you depend upon the farmers, and I presume some of you are the golden agriculturists of Manitowoc City. We promise we will do you no harm, and we may do some of you good, if you will only stay with us.

Before opening up the subject before us for discussion, I will appoint two committees. I will appoint as the Committee on Resolutions Mr. W. C. Bradley, of Hudson; Mr. Geo. Church, of Winneconne, and Dr. Victor Kutchin, of Green Lake.

I have been requested by the local committee to select horse judges. As a rule, we believe that the single judge system is the proper one, especially at fairs and great expositions, but we find many farmers who prefer the old system of three judges, which is very good if you are sure all three of the judges are good. Not wishing to throw all the responsibility of this great horse show onto one man's shoulders, I am going to name three members of our Institute who will do the judging of the horses tomorrow, subject to the orders of the local committee, and those gentlemen are Mr. David Imrie, of Roberts; Mr. L. P. Martiny, of Chippewa Falls, and Mr. W. A. McKerrow, of Pewaukee.

Mr. W. F. Stiles called to the chair.

Music, Orchestra.

ENSILAGE FOR NORTHERN WISCONSIN.

E. Nordman, Polar, Wis.

Ensilage is a feed that has been preserved with its natural juices as distinguished from feeds that are dried out and stored away as hay or fodder. Because of its juicy character, ensilage is a much better feed than dry fodder, no matter how well this fodder has been cured.

My experience leads me to believe that there is the same difference between good ensilage and dry fodder made from the same crop that there is between grass and the hay made from this grass. Where any of our principle roughages are fed or preserved green at the period of their growth when they contain the largest amount of digestible nutriments, they supply the cheapest feed for milk or meat production that we know anything about. Dried out and fed as hay or dry fodder these feeds are less valuable because they are less digestible. While they contain as much nutrition as they do in their green state, the animal's digestive apparatus does not have the capacity to make use of it, hence, the reason why concentrates must be fed in such liberal quantities to make milk or meat on dry feeds.

Corn is the crop from which, as yet, most of the silage is made, though farmers are beginning to utilize other crops for this purpose. Clover has been found to make very excellent silage and peavine from our pea canning institutions are all made up into this feed. At Antigo, Wis., this peavine silage was sold to farmers this winter for two dollars per ton and the hundreds of tons that had been ensilaged were all sold out by the first of Febru-

ary. My own opinion is that any feed that will make hay or fodder, will also make ensilage, though the value of the ensilage will vary with the different crops of which it is made.

Growing Corn For Ensilage In Northern Wisconsin.

Since corn is yet the principal ensilage crop, I will state my opinion of the way it should be grown in northern Wisconsin for best results.

The tendency of corn in the cooler climates is to become flinty and the flintier it is, as a whole, the more protein the plant contains; therefore, a variety of flint corn should be selected, the largest that will mature in the locality where it is planted.

As the purpose is to grow the most feed possible on a given area, the corn should be planted about twice as thick as if grown for grain. On the clay loams of northern Wisconsin, the seed should not be planted before the 20th of May, and preferably a week or ten days later, to be sure that the growing season has set in. Care should also be taken to plant the seed near the surface, not over one inch in depth, as it will then come up quickly and grow rapidiy, all of which is a big help in fighting the weeds later on. So much for the seed; now about the land.

It has been demonstrated that land rich in nitrates will produce a fodder that is comparatively rich in protein. One investigator states that by heavy manuring and thorough cultivation, it is possible to feed twenty-five per cent more protein into a crop of corn than when grown on poor soil, with insufficient cultivation. Whether this estimate is overdrawn or not, it is nevertheless an important fact, since it points out one more way by which the farmers may produce more of their own protein on the farm and be less dependent on the millers' monopoly for the

Corn planted on Nordman's farm in Langlade Co., June 4th, which had no rain from that date until July 24th. This picture was taken July 10th.

important element in their cows' rations.

It must be borne in mind that the climate of northern Wisconsin is cooler and usually more moist than in the south, as a result of which, growing plants contain more sap and do not dry out as quickly as they do in a warmer and drier atmosphere. For this reason, I have succeeded in making the best and sweetest ensilage by letting the corn get ripe, and if not frosted, then to cut it down and let it dry one or two days before filling the silo. My aim is to put the corn into the silo just as dry as it will keep. If the corn is struck by a frost, it will then usually dry out enough in a few days to make good silage. Frozen corn should not be allowed to stand out too long, as it damages the leaves to be exposed to the weather when it is in this condition.

Quantity of Silage Advisable.

While a very large proportion of farmers are beginning to see the good there is in silage, I doubt if very many of them have yet begun to fully appreciate its true value, and for this reason the silos now being built do not have the capacity their owners will wish they had later on. I would advise every farmer of northern Wisconsin to so plan his silo construction that he will have room for seven tons of silage for each cow he expects to keep on the farm; two and one-half tons for each head of young stock; the same for each horse and about six hundred pounds per head for his sheep. This amount will allow fifty to sixty pounds per day for each cow for two hundred days; fifteen to twenty pounds each for horses and young cattle; three pounds per head for sheep, and there will be silage

Same field of corn July 27th. This field yielded 12 tons of well-eared corn silage to the acre. It had no rain for seven weeks, but thorough surface cultivation made a good crop of it.

enough left in the spring to help out the pastures during the summer. This may seem like heavy feeding of ensilage to cows, but our best cows eat this much every day. They are doing well on it and the only thing that ails them is that twice each day they get hungry for more silage. Our aim is to feed most of our stock all the silage they will eat up clean twice each day. We have not enough ensilage so we can quite do this yet, but we are planning to have more in the near future. It may be urged that it will require too much land to grow the ensilage I advise feeding. To this I reply that the land can be put to no better use whatever than to grow the crops for this feed.

There are two reasons why ensilage is more essential to the north Wisconsin farmer even than it is to farmers who reside farther south. One of these is that while vegetation grows rapidly in that territory, the growing season is comparatively short and in order to have the advantage of green, juicy feed for a longer period and at a reasonable cost, silos must be constructed. The other is that the country being new, a large proportion of the clearings are relatively small. Silos and silage must furnish the means by which these small clearings can be made to carry the most stock per acre and thus, by increasing his income, to greatly assist the farmer in developing his farm.

One mistaken idea that is entertained by many northern Wisconsin farmers is that a silo won't pay them unless they have large clearings. This is a wrong notion. It will pay a farmer in this section to construct a silo as soon as he is in a position to raise ten acres of corn and clover each year. Of course, the first silo would have to be small, but if constructed of concrete it could be used later on for summer feeding, when the larger clearings would warrant the building of a bigger silo.

Both in the building and filling of silos by farmers of limited means, the principle of co-operation can be brought to bear to the great advantage of all concerned. One set of silo forms will build any number of concrete silos, and where their cost is distributed among several farmers, this expense for each of them will be comparatively light. The same principle holds true in purchasing the silo filling machinery. Then there is the benefit to be derived from changing work while the silos are being filled.

DISCUSSION.

A Member—How small a silo is it advisable to build?

Mr. Nordman—You can build a silo twelve feet in diameter and just as high as you choose.

The Member—Wouldn't the size depend on the stock you wish to keep?

Mr. Nordman—Of course. You could build them smaller, build them eight feet if you want to, but I should say that twelve feet would be as small as would be practicable.

A Member—I know a party that has a silo eight feet wide. He has only six head of cattle and he thinks it is a good thing.

Mr. Bradley—Do you have any trouble cutting this flint corn that suckers a good deal, with the binder?

Mr. Nordman—Since we have been having larger crops on account of the richer land, it grows heavy and blows down; then we cannot cut it with the binder at all.

Mr. Bradley—Doesn't it grow up lots of suckers at the bottom?

Mr. Nordman—Yes, quite a number, but when the corn stays up we set the binder so it cuts low.

A Member—What is the reason we get mold in silage sometimes?

Mr. Nordman—Because it gets too dry and it is not properly packed. In that event, the corn must be watered, must have water added to it as it is being put into the silo, but in northern Wisconsin we are not usually troubled with having our corn too dry; it is the other way, mostly.

Mr. Convey—We found where we were careless in putting in the silage, where we let the heavier material fall in one place and the lighter material in another place, so it was not carefully distributed, that the air would not be pressed out where the lighter material was. The silage must be evenly distributed, and if it is, you will have very little trouble with moldy silage, and also you must not let the corn get over dry.

Mr. Jacobs—Don't you think there is a point at which silage, if it has excessive heat, will burn more or less and lose some of its feeding value?

Mr. Nordman—I imagine if we put it in too dry, so it will burn, it might do some harm. It will at least lose its color.

A Member—How would you determine about that so as to get it just right?

Mr. Nordman—With us, we let the corn get ripe, then we cut it and let it lay for one or two days, depending upon the weather. The stalks still have juice enough at that time so the whole mass is thoroughly wet, and it makes a good quality of silage.

Mr. Jacobs—There is certainly a certain proportion of moisture that is necessary in this crop. I do not know of any authority, and if you do I wish you would state it, that tells us just what that proportion would be. I believe it is a question our Experiment Stations could very profitably take up.

A Member—What would you do if rainy weather sets in while you are filling the silo?

Mr. Nordman—If it rains, we do as they do in Germany, just let it rain. Rain doesn't injure the corn any. We have filled many times during rainy weather and if the corn was in right condition, the silage was all right—all the better for the rain. We took it right up and put it in. We are as wet as muskrats ourselves when we are at that kind of work.

Mr. Roberts—You would prefer corn to be a little over-ripe than too immature?

Mr. Nordman—Yes, every time. I think that is one reason why there is so much complaint about feeding silage, it is put in green. I believe silage ought to be comparatively dry and ripe in order to get the best results. I can feed my cows all they can eat and they will do nicely on it if the corn was in that condition when it was put in, but, if, on the other hand, it is too green, it has a bad effect on the cows.

Mr. Convey—Is the silage green after being cured?

Mr. Nordman—Yes, you can hardly tell it has been dried out at all.

Mr. Convey—It is really sauerkraut.

Mr. Nordman—Yes, bovine sauerkraut.

Mr. Convey—And like the other kind of sauerkraut, if you don't put water on it, it spoils.

Mr. Roberts—That has been the main thing that has brought silage into disrepute, the fact that it has been put in too green. How long do you cut it, Mr. Nordman?

Mr. Nordman—We cut our silage an inch in length, but I have seen it cut two inches.

Mr. Bradley—And I have seen silage that was cut six fe t in length way up in the north country.

Mr. John Imrie—Can you fill your silo rapidly, or do you have to let it stand between times?

Mr. Nordman—We fill it as rapidly

as possible until it gets full and then we discharge our extra help and keep filling it afterwards with our own help.

Mr. John Imrie—Our silage showed a moldy streak where we stopped filling and let it stand.

Mr. Nordman—One should not let it stand without refilling for more than one day. A silo thirty-eight feet in depth, which is the size of our old one, will settle eleven feet if it is filled right up and nothing done to it after that.

A Member—And the water is over it, on top of it?

Mr. Nordman—Oh, no. It is put in too green if it is like that. We fill our silo right up, but it doesn't make any serious difference, as far as that is concerned. We fill it right up and then after it has settled we keep on filling until it is full.

A Member—Years ago I used to have a silo, and we would fill it about four feet and let it settle for awhile and heat up, and then we would put on another layer, but we filled it green in those days.

Chairman Scribner—Fast filling or slow filling doesn't make any difference; the most important thing is to put it in at the right stage of ripeness. If you waited two or three days in a hot season, it might make a difference, but I mean ten or twelve loads a day, or a hundred loads a day, makes no difference.

A Member—What kind of a covering do you use over a silo when you get through filling?

Mr. Nordman—We have a little marsh near our place that grows swamp hay, and we use that without cutting it up, but anything will do to cover it. Oat chaff is all right, if you wet it thoroughly it will exclude the air. You want to put on enough so none of the corn spoils.

A Member—The best thing we ever used was sawdust. I used it last year and you could hardly notice any spoiled on top.

Mr. David Imrie—In the corn section nothing is cheaper than corn stalks, and they are all right.

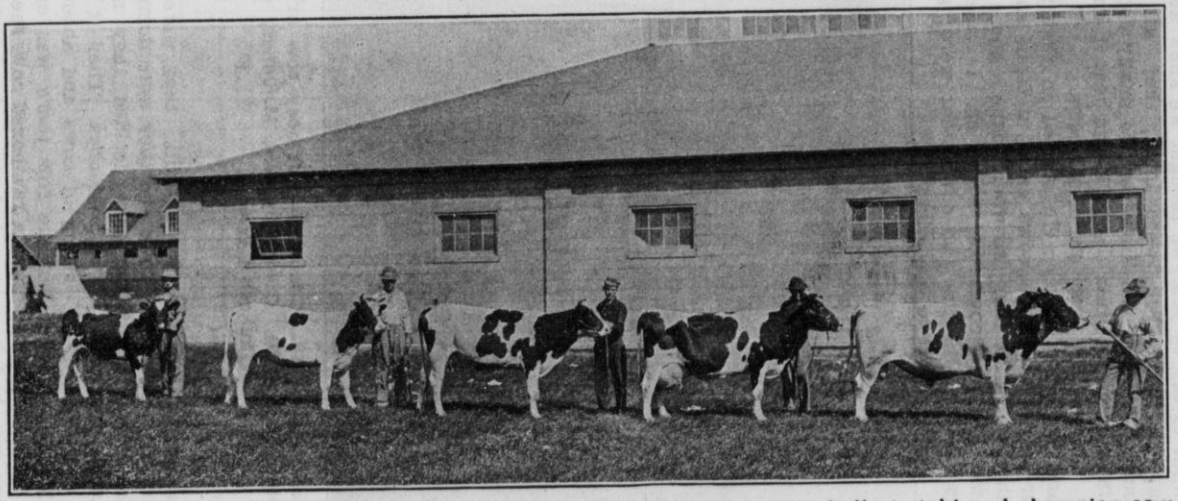
COW TESTING ASSOCIATIONS.

L. P. Martiny, Chippewa Falls, Wis.

In regard to the judging of our beef cattle and sheep, a great many of our educators have become so expert they can tell by sight and by feeling something about the kind of meat these different animals will produce, a steer, or a sheep, or a hog, and we judge them by their external appearance. There are two classes of animals that it is impossible to judge of their producing power in this way; one of them is the race horse and the other is the dairy cow.

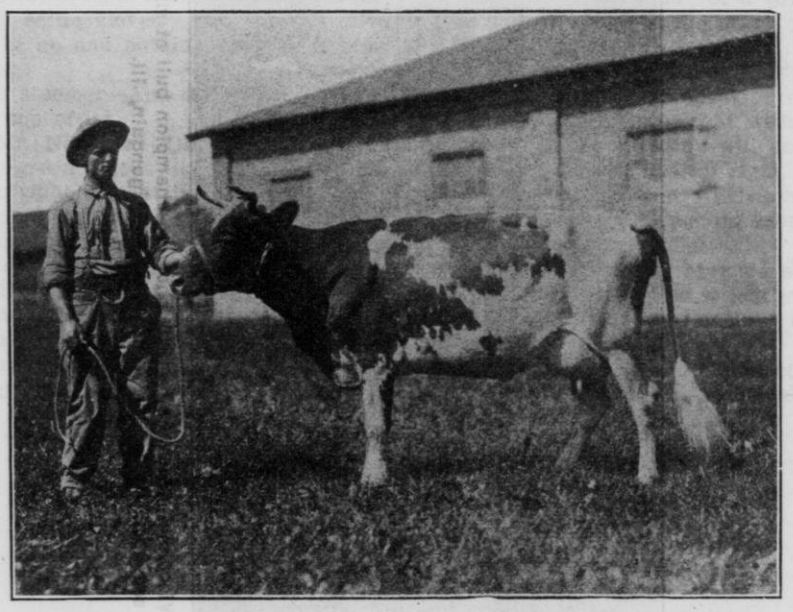
Now, we have some standards which we go by in the selection of these animals, and yet if we were to lead out here say ten race horses, every one of them very typical in conformation and about even, there might be a vast amount of difference in the speed of those horses. That comes from something inside of the animal which we cannot see.

It is the same way with a dairy cow; we might have a dozen cows here that would all score the same, very typical of their breed or of their type, and all scoring very highly in standard dairy production, but you know no good judge of dairy cattle would attempt to say how much each one of those cows would produce in



Champion Holstein herd, Wisconsin State Fair, 1910, showing champion bull at right and champion cow second. Owned by R. E. Haeger, Algonquin, Ill.

butter fat. So I want to say to you, all of you who have not been keeping records of your cows, that you have some cows in your herds that are a great deal better than you think they are, and you also have some cows in your herds that are a great deal poorer than you think they are, and unless a man tests his cows and keeps records of them in the way of milk production and butter fat, he is at a loss to know which are his best cows and is just as liable to sell his best cows as his poor ones.



Tricksey of Waukesha, 19016. Champion Guernsey cow at Wisconsin State Fair, 1910. Owned by Wm. M. Jones, Waukesha, Wis.

How Mistakes are Made in Judging.

In our case, where we had been breeding up with a pure bred sire, we thought it was not advisable to follow them up in that way, because we thought we knew about what they were doing; they all looked alike. However, we finally decided to weigh the milk and test it and keep a record of our cows.

We started in that fall when our cows came in fresh and we thought we would make a guess on what each cow would do. I remember we had two cows that were giving a large flow of milk; they were quite large cows and they were doing so well we at once decided they must be the two best ones. Then it ran down a string of cows and about the center of the row there was one cow that was a raw-boned cow, she was a little too dark in color to be a typical grade Jersey, a sort of hard milker, and then she had sort of a snoupy disposition. She always seemed hun-

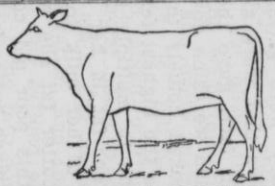
_____ Co-Operative Cow Testing Association

COW _____

Breed _____ Type _____ Size _____ Age _____ Calf

Testing period	Lbs. Milk Daily	Yield During Testing Period: Lbs. Milk	Average Test	Lbs. Butter-Fat	Price Butter-Fat	Value Butter-Fat: @	Value Butter-Fat: C	Feed Fed in Testing Period								Cost of Roughage	Cost of Grain	Total Cost of Feed	Profit	Loss	
TOTAL																					

Description of Cow; Distinguishing features in Color:



Sample page of record book.

gry when we turned her out and she was liable to stick her head into another's cow stanchion. She was rather unsightly in appearance and we wanted to sell her, but so long as we were starting our herd in a test, we tested this cow with the rest.

Well, it went along through the first month of weighing the cows' milk every milking; we had a scale and a milk sheet and kept a record, and when the end of the month came, we footed up the weight of the cows' milk—though that didn't mean very much because we could see what each milking amounted to—but when it came to saving a sample of those cows' milk and testing the samples, we found these two big cows were not testing in the same proportion that they were giving milk; those two cows that were giving the most milk, in fact, gave the lowest tests, and when we came down to this cow that looked homely to us, we found she was the highest tester, and when we came to multiply the percentage of butter fat in her milk by the weight of her milk to find out how much butter fat she was giving, we found this poor old cow was giving just as much butter fat as those other two cows did. I can remember that afternoon very well. We went out to the barn and looked at the cows and they looked different to us. Of course those two cows that we thought were the best cows, we were giving them the most feed and we weren't nearly so particular about feeding this other cow, but she looked differently to us that day than ever before, and strange to say, something happened about that cow afterwards, she sort of changed her disposition, she got to be a nicer cow, and when we would go by her, instead of trying to get out of our way, she would let us put our hands on her, pet her, and we fed her better and she did better, she kept gaining; the more we fed her the better she did.

This test ran along for about six months and then these that were giving so much milk dried up. We had forgotten about that, but we remembered now that they were in the habit of drying up early while this one cow kept right along. After about a couple of months more the two went dry completely, while this other one we had hard work to get her dry before her next freshening period, and she had given four hundred and thirty pounds of butter fat in the year, while these other cows which we had estimated as our best cows, one was the fourth best cow and the other was sixth down the line, and we also found out that while our cows looked so very uniform we had some cows in our herd that were so poor they were not paying for the feed they were eating. We sold them, we got one of our neighbors to help drive them down to the butcher, and he remarked that it seemed a shame to sell such nice looking cows as those; that is just what we had been thinking about them, and that is the reason we kept them in our herd for years.

But that isn't all; that was some twelve years ago. If we had sold that old cow then we would have sold with her all of the progeny we got from her, for, as a matter of fact, nearly all of our own breeding at the present time are daughters, grand daughters and great grand daughters of this cow we wanted to sell, and now we have a great deal better herd than we would have had if we had not saved our calves from this one poor looking cow and had been saving our calves from those other cows, so it taught us something else besides the immediate profit of keeping a good cow.

Keeping Systematic Records Teaches How To Feed.

I would say to any man who is keeping cows, if you keep a systemat-

ic record of the milk production of your herd, it will teach you how to feed those cows; and you will learn what amounts of feed to give them and what kinds; you will learn whether it pays best to leave those cows in the barn or leave them out in the cold; it will teach you whether warm water or cold water is best for your cows; it will teach you whether it pays to be regular in handling those cows. In fact, this keeping of records beginning a number of years ago is what taught me how to take proper care of cows at all. If you show me the man who has made a success at the dairy business in this state, I will at the same time show you a man who has been keeping records of his cows for years, and that is the only practical way you can do it.

Some of you will say that it is quite a job, and so it is, and our State Dairyman's Association has taken this matter up to help the dairyman with part of that work in order to promote the dairy interests of this state, and they are organizing what they call Cow Testing Associations. We have one in our locality which was organized very nearly a year ago.

The Plan of Organization.

The plan is to organize at least twenty-six herds into an association, and among those twenty-six herds there shall be at least three hundred and fifty cows. Each farmer is charged one dollar per year for each cow that he has in the association, each cow that he has listed to test. The State Dairyman's Association furnishes a man to go around and weigh the cow's milk, test it for butter fat, weigh the cow's feed, figure out how much each cow produces in butter fat and how much she produces in dollars and cents; what it costs to feed her in dollars and cents and the net profit or loss there is to the dairyman in feeding and milking that cow. Also what it costs to produce one hundred pounds of milk or a pound of butter fat, and how many dollars and cents, or cents, you get from a dollar's worth of feed fed to those cows. All that is figured out for each individual cow and I think this is a very good plan. I know in our locality, although we have not been running a year yet, there have been some wonderful things developed.

This man whom the State Dairyman's Association furnishes is a graduate from the Agricultural School and he thoroughly understands how to figure out a balanced ration. He is the best monthly agricultural newspaper we have, because every farmer he goes to has a chance to ask him all kinds of questions, not only about his own herd, but about the other fellow's herd and what the other fellow is doing, and every member of our association is talking about building a silo, about putting in a ventilation system, about putting in improved cow stalls and about feeding a balanced ration, and this year there has been one carload of buckwheat middlings come into our town, a carload of cottonseed meal, a carload of oil meal and gluten feed; none of these things were ever fed before, but they are being fed this winter. One man has three farms; he was telling me he had the same cows he had a year ago, but he said, "It is costing me less to feed those cows than it did last winter, though I am getting about two hundred pounds more milk a day than I did a year ago." And all these things happened through the interest taken in this local cow testing association.

DISCUSSION.

A Member—What kind of meal is this gluten meal?

Mr. Martiny—It is the by-product

from one of these glucose sugar refineries, a by-product of corn. They take out the sugar and starch for manufacturing glucose and the matter that is left is called gluten feed; it is very rich in nitrogen.

A Member—What is cottonseed meal made of?

Mr. Martiny—Of cotton seed.

A Member—How does that look?

Mr. Martiny—It is yellow.

A Member—How often would you recommend testing a cow?

Mr. Martiny—In our practice we are testing our cows once a month by saving four samples from four consecutive milkings, but where experiments are carried on for a long time, they say one day's sample once a month is all right, that is, samples from two milkings in succession once a month. Mr. Scribner here, the president of the Dairyman's Association, perhaps can tell us something more about this testing association and what is being done.

A Member—How much does the man get who is doing the testing?

Mr. Martiny—The farmers have to pay one dollar per cow for the number of cows they have in this cow testing association. If one man has ten cows, he pays ten dollars, and the man comes there once a month, twelve times during the year, and tests those cows; they count whether those cows are giving milk or whether they are dry.

A Member—Where does that dollar go to?

Mr. Martiny— It goes to pay this man who does the testing.

A Member—Can you raise a cow's test by feeding her certain grain?

Mr. Martiny—No, not in a practical way, but we have found that where cows are fed so they are in good condition that their test is usually higher than where they are in thin condition of flesh.

A Member—Has this anything to do with the contest that is going on?

Mr. Martiny—Oh, no; that has nothing to do with the state contest.

A Member—I want to know if they can raise the test with feed?

Chairman Stiles—For a little while, but not very long.

Mr. Martiny—This co-operative cow testing is the very best way of educating farmers. For instance, if there is one man in the association who is doing a little better than the rest of them and he makes a suggestion, it helps all the farmers, and, as I said, the man who does this testing is the best newspaper we have; he can figure out rations, feeding rations, and everything of that kind, and we have found it is really costing us less to feed and the members are making more money.

A Member—Does a cow vary in her test from the first of her lactation period toward the last?

Mr. Martiny—As a rule, as she decreases in milk she increases in butter fat. Sometimes after calving time a cow has an abnormally high test of butter fat, but after a couple of weeks she drops down to normal.

Mr. Jacobs—You find a whole lot of variations that you cannot account for.

Mr. Martiny—That is true. Here is a book that is furnished to members by the State Dairyman's Association.

Mr. Imrie—You said you took that record from one day's test. Does your tester use your weighing to check up with?

Mr. Martiny—No, he does the weighing himself for that day, but we weigh right along, because it is a sort of thermometer on the business. This little book has columns for all these things (see cut of sample page), and on the back is a summary of the whole herd. In our case the average cost of producing a pound of butter fat was sixteen cents. For last month the average cost of producing a pound of butter

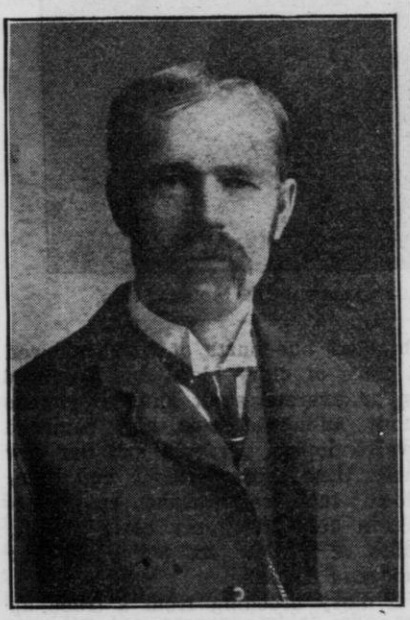
fat was fifteen and one-half cents; that was for the feed consumed.

A Member—How does this record compare with yours as to the amount of milk; I mean for the whole month?

Mr. Martiny—Just about the same; sometimes there will be a little variation and sometimes hardly any. You feed your cows as you want, but you will get all sorts of suggestions on that and every farmer is a question box in that neighborhood. We have a very good man in our cow testing association; he has got them stirred up. I know there is one farmer in our locality who has two or three tenants on different farms and they are striving with each other, they want to beat each other on these records. They are asking every day about each other's record at the creamery, or they ask each other. One says, "How many pounds of milk did you get this morning?" and he very likely gets the answer, "It is none of your d—— business," but it shows these men are interested.

THE COW FOR PROFIT.

E. C. Jacobs, Elk Mound, Wis.



Mr. Jacobs.

The total amount of Wisconsin dairy products and the large number of high producing cows, as shown by the various register associations and cow testing associations, together with the numerous winners of world's honors in individual production by Wisconsin dairy cows, might lead us to assume that Wsconsin cows as a whole must be very large producers and very profitable cows to keep, but taking the statistics as gathered by the State Board of Agriculture, we find that the 1,259,531 cows of Wisconsin returned $68,000,000.00 yearly in dairy products, or only fifty-four dollars per cow, including all by-products.

We have cows giving four thousand pounds of milk testing four per cent, the butter fat (160 pounds) selling at thirty cents per pound, bringing a return of forty-eight dollars for butter fat, and adding to this 3,500 pounds of skim milk at twenty cents per hundred-weight, seven dollars, would make a gross yearly return of fifty-five dollars per cow, but as there is a larger amount of market milk and cream produced and sold above creamery prices that goes to swell the total income from dairy products, I think it is safe to assume that 160 pounds of butter fat is above the amount produced yearly by the average Wisconsin cow.

Although it is comparatively easy

to prove that the average Wisconsin cow is not a great producer, or that she is being kept at an enormous profit as charged by some of our city friends during the early part of the present winter, it will be of no particular benefit to establish this fact unless we can diagnose the case in such a way as to determine some of the causes which influence production and bring to the light some of the sins against good dairying which rob the owners of cows of a legitimate profit.

Elk Lake Farm; residence of E. J. Jacobs, Elk Mound, Wis.

In dairy cow investigations carried on by the Experiment Station of Illinois, it was found from the yearly records of over five hundred cows that the cows having one-half or more of the blood of one of the dairy breeds produced 268 pounds of butter fat per year and returned sixty-seven dollars per year, while under the same conditions, those not having that amount of dairy breeding produced 182 pounds of butter fat and returned forty-five dollars per year, a difference of eighty-six pounds of butter fat and $21.50 in favor of dairy blood. In a herd of twenty cows this would amount to $430.00 yearly, which can be credited to keeping a pure bred sire rather than a scrub. If money is worth six per cent, a pure bred bull in a herd of twenty cows will be worth $7,166.66, for it takes that sum at six per cent to produce $430.00 per year.

In a cow census in New York conducted by "Hoard's Dairyman," the yearly records of 1,700 cows were obtained, one-fourth of which showed a trace of dairy blood and produced on an average eight hundred pounds more milk per cow and returned twelve dollars per year and per cow more than those without any dairy blood. Increased income by breeding in herd of twenty cows $240.00, value of sire at six per cent, four thousand dollars.

If dairy breeding from a trace up is found to influence production as above, we may safely expect that by reinforcing this amount of dairy blood by breeding the cows possessing it and their daughters to a pure bred sire, a greater difference in

favor of breeding will result, and that the improvement will become more uniform and permanent.

But breeding cannot be expected to eliminate all the unprofitable cows from our herds. There is no doubt that many of the cows having some dairy breeding and included among those returning the greater profit were themselves unprofitable cows.

Let us consider a few of the individual yearly records of cows from a herd, all of which were at least one-half blood of one of the dairy breeds, to see what influence selection may have upon profitable production, and to what extent profit and value are determined by production, selecting three of the best and three of the poorest cows in the herd.

Good Cows

No.	Butter Fat	Record	Profit	Value of Cow
1	318	$85.33	$35.33	$588.83
2	284	76.20	26.20	436.66
3	282	75.67	25.67	427.83
Average.....	295	$76.06	$29.06	$484.44

Poor Cows

1	200	$53.66	$3.66	$61.00
2	172	46.15	—3.85	—64.16
3	161	43.20	—6.80	—113.33
Average.....	178	$47.67	—$2.33	—$38.33

Assuming that fifty dollars will pay for feeding, housing and caring for a cow a year and that her skim milk and calves will be equal to replacing her in the herd when she is through as a worker, then we can consider the amount which she returns yearly above fifty dollars as profit, and if money is worth six per cent, she will be worth as an investment whatever sum of money it takes at six per cent to return the same dividend.

It is only by making comparisons on the basis of profit, and that certainly is the true basis, can we realize the importance of every Wisconsin cow having a fair opportunity, not only of being fed and cared for properly, but also the opportunity in life which is afforded by being well born, and for her owner to know how well she repays him for these privileges. Then if she fails to make good, he will be justified in saying to the cow in the language of a noted dairy authority, "You have been found guilty of deceiving the hand that fed you. You had a comfortable home, fat fields to browse on, sheds to shelter you, attendants to wait on you, and you reward all this kindness by trying to give as little milk as possible. Your sentence is to be driven to the next sale and handed over to the tender mercies of the jobber, while another cow will be given the position you have abused."

DISCUSSION.

Chairman Stiles—They tell us figures do not lie. If these figures are true, they certainly present a state of facts that we should look into.

Mr. Martiny—Upon what basis do you get at the high value of those cows?

Mr. Jacobs—As I told you, on the basis of the sum of money it would take to produce this same amount of

profit, interest reckoned at six per cent. Six per cent on $588.83 will produce the same amount that this cow does, or $35.33.

Mr. John Imrie—You would save milking if you had the money.

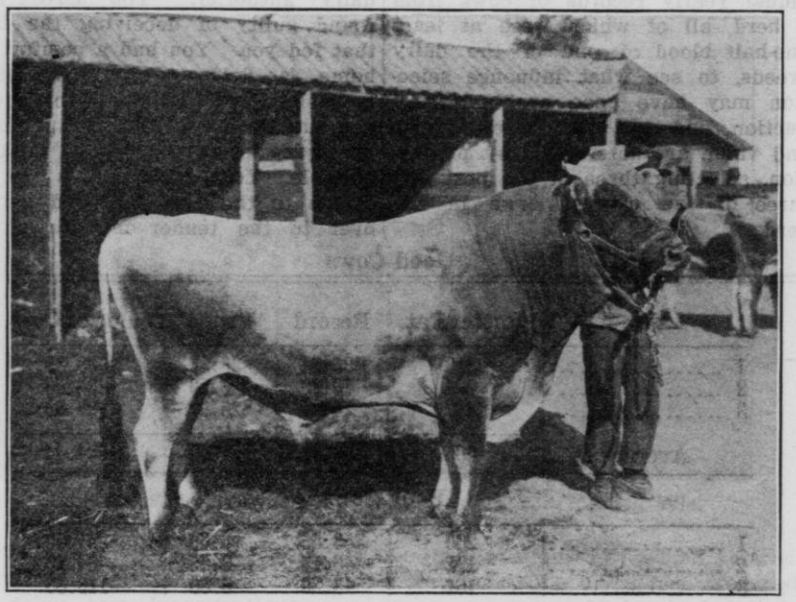
Mr. Jacobs—No; we assume that the fifty dollars is paying all the expenses of the cow, that her skim milk and her calves will replace this cow in the herd when she is through as a worker, so her value is a permanent value, and it will be continued on from year to year.

Mr. Martiny—Do you think that is a true valuation?

Mr. Jacobs—That is the true amount of money it takes to produce $35.33 at six per cent. I am going to let you put your own valuation on the cow. You needn't give that much for the cow unless you want to, but if the fifty dollars pays for caring for this cow, all expenses in regard to her, and if her skim milk and her calves will replace her in the herd, you have a permanent investment which is returning $35.33, and all expenses paid. Now, tell me why she isn't worth $588.83?

A Member—Because she won't live forever.

Mr. Jacobs—But her calves will replace her when she is through and your investment will live forever.



Mabel's Loretta King 72771; owned by E. C. Jacobs, Elk Mound, Wis.

Mr. John Imrie—I guess you have got him, Jacobs.

Mr. Convey—I think it is true that we do not set a proper value on good cows.

Mr. Jacobs—No, we never place a high enough value on a good cow, nor a low enough value on a poor cow.

Mr. John Imrie—According to your figuring, that lowest cow should be worth $113.33 less than nothing.

Mr. Jacobs—Yes, you need that

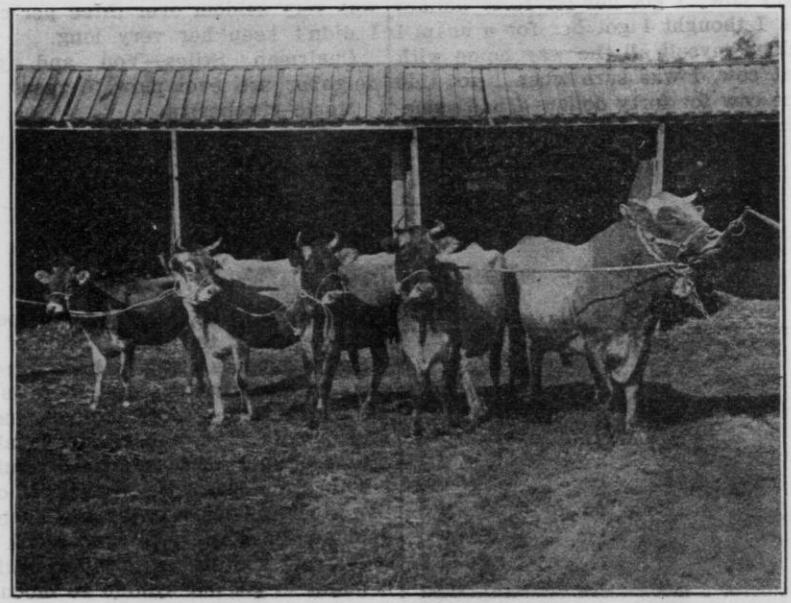
much money at interest to break even.

Mr. Imrie—Would you tell that to the fellow to whom you sold her?

Mr. Roberts—Did you sell those poor cows to a neighboring dairyman, or to a stock buyer?

A Member—Would you be willing to pay taxes at that rate?

tell what my cows are producing all right." I went to his place and I bought one of those cows and I put her into the cow testing association, and during the month of November she produced 56.3 pounds at a cost of eight cents a pound for butter fat, the next month, 41.2 at twelve cents a pound; the next month, 51 pounds



Mr. Jacobs' Jerseys winning the sweepstakes at the Dunn Co. Fair.

Mr. Jacobs—Upon advice of counsel, I refuse to answer.

Mr. Martiny—We have been talking and joking about those figures quite a little here, but I want to say there are a lot of fellows who will fall right into just such things as we have been laughing about. I have a neighbor whom I wanted to get into this cow testing association of ours and he said, "No, sir, I won't have no young fellow going around my place interfering with my business. I can

of butter fat at ten cents a pound; the next month, 58.9 at nine cents a pound; the next month, 53 pounds of butter fat at eleven cents a pound. Now, I ask you, what is that cow worth? I gave thirty-two dollars for her and she is going to make over four hundred pounds of butter for this year, she will produce over one hundred and twenty dollars' worth of product. Is she worth thirty-two dollars?

Mr. John Imrie—I think it is up to

Mr. Martiny to go down and give that man one hundred dollars.

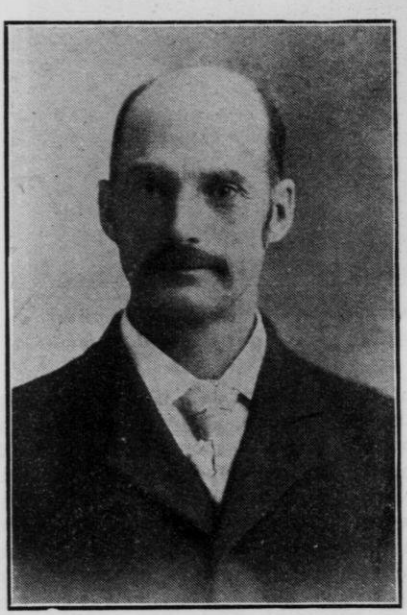
Mr. Martiny—No, I didn't cheat him, he cheated himself. He held a penny so close to his eye he couldn't see anything outside of it. I want to say after I bought this cow and she started out so well, I went back and bought another cow of this man, a nice, big cow, looked like a perfect dairy cow; I got her for forty dollars and I thought I got her for a snap, I tickled myself all the way home with that cow, I was sure when I got this nice cow for forty dollars I had something that was all right. Not long after Mr. Scribner came to our place, and he is a man who has a national reputation as a judge of a cow. When he came and saw this cow, he stopped and said, "There is a fine cow," and he extolled her to the skies. I let him go on awhile and then I told him what her record was; she was giving about ten or fifteen pounds of milk a day and her test was very seldom over three per cent. I didn't keep her very long.

Chairman Stiles—You and your neighbor are even now, I guess.

Music—Orchestra.

THE COW—HOW TO GROW HER.

F. H. Scribner, Rosendale, Wis.



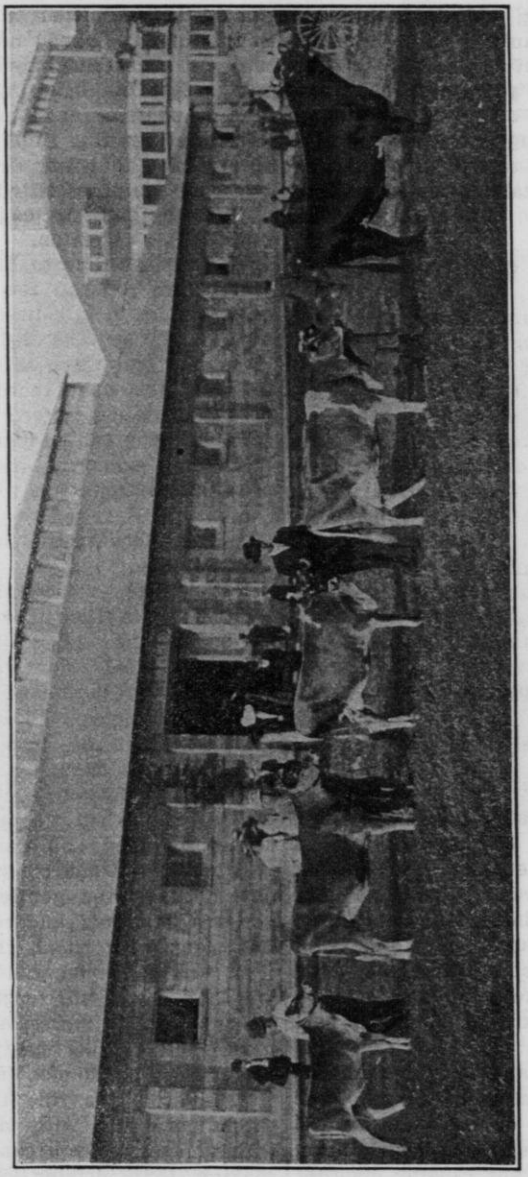
Mr. Scribner.

Never in the history of our country was there so much encouragement from the pecuniary standpoint to do things right in all lines of farm operations as today, the high price of all farm products is going to have a tendency to bring out the best there is in us, which means more thought, more study, more care, and unquestionably means in every case increased results.

The same rule also applies to our live stock, as there never was such a demand for good, well bred stock as today, and with prices so remunerative it ought to get our system so inoculated with this bacterial progress that our thinker would work quicker and bring us into line with the progressive, money-making dairymen.

This seems to be an age of special preparation along all lines; the physician, lawyer, minister, even the farmers' boys are given special training that they may be better equipped for their life work, the exercise of more sanitary conditions of our public buildings and homes, that we may have stronger bodies, or a better equipment for either mental or manual labor. People do best work who have their minds and hands trained along certain lines, so our animals are better equipped that have had a hereditary training.

The old Scotch adage, "Trit father,



Champion Jersey Herd at Wisconsin State Fair, 1910, showing champion bull at the right and champion cow second. Owned by Dixon & Bruins, Brandon, Wis.

trit mither, ere foal canna' amble," meant something, and about the same rules apply to animal as well as human development; hereditary characteristics, strong physical bodies, education, kindness and care and an opportunity to bring out the best there is in us, and in treating on this subject I want to take it up along this line.

Hereditary Characteristics.

Hereditary characteristics are something we want to pay special attention to, as a calf whose ancestry for generations has been along the lines of milk production, is right in line for carrying on this same kind of work and has all the advantage in the world over the calf that has had no particular training, or has been trained in an opposite direction. Characteristics in conformation and disposition are handed down as well, so really a calf's training begins a long way back, and when these things have been well considered, then we are ready for the little fellow's appearance.

A Physical Body.

A cow should have from six to eight weeks' rest before freshening time, to permit the recuperation of her body, which necessarily means that the calf when dropped will also have more vitality. When the cow is nicely dried off, she should have plenty of succulent, nourishing and easily digested feeds to keep her in a laxative condition. A box stall should be part of the furniture of every well-regulated cow barn and should be about the same temperature as the stable, or a little warmer, or it would have a tendency to congestion or a stagnation of the blood, thereby causing disorder of the functions. This stall should be well cleaned and sprinkled with some disinfectant or slaked lime, and plenty of dry, clean bedding used. The cow should be permitted to occupy it a couple of days ahead of time, so she may get accustomed to her new quarters before the little one arrives. No cold draughts or excitement should be permitted at this time, as all these things have their effect upon the system and are transmitted through the milk to the calf, and cause a derangement in his digestion.

The easiest time to kill a weed is just before you can see it, and the easiest time to kill disease is to prevent it. When the little fellow arrives, the first thing to think of is to disinfect the navel cord, to prevent germs of disease entering the system. A good lesson can be learned from our best horse men, who are paying a lot of attention along this line.

Feeding the Calf.

Nature has provided something in the first milk that is very essential in getting the calf's digestive machinery started right, and I think it should be permitted to have it. We usually leave the calf with the cow a couple of days, until it is nicely straightened up, then comes the most important time in the life of the calf; when we take upon ourselves its feed and care, and here is where we want to exercise a lot of kindness and gentleness, for if you are impatient and rough in your treatment with them, they will distrust and fear you and the chances are they never will forget those first lessons and impressions. A cow never will do her best, unless she has perfect confidence in you.

It is an old saying that you can catch more flies with molasses than with vinegar, so you can do more by coaxing than driving. When teaching the calf to drink, don't push its head into the pail; wet your fingers in the milk and let it suck and coax

its head into the pail, and usually the second or third time it will drink of its own accord.

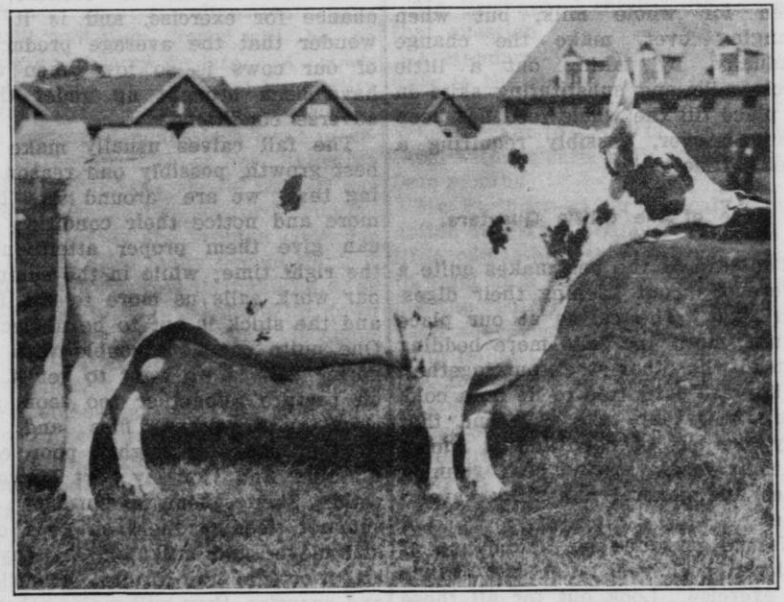
There are three essentials at this time; the quantity of milk, the temperature and quality. Calves are injured more by not observing carefully these rules, for the first few weeks of their lives than any other way. At this age, their little stomachs are not strong and a little care exercised at this time often means the difference between an unprofitable and a profitable animal.

The amount of feed at this time will depend largely on the calf and somewhat on the nature of the milk. This amount must be determined by the feeder, but this precaution is always advisable; better to begin carefully and work up to what they can handle, rather than to begin with a large amount and get them off their feed and then have to commence all over again.

The amount to be fed should not be determined by guess work, but by actual weighing or measuring, for I find it so easy to overestimate.

No artificial heating of milk is so good as the natural animal heat, which is about one hundred degrees, and try to retain this temperature as near as possible. The mother also furnishes the milk in a sanitary condition and we should try to follow her example in this respect and see that the pails are kept in a cleanly condition.

We also notice that quite early in life the calf will begin chewing on something, possibly a straw or piece of hay. Now is the time to educate it to eat oats, and a few minutes in



Champion Ayrshire bull, Wisconsin State Fair, 1910; owned by Adam Seitz, Waukesha, Wis.

getting its head into a basin or box is time well spent. Oats are nourishing and invigorating, and the chewing process has a tendency to start the saliva, which when mixed with the gastric juices of the stomach, makes the digestion easier and more complete. A little nice, bright clover hay should be reserved for them, and when they are nicely started on these, then skim milk can be substituted for whole milk, but when changing over, make the change gradually, by taking out a little whole milk and substituting skim in its place till the whole feed has been changed over, possibly requiring a week's time.

Care of the Calf's Quarters.

The care of the pen makes quite a difference about keeping their digestion right. The calves at our place require more and take more bedding than all the other stock put together. If they are permitted to lie on a cold, damp bed, they take cold and that they are out of condition is shown by their rough, staring coat, running noses and general unhealthy appearance.

Nature provides an abundance of sunlight, good ventilation and chance for exercise. Look out for all these things, as they all mean something in keeping the digestion right and the building up of a good, strong physical frame.

I like the good, old song, "Let the blessed sunshine in," and believe it is just as applicable to our cow stables and calf stables as our Sunday Schools, and also believe we can serve the Master better by caring for our stock in such a way as will bring about a more healthful condition.

Young animals need especial care, as their growth and development require all the nourishment there is in feed, and if we neglect the healthful conditions, then nature will be thwarted in her endeavor to do her part.

Don't forget the exercise. I visit so many barns where calves are kept in a little four by six pen, with conditions just the reverse of what they should be; dark, damp, gloomy, ammonia-filled air to breathe, no chance for exercise, and is it any wonder that the average production of our cows is so low when they have been brought up under these adverse conditions?

The fall calves usually make the best growth, possibly one reason being that we are around the barn more and notice their condition and can give them proper attention at the right time; while in the summer, our work calls us more to the field and the stock is apt to be neglected. One quite common trouble with the spring calf is we want to get it out on pasture altogether too soon, and skim milk, grass, flies and hot weather make a mighty poor combination, and for my part I would rather keep them up through the summer, feeding them on good oats and clover and milk, and by paying attention to the stable conditions and exercise, they will make a better growth than if turned out.

Too many do not really understand the nature of feeds to know what brings best results. Nature provided an easy digested feed for young and growing animals and a ration balanced with the proper amount of digestible protein. Protein is what makes the growth and should not be neglected if we are to expect a good physical frame.

The Dairy Conformation.

In the selection of a cow, we look to the conformation somewhat and much

prefer a cow with a good deep body, and this conformation is desirable in the calf, as it denotes good, strong digestive ability, or powers to handle a lot of feed, and so we like to encourage this condition by feeding bulky rations rather than too much concentrated food. Keep the calves growing from start to finish, for if you stunt them in their growth, you weaken or stunt the digestive organs as well, and they never will be as strong and hearty feeders. A cow's ability at the milk pail and her ability to stand it for a long term of years of high feeding, depends in a large measure on the strength of her digestive machinery, and we should use all our powers to make her so, for I imagine that none of us are keeping cows for our health. So many people think it is so easy for a cow to make milk, as all she has to do is to eat and lie down and chew her cud and that is about all. When we see a horse draw a heavy load, we think what a lot of nerve and energy he puts forth, and so for the cow taking in a lot of our food products and converting them into material to make milk of, it requires a lot of energy, more than most had imagined or thought of. When we buy a machine we buy a strong one that can stand up under the work and that will last a long time, one that will be profitable to us, so in building up this machine, the dairy cow, let us be careful how we build, if we are to have one that is worth while.

DISCUSSION.

A Member—What ration would you prefer for a calf after weaning; how long do you feed milk?

Mr. Scribner—I feed milk until they are a year old. I have heard of a boy who nursed until he was fifteen years old and it didn't seem to hurt him either. I like to commence when my calves are about six months old to feed them on a little more of a bulky ration. Mix in some bran along with their oats and with the skim milk and clover, that makes a good, bulky ration, and later on we can drop out the milk.

Mr. Imrie—I think if you tell the gentlemen what to feed that calf after three months, that will answer his question better.

Mr. Scribner—I think I did answer that question.

A Member—We usually take our milk to the cheese factory, so we are short on skim milk to raise our calves. What I want to know is how to raise them without skim milk after three or four months.

Mr. Scribner—After the calves have gotten to eating oats nicely and a little clover hay, they will eat enough to build up a good body, but will not get the real good dairy development as if they were continued longer on skim milk.

A Member—Don't you think oil meal is good?

Mr. Scribner—No, I used to, but I have dropped it out of my ration entirely by continuing whole milk until they begin to eat oats and clover hay, and then I dropped the whole milk entirely.

Mr. Jacobs—If you dropped off the skim milk, it might come in. How about alfalfa hay?

Mr. Scribner—You have got to be careful how you feed alfalfa hay, especially to calves, or they will get too laxative.

Mr. Bradley—I would like to know what Mr. Stubley says about feeding alfalfa.

Mr. Stubley—We do not have any bad results. We have to be a little careful about overfeeding, of course, but we feed it twice a day.

Mr. Bradley—Have you ever had any experience in feeding calf meal?

Mr. Scribner—Yes, a little more than I would like to tell about.

Mr. Jacobs—I would like to see you take a fall out of Mr. Imrie and prove that you can feed skim milk more profitably to some stock than others from three to four months old up to a year old.

Mr. Scribner—You must remember I am not talking from the standpoint of the average calf, the scrub calf. I think the better the grade, the more profitably you can feed the skim milk. Of course I realize that when milk is worth $1.40 a hundred, you can use it more profitably by sending it to the cheese factory than by feeding scrub calves.

A Member—Did you ever have a calf bloat on skim milk at about two months old?

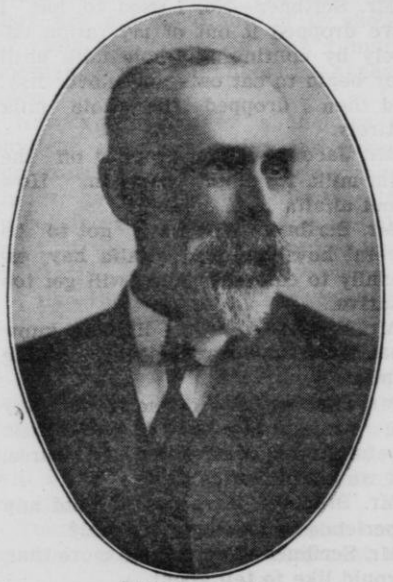
Mr. Scribner—Well, I think that depends on the skim milk. Sometimes where we have separator milk, we are apt to have too much foam and they suck in the air with it. We should be careful in feeding separator milk to take off the foam, that is all the trouble I ever had. It brings on indigestion.

Mr. Convey—We used to have trouble in that way with fall calves. We fed the calves skim milk and they would come rushing down to the trough and a calf always drinks very rapidly, and then they would bloat up. I think if you are a little careful, fix it so they cannot drink so rapidly and do not get the foam, they will not get out of condition on skim milk.

Mr. Scribner—Our calves are all tied up at feeding time, so we do not have that condition to deal with.

THE COW—HOW TO FEED HER.

H. D. Griswold, West Salem, Wis.



Mr. Griswold.

What to feed, how to feed and when to feed are subjects that thinking farmers and students of agriculture have studied for many years, and yet farmers cannot follow fixed rules, but have to adjust themselves to the conditions. They have changing seasons; no two precisely alike. Different soils cause a difference in the crops that can be grown upon them, and a difference in the feed values of the same crop, so no fixed rules can be given; each man has to be a student of his own individual conditions and surroundings. What can we raise profitably on our farm to feed our cows? Alfalfa?

You say it can't be done? I say it can be done. It is being done all over the state.

Red Clover? What excuse has the old "standpatter" who has raised timothy hay for the last fifty years for not raising clover? Any farmer

who tries can raise clover, but clover or alfalfa either can be spoiled in the making, so be careful and cut it early, cure it carefully to preserve the leaves and the blossoms, and then you have made a great step in your cow feeding, but over-ripe, poorly cured hay, clover sticks, your cow tosses over the manger and she says, "You are a fool to expect me to do business on that stuff."

Corn silage? The dairyman today without a silo is like a man without a wife; he is not embracing his opportunities. A good silo and good corn in the silo, well matured corn, put up at the proper time, and you can look the old cow in the face and be happy. She will eat silage summer and winter and no crop yields so much feed per acre.

Oats and peas are good feed, sweet corn in the fall, rape, pumpkins and cabbage are all good, if properly handled, but no rotten or frozen, damaged stuff should be fed. Shredded corn is good fodder, but must be shredded in the right condition; if too green or too wet, then it spoils readily.

In the grains we have oats, barley, corn; all are good in the right proportion. The price has to be considered and many times oats or barley can be sold and some cheaper feed bought in its place. Our farm feeds are deficient in proteids, so it is well in buying to buy the feeds to balance the ration. The cow for her own support, for the growth of her calf and for milk production, requires a balanced ration, and unless this is given her, she cannot do her best Wheat bran is one of the best feeds in protein content, the effect upon the system being light, easily digested and laxative, is very beneficial. The same can be said of oil meal, cotton-seed meal, ajax flakes, gluten, and many other feeds, which are good but need to be fed carefully with other grains.

How to Feed.

Some dairymen have adopted this rule: to feed as many pounds of ground feed per day as the cow gives butter fat in a week. That is to say, if she is making seven pounds of fat per week, give her seven pounds per day of ground feed. This is simply a basis to work from. The good feeder does not mix his feed and feed the same mixture to all. He studies the individual; he gives to each according to what she is doing, taking care not to feed too much and not to feed too little, so that she does not lay on flesh nor yet get too poor; that the bowels are not too loose or too constipated. Thirty-five to forty pounds per day of ensilage and all the good clover hay they will eat, and the more corn there is in the silage, the less grain needs to be fed, and also the better the hay, the less grain.

Again, a good, warm and comfortable, light, well-ventilated stable saves feed, for if they are warm and comfortable they require less.

One man should always do the feeding and he should be the best man on the place. He does not take a text book in his hand, but his eyes are wide open to conditions and when he sees the eager, expectant look in the eyes of the cow, and the restless step, he knows she is hungry and waiting, and the way she takes hold of her ration, the condition of her droppings, the reading of the milk sheet, cause the feeder to vary the quantity and also the mixture to suit the needs of that day and that time, and each cow is a study in herself. The feeder who fails to make note of these things and work accordingly will never be an expert in feeding.

When to Feed.

Every day of the year, whether she is fresh or dry, whether she is in the pasture or the stable, see to it that she is provided for properly. Some pastures are so poor that the cow is forced to eat things she does not like in order to live. Watch the pastures and give the cow feed of some kind to keep her wants supplied. Feed regularly; at the same hour night and morning, then she knows when to expect it, and between times lies down, takes her rest and chews her cud. Have plenty of pure, clear water, at a moderate temperature, always at hand; salt often and in small quantities.

There is at the present time a great strife among dairymen to make records and some of the methods resorted to, especially to obtain weekly records, cannot be too strongly condemned. A week's record at the best, is no indication of what the cow will do in a year. A year's record, under good, normal conditions, without injuring the cow, is the only record worth considering.

Across the street is a window of beautiful flowers, bright blossoms and vivid green leaves. When came this beauty spot? Back of those plants a woman's hand has tended and watered all winter with utmost care, she has not counted the steps, she has not called it work, because she loves those things, and lo! the result.

Love will make a cow give milk. Try it.

DISCUSSION.

A Member—How warm should the water be?

Mr. Griswold—About forty-five or fifty degrees is all right, but if you are using a tank heater, it is all right to have it a little warmer than that. We use it just as it comes from the well.

Mr. Jacobs—What would you feed a cow if she is pretty loose?

Mr. Griswold—Do not feed so much bran and corn meal, and feed more feeds of the concentrated order.

Mr. Nordman—Would you feed concentrated feeds while your cow has first-class pasture?

Mr. Griswold—Not while the pasture is perfectly good and fresh in the spring. We do not cut right square off on the feed, but drop off gradually until they have been on the pasture a week or two.

Mr. Nordman—Don't you think a great many people fall down in their methods of feeding in the fall?

Mr. Griswold—Yes, they keep them in the pasture too long. It is an easy matter as long as they can get their living in the pasture, but you let them go until the grass becomes frosted, and frosted grass is very poor feed; they cannot get enough to feed them properly.

A Member—What temperature would you keep the stables?

Mr. Griswold—We like to have our stable about fifty degrees.

Mr. Convey—How much value do you attach to silage for summer feeding?

Mr. Griswold—We like silage as well as anything we can get to supplement our pasture, and we think it is the cheapest feed to use in that way.

A Member—I have some neighbors who feed whey with their dry feed, mix it up. Do you consider that good?

Mr. Griswold—Do they get good results?

A Member—They claim they do.

Mr. Ribault—I am feeding that.

Chairman Stiles—Do the cows eat it readily, and what is your mixture?

Mr. Ribault—I am feeding half rye and half wheat bran by weight. It is better than to feed it dry.

Mr. Scribner—Every man has to

study his own conditions and consider the feeds he can get.

Mr. Ribault—I have fed that for the last three winters, I used to grind the corn, but since I started in with the rye and bran, it does as well as any feed going.

Mr. Jacobs—Do you take your milk to the cheese factory?

Mr. Ribault—No, I make butter.

A Member—I would like to have a ration we can raise on our own farm. If we raise oats and peas together and grind it up, and also raise alfalfa and oats and barley, can't we balance up a ration ourselves and get good results?

Mr. Griswold—Yes, you certainly can. Do not forget the silo. If you raise oats and peas and alfalfa hay, you have all the protein you need.

THE FARMERS' CREAMERY.

Fred Stubley, Black Earth, Wis.

Mr. Stubley.

This is a question asked in nearly every section of Wisconsin: How shall we organize and manage a farmers' co-operative creamery?

The creameries of Wisconsin can be classed as co-operative and private. Co-operatives are owned and operated by the farmers; the privates are owned by private individuals, they charge a certain amount per pound for manufacturing the butter, and in some cases the business is managed by the farmers in a similar way.

Patrons First Essential for a Successful Creamery.

The first thing essential for a successful creamery is patrons, so in organizing fix the value of the shares not to exceed ten dollars per share, so as to make it possible for every farmer or producer to become shareholders, for when they are interested and have a share in the business, there will be less chance for dissatisfaction. There have been many mistakes made in the past in organizing farmers' creameries, in selling shares to non-producers and charging a fixed amount for manufacturing, making this so high as to enable them to pay a dividend, in some cases as high as thirty-five per cent, which is a serious mistake, as a producer will not stand for this, and it has been the cause of so many of our farmers' creameries being failures.

Have Working Capital to Compete With Rival Companies.

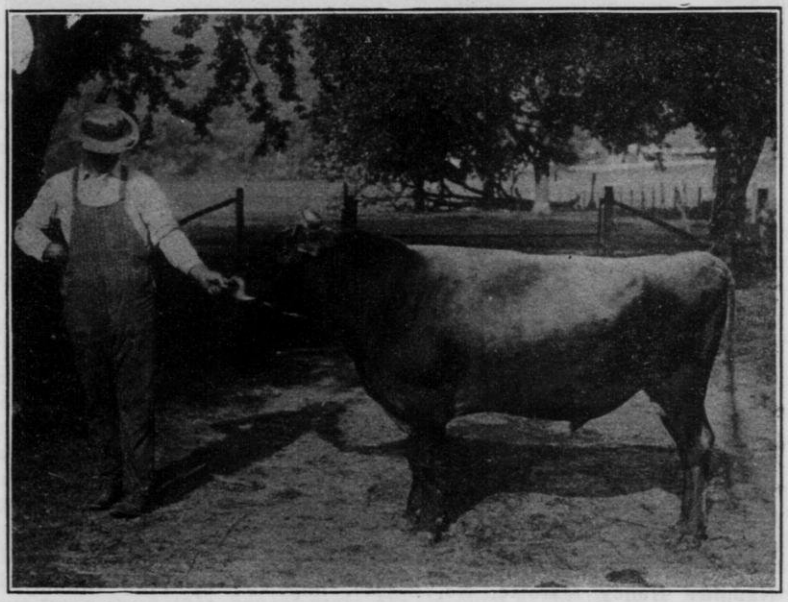
In organizing, after securing patrons, fix your capital stock sufficient to build and equip your creamery complete and have a little working capital. Right here is where many co-operative creameries have made a failure, for we have a rival in the field known as the centralizers and have found many a creamery put out of business just for the lack of a little working capital to compete with them. Centralizers send their agents into a community and offer a little above market quotations for butter fat. They pay every day or once a week and in some places twice a month, and right here is where the centralizers meet much of their success, for the majority of the patrons of creameries are dependent upon the creamery returns to pay the running household expenses. Here is where the co-operative creamery must meet and combat with the centralizers if we do not wish to meet the fate of some of our sister states. When patrons can ship a can of cream and in a few days receive a check for the same, an advance of two cents a pound for butter fat with the prospect of waiting two weeks or one month for returns, does not appeal to the average patron, nor will he change his patronage for this increase; what he wants is cash.

The Black Earth Co-operative Dairy Association.

Many patrons, to their own loss, scarcely know the value of the product they sell; they do not know and appreciate prompt payment. Most of our co-operative and a large number of the private creameries are dependent upon the sales of butter to pay their running expenses and the price of raw material. Unless a working capital is

subscribed, it is evident that the management is much handicapped in competition.

Prompt payment involves the daily testing of cream. Here again managers balk. The argument is that it takes too much time;—no system of management is complete without a knowledge of daily receipts and outlay. No creamery which has adopted daily testing ever reverted to semi-monthly or monthly testing.



Noble Avranche, No. 92571. Imported by Fred Stubley, May 23, 1910, a son of Noble Oakland, the greatest Jersey bull on Island. He was recently sold for $15,000.00.

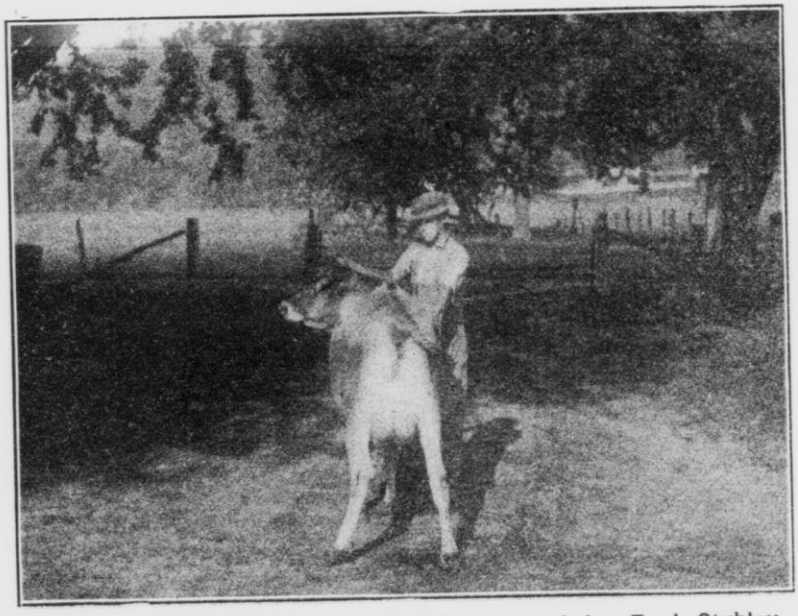
Aim to Keep Patrons Satisfied.

We should charge for manufacturing just enough for running expenses and pay a fixed amount of interest on money invested, for a dissatisfied patron is the source of much loss to any creamery. If it ended with the loss of his patronage, all would be well, but he complains of how much he suffers and spreads distrust and dissatisfaction among the other patrons, so like the worm in the core of the apple, he continues to work, partly concealed, yet always in evidence.

Another point that is sometimes overlooked by some is the natural jealousy of the average farmer over the success of any business in which he is not interested. Now, as the patrons are the foundation, care should be taken to equip the patron with knowledge and understanding concerning his share of the work, that he may make the largest profit possible. A large proportion of the creamery patrons make the serious mistake of supposing that their profits must come from the creamery end

rather than the farm end. They are always looking at the price paid for making the butter, thinking the expense lies there. This is not true; the real and most serious expense lies at the farm end in producing the milk and getting it to the creamery. There seems to be a serious lack of knowledge concerning the best economy and methods of producing milk; the right kind of cows that shall produce milk in sufficient abundance to make the cost low per cow; the right methods of stable management and the kinds of feeds to feed to make the cow produce.

Harmony in co-operation; successful co-operation; the co-operation that outlives the enthusiasm of the first season of an enterprise, is the kind we want to establish in Wisconsin. There is no question but that co-operative creameries are the most successful, providing harmony can be preserved. A co-operative plant does not rest on one individual but on the patrons as a whole, but the lack of harmony among its patrons is usually responsible for the failures.



Naughty Nancy Marette, No. 244944, imported by Fred Stubley, May 23, 1910; two years old July 29, 1910. Is making 13 lbs. of butter in 7 days. This picture shows good back udder development.

Questions to Consider When Organizing.

There are a few things we must observe, first, in selecting the officers, as inherent honesty, courtesy, tact, perserverance are powerful factors in the competitive struggle which grows keener daily. We must educate the patrons to such factors as overrun, quality, and what creamery

losses are; variation in tests from time to time and the knowledge of the management of the business.

Every creamery should prepare a yearly report, setting forth the name of each patron; the number of cows in the herd and the cost of their yearly keeping; whether a silo was used or not; the pounds of milk and butter yield per cow; the average price at which the butter sold for the year and the amount received in cash per cow for each dollar spent in feed. Such a report would show each patron at once just what his neighbor's cows were earning, by it he could compare his own work and see whether his ideas were as profitable as they should be or not. Such a report as this would act as a stimulant to dairy farmers, and taking our creameries where this is practiced, we find them the most successful; it educates along the right line.

It seems needless to emphasize the importance of honesty in dealing with patrons. Often where the business is conducted on an honest basis the manager is at a loss to know what to do with the patrons who are eternally kicking about the tests. A good practice to adopt is to encourage the attendance of the patrons while the cream is being tested. Besides satisfying them that honest tests are being given, they acquire a familiarity with the Babcock test that will be of material value to the patron and enable him to become familiar with the working of the creamery.

DISCUSSION.

Mr. John Imrie—I have had a little experience with regard to paying every day at the creamery and I find this to be the fact; if we attempt to pay cash every day, we have to get half a cent or a cent more for butter fat. There is a man in Roberts now buying for a dairy company in St. Paul. He is paying as high as he can and we have got to compete with these men. We find that by paying once a month, we can keep expenses down, which will enable us to pay from one to three cents more than this man does. and that will mean taking away all his customers, but we cannot pay for cream every day without getting at least a cent or a cent and a half more for butter. The farmers have to wait just one month, thirty days. After that, they can put it in the bank and draw out anything they wish and have their cash every day for a month. A great many people cannot see that, but it is a very simple matter, and besides that, we are always willing to furnish them money if they need it during that thirty days, they can draw any amount, so in the end it amounts to the same thing. I cannot see any object in paying for the cream at the time it is delivered.

Dr. Kutchin—My experience corroborates Mr. Imrie's, but it may be due to the fact that the farmers in northern Wisconsin are not so hard up for money. In our competition with the centralizer, it doesn't cut any figure. Our patrons insist on prompt payment, of course, but if it is once a month, it is just as well as once a day.

Mr. Stubley—It is impossible for us to keep our patrons satisfied with just one payment a month, as those who have been shipping and receiving their pay every two weeks insist on the same.

Dr. Kutchin—We pay a man on commission. The first week he got $1.20; the next week he got $1.29 for his commission. We pay four cents above his price; for that month he paid thirty cents and we paid thirty-four, and I think he won't stay long.

Mr. David Imrie—You see we are

only thirty miles from St. Paul and Minneapolis, and there is lots of competition.

Chairman Stiles—If the farmers were wise enough to see their own interests and let these centralizers go it would be all right.

Mr. David Imrie—I noticed in a paper about a month ago a statement from some Minnesota creameries that the best Minnesota creameries paid an average of twenty-eight cents a pound for butter fat, while the centralizers only paid eighteen cents a pound for butter fat.

Mr. John Imrie—There was a man traveling around through Kansas and Oklahoma and he was advising the local creameries to shut up and ship their cream to Minneapolis and St. Paul. The farmers were receiving twenty-six cents a pound for butter fat and a good many took his advice and closed out, and lots of them are getting fourteen cents a pound, and that is all, for their butter fat, so we always advise every farmer to stick to the farmers' creameries and do their own business.

Mr. Stubley—The question has been raised as to the expense of paying by the day. Now, I do not advocate the daily system, but I do claim we should pay at least twice a month. There isn't such a great deal more expense. We hired our secretary for forty dollars extra a year to do the figuring and we pay every two weeks.

Mr. Imrie—What do you pay your secretary?

Mr. Stubley—One hundred and forty dollars next year; our butter maker has a good share of the afternoon and he does all the copying and footing out the milk sheet, so that system is not going to add a great deal to the secretary's labors.

Mr. John Imrie—We are getting along with only one butter maker; he does all the work and I get ten dollars a month for my services in looking after that matter, but if we had to pay twice a month I would feel as if I would have to ask a little something for the extra labor, because there is twice the amount of work, and I am sure it would be only fair to pay the butter maker at least half a cent a pound more for the butter fat.

A Member—How many officers do you have in your co-operative creamery?

Mr. Stubley—We have three, the president, vice-president, and the salesman and secretary is hired by board of directors.

A Member—How much salary do you give your manager?

Mr. Stubley—The whole board are considered managers and we pay our president fifty dollars, the vice-president fifty dollars and the salesman seventy-five dollars per year, and as a reference has been made to the daily testing, we have quite a plant and we have to employ two extra men, and we think they can do that extra work, as no creamery is complete where the daily system is not practiced where cream is delivered.

Mr. David Imrie—There might be some difference in Mr. Stubley's conditions and ours. All the northern part of the state is under the gathered cream system, there is no whole milk, and of course the butter maker has a little more time. There is only one officer who draws a salary, and he is the general manager. There is a board of five directors and they get no salary whatever, nor the president. The general manager does all the business.

A Member—We have nine directors, and we have three salaried officers. We pay the manager seventy-five dollars and the treasurer gets thirty-five dollars and the secretary thirty-five dollars.

Mr. John Imrie—There is no reason why a man cannot wait thirty days when we are willing he shall draw as

high as eighty-five per cent for the first month; then as soon as he gets his first check and deposits it, he can pay back a little at a time. We have his cream so we can afford to trust him.

A Member—How much did you charge for making butter last year?

Mr. Stubley—Two and a half cents for manufacturing and furnishing packages.

Chairman Stiles—At our creamery it costs about two cents a pound and then the package costs about half a cent, which they furnish.

MISTAKES IN VENTILATION.

E. L. Aderhold, Neenah, Wis.

Mr. Aderhold.

The ventilation of most of Wisconsin's cow barns is attempted by various means, such as open windows or doors, trap doors in the ceiling, flues running from the ceiling up, openings in the walls, leaky walls and ceilings, etc., and we have read about the use of muslin windows. Some of these devices are faulty part of the time and others all of the time; for instance, on a mild, still day, good ventilation can be secured by the use of open windows and doors, while on cold or windy days we usually find doors and windows closed, and for good reasons, in which case, they do not answer the purposes of ventilation.

Many stables have stone walls with a few four-inch tile stuck through near the top. Such openings let out heat and supply very little fresh air, excepting while the wind blows.

All the above named flues, openings, etc., as well as leaky walls and ceilings, help to ventilate, but not economically, because they carry out too much heat.

I have not seen muslin curtains used, but I would consider them, at best, a much modified opening in the upper part of the wall. In my opinion, they do not come anywhere near to filling the bill, excepting where very little ventilation is required.

With lands, labor, feeds and cows at high prices, the sensible dairyman will prevent some of the leaks by providing environments which will enable the cow to do her best. Cows pay big for comfort and it can be had at an extremely small cost. A warm barn is a necessity to comfort in Wis-

consin. A cold barn does not furnish it and is a food waster. The heat generated by the cows should be utilized as fully as possible in warming fresh air.

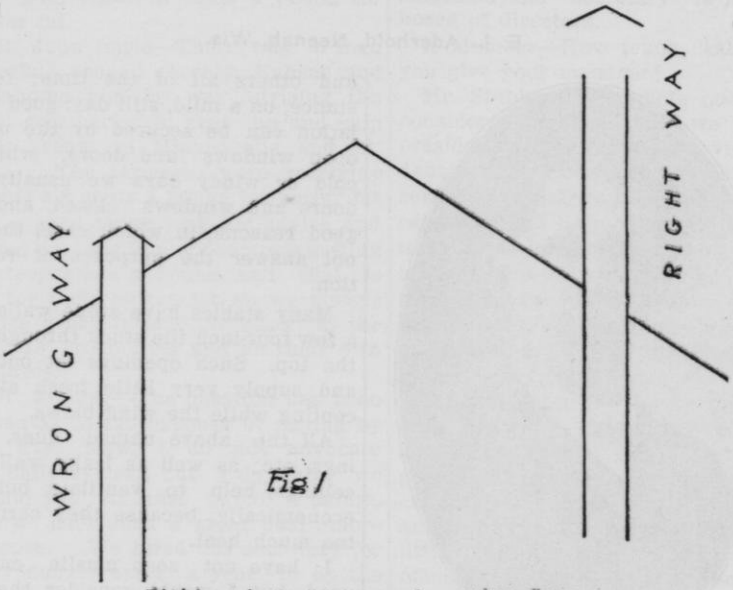
The cow barn is a permanent fixture on a dairy farm, so it will pay to insulate the walls, to have a tight ceiling and, in many cases, to put on storm windows. Having provided quarters that are comfortably warm, we should ventilate as much as possible without making the barn too cold.

In the absence of artificial means, this result can only be brought about by using the "King" system of ventilation, because with it only the coldest air is removed and it has advantages aside from that.

This system has been so much discussed that it is not advisable to go into details, however, so frequently are mistakes made by parties who are attempting to install it that a discussion of the more common mistakes appears pertinent.

Some Things to be Avoided in Ventilating Systems.

Properly constructed foul air flues of the right size are of greatest importance, but of those that have been built, only a small percentage are thoroughly effective.



Right and wrong way of capping flues.

When a mechanic builds a dwelling house, he plans a chimney that reaches several feet higher than any part of the roof, and the top end is not covered; let the same mechanic plan a foul air flue for a barn (where the same principle is involved) and he will choke the flue with a cap put close to the opening and the chances are that the barn roof would extend upward far beyond the end of the flue. Aside from that, he has no concep-

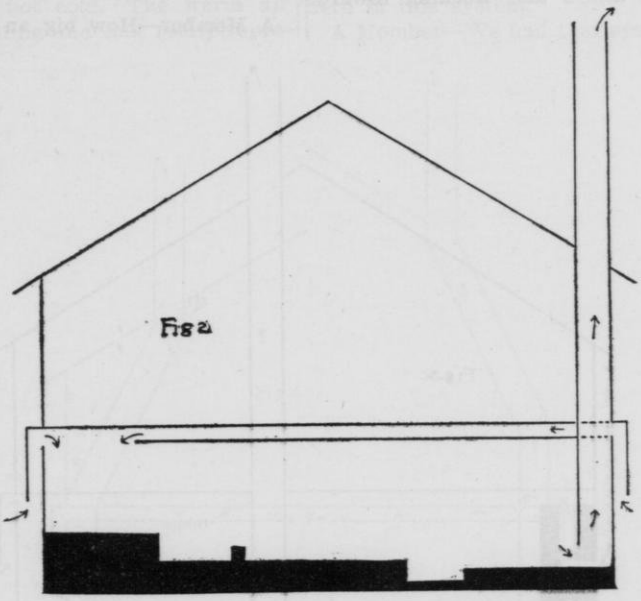
tion of the right capacity of such a flue and I wouldn't give two cents for ventilators built according to his plans. The majority of foul air flues are too small.

Where foul air flues are to be placed at the side of the barn, if it is not feasible (in many cases it is) to continue them directly upward to the required elevation, I would advise to run them from the eaves to the purline plate, or hip, thence directly upward, rather than follow the roof from eaves to ridge, which would be at the expense of efficiency and material.

It is not advisable to have the flue end up in a cupola, and, if capped over, the space under the cap should be nearly equal to the diameter of the flue.

Some Effective Systems of Ventilation.

I know of a flue that is a little over two feet square and thirty-six feet long, built of galvanized iron roofing nailed on the outside of two by four corner posts. The cost of this flue, including labor, was about twenty dollars. I consider that a good way to build large flues.



Barn arranged for one row of cows.

Where the lower end of the foul air flue is in the way (figure 3), it may be hinged just below the ceiling and swung up out of the way while cleaning out the manure.

Fresh air flues should not discharge near the foul air flues, for, if so, the fresh air will drop and be drawn out in place of foul air. The fresh air should be made to travel some dis-

tance before it reaches the foul air flue.

Probably the best effect is obtained where the fresh air discharges in front of a row of cattle and is removed at the rear.

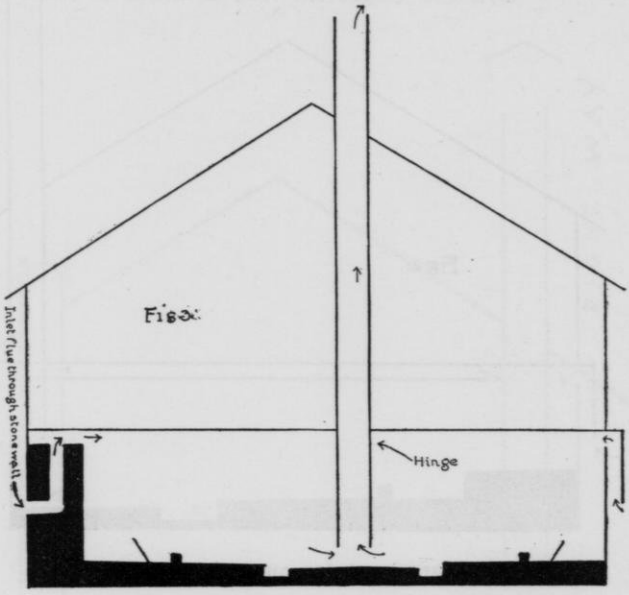
Figure 3 shows a barn arranged for two rows of cows facing the side walls, the fresh air discharging over the feed alleys and working toward the rear.

that enters the barn, no matter from which side, is fed in front of all the cows.

Figure 1 shows the correct and incorrect ways of capping flues and also the proper elevation of top end of same.

DISCUSSION.

A Member—How big an outlet flue



Lower end of flue may be swung up out of the way while cleaning out manure.

Figure 2 shows a barn arranged for only one row of cows, with the fresh air flues from rear side extending so they will discharge over the feed alley.

Figure 4 shows a barn arranged for two rows of cows facing each other. The fresh air flues are extended from both sides and made to discharge over the feed alley.

In Figures 2 and 4 all the fresh air

would you need in a barn thirty-five by thirty-five?

Mr. Aderhold—How many cattle will it hold when it is full to its capacity?

A Member—About fourteen head.

Mr. Aderhold—Well, we want a square foot on the inside for five or six thousand pounds of live stock. That would be perhaps twelve or fifteen thousand pounds of live stock, and we would want a little over two

square feet inside, but a barn that size would hold more than fourteen. If the flue is eighteen by twenty-four inches inside, that will give you three square feet.

A Member—How do you get rid of the warm air in the barn?

Mr. Aderhold—We don't want to get rid of it. It is easy to ventilate if the weather is not cold. The warm air is at the ceiling and that really represents food. We cannot afford to waste that warm air, so we do not let it out; we draw the air from the floor, because there is where the foulest air is.

A Member—You know in the spring there will come solitary days when the air is awful warm.

Mr. Aderhold—You can open the window or door if it is too warm, but you could have an opening at the ceiling in the outlet flue. But I wouldn't draw it out entirely at the top. I think the foul air ought to be removed from the floor.

A Member—Can you make the ventilation system work right by letting pure air in one end and the foul air out at the other end; will that work?

Mr. Aderhold—Yes, that is going on here in this system.

A Member—We had that system put in our schoolhouse and they said it wouldn't work.

Mr. Aderhold—That is different, they have artificial heat there; we have not in the barn. In the schoolhouse they bring it in at the floor, heat it and send it up and it is supposed to go over and back. There is no reason why the foul air cannot be drawn out on the same side in a schoolhouse.

Mr. Jacobs—This air that is intro-

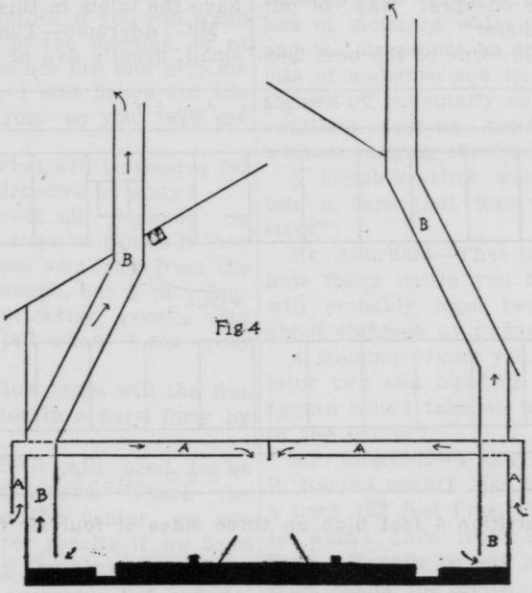


Fig 4

A. Inlet flues for fresh air.
B. Outlet flues for foul air.

duced into a schoolhouse is heated, and is pure air when it is heated and sent up.

Mr. Aderhold—Yes, and all our heat is at the ceiling; we have got the foulest air at the floor. We cannot use the same system as can be used in a schoolhouse, because we have no way of heating that air right in one spot, while the cows that do the heating of the air are scattered over the barn.

Mr. Bradley—What is the best material and the cheapest way of putting in a ventilator?

Mr. Aderhold—One of the best flues I have seen built for the money was twenty-seven inches square. The fellow took four two by fours and nailed galvanized iron roofing on the outside of those two by four's with six-penny nails. He built it thirty-six feet long: he paid a little less than twelve dollars for the iron, and there was no skilled labor involved in making it. I have seen farmers go to a tinsmith and tell them to make a round flue, tell them how big they want it and then make the mistake of asking what it is going to cost and when they hear the price they get cold feet and order a very small one that doesn't amount to anything. If you are going to have it round and you expect the same capacity as two feet square, it will cost two or three times as much, because there is a lot of skilled labor you are paying for; but you make it of this galvanized roofing, nail it around two by four's, make it tight, there is no expensive labor about it, and you can get a big flue at a very reasonable cost.

A Member—How large would you have the inlets in this same barn?

Mr. Aderhold—Those are usually small, usually five or six inches in diameter, but numerous. We want a little air coming in all around, but not too much in a place. They claim one every ten feet is all right. This is assuming the walls are tight, so the heat cannot get out.

A Member—Should the area of the inlets figure up more than the area of the outlets?

Mr. Aderhold—No; if your outlet flue is big enough and built right, so it will draw good, even if the area of the inlet flue does not figure up quite as much as that of the outlet flue, it will work all right. You will want some way to control those inlet flues

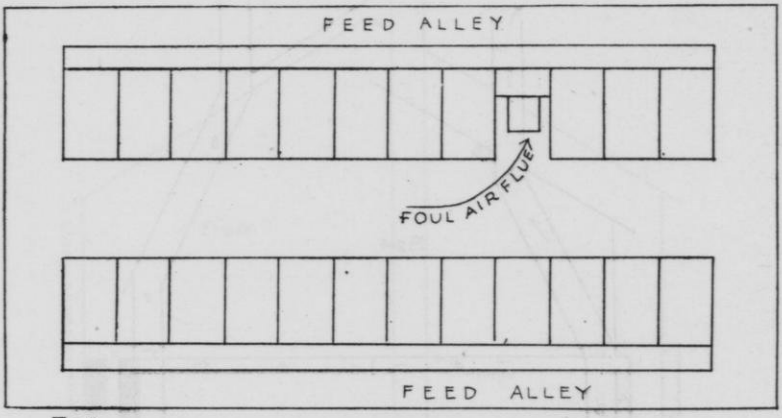


Fig 5. Partition 4 feet high on three sides of foul air flues.

and the outlet flue. When there is a very high wind, they work too fast and we have to regulate them; the higher the wind the more the foul air the flue will draw, so we have to have a damper in there to regulate it when there is a high wind.

A Member—Will one ventilator do in a barn forty by sixty?

Mr. Aderhold—Yes. I want to say if any of you farmers are thinking of building and want information on putting in ventilators, if you will come up at the close of the meeting, or at any time you can see me, and give me your floor plan, I will figure out the ventilators for you so you will get good results.

A Member—What will be needed for a barn about thirty-five by sixty?

Mr. Aderhold—It all depends on which way your cows will face. If they face the walls and you draw from the center, one is enough, but if they face in, you may get better results with two, but I can tell when I see your floor plan.

A Member—How large will the flue be in a ventilator in a barn forty by sixty?

Mr. Aderhold—It will need to be about two feet square. Where the cows are facing the center, we can get a little better results if we have two flues taking the air out from behind the cows.

Mr. Martiny—I think you made a little mistake in answering one question. You said two feet square would do in a barn forty by sixty.

Mr. Aderhold—How many head of cattle will that hold?

A Member—About twenty-five or thirty.

Mr. Aderhold—Well, two and a half feet square would be plenty big enough.

Mr. Jacobs—It all depends upon the amount of live stock and not upon the size of the barn.

Mr. Aderhold—And when you put in your outlet flue, you want to figure on what the barn will hold, not how many head you have. If you had a big barn and not much live stock, you wouldn't need so much ventilation, but when you have the barn full, then you will need more, and you should plan for the full capacity. I have heard farmers say, "My stable is dry;" others say, "My stable is damp." The air in a stable is always damp, because the cattle are discharging lots of moisture while they are alive and the air cannot be dry. There are lots of moisture and impurities being thrown off constantly and we ought to ventilate just as much as we can without making the barn too cold.

A Member—How would you ventilate a barn that was forty-eight by sixty?

Mr. Aderhold—That is according to how many cattle you have, but you will probably need two outlet flues about eighteen by twenty-four each.

A Member—Don't you think a ventilator two and one-half by three feet square would take up too much room in the center?

Mr. Aderhold—I saw a fellow down in Racine county last week. He had a barn 122 feet long, and he thought he didn't have room for his outlet flues. It pays to put in a flue, even if it takes the place of an animal, because it is going to bring you in more money than that animal, and you don't have to feed it.

A Member—But wouldn't it be just as well to have one at either end?

Mr. Aderhold—Sure; sometimes it is better, but if you build two they will cost you more and they will take up more room. I would rather have one near the center than one at each end. Two might sometimes be more convenient.

A Member—I am going to have my cows facing toward the windows, and have doors in the center, and if I put

a ventilator in the center, it would interfere with my drive.

Mr. Aderhold—Oh, no, you can put your ventilator in a little to one side, so it will be entirely out of the way of the drive. Put it between two stalls and partition them off a little so the draft will come from the driveway only.

A Member—How close can you have a ventilator to a cow?

Mr. Aderhold—You can have it very close, but you must have a little partition between it, so as to shut off the draft; just put inch boards about three or four feet high running from the manger to the gutter, so there is no side draft there. We often place them between two stalls.

Adjourned to 7:30 P. M., same day.

EVENING SESSION.

Wednesday, March 16, 1910, 7:30 P. M. Mr. W. C. Bradley presiding. Music, Chorus, High School Boys.

TUBERCULOSIS.

Dr. G. Lawrence Bellis, Antigo, Wis.

Dr. Bellis.

Tuberculosis is an infectious disease caused by the growth and multiplication of the tubercle bacillus in the living bodies of human beings and animals.

History.

It is one of the oldest diseases of which we have any record, being described in the Old Testament as a sickness sent upon the children of Israel on account of their disobedience during the flight from the land of Egypt. Four hundred and fifty years before Christ, tuberculosis was described practically as it exists today by a great and learned Greek physician, Hippocrates, who is also known as the Father of Medicine. From that time on, but little was added to the medical profession's knowledge of the disease until 1882, when Sir Robert Koch, a German scientist, proclaimed to the world the welcome news that he had discovered the cause of this dread dis-

ease to be due to a tiny form of plant life which he called the tubercle bacillus. Since that time thousands of physicians have proven the assertion of Koch to be correct.

Description of Germ.

The tubercle bacillus is a tiny form of plant life so small that it is impossible to see it with the naked eye; in fact, for the purpose of study, a very powerful microscope is required. To give you some idea of the size of this plant, I will state that were twenty-five thousand of them laid side by side they would scarcely reach across a circle one inch in diameter.

The germ of tuberculosis is exceedingly rapid in growth, for it is asserted that under suitable conditions one bacillus will in the course of twenty-four hours parent at least one million bacilli.

The natural habitation of the tubercle germ is in the living bodies of human beings and animals. Outside of such favorable environment, it will live for varying periods of time, depending upon the surroundings whether suitable or unsuitable. For instance, sunlight is very destructive to its life, while darkness and dampness favor its vitality.

The general rule of creation of all organisms applies to the tubercle bacillus. The germ cannot come into being spontaneously any more than a kernel of wheat can generate spontaneously, therefore the disease produced by its growth cannot of itself arise in the individual or animal, it must come from some previous case of the disease, just the same as every kernel of wheat must be the progeny of some parent kernel. This brings us to the point of determining in what manner tubercle bacilli are transplanted from the sick to the well.

How the Diesase is Disseminated.

The infection of tuberculosis in animals is spread in three principal ways, namely, the ejecta from the bowel, milk from diseased udders, and slobberings from the mouth and nose during the acts of feeding and coughing. The first mentioned is by far the most important. Bacilli are present in the droppings from the bowel long before the disease has advanced sufficiently to cause a cough or furnish external evidence of its presence. This concealed characteristic renders the disease especially dangerous, for infectious droppings are present in stables and pastures, healthy animals constantly exposed and results show that but few animals in the herd escape. Tuberculosis of the udder is considered to be a source of an exceedingly virulent form of the disease, probably on account of its direct transmission through the medium of the milk to the young stock on the farm. When a cough is present, the excretions from the mouth and nose contain the bacilli and contaminate troughs and pails. Infection is often produced in this way. We must acknowledge, therefore, that tuberculous animals are dangerous and undesirable.

A tuberculous dairy cow is a dangerous animal; not only dangerous to public health, but to every head of live stock on the farm, and also detrimental to the financial interests of her owner.

In what way is she dangerous to public health? A tuberculous dairy cow throws off daily through the ejecta of the bowels millions upon millions of tubercle bacilli, this taking place long before there is any external evidence of tubercular trouble. As you know it is practically impos-

sible to obtain the milk from a milch cow without contaminating it with free particles of excreta, a dairy which harbors a single tubercular cow will contain the infection of tuberculosis. Where no restrictions or care is exercised by municipalities over their milk supplies, food of this character is freely distributed and tuberculosis results.

To realize how necessary it is that dairy milk be free from tubercle bacilli, consider the fact that over one-half of the babies born in the cities are dependent upon the dairy cow for their food. They are especially susceptible to tubercular infection and will in nearly every instance develop symptoms of the disease if fed tuberculous milk. Consequently when you are feeding your children milk from an infected dairy, you are laying them liable to sickness and perhaps death, for many cases have been traced directly to this source.

The second point I wish to make in regard to the tuberculous dairy cow is that she is a source of danger to all other cattle or heads of live stock associated with her on the farm. Through the droppings from the bowel containing millions upon millions of tubercle bacilli and the contamination of troughs and pails from the slobberings of the mouth, the disease ultimately spreads throughout the entire herd. The deterioration in weight, productiveness and value which is sure to follow, proves the third point, that a tuberculous cow in the herd is detrimental to the financial interests of her owner.

How Existence of Tuberculosis May Be Determined.

Tuberculosis in cattle is a slowly progressive, insiduous disease, showing no outward symptoms which can be recognized until late in the course of the disease. As it is impossible for you or I or any veterinary surgeon to tell from the external appearance of the cow whether or not she harbors the infection at the time she begins to scatter bacilli in the excreta from the bowel, we must resort to a method by which we can determine the existence of the disease, namely, the tuberculin test.

Tuberculin is a medicinal substance, and when injected into the living tissues of a tuberculous animal causes a reaction to take place as proof of the presence of this disease. There have been a great many mis-statements made concerning turberculin. It has been said that tuberculin will cause the disease; that healthy cows when tested become sick, and that it will cause a reaction in some cattle that are not tuberculous. I wish to say in regard to these statements that they have been made mostly by inexperienced, unobserving and incompetent persons and should not be accepted as facts based upon a scientific knowledge of the action of tuberculin.

The United States Department of Agriculture has carried on extensive experiments with tuberculin and have given to the public the truth concerning it. The results of their experiments prove conclusively that tuberculin given in the usual dose, or even in ten times that dose, will not injure in any way a healthy animal. In tuberculous animals, however, it will bring about a reaction in at least ninety-five per cent of the cases. We can truthfully say for tuberculin today, that it is absolutely safe, and the only means we have of determining the early presence of tuberculosis, thus serving as a means of protection to the thou-

sands of babies who must depend upon the dairy for their food.

Eliminating Tuberculosis From the Herd.

After the herd has been tested for tuberculosis with tuberculin, the question arises, what shall we do with the reacting animals? Our state of Wisconsin provides for the furnishing of tuberculin free of charge to be used in the testing of cattle when there are suspicious signs in the herd, and rebates to the owner three-fourths of the appraised valuation of all cattle found to be tubercular, asking in return that a record will be sent to the state office, all reacting animals slaughtered, and the premises disinfected. This is a very liberal attitude on the part of the state and the expense is assumed for the purpose of encouraging all dairymen and cattle owners to free their herds from tuberculosis. I believe the time is coming when the state will refuse to furnish tuberculin and to repay the appraised valuation of tubercular animals. It is at least very advisable for all owners of live stock to have their animals tested as soon as possible.

Dairymen in the state of Pennsylvania, which state, by the way, has harbored many tuberculous cattle, have done much in eliminating tuberculosis from their herds. They use a very good method known as the Bang System. After testing the herd with tuberculin, the reacting cattle are separated from the healthy herds and allowed to live for the purpose of breeding. The milk may be used for feeding after pasteurization. As soon as a birth in the infected herd occurs, the calf is taken away from the mother and placed in the healthy herd. And it is a notable fact that when kept well separated from the diseased cattle, these calves seldom, if ever, react to the tuberculin test. This proves a point in connection with the general subject of tuberculosis, that the disease is not inherited. I dare say that not one child out of a illion is born with the disease already in its system. When the disease appears later on, it is either due to their association with tuberculous individuals, or the ingestion of infected food.

Education Paramount Need in Eradication.

What is especially needed at the present time for the eradication of tuberculosis is the education of the public regarding the nature of the disease and sources of infection. In knowledge there is power and as the people become acquainted with the facts and accept them as truths, tuberculosis must disappear from the land. Stock raisers and owners will insist on tuberculin tested herds, all cities will adopt and enforce milk ordinances and in this way will the bovine source of infection be eliminated.

Need of Governmental Aid.

I am particularly interested in the eradication of tuberculosis in human beings, and I am at a loss to understand why our state and national government take so little cognizance of the necessity for governmental aid being extended along that line. To date it is left mostly to the efforts of individuals, philanthropic societies and state associations; we receive practically no aid from the state direct. As tending to show the attitude of the state and national governments in relation to this disease in the human family, I am go-

ing to read you a clipping taken from a medical journal, entitled, "The Young Mother and the Fat Hog, Not a Fable, Simply Straight Goods."

"One time a little mother, who was only twenty-five years old, began to feel tired all the time. Her appetite had failed her for weeks before the tired feeling came. Her three little girls, once a joy in her life, became a burden to her. It was 'Mamma, Mamma, all day long. She never had noticed these appeals until the tired feeling came. The little mother also had red spots on her cheeks and a slight dry cough. One day, when dragging herself around, forcing her weary body to work, she felt a slight but sharp pain in her chest, her head grew dizzy and suddenly her mouth filled with blood. The hemorrhage was not severe, but it left her very weak. The doctor she had consulted for her cough and tired feeling prescribed bitters made of alcohol, water and gentian. This gave her false strength for a while, for it checked out her little reserve. When the hemorrhage occurred, she and all her neighbors knew she had consumption, and the doctor should have known it and told her months before.

"Now she wrote to the State Board of Health and said: 'I am told that consumption in its early stages can be cured by outdoor life, continued rest and plenty of plain, good food. I do not want to die. I want to live and raise my children to make good citizens. Where can I go to get well?' The reply was: 'The great Christian State of Indiana has not yet risen to the mighty economy of saving the lives of little mothers from consumption. At present, the only place where you can go is a grave. However, the State will care for your children in an orphan asylum after you are dead, and then in a few years a special officer will be paid to find a home for them. But save your life, never. That is a cranky idea, for a member on the floor of the Sixty-first Assembly said so. 'Besides,' said he, 'it isn't business. The State can't afford it.' So the little mother died of the preventable and curable disease, the home was broken up, and the children were taken to the orphan asylum."

I beg to state that this story represents a practical statement of what has happened many times in the state of Wisconsin. We sacrificed 2,500 lives from consumption last year, and a great many of these deaths were among little mothers.

What a difference in the attitude of the government when a hog is taken sick.

"A big fat hog one morning found he had a pain in his belly. He squealed loudly and the farmer came out of his house to see what was the matter. 'He's got the hog chollery,' said the hired man. So the farmer telegraphed Secretary Wilson of the United States Agricultural Department (who said the other day he had three thousand experts in animal and plant diseases) and the reply was, 'Cert., I'll send you a man right away.' Sure enough, the man came. He said he was a D. V. S., and he was, too. He had a government syringe and a bottle of government medicine in his handbag, and he went for the hog. It got well. It wasn't cranky for the government to do this, and it could afford the expense, for the hog could be turned into ham, sausage, lard and bacon. Anybody, even a fool, can see it would be cranky for the State to save the life of the little mother, and it could not afford it, either. Moral: Be a hog and be worth saving."

Another little story to show the at-

titude of the government in the raising of hogs and in the raising of children.

"Congress has been asked this year for an appropriation of three thousand dollars for the employment of an expert in the welfare of children. It was hoped by those who made the request that this modest beginning would lead to an efficient Bureau of the Department of the Interior, which would eventually deal with a wide range of questions affecting school children.

"In support of this request, a Nebraska woman wrote that her husband was engaged in raising hogs, while she was trying to raise a boy. Her husband, she said, had no difficulty in getting efficient and expensive aid from the government in his hog raising pursuits, but she had to struggle along in her own way with the boy question. With a mother's pardonable prejudice she argued that the welfare of her boy seemed almost as important as the health and happiness of her husband's hogs."

The progress of civilization at the present time can be almost wholly measured by our ambition along commercial lines. In our efforts to accumulate the Almighty Dollars, we have apparently lost sight of the necessity of preserving our greatest state and national asset, individual health and strength. Tuberculosis in man and animals extracts an enormous yearly toil, not only in suffering and death, but when accounted in dollars and cents the amount is appalling. It is to be earnestly hoped that the general awakening of the public now taking place as the result of a correct knowledge of tuberculosis, a preventable and curable disease, will bear fruit and as speedily as possible eradicate this dread disease from our land.

The Chairman—I think if the farmers all over the state of Wisconsin some time during the next year could hear just such talk as we have heard tonight, that in a few years they would perhaps pay more attention to the children and the little mothers, and perhaps not give their very best attention to the hog.

VALUE OF VENTILATION IN THE PREVENTION OF DISEASES.

Dr. M. P. Ravenel, Madison, Wis.

My subject is "Ventilation," or, we may say, "Fresh Air." The term ventilation is derived from the Latin word ventus, meaning wind, and ventilation means fresh air; that is the whole sum and substance of it.

To have an understanding of what we are driving at, we must understand some of the normal conditions of this air we breathe. If you hold your breath for a minute, you have a strong sense of suffocation; if you cover up your head with blankets at night, you soon get a sense of oppression,—you have got to have fresh air. But a great many people do not know of the necessity of a constant and abundant supply of fresh air—in fact, the medical profession only within the last few years has come to understand it. We have a saying "free as air," and it is true, air is free to everybody, and yet the thing that comes so freely—as freely as air does to everybody, many of us shut out.

The air as we get it, pure air, consists approximately of one part of oxygen to four parts of nitrogen. What we consider normal air ought not to have carbonic acid gas in it beyond

about three parts in every ten thousand. Then there are some of the newer elements, like argon, and a little ammonia, but the thing that principally interests us is the oxygen, because this oxygen, which is carried by the red cells of the blood, is necessary to nourish our bodies. What I say of man is true also of animals. Man is an animal, and lots of married women will tell you that man is also a beast, but man is an animal just the same as all our farm animals are, and we need exactly the same sort of air and the same kind of respiration.

We take in at each respiration about thirty cubic inches of this atmospheric air, equal in twenty-four hours to about thirty-four pounds of air. This gives seven pounds of oxygen, and of that seven pounds we absorb about two pounds and we give out to the atmosphere about two pounds of carbon dioxide or carbonic acid gas per day. Carbonic acid gas is not poison, but it is absolutely incapable of supporting life. If you drop a lighted match into a jar of carbonic acid gas, it goes out like that (with a snap). If you lower a man or animal into a well with carbonic acid gas in the bottom, his life goes out in the same way, but if he is dragged up to the air, he may recover. That is different from what we call carbonous oxide; that is actually poison, but carbonic acid gas is not. It simply cannot support life.

The Object of Ventilation.

The chief objects we try for in ventilation are to get rid of this carbonic acid gas and to keep the supply of oxygen abundant. We breathe in the air containing about one part of oxygen per hundred parts, and we breathe out a mixture containing four parts of carbonic acid gas, and only seventeen of oxygen per hundred.

We raise the temperature of the air we breathe almost to that of our bodies, ninety-eight degrees, and we saturate that air with moisture. We breathe out five hundred and fifty grains of water each hour, or some four pounds per day. All of this makes this air unfit for being breathed again until it is purified.

There are several historical instances of the danger from carbonic acid gas. Perhaps the best known is the Black Hole of Calcutta, where one hundred and forty-six prisoners were confined over night, and one hundred and twenty-three were found dead in the morning. Other well-known instances are the ship "Londonderry," which was caught in a storm, and for safety one hundred passengers were put into a cabin eighteen by eleven by seven feet. Of the hundred, seventy died during the night. Again at Austerlitz, three hundred soldiers were confined in a small cellar, and two hundred and sixty of them died before morning.

I have said before that carbonic acid gas exists in what we consider normal air in the proportion of three parts in ten thousand. We regard six parts in ten thousand as being allowable. When the amount rises to ten parts, the danger line is reached, and amounts above this very soon give rise to headache, nausea, and symptoms which are not only disagreeable, but dangerous.

These are facts, but some people are very much influenced by their imagination. I heard of a man once in a hotel who was unable to sleep. He believed in plenty of fresh air, so went to a window and tried to raise it. Failing in his efforts, and feeling obliged to have more air, he kicked out a pane of glass, went to bed and slept comfortably. When he awoke in the morning, he found he had kicked in the door of a book case. The room was a large one, consequently he had plenty of air for safety without the

opening of a window, and his imagination was satisfied by breaking in the door.

Night Air.

I will now speak on a subject on which there is misunderstanding in every part of the world that I have visited. Many people will say it is all right to breathe plenty of air in the daytime, but it is dangerous to breathe night air. I want to tell you that if you do not breathe night air at night, you will suffocate, because there is nothing to breathe at night except night air. This fear of night air is an old one, and has a little grain of truth at the bottom which modern science has cleared up. The idea became current in Italy where malaria, or chills and fever, was very bad. The Italians found that if they slept with open windows they contracted this fever and ague. This disease is also very prevalent in the southern part of the United States and is one of the diseases which made the French fail in digging the Isthmus of Panama. It has made parts of the west coast of Africa uninhabitable for the white man. Now, "malaria" is derived from two words "mala," bad, and "aria", air, bad air, and the Italians believed that it was due to noxious effluvia carried by the air which got in if their windows were open. We now know that the disease is transmitted always through the agency of a mosquito which we know as the "anopheles." This mosquito flies at night, and got in through the open windows. This is all there is to the idea of malaria being carried by the air. You can live with perfect safety in the worst district possible, if you keep your windows screened with mosquito netting. This experiment has actually been carried out in the worst parts of Italy with perfect safety.

Fresh Air a Preventive of Disease.

This brings me to another point, and that is, can air carry diseases? We used to believe that lots of things came through air; we also believed that disease came to us as punishment by an offended Diety.

Now, disease is the result of sin, but it is sin against the laws of health, against common sense, against sanitary precautions, and the man who gets sick has broken some law of health, but we do not any longer believe, of course, that it is sent by any offended Diety to punish us for our sins.

We know that by neglecting the laws of health, drinking bad water, and not breathing fresh air, we are encouraging disease, but many of these diseases that are supposed to be transmitted by the air can be explained in exactly the same way that this malaria is explained. It is perfectly true that the air carries particles of dust and with the dust germs of certain diseases. Many cases of consumption are carried by currents of air; one of the principal ways in which this happens is in consequence of careless spitting on floors and in public conveyances. Connected with that idea, the worst possible thing is dry-sweeping; when you dry-sweep you stir up all these germs that are on the floors and those germs are carried to a person through the air, but the air in that case is only a medium, it has nothing to do with the disease itself.

How does the fresh air prevent that? Because fresh air is absolutely essential to us—an abundant and constant supply is necessary to us. If we lower our vitality by cutting off our oxygen supply, or loading up our lungs with this carbonic acid gas, we

are lowering our resistance to disease, and the man who breathes plenty of oxygen all the time is building up his resistance against disease. All of us get our dose of disease. There is no question that everybody in this audience at some time or other gets a dose of every epidemic disease that is going around, but everybody does not get sick. An epidemic will go through a city and probably not one-third of the people in that town get it, because they have built up their resistance and they have immunity from that disease. That is one way by which ventilation and fresh air prevent disease, namely, by building up your resistance, keeping your body in a good, healthy condition, and enabling you to stand up in adverse surroundings, and not being knocked down by them. Fresh air is what builds us up tremendously; it is the best of tonics.

Many people dread sleeping in the cold. Why, we take consumptives at the present day and give them the fresh air treatment. In Philadelphia, and other cities, they are building hospitals, the wards of which are connected by bridges, on which to put people who have tuberculosis, so they will get all the air possible. We learned years ago that pneumonia would go through a prison among the people that were confined with insufficient ventilation.

Let me tell you something I think is very remarkable. Benjamin Franklin, about one hundred and sixty years ago, said this: "My observation is that common colds and influenza are not due to exposure to cold and dampness, because if they were sailors, lumbermen and soldiers, whose occupation compels them to be exposed to the coldest temperature, would always have colds, whereas we find that of all men they are most free from them." He went on: "But it is my observation that these colds are transmitted by noxious effluvia from crowds." If he had said "germs" in place of "noxious effluvia," he would have had the germ theory one hundred years before Pasteur ever discovered it; he was practically one hundred years before Pasteur's time, and he had the theory of modern disease down fine, except that he said "noxious effluvia" instead of "germs."

In ordinary circumstances, how does the air purify itself? One method is by the ventilation that takes place by circulation and mixture, the carrying off and putting of new air in place of the old, and if you give it half a chance it is sufficient in the great majority of cases.

Another one of the ways by which our forefathers got fresh air in the house was by putting in fireplaces, and there is no better way of ventilation than through fireplaces. Another way is the ordinary chimney or ventilator, which must be tall; it works on the same principle as an atomizer such as you use for nose sprays; the air blows across the top of the chimney, creating a suction which must be supplied by sucking in fresh air from below.

Those are some of the natural methods of ventilation, and unless we interfere with nature, the average room will ventilate itself fairly well, but it does not ventilate itself as much as we would like to make people do it. We want to make people not accustom themselves to too much heat. Fresh air does not mean exposure to cold. The great difficulty with ventilation, the great thing which keeps so many people from ventilating properly, is the ex-

pense of it in cold climates; that is one of the greatest stumbling blocks to good ventilation anywhere.

Let me give you a little medical advice—this is cutting into the doctors in this town but I am sure they will agree with me. If you will always sleep in a cold room, with plenty of windows open, I will guarantee you will not need a doctor as often as you need him now.

By "fresh air," I mean fresh air twenty-four hours each day.

Many children who go to school get dull, and logy, and stupid, due to lack of ventilation; many of those children through no fault of their own are considered lazy.

You take our manufacturers all the country over, they are realizing that the best work of their employers is done in well lighted, well ventilated, and pleasant surroundings, with good ventilation always, which invariably goes with good lighting.

One of the great ways in which the air is renovated is by green growing plants. It is a wonderful thing to see what a green plant will do. It is estimated that one acre of woodland during the season will take up four and a half tons of this carbonic acid gas which we breathe out. It retains about a ton and one-fifth of carbon, which it makes into wood, and gives out three and one-fourth tons of fresh oxygen. This respiration of plants, as it is called, takes place in the sunlight, and during the daytime. At night it is somewhat reversed, but even under those circumstances, this is one of the great ways in which our air is renovated, and the carbon dioxide destroyed and utilized as plant food and oxygen given back to us in a fresh, clean state.

Many erroneous ideas are held by people as to what constitutes bad air; oftentimes when you think the air is bad it is simply because it has not got moisture enough.

At the University we had complaints from professors and students alike of some of the lecture rooms being unhealthy. I had some chemical examinations made there and found that the air in those rooms went down as low as fourteen parts of moisture. The air ought to contain about fifty or fifty-five parts moisture to be comfortable. If we get too much moisture again, then we get it like the sultry weather we have in August, when we say the humidity is high. If you have a lack of moisture, you have that dry feeling in your throat and skin. At the University, as I say, we found some of the rooms went down as low as fourteen parts, and one as low as eighteen, so we put a steam jet in the hot air flues, with the result that I have had letters from the professors, saying that never in their connection with the University have they been so comfortable before. Many times when people complain of closeness and bad air, it means that the moisture is deficient, so in our houses we must regulate the moisture in the air as well as the temperature.

But I would like to insist once more on your not making hothouse plants of yourselves; accustom yourselves to fresh air and to cold air. I do not for an instant recommend exposure to cold so as to make you sick, but a healthy man can go out of doors without muffling himself up, and covering his ears, and nose, and everything else. A person in good condition does not need to be treated like a hothouse plant, and it is only those people who do raise themselves as hothouse plants who catch cold by a little breath of air.

There are two ways in which this

condition of resistance can be brought about; one is the cold bath, and the other is sleeping in the cold. If any room in the house must be well ventilated, be sure it is the sleeping room. Breathe in plenty of the good night air—take my word for it, night air is better than day air; it is purer and cleaner than day air, because factories are all shut down then, horses, and people are not traveling around.

But remember,—just a parting word on this—that fresh air means fresh air for twenty-four hours, not simply poking your nose out of doors for two or three minutes, but fresh air for the entire twenty-four hours; sleep in it, have it in every room in the house, and I will guarantee that some of your doctor's bills will be very materially reduced.

The same thing is true of cattle; man is an animal and the same laws which apply to men apply to animals. I believe Professor King is on your program and is going to show you actual methods of introducing good air into the stable, so your animals can be kept in a good, healthy condition. Give them plenty of fresh air, and you can be sure they will give you better returns and stay in better health.

I will tell you of one instance that has come under my notice. Those handling animals in zoological gardens have found in the past that they must calculate every three years for an entire new stock of monkeys, because monkeys are just as susceptible to tuberculosis as people are, if not more so. It has been the rule in every zoological garden I know of that the total monkey population will die out in three years, and they have to practically renew their stock of monkeys every third year.

Starting down in Chicago, I believe under the advice of Dr. Evans, they have commenced keeping their monkeys in open houses, not shutting them up and giving them steam heated houses, as they did formerly. They have some protection from cold. New monkeys coming in are tested with tuberculin, so as not to introduce the disease. The result is that the monkeys live there year in and year out, they never lose them from tuberculosis.

This is now done in Philadelphia, and I believe in all zoological gardens, and it is a most striking example of what fresh air can do in the campaign against this disease tuberculosis. While I do not believe it can absolutely prevent the disease, and you still have to look out for the germ, there is no doubt that by building up our bodies we can increase the power of resistance to that germ.

The same thing applies to cattle; by bringing them up under proper conditions, we can make them resistant to disease.

As a final word, let me say once more that fresh air means abundance of oxygen, means air which has never been breathed before. You do not want to breathe over and over again either your own air or air from other people. Fresh air means air with its full supply of oxygen. It also means air that has not too much oxygen. If there is too much oxygen, that is dangerous. At some of our summer resorts you see people advertising an abundance of ozone. They do not know that too much ozone would be dangerous. One part of ozone in two hundred and forty parts of air will kill dogs quickly.

So we want what we call normal air, the air we get on high mountains, or in the middle of the lake, or the ocean.

Have fresh air, morning, noon and night, live in it during the day, sleep

in it during the night, and I will guarantee you will find yourself very much benefited by it in every way.

Thank you.

Music, Duet, Miss Fenton and Mr. Scribner.

Scotch Songs, Mr. John Imrie.

Mr. Bradley—There is an old tradition among the people of Italy that men who were producing some of the finest violins made in the olden time, sought for wood with which to manufacture those great instruments in the mountain cottages, choosing those that had been inhabited for generations by the happiest people on earth, families who had been noted for love and song and story.

The thought of these violin makers was that the rafters of such a cottage had listened to the love songs of young people, to the lullabies of mothers rocking their children, to the joyful songs of fathers in happy, contented homes, and they believed that in the wooden beams and rafters of such cottage homes had been absorbed some of the sweetness they had listened to all those years and that it could be transmitted to the delicate instruments they were making, and so they sought far and near for these embodiments of human tenderness.

I have been wondering as I listened to the beautiful tones of the violin which has been giving us so much pleasure with the rest of the orchestra for the last two days, I have wondered where this violin was made, where the wood came from to make this instrument which has given us so much joy and so much sweetness. You may think it is all in the man who is manipulating the instrument, and I don't know but it is, but still I like to think that there is something in the wood out of which that violin is made that is proclaiming to us the happiness to which it has listened, and so I am sure we shall all be glad to listen once more to the music which has helped so much to make our sessions enjoyable here.

Music, Orchestra.

Music, "America."

Adjourned to Thursday, March 17, 9:00 A. M.

THIRD DAY.

Convention met at 9 o'clock, Thursday morning. Prayer by Rev. G. R. Anderson.

Supt. McKerrow—In the Farm Institute work of Wisconsin from its beginning it has always been the object to instruct the farmer and encourage the farmer to do better things upon the farm. It has also been an object to help the farmer, if possible, to build a better farm home, because we think this is the primary purpose of all work.

This morning for a short time we are to deal with the things that mean the betterment of the farm home, mean the putting of a part of the farmer's saving into the farm home, as a home bank. It is a proper thing for the farmer to have a bank account, but, as Mr. Bradley stated the other evening, the farmer should not strive to put all his dollars into the

bank; part of them should go into the betterment of the farm home.

This morning we are going to discuss briefly some of those things necessary and convenient in improving the farm homes of Wisconsin, not because we think they are way behind the farm homes of other states generally; indeed, as we ride through the state of Wisconsin and go into her farm homes, we become convinced that considering the age of Wisconsin as an agricultural state, there is no state in the Union which can present a better class of farm homes than can our state of Wisconsin; still there are many things we can do to improve them, and we are going to talk of some of those things.

WATER SUPPLY.

David Imrie, Roberts, Wis.

A water supply we must have in every home, and on the farm where there are no springs or running water, some kind of a storage tank should be provided, where a windmill is used, to pump the water; or at times there will be a shortage, or a lot of hand work, which is costly.

The Storage Tank.

Where the ground is right, place the storage tank or cistern higher than the barns but lower than the second story of the house; place it as much below ground as possible, but it will give good service if it is partly or quite above ground.

In my case, I built of rock, a wall two feet thick, partly above ground, and covered it by putting in two by eight joists, ceiling these on the lower side with matched flooring, then filling between with sawdust, then covering this with boards, a thickness of tar paper, then another thickness of boards. This was done nine or ten years ago and I did not know as much about concrete as I do now, or I should have made it of concrete, reinforcing it with steel and covering with a reinforced concrete slab.

Equipping the House.

After you have your storage tank, put in a three-way pump; then pipe to the house direct from the pump, so all water pumped will first go to the house.

On the second floor of the house, make a light concrete tank holding eight or ten barrels. Ours is only two inches thick at the top and two and one-half inches at the bottom, well reinforced with No. 8 wire, placing the wires both up and down and around about eight inches apart. Place this tank about two and one-half feet above the floor, so you can get the water into a bath tub and the bedrooms. Surround this tank with about four or five inches of sawdust, not to keep it from freezing, but to keep it from getting too warm in summer.

Connect the pipe from the pump to this tank about three inches from the top. Put a tee on the end of the pipe and a piece of pipe reaching to within six inches of the bottom; then put a short piece of pipe in the upper end of the tee, letting it extend above the tank. This is so that if the pump leaks it will not drain the tank or syphon the water out.

Place an overflow pipe near the top of the tank, taking it down through the same opening in which the supply tank is to your storage tank. Connect your house to this tank up stairs, and you have a supply of fresh water always at hand. Every time the wind blows the water is changed in the tank. From the supply tank pipe to the water tank in the yard (and this need not be large) put a float valve in this, and it will always be full, if there is any water in the storage tank.

Norway Spruce windbreak on farm of David Imrie, Roberts, Wis., eight years after planting; at time of planting 18 to 24 inches high; now 12 to 16 feet.

The Out-Door Equipment.

Also pipe to the barns and hog-house. If there is any danger of freezing in the buildings, put a stop-cock down in the ground with a rod extending above the floor. Below this stop-cock place some stones and gravel, so the water can drain off.

In the cow barn make a float tank and place it anywhere so it will be out of the way; under the stair or in some corner. It need not be large, two feet in diameter is big enough. Put a float in this at the height you want water for calves, cows, or other stock, and by piping from this to small drinking basins you can have fresh water at all times, which is a great convenience.

I have used this system for nearly twenty years and I like it very much. I like it better in most ways than a compression tank, because the water is changed so often, and it is so much cheaper.

If the well is near the house, the

house tank and piping from pump to tank and overflow pipe can all be put in for less than twenty-five dollars. Of course, the other piping will depend on where the barns are located, distance to yard, etc.

Be sure to put your pipes below frost. It is easier to put them down to a good depth when laid than to be obliged to dig them up and repair them after they freeze. In our case, we put them all six feet below ground and they have never bothered us in any way.

When the cost is so small, it seems to me that all farmers can have this water system and save a lot of work for women in the house and always have a good supply for the stock; besides the storage tank or cistern makes a splendid place to cool milk or cream, as the water is always fresh and cool.

DISCUSSION.

A Member—About how large a pipe would you need running to the barn?

Mr. Imrie—The pipe to the tank in the yard is an inch and a quarter, the rest of the pipes are only an inch. If you are going to water your cows in the barn, I hardly think that is practical, that is, to let the water into a cement manger, for this reason; any of you who have been to the Chicago Stock Yards have noticed that the commission men will not allow cattle to drink at the troughs until they are full. When I first saw that I asked the reason for it, and they said, if there is just a little water, the animals keep sipping and sipping, they fill themselves with air, and they won't get a good fill of water. I had noticed that myself, and so we do not water our cows in that way. If you are going to do that, you ought to have something to lay over the mangers to keep them away until you can fill the mangers with water and let them drink. The size of the pump will determine the size of the pipe you have to force the water through. In our case, our well is one hundred and sixty feet deep, and an inch pipe carries the water easily from the pump. The overflow pipe is an inch and a quarter.

Mr. Convey—I have found the same objection to that style of watering and my attention has been called to a new style of stanchions that have a small chain which can be fastened under the animal's neck, to prevent it from taking water until there is a sufficient supply, so that objection can be removed in that way.

A Member—My cows usually go to a spring to drink in the winter, they have about one-eighth of a mile to go through woods. Now, do you think it would be better for me to put a system in the barn, or to have the cows go to that spring and take that daily exercise?

Mr. Imrie—I could hardly say. It would depend a good deal on what kind of a walk they had. That would be forty rods to go in a cold day. It might be all right through the woods. We do not water our cows in the barn. The calves are watered there and the cows can be watered, if necessary, in the barn. The trouble with these springs is, they often get snow around them and bad places, so a cow not only has a bad place to stand to drink, but often has to pretty near stand on her head to do it.

Mr. Griswold—This is a question of water supply in the house. All houses are not made so a tank can be placed overhead in the house, and

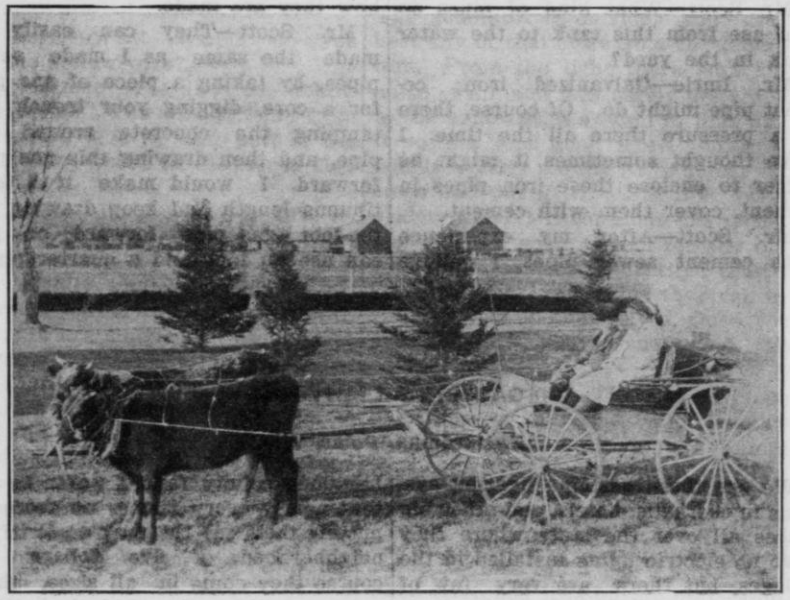
in cases like that, the Whitney system of water tank under pressure is all right; we use that and like it very much. The water we want to use in the house is mostly for washing purposes, we want soft water, and so we put in a big cistern out by the barn where we have the use of about two thousand feet of roof, and we pipe that water into the cellar and have an air pressure tank in the cellar, so we have soft water all the time in the house and a range tank in the kitchen connected with that gives us hot water all the time.

Mr. Scott—There is a new system, I think the Perry system, where they have just an air pressure tank and this pipes water through the well so that on the turn of a faucet you get the water directly from the well, instead of from a reservoir.

Mr. Griswold—It can be piped from the well with the Whitney system, too.

Mr. Scott—In the Perry system there is no water stored at all, it is just an air pressure tank and the water is not taken out of the well until you turn the air pressure faucet.

Mr. Imrie—The Kewaunee system is all right. Now, our well is very deep, and it takes two women to pump from that well. This tank is enclosed in sawdust, and it is never warm, so but what we can use it for drinking water. The water in our well is comparatively soft water, so we can use it for all purposes in the house.



The real dual purpose cow discovered at last.

Mr. Scribner—That would work all right out at Salt Lake, where you have three or four women.

Mr. Jacobs—What provisions have you for hot water?

Mr. Imrie—Well, you can have a water front in the range, though we are not using it that way.

Mr. Jacobs—Do you think if your tank was connected with a common hot water reservoir, it would heat your tank?

Mr. Imrie—I think so. I think you would have to have a faucet and an expansion tank in connection with it to get this hot water.

Mr. Scott—What kind of pipes do you use from this tank to the water tank in the yard?

Mr. Imrie—Galvanized iron; cement pipe might do. Of course, there is a pressure there all the time. I have thought sometimes it might be better to enclose these iron pipes in cement, cover them with cement.

Mr. Scott—After my experience with cement sewer pipes, I believe if you didn't make the mortar too rich that the pressure wouldn't cut much figure, and that these pipes may be made with cement without the gas pipe at all.

Mr. Imrie—Prof. King told us at Madison that you could not make a compression tank of cement, because the air got through it.

A Member—I never heard of cement pipes. I would like to know how they are made.

Mr. Scott—They can easily be made the same as I made sewer pipes, by taking a piece of gas pipe for a core, digging your trench and tamping the concrete around the pipe, and then drawing this gas pipe forward. I would make it a continuous length and keep drawing the ten-foot gas pipe forward; or you can use an inch and a quarter pipe.

GASOLINE LIGHTING.

E. Nordman, Polar, Wis.

We see these gasoline lighting systems in the halls, hotels, and other big places all over the state where they have no electric lights installed in the villages, but there are very few of them in the farmers' homes. I cannot see why the farmer should not be able to install these lights if he sees fit to do so. They are comparatively cheap and make an effective light, so it seems to me that every farmer could have them if he just thought so.

In the first place, each light will furnish from eight to ten times as much light as common kerosene lights. By having one of these lights in the room, you can sit in any part of an ordinary living room and read just as well as you can by daylight.

Now, as to the cost of these lights. The kind we have on the farm up in Langlade county (and I want to say that nearly every farmer up there is putting them in) the tank costs in the neighborhood of five dollars. Of course they come in all sizes, there are ten-dollar tanks and three-dollar tanks, but the kind used ordinarily by the farmers costs about five dollars. In addition to that, each light of six hundred candle power will cost seven dollars, provided more than two or three are installed, so you can see the plant is comparatively cheap; all the other paraphernalia that belongs to the system is thrown in.

These lamps are very convenient as compared with the old kerosene system; the lamps, you see, do not require very much special attention. When they are once put up, they need pumping and filling occasionally, say

once a week, but aside from that there isn't very much labor required to keep them going.

The cost of repairs is also slight. We have to replace a mantle occasionally, but aside from that there isn't any cost for repairs. We have had ours now for three years and for anything else except the mantles there has been no extra cost.

DISCUSSION.

Mr. Imrie—What system do you have, the hollow wire?

Mr. Nordman—Yes, it is the hollow wire system. The wire is run from the pressure tank in some part of the house to any room in the house that you intend to light.

Mr. Jacobs—Do you have to have an expert install that?

Mr. Nordman—Well, there is a man in our locality who does this work. You would hardly call him an expert. The lights are simple and easily kept in order.

Mr. John Imrie—We just installed one in the store in Roberts and I helped the manager to put it up; it is very simple, we put it up in about twenty minutes. We set the tank in the back part of the building, bored a hole through the partition, ran the wires in and hung our lamps, and it was all through.

Mr. Scribner—My objection to those lights has been, they are too noisy for the ordinary room. We used to have them in our church, had generators in different parts of the room, and it gives a very nice, soft light. We installed them high up, close to the ceiling, and yet you can see in any part of the church. They are very economical.

Chairman Bradley—Like Mr. Nordman, we have been using the hollow wire system for about three years without any trouble whatever, except in this, it is a little noisy, there is a little objection to that, and while the user soon gets used to it, the neighbors coming in notice the hum and noise. There is a system called the "Fool-Proof" that would be a right good one for most farmers, perhaps, and a good many other people, because gasoline is something you do not want to fool with very much, and especially a foolish fool. This "Fool-Proof" system, instead of the hollow wire, has hollow tubes some two inches in diameter. The generator is outside, you don't hear any of that noise from the generators. From the light there isn't any noise at all, and it is surely preferable to the hollow wire system in that way. It costs a good deal more, however, and it would require a plumber to come and put it in. But this other system which Mr. Nordman has recommended is a good system for any one who wants something better than a kerosene light, something they can install and put in themselves. Once you get used to it, you do not mind the noise.

Mr. David Imrie—There is only one objection to this kind Mr. Bradley speaks about, it is all right in a store or a church where you put it up high, but in a house it is rather unsightly; while the wire is always out of sight, at least you never notice it, it is about the size of a No. 9 wire, and when stretched it is hardly noticeable.

Mr. Scott—These tubes may be of gas pipes and they may be installed in the walls; in the best houses they are entirely out of sight, you wouldn't know but what you had a regular gas system. There is another advantage in this system, however, and that is you are not obliged to generate the gas in every lamp. When the gas is once generated in the generator, you can light as many lamps as you have installed in the house by just touching a match.

A Member—Can you cook with it?

Mr. Nordman—Yes, you can cook

with it. There are one or two farmers in our locality who have their stoves attached to the tank and use it for cooking. The noise doesn't amount to any more than the tick of a clock. Suppose you ear was not used to our ordinary kitchen clocks, you would find the same objection to that. But now, as regards the cost of running one of these lights, a sixty-candle power light will run thirty hours with one gallon of gasoline, which costs you about twelve cents.

Mr. Imrie—Can you use as cheap gasoline as that?

Mr. Nordman—We use the same gasoline as we use for the gasoline engine.

Mr. Matteson—Is there any odor to this?

Mr. Nordman—No, if the plant is in order, there is none. If it gets out of order, you will soon notice it.

Mr. Aderhold—Then there are a good many of them that are out of order.

Mr. Matteson—I was stopping at a farmer's house down in Dodge county, a new house he had built there; he had the Detroit gasoline system and it seemed to be the finest thing I had ever seen in the way of farmhouse light. It was gasoline and gas, but the gasoline was in a tank outside in the yard, the generator was in the cellar, and it was piped through the house just the same as city gas would be piped and lighted exactly the same way, and it seemed to me an ideal system for lighting a farmhouse, but it costs a good deal. This man's plant, which is no larger than I use, cost him three hundred and fifty dollars, while my plant, like Mr. Nordman's, only cost forty dollars, and his didn't give any better light than we have, but a great deal more desirable, I thought.

Mr. Scribner—I believe the system Mr. Bradley speaks of would be very good for churches where they have those foolish virgins who haven't their lamps trimmed.

ACETYLENE LIGHTING.

W. A. McKerrow, Pewaukee, Wis.

In discussing the topic of acetylene lighting for the farm home, will not endeavor to convince you it is the only good lighting system; however, it has proven very satisfactory with us.

Acetylene lighting has gone through the same period of raw experiment and partial success during its perfection that the telephone, street car and other inventions have, and therefore there have been some fearful "bluffs" put upon the market as acetylene generators by people who were good tinsmiths but not good chemists. There have been over six hundred generators of different styles manufactured. The National Insurance Board permits about seventy of these without extra charge under their regular insurance policies, thus putting them on a par with other lighting systems, but we find many of the poor, condemned machines still in use and giving a bad reputation for the good ones. These poor machines in many cases give off offensive odors, thereby using more acetylene than should be used for economy, and leave a bad impression for the general system.

Today we find over six million people using this system within six years of its invention, showing its popularity, where a proper system is installed.

We hear considerable comment on

the explosive dangers of different lighting systems. Let me quote from the National Insurance Board, one year's figures.

4 fires from acetylene, cost to Insurance Cos..	$13,260
1048 fires from electric light, cost to Insurance Cos.	16,294,540
8222 fires from kerosene and gasoline, cost to Insurance Cos.....	8,441,445
1033 fires from city coal gas jets, cost to Insurance Cos.....	368,970
453 fires from candles, cost to Insurance Cos..	282,080

Acetylene is much cooler than kerosene, gasoline or city gas, because only one-tenth of the flame is necessary with acetylene to produce the same amount of clear seeing light, and one-tenth of the flame means about one-tenth of the heat.

We find the light very soft, steady and light easy on the eyes, and does away with the repair bill of wicks, chimneys, etc., which is a large item.

They tell us of the disagreeableness of the acetylene odor. This we consider a good thing, giving us early warning in case of a leaky system.

We have used the acetylene lighting system for over a year and would not know it was acetylene or electric, so far as odor is concerned.

With a twenty-five-light system, there is very little work to recharge the machine.

The cost of the upkeep in a properly made generator and well built plant is not great. The difference in efficiency is found in the poor and good systems

We find the running expense with us very similar to that given out by some of the manufacturers, burning one-half foot of carbide gas per hour in each burner. Calcium carbide may be bought in one hundred pound lots, which costs from three and one-half to four cents per pound east of the Rocky Mountains. One-half foot of acetylene gas, which is produced from one-tenth of a pound of carbide at four cents, is only two-fifths of a cent per hour for a twenty-four candle power light.

DISCUSSION.

Mr. Jacobs—What does a twenty-light generator cost?

Mr. W. A. McKerrow—Approximately eighty-five dollars.

Mr. Nordman—Do you have this light in your barn, too?

Mr. McKerrow—No; they tell us we can install them in barns, but we haven't got them.

Mr. Nordman—Do you think they would be practical in barns?

Mr. McKerrow—Well, I probably would say I did not think they would be as good as some other of our systems; however, I think they would be fully as practical as gasoline lights, or lights of that nature.

Mr. Martiny—What would be your objection to them in the barn?

Mr. McKerrow—Well, I couldn't say that I would have any particular objection, provided I had the burner properly protected.

Mr. Martiny—Your objections, then, would be danger from fire?

Mr. McKerrow—Danger from fire, yes.

Mr. Imrie—And blowing out.

Mr. McKerrow—We could have them properly protected by globes or something else.

Mr. Convey—After giving this light question a whole lot of study, I came to the conclusion to put in acetylene light. We have run it just a few months and we find it costs about twice as much for light as any other gasoline system. I like the light very well but the parties who put the plant in, their generator is not working as it ought to and they propose to put in a new generator. But

after our experience, so far as economy is concerned, we consider the light the most expensive of which we have any knowledge. It costs about thirty cents a light a week, I think it is.

Chairman Bradley—You must sit up all night.

Mr. Convey—No, nor we don't burn very many lights, but it does not give one-third of the service they claim it would give, as far as economy is concerned. There is no objection to putting it in the barn, because you can have it enclosed in a globe and all you have to do is to pull a little chain, and one light in the barn would give as much service as half a dozen lanterns. We contracted to have a barn light put in, but they didn't get around to it before it froze up. I know parties who have it in use in their barns and they regard it as very serviceable.

Mr. McKerrow—Do you have the half-foot burners or the three-quarters burners?

Mr. Convey—I think we have the half-foot burners. We got the Pilot generator. Your estimate of eighty-five dollars for the generator would not include the piping?

Mr. McKerrow—No, that would not include the installation or the pipes.

Chairman Bradley—What is the cost of the entire plant?

Mr. McKerrow—That depends entirely on the equipment you have, the kind of chandeliers you put in, the kind of packing you have to have and the number of lights you install. I do not remember exactly the number of lights we have. It cost a little less than one hundred and eighty dollars for chandeliers and all. We have, I think, about twenty-eight lights installed.

Mr. Convey—We paid one hundred and fifty dollars for thirteen burners.

Mr. Scott—We are using an acetylene lantern, a thing of very recent invention; in fact, we are just trying it out. It gives a splendid light in every way satisfactory, except as to cost, we have not figured that out yet. I am inclined to think it is going to be a little expensive, and it goes out with a jar. I do not think it would be handy to carry around a barn, but for a stationary light it gives a most satisfactory light.

Mr. McKerrow—I think there is one misconception about acetylene lights. In our main living room we have three chandeliers, three-quarter burners. Of course if we go to work and light two of those burners, we will burn a lot of gas, but we will have that room illuminated more than if we had half a dozen kerosene lights, therefore we are burning more light than is necessary, and of course it is costing more to do it, but in figuring out the cost and the expense of our plant, I figure that this estimate I gave is nearly correct, that is, figuring the carbide at four cents a pound and figuring that we run five lights four hours, that would average a year, the cost of running our carbide, it would bring it to about twenty-eight or thirty cents. That is figuring on five lights four hours an average through the year.

Dr. Kutchin—Isn't it a good deal of bother to take care of this light, and where you have it in the basement, isn't it necessary to get the water out every time you charge the machine?

Mr. McKerrow—That is necessary, but we find it does not hold very much water. We charge this machine about every two weeks in the winter; it holds about eight pails of water and this can be carried out, and the water of course, in our case, is procured right in the cellar, so the man can charge the entire machine in half an hour.

Mr. Scott—Just good exercise for a professional man, Doctor.

HOT WATER HEATING.

W. C. Bradley, Hudson, Wis.

To anyone building a new house or remodeling an old one, the problem of heating is an important one, whether it be stoves, hot air furnace, steam, hot water, or a combination of hot air and hot water. If the house be small and compact, so the furnace can be put near the center in the cellar, hot air is a very good way of heating, but unsatisfactory if the house is large, and especially if the building is alone, exposed to the winds, as most farmhouses are.

Steam heating is all right where the building is extra large and is not all used all the time, then those parts unused need not be heated, but steam heat requires more attention, as you get no heat until the water boils, which is at 212 degrees; then one must keep closer watch of the radiators, turning off and on as the temperature requires, so it requires attention often. Then with steam the radiators get very hot and use up more of the oxygen than with radiators of a lower temperature.

The ventilation should be considered at the same time. Some steam and hot water heated houses, on account of improper ventilation, seem stuffy and close and people condemn the heat, while the trouble is with the ventilation.

I studied all these problems over three years ago and concluded to try hot water and have been very well pleased with it. It is especially suited for the house of ten to fifteen rooms where all the rooms are in use, and what is the use of having a house unless you use it?

The first cost is greater than steam or furnace heat, but more economical in fuel than either of the others. It requires more piping and about double the radiation that steam does, but having more radiation to throw off heat, the radiators do not have to be so hot as with steam, as the water begins to travel through the pipes at eighty to one hundred degrees and 140 is as hot as is ever required in the coldest weather to keep a temperature of seventy in the rooms. It requires very little attention, except morning and night, where coal is used, as it will keep an even heat for ten or twelve hours.

If air is admitted into the boiler room and a floor register into one of the living rooms, then an open fireplace, the ventilation will be good. This will necessitate the building of a double flue chimney, and while the fireplace will not be used much of the time, by leaving the draft open it takes the cold air from the floor and is a good ventilator at all times, as the heat in the furnace flue will keep the other warm and insure a draft at all times. Then the open fire at night is fine, the burning wood and glowing coals radiate happiness if not much heat.

With hot water heating it will require six tons of coal to heat a twelve-room house warm all the time, where it used to take four tons to keep one-half the house warm one-half the time with the stove.

DISCUSSION.

Mr. Scott—How large a boiler for a ten-room house?

Mr. Bradley—Why, I am sure I do not know. You have to have some engineer figure on the amount of radiation and he will tell you how big a boiler to use.

Mr. Scott—And when he tells you, you want to get it a little bigger.

Mr. Bradley—No, I do not think so, they are anxious to sell you about all the iron they can, they will look out for that. We find we have plenty of radiation. I might perhaps give you the diameter of the boiler; it is an upright boiler, with four sections where the hot air passes through, goes through one hole and then through the next, through four different systems in the top of the boiler. I do not think the firepot is over eighteen inches in diameter, that is, for the coal, but the boiler is perhaps five and a half feet high, possibly six feet. We have to use coal with ours; you could use wood, but in determining the kind of a boiler you want, it will depend on your fuel. If you are burning soft coal, you want a differently constructed boiler than for hard coal, or a still different one for wood, although with a hard coal boiler you can burn your soft coal or wood, but each system is constructed differently and you determine what you are going to burn before buying the boiler.

A Member—In a hot air system, would it work better to take the intake air from the outside or from the room?

Mr. Bradley—Always, in any system, take your intake air from the outside, so as to get fresh air. When you simply warm over air that is in the room it does not give you any ventilation.

A Member—How do you get your water in circulation?

Mr. Bradley—The water system is first a boiler in the cellar, or in the basement; then the pipes, the radiators, run through the first and second floors, right at the ceilling, and at the second floor is what is called an expansion tank, a tank which holds about fifteen or twenty gallons. If you use the whole system with water, the boiler, the pipes and the radiators clear to this expansion tank are filled with water and it is cold when you first fill them. You start a fire in the furnace and begin warming the water that is in the furnace, the cold water comes down to the bottom of the furnace and as the water warms up in the furnace, the warm water rises, so in one pipe the warm water is traveling up and the cold water is coming down, and there is a continuous circulation round and round and night and day; in that system you keep a fire in the furnace.

Mr. Scott—You don't want to fill your expansion tank too full with water.

Mr. Bradley—No, it might run over. There is an expansion pipe and it runs back into your closet system, it goes off in that way, if there is any overflow. Before this winter, we have had to put four or five gallons into the expansion tank, but this winter we haven't put a drop of water in it and it stayed half full all winter.

Mr. Aderhold—There may have been some air in the radiators. It does not circulate well when there is air in the radiators.

A Member—What is the cost of that?

Mr. Bradley—Oh, it depends on the amount of radiation. We have about twelve hundred feet of radiation in the house and it cost us about five hundred dollars, installed.

Supt. McKerrow—We put our plant in twelve years ago and it cost somewhere between five and six hundred dollars. There are twelve rooms.

Mr. Bradley—Practically about the same as ours. We have twelve rooms with twelve radiators and

there is about twelve hundred feet of radiation.

Mr. Aderhold—There isn't much difference in the temperature in different parts of the room.

Mr. Bradley—Very little, and the house is always warm all the time. With a coal stove, it was good and warm around the stove and good and cold every place else.

A Member—How about moisture?

Mr. Bradley—This is a dry heat and there should be some provision for water evaporation. There are a good many steam heated houses and hot water heated houses that smell bad, but that isn't because of the hot water heating, it because of improper ventilation. You want to take in some air into your boiler room and let that radiate through the house. That can be warmed through the radiator, if necessary, all the cold air come in and pass under the side of the radiator, but by all means have some sort of ventilation along with your hot water or steam heat.

Mr. Aderhold—If you have an open fireplace, there is always fresh air coming in there.

Mr. Bradley—Yes, and the open fireplace, although you may not be using it, acts the same as a chimney and where the air is kept hot by being heated by the furnace, there is a continual draft, and we have not noticed any closeness in the house.

Mr. Aderhold—It is not really necessary to have inlets.

Supt. McKerrow—Most houses do breathe a little when they have a chance.

Mr. Aderhold—Have you done anything to supply moisture in the air?

Mr. Bradley—Simply putting a pan of water on the top of the radiator; it evaporates a little. We noticed that the furniture has dried up in some cases more than it used to, and the floor has dried up more than we supposed it would.

Dr. Kutchin—Would that be more than with furnace heat, do you think?

Mr. Bradley—No, probably not so much, but more than the ordinary stove heat.

Supt. McKerrow—Isn't there an advantage over furnace heat in the fact that there is less dust blowing about?

Mr. Bradley—Yes, it is a very clean arrangement, and the best of it all is you are not taking down stove pipes and putting them up every year, getting yourself ugly and your wife uglier.

Supt. McKerrow—Now we understand why you have grown better natured in the last three years.

Mr. Bradley—Yes, that has helped.

Mr. Aderhold—How do you find it in moderate weather?

Mr. Bradley—We put in very little fire; that is an advantage of hot water over steam; while your radiators will just be lukewarm, you will get a little heat, while from your steam you have to get your water boiling in order to get any heat, so we think the hot water is nicer during moderate weather. We use wood in the spring and fall before we want to make a continuous fire.

Miss Maxwell—How long does it take to get up heat?

Mr. Bradley—It takes longer than with a stove. If it goes out completely, it will take two hours, I guess, to warm the house up good.

A Member—How large is your chimney?

Mr. Bradley—The flue should be at least eight by eight, I think; that is what they tell me. I can't see for the life of me why it should be over four inches, there is so little smoke going up, because it burns so slowly. I presume if we used wood, it would need a bigger chimney. We have a big chimney, eight inches square, and yet the damper in that pipe is kept so there isn't over a four-inch hole in the eight-inch pipe, and I don't know why

they put on such a big pipe and then put in a damper that way and keep it closed all the time. There are little spaces for the smoke or heat to go out of the chimney but they tell me you need a big pipe.

A Member—Do you take the water out during the summer?

Mr. Bradley—No, you must not take the water out of your pipes during the summer, because the pipes would rust if you did, but you must renew the water in the fall. Water breathes air the same as you do, and it requires some air in the water to make it live water, so take out the water, drain the pipes in the fall when you are ready to build your fire again, put in a fresh supply of water, but leave the old water in there until you want to start your fire in the fall, then fill it with new water.

Mr. Scribner—Is soft water preferable?

Mr. Bradley—I don't know. Ours is hard and it is good enough.

Mr. Scribner—I didn't know but it might have a tendency to corrode the pipe.

Mr. Bradley—No, I don't think so. There is no evaporation, you know.

Mr. Nordman—I imagine that soft water would be rather the best for that, for we have seen where hard water coats up pipes.

Mr. Bradley—You must remember this is just a few pails of water, or a barrelful of water, so it wouldn't have a great amount of surface to cover, and is only used once, so I think it would have very little effect.

Mr. Roberts—The water is not boiled?

Mr. Bradley—No, never over one hundred and forty. It is awful hot when it gets up to one hundred and forty.

Mr. John Imrie—Do you use as much fuel with hot water as with hot air?

Mr. Bradley—No, not nearly so much fuel with hot water as with hot air for the same amount of heat.

Mr. Scribner—This winter we have burned about four and a half tons of coal and we heat our whole house. I think five and a half tons will carry us until warm weather comes.

Mr. Imrie—We have used our furnace now for seven or eight years and we have never used over five tons of coal. We usually heat from eleven to twelve rooms in the house, and only one winter did we use five tons.

Mr. Bradley—Then I may have to take this all back and say the other is the best.

A Member—Is there any way of getting a supply of hot water for other use from this hot water system?

Mr. Bradley—Sure; put a coil inside of your boiler, connect that with the boiler at the stove, and also with the fire front of the stove, and you will have two heating systems here. It must be a separate pipe from the boiler.

Supt. McKerrow—You can have an attachment in your bathroom if you want it right direct from the pipe. You have to watch the indicator on the expansion tank and keep it full.

A Member—Couldn't you have an automatic arrangement?

Supt. McKerrow—I expect we could, but we haven't.

Dr. Kutchin—I should think a float valve would do it. All these systems of heating require fuel. This is St. Patrick's day and I am reminded of the story of the Irishman who was told that if he bought a certain kind of stove he would save half the fuel, and he said, "Be jabbers, I will buy two stoves and save all the fuel."

Mr. Nordman—Inasmuch as this report is going into the northern part of the state where they have lots of wood, I will say our furnace requires about ten cords of wood for the season, cut very coarse, so we don't have to fill so often.

Mr. John Imrie—I would like to know if anyone here has installed a gasoline engine and dynamo for lighting the house and barn, and if so, what it costs.

Supt. McKerrow—For electric lighting for the home and the barn? Perhaps you can tell us something about that, Mrs. Durand?

Mrs. Durand—Talking over these methods of lighting, I couldn't help but think that really my system is about as good as any I have heard of today. I installed my system of electricity originally to use upon the milking machine. I have a two-horse gasoline engine which came from Wisconsin and with that little engine and dynamo I light thirty-five lights in my stable and my dairy. There is nothing better, more economical or simpler to run than that little two-horse gasoline engine. At noon we put the gasoline in, we see that the water is not too hot in the supply boiler, and we have no difficulty whatever. We have made everything on our farm as near "fool-proof" as we know how, and we think this lighting is about as near "fool-proof" as we can make it. The cost of installing that engine and dynamo was less than one hundred dollars. We put the wiring in ourselves. It only takes a moment in the morning to start the engine. We have a different arrangement for turning the light if we do not need it in one part of the system, so we can use it in another part of the stable, and do not need to have the entire number of lights going. We get our men up at half past four in the morning, and when they come on duty we have thirty-five lights going, and no boy can go to sleep on this account.

A Member—About what amount of gasoline do you use per day?

Mrs. Durand—I wish I could tell you the exact amount, but it is very little. We run three gasoline engines on our place.

I will tell you about our water system, as you seem to be talking on all these subjects for the improvement of the house. Mine is an old farm-house, it is over fifty years old, and when I moved there it had no conveniences whatever—I didn't go there fifty years ago, however, I went there four years ago. I looked over this question of an economical supply of water and also heat and sewerage for the reason that I hoped in time to have a better house and a better lot of buildings for my cattle. I have a well one hundred and eighty feet deep, which was always just pumped by hand. I got a "Jack-of-all-Trades" from Fairbanks, Morse & Co., and put it in. I first tried with an electric motor to take the power from the electric railroad which went by my place, but they couldn't reduce it properly and they burned my wellhouse down in trying. So I got a "Jack-of-all-Trades" and I put that in for a very small amount of money. Then I put up a tank which holds—well, I don't remember at this moment but a tremendous lot of water. We pump from that "Jack-of-all-Trades" right up into this tank, and that tank is high enough to give us force and power for the bath room and for water all over the farm. All we have to do is to keep that tank full of water. We pump an hour in the morning, an hour at noon and an hour at night, three hours a day is sufficient to keep our tank supplied, and we have over two hundred head of cattle on the farm. We have a bathroom on the second floor of the house and we have cold water in the kitchen. We have a coal range with a hot water boiler, and this comes from the tank, this water. The whole thing is very simple and very inexpensive. I did a lot of it myself. Then this water goes out into the stable. There was a suggestion made here about cows absorbing air in drinking. We rope our cows while

we milk them to keep them clean and to keep them from lying down, and we water them immediately after milking, so it is a very simple matter to fill the troughs first, and we take the chill off by turning in steam. I don't think any cow can give milk that has to drink water which is as cold as ice water.

Mr. Nordman—What candle power has each of those lights?

Mrs. Durand—I use the Tungsten burners. They are rather expensive to start with, but our barn is as light as day. We only use the light while we are milking and it gives a splendid light. Come and see it.

Dr. Kutchin—Do your gasoline engines ever balk on you?

Mrs. Durand—It depends on who is running them; it depends on the man.

Supt. McKerrow—If it balks on the man, does the woman run it?

Mrs. Durand—The woman can.

A Member—We would like to hear Mr. Jacob's experience with electricity.

Mr. Jacobs—We had a storage battery system installed. I knew nothing about it. I took the manufacturer's agent's word for it, they installed it and guaranteed it a success, and it was for a time, but perhaps we didn't know how to run those pumps, for some reason, after eight or ten months, it was necessary to put in new plates. But the same thing occurred after we had run them ten months or a year again, and I discontinued using them on that account. Our engine was an old one and that used to give us considerable trouble, and for that reason we did not have a good, steady light when we were getting the light directly from the engine. But I think by taking Mrs. Durand's experience and having an engine that doesn't do anything else and is properly provided for, our dynamo would probably provide us with a satisfactory light.

Mrs. Durand—There is no engine which is going to run without oil, and there is no boiler which is going to run without water. You have got to see that everything is all right every day, and I have a special man who does that at noon every day. Then we have to be very careful that our dynamo is clean. I am not superstitious, but I insist that we have six nice lanterns hung up all the time, ready to light, though our electric light very seldom fails us.

Mr. Bradley—Is this a horizontal engine or an upright?

Mrs. Durand—No, it is a small engine made in Evansville, Wis., similar to the "Jack-of-all-Trades." The engine and dynamo together cost ninety-two dollars. We did the wiring ourselves. I got the dynamo in Chicago.

A Member—Of the Western Electric?

Mrs. Durand—I have forgotten, one of those places. It is very inexpensive and it is admirable, really a perfect piece of machinery.

Dr. Kutchin—Mr. Scribner wants me to say something about a plant we have over at Green Lake at the Opera House. It was installed by Fairbanks-Morse and it is a fairly satisfactory plant, but I think it cost over five hundred dollars.

Supt. McKerrow—A little too expensive for farmers.

Mr. Scribner—I was in one home where they had installed a plant and it is giving very satisfactory light; I think it cost something like two hundred and fifty or three hundred dollars for an ordinary house, but the cost of the installation was very little. It was carried on by some system of storage battery which was easily and cheaply replaced.

Mrs. Durand—I brought over the first electric machine from Hamburg, Germany. We operated four machines, that was why I had my engine. I ask you all to come and see it.

Supt. McKerrow—You want us all to come, do you?

Mrs. Durand—Yes, all come, have an Institute meeting there.

Supt. McKerrow—We will hold a Wisconsin Institute right there in Illinois.

Mrs. Durand—Well, I ought to be in Wisconsin, you know.

Music, Orchestra.

Recess to 1:30 p. m.

AFTERNOON SESSION.

The Institute met at 1:30 P. M. Music, Orchestra. Supt. McKerrow in the chair.

Supt. McKerrow—We will now listen to a lady who has made a success of dairying down in the neighboring state of Illinois, strange as that may seem; some of us are in the habit of thinking that the only place where successful dairying can be carried on is in Wisconsin, but as this lady has made a success in Illinois, as we must acknowledge she is a good dairyman, I suppose Illinois must have some of the credit.

MY EXPERIENCE AND SUCCESS IN DAIRYING.

Mrs. Grace G. Durand, Lake Bluff, Ill.

Mrs. Durand and son.

I may be unknown to Two Rivers, but I know Two Rivers, though I have always come in by the front door and not the back door, as I did yesterday. I have sailed up this beautiful harbor many times.

On being asked the other day what is done at these farmers' meetings I attend, if they are for the purpose of teaching the farmers how to make money, I replied, "Not at all, they are telling the farmers how to spend money nowadays in the way of gas or electric lighting or water power, etc."

My paper today is on my experience and success in dairy farming. My good friends, it is with a touch of conceit that I use that word "success." Perhaps you old and experienced farmers may say, "How can she, a woman, farming but five years, know real farming, and then what did she, or could she, do about the real activity of the farm? She likely paid the

bills to employ men with experience to do the work, but that is all." With gratitude to men of whom I now think, who worked for my interest, (I assure you the hardest experience I was put to was this question of labor, right men for the work), when I look back on these five years, almost to a day, when I, with fearless audacity, started agriculture or dairy farming, I see before me, as I unfold month by month in looking backward, such an experience that has fitted me for almost any condition. Why that alone, the dealing with men, is worth all the hardship encountered with it, for it has made character in me and I feel so firm, so fearless, that if the heavens were to fall I believe I would not even quiver. This dealing with men has given me an insight into human nature that is absolutely invaluable. It has rounded me, made me quick and keen in deciding questions of importance; it has made me see the necessity of separating the good from the bad if one wishes success, of doing the right thing instead of the wrong thing, the honest way instead of the dishonest way. And not only have I in these five years learned to know the soil that God has given us to work, the fitting of the soil, the planting of the seeds, the care of the young sprouts, the harvesting of the matured crops, not only have I learned to know these wonderful friends of man, the cow and the horse, yes, the fowl and the swine, but I have learned to love them, to see in each individual animal a purpose, an honest purpose on its part to serve man.

When we can bring into agriculture that spirit which gives to the farmer a nearness to God, his Creator, where, instead of the drudgery of the old farm life, the man, yes, the woman, too, feels the duty, the perfection, the true living of life where all nature is akin, then, I say, will agriculture be placed where it should be placed, the most honorable occupation of man, and here may I quote the saying of Abraham Lincoln which I find on the front cover of this program: "No other human occupation opens so wide a field for the profitable and agreeable combination of labor with cultivated thought as agriculture."

There is no occupation, my dear friends, where man is brought so close to his God as he is in this occupation of farming, for is he not working side by side with God in producing food for man and beast?

When we hear the cry of the high cost of living, when the farmer is spoken of as a robber, let us say to these thousands upon thousands struggling in the cities for the bare necessities of life, "Why do you stay there? Why do you not also go out into this broad expanse of land in this wonderful country and do likewise? If corn is high, if bread is high, if beef is high, then come out with us and help produce it. The way to live by the fat of the land is to live on the fat of the land."

How the Venture was Inaugurated.

Now, I am going to tell you how it happened that I went into dairy farming, and I believe it will be far more interesting to you to let me tell my story to you than to read it to you, though I may ramble and repeat some things.

I have never spoken at any Institute meeting of the personal side of my dairy farming, but so long as Mr. McKerrow has given me this title, "My Experience in Dairy Farming," I want you all to know a little bit about the personal side of that experience.

You think, probably have read in the papers, or heard or thought, that

I was a rich woman farming with money. Let me tell you what I have today I really earned myself, with the exception of the original six acres which my husband owned, and five thousand dollars which was given to me, and that is all.

Now, I want you to see step by step what I have done in the years I have been married. We built the shell of a house, but a good one, solid. It was the year after the World's Fair, or two years, when lumber and labor were cheap. The estimate of the house was twelve or fifteen thousand dollars. I built it for less than ten thousand, but I worked myself very hard in helping the men. I put the stucco trim on myself, I designed the mantel places and helped put them up. I helped put in the tile. Then I wanted the house warm, so I had heard of this wonderful thing, mineral wool, and with my own hands packed in the mineral wool around the doors and window casings.

The first two years we lived in that house. The third year an idea came to me, why not rent for the summer and obtain a profitable rent. I rented that house for the summer for fourteen hundred dollars. That money furnished my house and put in electric lights. The next summer I rented it for eighteen hundred dollars; the next summer two thousand and so on until I had rented seven summers and received $15,200.00.

In those seven summers I built a stable, a cow house, made a garden and drives, and I helped make those drives myself, laid them out, and learned my first lesson in the art of building good roads.

Then I began to think I was like the man who didn't want to own the earth but wanted all the adjoining land—I wanted the property adjoining mine, and as I accumulated the rent money I began to buy land; I bought first one piece, then another piece, until I had twenty acres of land, and there is where I started my dairy. We had paid for our home, had it and twenty acres of land all from that sort of a beginning.

Starting the Dairy.

Then the thought came to me to go into dairying. I had two cows and I had had several calves in earlier years and I started the dairy business on that little place of twenty acres. I put up a rough stable where I could milk fifteen cows, I had a little cottage where I had a room in which I could bottle. I rented my place that last summer for three thousand dollars and lived in this little cottage which had five rooms in it, and started dairying.

There was one thing in which I had an advantage over most people; I was a woman and I was known socially; I was a woman of education and of course the papers soon found out what I was going to do and they immediately took it up, and that, of course, gave me good advertising.

I worked there one year and the first few months I tried to work without a manager, without knowing anything about it myself. I didn't know what a separator was until I bought one; then I decided to have a manager, and for seventeen months I tried two.

It became evident to me that winter that we would have to have a larger place; in fact, I was obliged to have a larger place, and I will tell you why. I was all ready to build on this little twenty acres and I had leased one hundred acres nearby where I could grow my corn for ensilage and buy my alfalfa, because I knew enough to know that I wanted ensilage and I wanted alfalfa, I knew that five years ago, and I wanted enough land to grow corn to make my ensilage, but everybody thought I

was a woman and they could get the better of me. So, one night a stock dealer came and brought some cows he had been having calves on for weeks. They were not fresh cows at all, but he left them there, thinking I would buy them. I was away at the time, and about eleven o'clock that night, as I was driving home, I heard a terrible commotion. I wondered what was the matter. I soon found out the trouble. Well, that man died the other day, and I really have to thank him, but for that one incident I never would own the farm I own today. Those cows played havoc, they were wild, the whole herd ran loose and went all over Lake Forest, into everybody's garden, produced a terrible state of affairs. Then the council passed an ordinance that Mrs. Durand would have to get out of town with her cows. I assure you I have had my trials. One of these trials comes to me with keen recollection.

I brought two Wisconsin boys down, two brothers, and they, with a third boy, were doing the work. The third boy went off, left me, so I telephoned Chicago and got two milkers. One of the Wisconsin boys became ill, so that left me with the boy, Charley, and the two bums from Chicago. The bums went off and got drunk and Charley and I were left with thirty cows to milk. I went over to his sleeping room at nine o'clock that night to see if the milkers had returned and Charley jumped up with, "Is it time to milk?" I said, "Not yet, Charley." But at three o'clock that little chap started in; he said, "If I have got to milk alone, I think I will start in early," and so he did. I thought to myself, "Charley, when you finish the last cow you will begin on the first one again."

But kind Providence helped me, as I happened to think of an old Hollander, and I went right after him and brought him up, and we got along all right. That was one of the hardest propositions I ever ran up against.

The next thing was to buy a farm, and everybody wanted to sell me a farm. The one farm I wanted was the one I now own, but I didn't think I could possibly have that, because I knew an offer was refused for it in 1893 for two hundred thousand dollars.

The real estate man told me, "I think I can buy that farm for you." "How much?" "A hundred thousand dollars." I said, "They refused two hundred thousand dollars the year of the World's Fair." He said, "Well, I think I can buy it for you for much less." Remember, all I had was five thousand dollars, and when my husband came home I informed him I was going to buy that farm for one hundred thousand dollars. He looked at me, but asked me no questions. You see I owned but twenty acres for farming and I couldn't buy any more there because it ran into a cemetery. I was to buy the farm and it was agreed that I pay down five thousand dollars the first of January and the first of April twenty thousand more, and then pay the balance in ten years at five per cent.

That sounded easy enough; I ought to be able to sell my home, but during those three months I couldn't sell my home and I began to be afraid I was going to lose the farm and my five thousand dollars, until ten days before the three months were out. Then a buyer came and said, "How much do you want for the place?" "Forty thousand dollars." "I can't pay that, but I will give you thirty-three thousand dollars in cash." I replied, "You may have it," for I wanted the farm very much.

The first of April we moved to the new farm. If any you have ever moved, you know what it is. We bottled the milk from sixty-two cows at Lake Forest in the morning; then loaded the dairy house, put it on wheels and brought it two and a-half miles to the new farm and milked

and bottled the milk there that afternoon.

We started in, patched up the old stables and the old barns the best we could. We tore up the floors and put cement where we could, and we kept on doing the work and producing the milk. What money I had, instead of putting it into new buildings, I put into my farm. I have already six miles of tiling and have but one more mile to completely tile the two hundred and thirty acres.

I then started to put in new fences. I fenced in two pastures of twenty acres each. I made a study of concrete posts. I found the Rock Island and C. B. & Q. were using a particular mold for making concrete posts, so I thought they must be good and they are admirable, so we are putting in concrete posts, and I have the best fencing that the American Steel and Wire Company is making.

I then pulled out stumps and took down trees, such trees as black oak, hickory, ash and trees not worth keeping. I have the most beautiful trees on my place in the way of white oak, black walnut and hard maple, and the farmer sometimes, seeing those trees on my place, says, "Why don't you take those down?" But I tell him, "That is residence property." I have 3,100 feet on the lake; I am not only a dairy farmer, but I am also a real estate woman, because I was offered last year for my farm, for which I paid one hundred and five thousand dollars, over two hundred and fifty thousand dollars in cash, which I refused, because I have seventy acres right along the bluff which in time will be worth a great many hundred thousand dollars.

The next thing was implements. I bought what implements this farmer had on the place, but I do not like this idea of buying old implements; I like to have new machinery.

The spring I located at my new farm, I started out on my first lecture tour. I had only been dairying a year when I was asked to address farmers' meetings, but I will tell you why I believe I was asked. I was a side show, a freak, people came to see me, because a woman farmer was going to talk, and it was thought that after I got through, some good farmer would get up and give the farmers something worth listening to. I went down to Louisiana that first spring, and I am still in correspondence with dairy farmers I met there at that time.

I began to buy cows, and here is where I made a mistake. As the demand came in, we never stopped buying, and we couldn't do the work, we couldn't pay the attention to them, it was like a man trying to farm too much land; I got too many cows, and after the experience of that first summer upon the farm with a manager, I decided I would give up having a manager and manage the farm myself. I had had so much experience and so much trouble by that time that I made up my mind if I couldn't run a farm myself I would sell out. I decided instead to roll up my sleeves and get rid of these fancy managers at one hundred and one hundred and twenty-five dollars, who told me the way to do things, and I have been successful from the moment I got through with the managers. I am the manager, but I have a good foreman to see that the work is done properly.

That fall found me running my own gasoline engine. I wasn't going to tell the boys I didn't know as much about it as a man, so I had a man come up there to show me how to run it, and all about the ensilage cutter. I needed a good man to cut the corn and run the binder. Fortunately, a man named Greene came from Iowa at that time; he came to see the farm, and as he looked around, he said, "What are you going to do?"

"Well," I said, "I am going to put in my ensilage." "Who is going to run the binder?" "I do not know." "Well," he said, "you haven't got a job for me, have you?" I said, "You run the binder and I will run the ensilage cutter and the engine." And we did.

As to the sales of my products, I had to compete with a lot of gentlemen farmers; they began to spring up all around and tried for my patronage. I had a splendid trade, best hotels in Chicago, tea rooms, etc. You see it was my idea to give good drinking milk in little jugs. I had a pretty keen fight with this competition for awhile, but I have held my own and more trade, and it is still increasing.

Four Things for Which to Strive.

Now, there are four thoughts that have always been before me in all this work: (1) Perfect cultivation and development of my land, with the best seed that can be obtained; (2) High standard in cows, horses, fowls and swine; (3) For the cleanest and purest milk that could be produced and distributed; to have my milk as clean as can be produced, and (4) Contentment and satisfaction on the part of my men.

How to Buy a Cow.

I will tell you how I buy a cow. I do not buy a man's worst cow by any means; but I have stopped buying cows now; in fact, I have cows for sale, because my young heifers are coming on so rapidly. But I used to go into a man's farm and look over his herd at milking time; I would ask him if he had any cows for sale, and if he said yes he had, I would say, "What do you want for them?" "Fifty-five or sixty or sixty-five dollars." Then I would look around and say, "That is a pretty good looking cow over there." "Oh, yes, I couldn't sell her." "What would you take if you should sell her?" "Oh, I would want eighty dollars." "All right I will give you eighty dollars." Of course that man was foolish for selling his best cows, he hadn't any business to sell them, but he did sell them to me at eighty dollars, and some of those cows were worth to me one hundred and eighty dollars.

In regard to crops, just a word. I have fed from my dairy farm corn and alfalfa. I put my farm into eight fields of twenty acres each and one of thirty, and I am going to have a six-year rotation; I am going to keep it two years in corn, then I will plow it under, seed down for oats and alfalfa and keep it in alfalfa until I turn it into corn again. My alfalfa last year went six tons to the acre; my field corn went ninety-two bushels to the acre, and my ensilage twenty-one tons to the acre, all actually weighed, and I think that is good enough for a woman. My oats went eighty-eight bushels to the acre. I have sold one thousand bushels of corn and I have one thousand bushels of oats to sell. I sold my hogs a week ago for $10.35 a hundred, and I saw no reason to complain.

How the Farm is Managed.

Since I have given up a manager, I have four departments, I have the farm, the herd, a dairy and a truck garden. I do a large truck garden business. I furnish a lot of hotels and restaurants and tea rooms with garden stuff, and I pick out the things that really pay well, like asparagus, spinach, strawberries and brussels sprouts.

I have a foreman over each of these departments; a farm foreman, a herdsman, a dairyman and a garden foreman. Everything is systematized; I know what every man should

be doing at a certain time, and if he is not through at the proper time, it is not the fault of the system, it is the fault of the man.

We run a little experiment station down there and show the men such things as the cultivation of corn. It is a good object leson, and it is surprising how few men one can trust to cultivate corn properly. Last year I had a remarkable man for cultivating corn, so when Andrew came I told him to take a piece and cultivate it next to John's. Andrew thought he could cultivate as well as John; they had the same tools, the same plow, the same cultivator and everything, but on Andrew's patch you could hardly find the corn in the weeds, while you would have to walk a good while to find a weed in John's corn.

I have a high standard in cows, horses, fowl and swine, and the cleanest milk, and try to live up to it.

I have my system in perfection in the breeding of the cattle.

I was speaking recently down at a farmers' meeting and I noticed a man looking at me in rather a suspicious way. After I got through speaking, he began to ask questions. Finally, he thought he had me sure, he said, "You are telling all the time about how you have so many quarts of milk a day. Now, that seems queer. Some months we have lots of milk and others the cows go dry; what are you going to do then?" I said, "I breed my cows accordingly. I know how many cows are going to freshen at a certain time, and how much milk I can depend upon."

Now, about handling men. I know just how long it takes to do everything, because I have actually done it; I was my dairyman for five years, I was my herdsman for two years, and I have used every implement on our place. I can milk, but I don't have to milk, but this all makes me much more lenient with the men.

Some Interesting Figures.

I am going to give you some figures which show what I have actually done.

My general expenses averaged last year per month, $1,039.00; wages, $465.00; the interest on $100,000.00, $600.00, and I bought every day five cans of milk and this milk I separated and used the cream for butter and gave the calves the skim milk; $40.00 a month for insurance and taxes; that came to $20,688.00 during the year.

I sold in corn and hogs, $1,000.00; cattle, $700.00; milk, $30,600.00, making $32,300.00 for the sales. That left me a clean profit of $4,412.00. Add to that the interest, $600.00 a month, and I had a clean profit last year of $11,612.00 to the good.

I had forty acres of ensilage corn, which brought me in six hundred and fifty tons; twenty acres of field corn; twenty acres of oats, seeded down and I will have next year fifty acres in alfalfa and the rest in clover.

In summing up, there are two words that mean more to me in the English language than any other two words, and these are "Energy" and "System."

I cannot recall one time that I have ever been called upon to attend to any one thing or to see to any one thing that I did not do it and do it at once. I am proud to say that I have found in myself no streak of laziness or indifference, and what a glorious thing it is to prove one's self, to really find out what stuff one is made of. One does not have to look up the records, or dive into family history to learn who are our ancestors, or whether they were knaves, fools or smart men. The place to

find that out is right in one's self, in one's brain, in one's heart, in one's good, strong right arm, and, men and women, we are not here in life just for ourselves, for our own pleasure; each one of us should feel the responsibility of the day and the time in which we live.

As history shows in the past, the crucial times were when men were called upon to defend their honor, to fight for their liberty, or to free the slaves, so today are we brought face to face with as potent a question as the world has ever been called upon to solve, and that is social, business and political honor; purity and temperance in our home, fairness and integrity in our business, honesty and right purpose in our political ambition.

The world today is aroused in the splendid uncovering of the scheming and manipulation of the privileged classes. The time is near at hand when no longer can the moneyed man thrive on dishonesty or advantage, or the scheming politician gain office through that influence. Today the press and the people demand honesty, fairness and square dealing in all that pertains to the protection and growth of our glorious country.

I thank you for your attention.

DISCUSSION.

Mr. Nordman—Mrs. Durand, you spoke of installing your electric plant for the purpose of running the electric milking machine. Are you still using that electric milking machine on your farm?

Mrs. Durand—Not on your life; no milk machine for me.

SOIL MOISTURE AND HUMUS.

L. E. Scott, Stanley, Wis.

Definitions.

It is unnecessary to define soil moisture. Technically speaking, humus is a brown or black waxy substance covering the soil grains. Most authorities, however, define humus as decayed vegetable or animal matter. Storer broadens the term to even include "peat, swamp-muck, vegetable mold, and the organic portion of all the earth-like products that result from the decay of vegetable or animal matters."

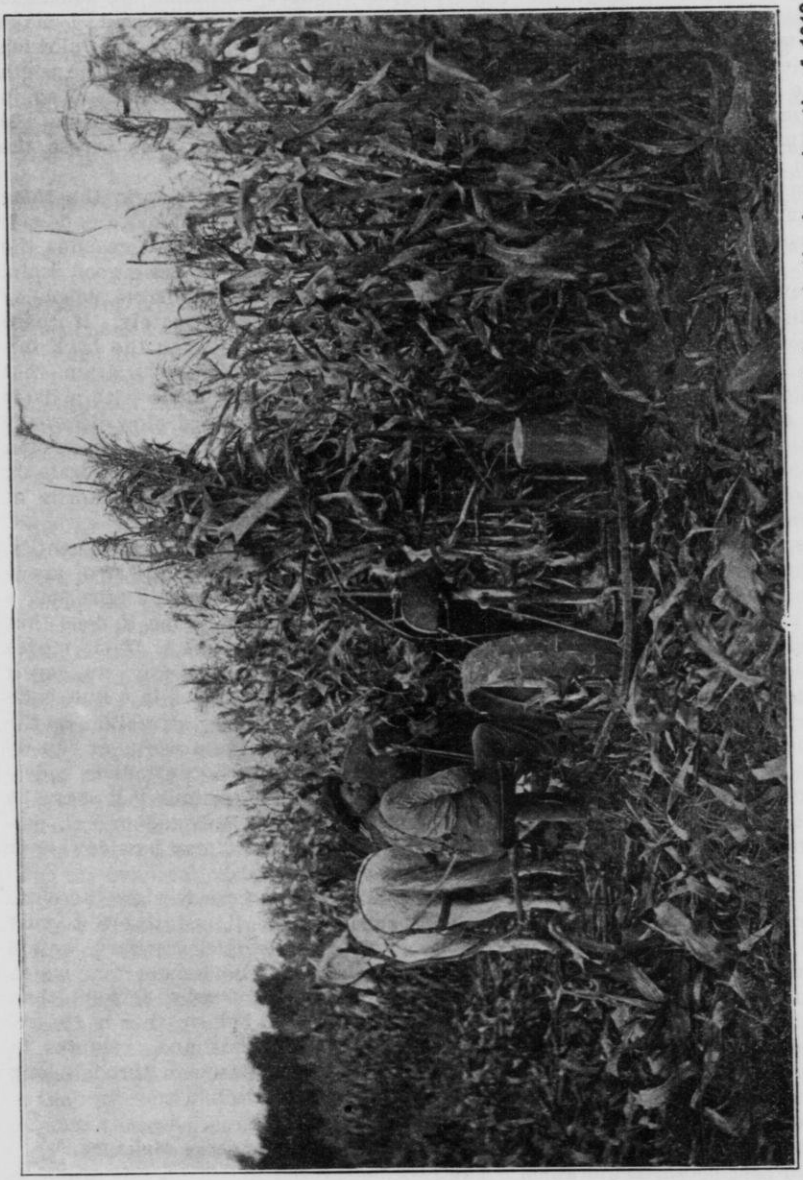
Though "organic matter" might be a better term, for convenience in this paper I shall use the word "humus" as applied to these matters in any stage of decay.

Amount of Moisture Needed.

Prof. King once demonstrated that it requires five hundred pounds of water to grow and mature one pound of dry matter in the oat crop. This seems to be a fabulous amount, but upon this basis it would require but three inches of rainfall to grow fifty bushels of oats per acre if it could all find its way into and through the plant.

In actual practice, in the semi-arid districts of the west, under the best and most thorough methods of tillage, satisfactory crops of small grain are grown with an annual rainfall of but seven inches.

The average annual rainfall in



Henry Heiting's cornfield near Stanley where moisture was conserved through the long drouth of 1910 by proper cultivation.

Wisconsin is 30.52 inches, much more than is needed, and yet there is hardly a season but what in some part of it our crops suffer from insufficiency of moisture.

The farmer is confronted with two problems; how to get rid of surplus moisture and how to conserve that which is needed. Too much moisture is just as bad as too little. Too much moisture keeps the soil cold; it fills the pores of the soil, excluding the air so necessary to the best workings and even to the existence of bacterial life, and the soil itself becomes lifeless.

We should regard the soil as made up of small grains of mineral matter lying close together, intermixed with organic matter or humus. If water fills the spaces between these grains the soil is water-logged or dead. If we draw off this water by underdrains, air washes in to take its place in the little spaces between the grains, and the soil breathes again and becomes alive. We still have around each little soil grain a film of moisture which adheres to it.

Underdraining not only aerates and gives life to the soil, but it warms it, making that life more active, and makes it possible to plant earlier, giving a longer and better season of growth.

I was on a Wisconsin farm last week (March 9th) which was underlain with tile drains every four rods. There was no water standing anywhere and the owner said he could work the soil as soon as the frost was out and very soon after any rain, while his neighbors were often obliged to wait for days.

There are areas in the interior of the state that on account of a fine textured hard-pan subsoil seem to defy all attempts at underdraining. This soil had best be surface drained. The method established upon Fairmount Farm is to lay off wide lands with the slope not less than eight rods wide. Where the fields are long and other conditions will permit, I make them twelve rods wide. In plowing we turn to the right for half the width and to the left for the other, so in no case will we have to drive the team more than six rods across the end.

I put the dead furrow in the same place each year, which gets deeper with each plowing, till it reaches the hard-pan. It then makes a good drain.

I keep the back furrow down by plowing it out alternately. If there is a sag or flat between the back furrow and dead furrow, a drain that by an open furrow made with a lister or double mold board, plow diagonally with the slope. This is a cheap and convenient method of surface-draining and is working very satisfactorily at Fairmount.

Soil water, if in sufficient quantity, as after a rain, by the power of gravitation, moves downward, if the soil is sufficiently porous. When it does this, we say it "percolates." If it moves sidewise in the same way, we say it "seeps." It also moves in a fine, compact soil by capillary attraction, as the oil climbs up a lamp wick or sap up the pores of a tree. Capillary movement is in all directions; it may be downward in a soil too fine to permit percolation; it may be sidewise or it may be upward.

While the process is slow the class of soils just mentioned absorb a vast amount of water by capillary action and being finer hold more film moisture and resist drouth longer than coarser soils. I believe this is the secret of green fields and pastures in north central Wisconsin through long periods of drouth.

How To Conserve Moisture.

It is conceded that a porous soil will take water faster than one that

is compact. Some resort to deep plowing and subsoiling. I believe a better way is to grow clover in short rotation. The decaying roots render the lower strata of soil porous. Much more water is absorbed from melting snows and spring rains if the ground is plowed in the fall.

Once absorbed, it is important to conserve enough to supply the large demands of a large and rapidly growing crop later in the season. Early cultivation, and where crops will permit of inter-tillage, frequent and continuous cultivation, is to be recommended to prevent evaporaion.

To determine how fast water climbs up through hard, compact soil, take two lumps of crust sugar. Put one in a dish of water with a little bluing or ink in it to color it and note how quickly the water comes up through the surface. Quicker than I can tell it. Upon the other, put a little pulverized sugar and you see the water comes up to that and no farther. The former represents the compact earth and if hard to the surface the moisture comes up through it just as fast as it is evaporated and with a hot sun and a dry wind the rate of evaporation is very rapid. Cultivate the surface and break up the soil particles, so the spaces between are so large that the moisture cannot climb up through, and we hold it down below this dust mulch so the evaporation is greatly checked.

If I may repeat, I will say that the ideal condition is a film of moisture around each soil grain with air in the intervening spaces. The finer the soil grains, the more film moisture we have.

If by any means we could reduce the size of our soil grains to one-half their present diameters we would have eight times as many grains as formerly and each grain would have one-fourth the surface of the former grain. We would then have twice the grain surface and twice the film moisture that we previously had down to the depth at which such soil is refined. We would also have twice the soil surface for roots of plants to cling to and to feed upon.

How can it be done? Clods at least can be broken down by cultivation and to a great extent the disintegration of the little rocky soil grains themselves can be accomplished by cultivation and decay of humus. Humus of itself in any stage of decomposition will hold about four times its weight of moisture as a sponge holds it. It adds to the absorbing qualities of the soil by keeping it open and porous and preventing it from becoming hard and baked. It makes it easier to maintain the dust mulch. Then by feeding the earth worm, it gives him strength to grind the soil. It furnishes food for millions of micro-organisms or bacteria that serve to break down rocky matter and convert it into an available form. In all of these ways humus assists in the conservation of moisture.

But humus does more. It prevents soil from washing; it also keeps sands from drifting. It assists in the formation and holding of compounds in the soil to feed the plant. In short, it is the very life of the soil.

True, good crops have been raised by irrigating lands devoid of humus, but on the other hand, lands in the east that have been cropped with commercial fertilizers with little attention to the humus content have become less productive than formerly.

Production of Humus in Soils.

It has been held by some that stable manures do not add humus and that the only way to supply humus is by keeping down meadows for a term of years, a practice that I believe to be unprofitable to the soil. Examples are given of tobacco fields which have had large dressings of manure and are often deficient in humus. I believe this

to be due to the fact that under intensive cultivation the organic matter is burned out of the soil very rapidly, especially if the soil is light and open; more especially also where one cultivated crop follows another in succession.

A twelve years' experiment has been carried on in Minnesota upon land long cropped to wheat and consequently low in humus content. This was divided into six plats. Upon one wheat was continued in succession, another corn, another oats and another barley. On all of these plats, the loss of both humus and nitrogen was excessive. Upon another plat, wheat, clover, oats and corn were grown in a five-year rotation, manuring for corn. There was a slight loss of nitrogen and a slight gain in humus. Both were practically maintained. Another plat grew oats, clover, barley and corn in a four-year rotation, manuring for corn at the rate of eight loads per acre, and was found at the end of twelve years to contain more nitrogen and a considerable more humus than when the experiment was begun.

Another experiment was tried by putting inorganic matter of various compositions in boxes of subsoil and left for a year when it was found that humus had formed and that formed from matter rich in protein had fixed the nitrogen of the soil and that from carbonaceous matter had tended to free the nitrogen.

We are hardly out of the kindergarten in soil chemistry, but I believe we are tending toward a balanced ration for the soil as well as for the animal. If a four-year rotation with two grain crops, with manure, will increase humus, I believe that a three-year rotation, or a four-year rotation with two years in grass, one for hay and one for pasture, would result in a still farther increase.

At Fairmount Farm, we have some stump land that we pasture, but upon our cultivated fields we practice a three-year rotation, manuring for corn once in three years. This with the clover stubble and roots serves to keep the soil full of vegetable matter and under this system the soil seems to improve in productivity, even over the virgin soil, of which we plow up some every year.

I am not enough of a chemist to know whether or not I am making humus of the vegetable matter I am putting into the soil, but I know we are getting results in crop production.

DISCUSSION.

Mr. Bradley—Do you find that where you have plenty of humus in your soil, your soil dries out quicker, or becomes workable quicker after a heavy rain?

Mr. Scott—Yes, it becomes workable quicker. It is not so tenacious, it is more crumbly, more friable.

Mr. Bradley—How would you plow, deep or shallow, upon heavy clay?

Mr. Scott—I am not in favor of plowing heavy clay land very deeply, but I am in favor of practicing a short rotation, and in that rotation growing the clover crop, which is a deep-rooted plant and serves to loosen up the lower strata of soil, giving it a larger capacity for the storage of moisture and aerating it, in fact, it does all the work of the subsoil plow, without bringing up the crude clay to the surface.

Mr. Bradley—What do you call shallow plowing?

Mr. Scott—We generally plow this clover sod for corn about four inches in depth. The next year after, we plow five or six inches, never deeper than that.

A Member—From what crop can you get the most humus?

Mr. Scott—That is an open question with me, but I believe clover will give more humus than any other crop.

The Chairman—More than alfalfa?

Mr. Scott—Yes, because clover is a rotation crop.

A Member—What depth of humus upon the land would you prefer?

Mr. Scott—If you have a good subsoil, I think four or five inches would be sufficient. We grow good crops on that kind of soil.

Mr. Imrie—Wouldn't it be better to sow clover and take off one crop and then plow under?

Mr. Scott—We take two crops, but we take them the same season; we only leave down one year. If it were not for our wild land, we would pasture in rotation. We are now practicing a three-year's rotation, it is corn, oats, clover, over and over again, coming around once in three years.

A Member—Can you keep up your fertility without artificial fertilizer?

Mr. Scott—When we buy mill feed, such as oil meal and bran, cotton meal, etc., we keep up the supply of potash and phosphoric acid, and in that way I believe we can keep up the fertility indefinitely.

A Member—Ensilage and alfalfa make almost a balanced ration without mill feed, don't they?

Mr. Scott—That might be true if the animals' stomachs were larger, but to get the best results we need more concentrated feed for a portion of the ration.

A Member—Don't you think it takes more fertilizer if you plow deep than shallow?

Mr. Scott—Yes, I do, but upon heavy soils I am not so fearful of leaching the fertility as a good many are. Here is the point, we say that moisture carries fertility with it when it goes down into the soil. There are two ways by which it comes back. It comes back through the plant, especially the deep-rooted plants, and where the water comes up by capillary action, as it does for three or four feet below the surface, it also brings fertility with it, just the same as when it went down, so we always find the soil near the surface more fertile. If I use the clover in a short rotation, I had rather not plow too deeply.

A Member—Won't deep plowing hold more moisture than shallow plowing?

Mr. Scott—If the lower strata of soil is hard, yes; but where you use clover in a short rotation, you have loosened that clover soil, so I believe it will hold as much moisture.

A Member—I have a piece of land that is sandy. I plowed it to plant corn on, and part of it I manured last fall. I took the manure and plowed it under, and I didn't have manure enough to cover the whole of it, so I took some manure and covered it this winter. Would you advise me to plow the manure under, or just work it in on top of the land? It is pretty fine and well spread.

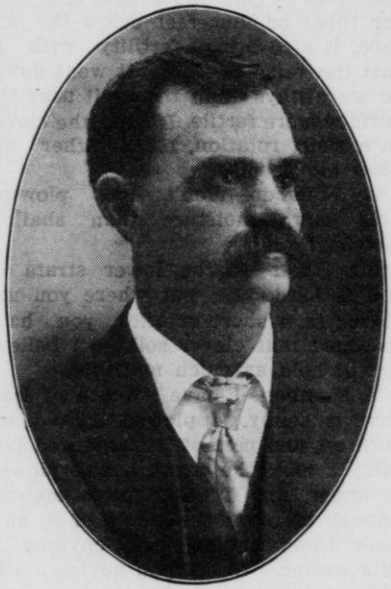
Mr. Scott—Then I would work it right into the surface of the soil, if the soil is well plowed. I like to work manure into the soil, either plowing shallow or working with the disk, rather than top dressing.

A Member—I do not think we would have any success in this country in putting manure on as a top dressing; it would be too cold.

Mr. Scott—But in this case he says the manure is pretty fine and the land is sandy.

CLOVER ENSILAGE.

W. P. Bussey, Omro, Wis.



Mr. Bussey.

Mr. McKerrow has asked me to give you the results of last year's experience.

Those of you who have read the last Bulletin can see the report of my results up to the time of the Institute last year, but at that time I had some clover ensilage in the bottom of my silos that I had covered up with corn the year before, so I had made no comparison as to the milking qualities of the two silages. At that time I was weighing the milk from nine of the cows I was testing out and I knew just what they were doing on the corn silage. When that corn silage gave out, I fed clover silage for thirteen days and that gave out, and the loss after that was very perceptible, but during the thirteen days that I fed clover silage, after my corn silage was gone, I lost four per cent in milk production. A large part of this loss was from two cows, and the most of it was from one cow. One of the nine cows gave just the same number of pounds in thirteen days on clover that she gave on corn silage before, and one cow was only three or four pounds short—I do not remember exactly all of the figures.

I like clover silage for summer feeding. Last summer I put in about twenty-five loads, or about thirty-five to forty tons, again in June. Our silage last summer was better than that which was put up the summer before. The first year we tried it we had a rank, watery growth; last year, our clover being on another part of the farm, on a little lower ground, I sowed considerable timothy and alsike seed with it the season before and I was a little bit afraid of using that in the silo last year, but I put it in, and whether it was on account of part being alsike, or some being timothy, or whether it was the right mixture, I do not know, but it was a fact that it made better silage than the first year's trial.

The first year, as I told you last winter, we had a lot of rain during the day, and our clover was very wet. Last year we had a perfect June day, the day we were filling. At nine o'clock I started the water running into the blower and we wet every bit of it from that time on till night.

There is just one thing in regard to clover silage I don't want you to make a mistake about. If you think it is plenty wet enough, give it just a little more water, and if you are sure it is wet enough, give it some

anyway. I think it is on account of this point that some of those who have tried clover ensilage have been disappointed, they have put it in a little bit too dry, not quite moisture enough to overcome the immense heat that transpires in the fermentation of the clover.

Feed Clover Silage by Measure.

Then again, in feeding clover silage, we feed by measure instead of weight. A basket full of clover silage will weigh about eighteen or nineteen pounds. The same basket full of corn silage will weigh about twenty-three to twenty-five pounds, so if you are depending upon the measure feeding, your cows will not get quite as much on clover as they do on corn. You must remember that and that you are in that case somewhat to blame, and the cow is not to blame. I think though that a common basket full of clover silage, night and morning through the summer, is plenty for the cow, that is, it makes a good supplementary feed and much handier to feed than any other form of soiling I have ever heard advocated. It is always handy at feeding time, whether it rains or whether it doesn't, it is there Sundays and every other day, and that saves hitching up and drawing in anything from the field, and it is one of the best cow boys you ever knew to get the cows up at milking time; it is like any other form of regular feeding, the cows are always there and willing to do their part.

Alfalfa for Ensilage.

A good many people have asked me, and I was going to say, a hundred have written and asked my opinion about alfalfa in place of the common red clover I have used. Now, I am just as ignorant about what alfalfa will do as you are, and maybe more so. Since coming here, a man told me of a neighbor of his who has tried it and had good success. I have been a little afraid of the first cutting of alfalfa hay, thinking it a little rank, but if I didn't have clover and had a large crop of alfalfa, I should probably try it. On the other hand, I consider the alfalfa if properly cured so nearly perfect that I do not feel like risking doing anything else with it until I have a larger acreage to experiment with than I have at this time.

Clover Silage vs. Corn Silage.

As far as feeding clover silage in the winter in place of corn silage is concerned, I do not know that we can afford it, and for this reason. Our weight per acre from corn is more than we can get from clover; that is, we cannot get the amount of feed from an acre of clover that we can from corn. One way I think we can come out even on our clover is, we cut it a little early and we are sure of getting a stand of seed from our earlier cut clover that we use for silage purposes, and our clover seed last year paid for the use of the land, outside of the returns we got from the first cutting.

Ensilage Machinery.

The question has also been asked me what I consider best, a blower machine for running clover through, or a carrier machine. I have had but very little experience with ensilage machinery, but I have found that on the make I use the rollers are such that no clover is carried down and gets under the cutting blade. Some of the machines with a lower roller will carry the clover down, and sometimes cause trouble.

The machine will take care of all

the clover two men can pitch onto it and cut it and use it in the blower all right. I think probably the blower will fine-up the feed a little finer than will the carrier machine. On the other hand, I think it takes a little more power to run the blower. I think for clover, I would like the blower best, because I think you can wet the feed more evenly than you can by using the carrier.

One thing I want to emphasize. If any of you are planning to use clover in the silo, have it plenty wet, and I think you will have just as good luck as I have had.

DISCUSSION.

Mr. Imrie—Do you think clover silage is better as supplemental feed in the summer than corn silage?

Mr. Bussey—No, sir, I don't say that I do, but unfortunately we did not have silo capacity to feed the year around. We will have enough silage this year to feed it until grass, but none to feed after that. It is a good supplemental feed through the summer if we don't have the other kind, and it is a pretty good feed anyway.

Mr. Scott—Isn't there quite a tendency to compare clover silage with corn silage, put one against the other? I do not know that we should do that. It is better to have thirty acres of clover and thirty acres of corn than to have sixty acres of corn, and we have got to rotate our crops. Now, if you have thirty acres of clover, the question is whether it is better to have fifteen acres in clover hay and fifteen acres of clover silage, rather than to have thirty acres of hay.

The Chairman—In other words, will clover silage make better feed than if that same clover was made into hay?

Mr. Bussey—I think there is absolutely no loss in the clover silage; they will eat everything just as clean as they do of the corn silage.

Mr. Scott—If you can put half of the clover crop into the silo, during the wet time, it gives you more time to make the rest of your crop into better hay than you otherwise would.

Mr. Bussey—If you are going to put thirty acres into the silo, you will have to have a pretty good sized silo; it is a pretty good bulk.

Mr. Jacobs—What is the comparison between the capacity of a given silo in clover and in corn?

Mr. Bussey—I should think about the same that we would have in the bushel basket between eighteen and twenty-four; I think that would be a fair comparison. There is one thing, in packing clover silage, it is naturally lighter and the closer you pack it, the better it will be.

Mr. Martiny—Would it be practical to put in about eight or ten feet of clover silage, then about fifteen or twenty feet of corn silage, with the idea of feeding that out before you put in your corn in the fall?

Mr. Bussey—Yes, that is the way I have used it. I have begun feeding right away, about the middle of July.

A Member—How much of that spoils on top?

Mr. Bussey—Four or five inches.

A Member—Do you cover your clover silage?

Mr. Bussey—The way I cover up my silage is by sowing a little grain on top. Last fall we covered one silo with grain and the other one we began feeding.

Mr. Scribner—We tried Mr. Bussey's plan of putting in clover silage. We put about eighteen feet in our sixteen-foot diameter silo and we had about eight or nine feet when it was settled. His advice is good, do not fail to put in some water. If I put in more this year, I shall put in more moisture, but the idea is that while

other people's cows are going down and out of business, our cows are continuing right along. This winter we are keeping up to the one hundred and twenty-five notch, while other people are going down to one hundred. If you have ensilage in, you have something to carry your cows right through, and that is where most farmers fall down. Keep them busy; it is like our hired man, if we don't have something for him to do every day of the year, he will be running behind. It is so with the cows.

Dr. Kutchin—I want to say I happened to be over and saw Mr. Scribner's Jerseys while this feeding was going on, and they were the fattest and finest looking herd of Jerseys I ever saw in America.

Mr. Imrie—Wouldn't it be better if we had two small silos and feed clover part of the time and corn part of the time. It seems hardly fair to compare clover silage with corn silage, unless while you are feeding the corn silage, you fed clover hay, and while you are feeding the clover silage, you fed corn fodder.

Mr. Bussey—I never have both at the same time. This year we are feeding alfalfa hay once a day and good clover hay once a day, and the days it is fed they are getting some corn stalks in the yard when they go out for water, and that makes a pretty good balanced ration with roughage. Of course, in the summer, when we are feeding clover silage nights and mornings, they are out at pasture, and if they want a little dry marsh grass, they will pick it up.

A Member—Here is a question I would like to have settled. In which form will clover make the most milk, in the form of silage, or in the form of good hay?

Mr. Bussey—I am up against it. I want to say this, however, I believe the cows will eat the same clover from the silo cleaner than they will right from the field. That is, you can feed green clover right from the field and they won't eat it as clean for as many feedings as they will the same stuff in the silo.

Mr. Scribner—I do not think there is any possible question but what they will make more milk on clover ensilage than on hay, and there is no question that they will eat it better.

The Chairman—They will eat corn ensilage better than green corn, and I have no doubt that the same will apply to clover.

Mr. Bussey—Now, I want to speak again about wetting it. I thought we had it plenty wet last year; we put on a stream as large as a lead pencil, but this year I shall use a little larger faucet.

Mr. Convey—One fact which is important, particularly for the northern part of the state, is the difference in the time of the ripening of clover and corn.

Mr. Bussey—In our locality, our second crop of clover is too far along to make silage at the time we are making it with corn.

Mr. Convey—I have made it in southern Wisconsin.

Mr. Bussey—Well, you happened to get it just right.

Mr. Scott—I made silage that same way three years in northern Wisconsin, putting in a load of clover and then a load of corn, and it was very satisfactory.

BIRDS AND THE FARMER.

Dr. Victor Kutchin, Green Lake, Wis.

Dr. Kutchin.

I deem it an honor to have a place on the program of the Round-up Farmers' Institute, because it makes me feel that for a little time I am standing shoulder to shoulder with an earnest, progressive body of men who have been doing great things for the state of my adoption, and it is certainly a pleasure to address you on a theme that to me is of paramount importance, namely, bird study and protection.

We all know who it was that said, "Thou shalt love thy neighbor as thyself," an impossible command unless by some mental gymnastics you can understand that the neighbor referred to is a bird neighbor. There are horse fanciers and chicken fanciers and dog fanciers; there are cow enthusiasts, devoted shepherds and successful swine growers, but these people interested in these various kinds of animals would scarcely care to be known as their lovers, and yet the world over, wherever you find a man or woman, a boy or a girl, interested in birds, they are proud to be known as bird "lovers."

Bird Protection Inadequate in Wisconsin.

Not very much has been done in the state of Wisconsin for bird protection. More than twenty-eight years ago, the gentleman who should have preceded me on the program of the afternoon (Professor King), was employed by the state of Wisconsin to prepare a paper on the economic value of birds. He worked on it for something over four years, and when it was completed, the great state of Wisconsin had a document of value to every citizen of the state published in a volume on the "Geology of Wisconsin," as though Moses, when he engraved the Ten Commandments upon the tables of stone, had left them upon the mountain and come down and intimated to the people that there was something valuable in an inaccessible place, but it would perhaps be just as well to climb up and see what was to be found. When the work on the economic value of birds was published by the state of Wisconsin in a great volume on the Geology of Wisconsin, it was certainly being published in the last place in the world where a boy or a girl or a farmer of Wisconsin would naturally look for a paper of such inestimable value.

I reiterate that not very much has been done in the way of bird protec-

tion. Dean Russell stands for better methods of farming, scientific farming, and he stands for the extirpation of the foul ulcer of bovine tuberculosis; Supt. McKerrow, with his earnest and faithful body of assistants, for eighteen or nineteen years has been going

But where has a voice been lifted in behalf of the protection of our birds? That paper of Professor King should have been published as a separate volume and put in the library of every school in Wisconsin; the question of bird protection should have a

Tree Sparrow.

from county to county, from city to city, from hamlet to hamlet, preaching the gospel of glad tidings of great joy of better methods on the farm, bringing this home to you, and the state has finally decided that there shall be a clean dairy product and a sanitary barn and it has put men into the field to educate the people in that direction.

place in the short course in agriculture at Madison and in the farmers' course, and in every Institute held in the state of Wisconsin.

You say, "Is it important, is it so important?" Let me illustrate.

During an insurrection in Paris, a temporary barricade had been thrown across the street and it was being

watched by a couple of French officers, when suddenly a cat ran across it. One officer said: "Hello, there goes a correction," and replying to an interrogation in the eyes of his companion, he said, "When God made a mouse, He realized He had made a mistake, and so He made a cat to correct the mistake He had made in the creation of the mouse."

Now, waiving theology, I want to say that when God opened the doors of creation to the myriad of crawling, squirming, repulsive insects and to the pernicious weeds, with all reverence be it spoken, it seems like a mistake; but if it was, the mistake was corrected,—that clearly must have been the intention,—by the creation of the bird, and the birds stand in the same relation to the harmful insect and the harmful weed that the cat does to the mouse.

I want to tell you a singular thing which I cannot account for—I wonder if you can? Let there be a fire in this city, entailing one hundred thousand dollars loss, and every paper in the state would give it headlines, and yet, do you know, there is not an oak growing on the hillside that has not four hundred lurking, insistent and persistent insect enemies seeking after its life? Do you know that through insects which infest them, the loss to the forests of America, instead of amounting to one hundred thousand dollars, amounts to a hundred million dollars annually, and you never see anything in the daily papers about it either.

Out in northeastern Oregon, one form of insect, the Mountain Pine beetle, destroyed from ninety to ninety-five per cent, in the three years last past, of the stately lodgepole and yellow pine on an area of one hundred thousand acres.

And do you know that the old commonwealth of Massachusetts has spent more than two million dollars in fighting one insect and it is a drawn battle today.

The boys and girls will know once during our history when we met the enemy, the message flashed over the lines, "We have met the enemy and he is ours." But all the science of America has gone after one insect, the gypsy moth, and it is a drawn battle today, and it is going on, not only in Massachusetts, but in the other states adjoining.

Now, some of you will probably say, What has that got to do with birds? It has everything to do with birds; they are the check intended—the twenty-seven members of the wood-pecker family are the police of the forest examining the bark—here are the wood-peckers going up and around the tree; here are the nut hatches standing on their heads coming down, that nothing may be overlooked.

Take the family of warblers and vireous; they examine every leaf, and both sides of every leaf, missing nothing.

I was calling at a house a few years ago and the lady said to me, "Now, you are not a bird doctor—" I thought she was going to say I was a "bird of a doctor," "but I have a young robin here and I am afraid he is going to die. Will you tell me what is the matter with it?" Of course I said I would like to. She went out and got it and gave it to me. Its eyes were closed and it tipped over on my hand, and I said, "I guess there isn't much that can be done for that patient." She said, "Willie picked it up three days ago on the lawn and day before yesterday I gave it half of an angle worm; yesterday I gave it a great big angle worm and I am afraid I fed it so much it is going to die." I said, "Yes, I was afraid so, too, but not of indigestion." "Well," she said, "don't you think that big angle worm was too much for

it?" And I said, "No, Madam, you should have added forty-nine more, each one larger than you gave it." A young robin will eat its weight and a half in twenty-four hours.

As to the destruction of insects, it is prodigious.

that if they were migratory we had migratory birds as well.

Where do the weeds come from?

Two years ago I made an island in Green Lake. We dug the dirt up for seven and a half feet and did it along in October and November. I said to

Bob White.

Birds as Weed Eradicators.

We have two hundred weeds in America, according to the Year Book of Agriculture. I was horrified to see this title in one, "The Migration of Weeds," and I said, "Good God, they have taken to flying." And then I thought with some satisfaction

my wife it looked like very rich ground, a nice place for a flower garden, and there wouldn't be any weeds to bother, so I thought I would scatter a lot of flower seeds there in the spring, and when the early rain and the sun kissed the surface and it began to become green, I went down there, and as you live, the weeds

were holding a spring round-up; they were all there. pigeon grass, pigweed, lamb's quarters, ragweed, thistles, and, as I live, a mullen. Now, where did they come from? From way, way, way down below, clearly.

In the Year Book of Agriculture back about six or seven years, we were told that there are two hundred and ninety million acres of land under cultivation in America, and that is followed by the statement that weeds do a damage to this land under cultivation of about one dollar an acre. That would be two hundred and ninety million dollars.

On a sailing vessel between New York and the West India islands, there was a little runty sailor who had the reputation of never exaggerating. One day he was way up on the mast, the foretop gallant, if you please, standing on a spar. The little fellow was known as Billy Peters, and his shoe string broke, his foot turned and he fell to the deck below. There was a crowd of men there and somebody in the crowd said, "What has happened?" Billy had not been quite knocked silly, and he got on his feet, saluted and said, "Billy Peters broke his shoe string," and the mate looked at him and said, "You don't exaggerate none, do you?"

Now, when it is said that weeds damage the crops in America at about a dollar an acre, I would like to say to that writer, "You don't exaggerate none, do you?" For, if they only damage some acres a dollar, then the crop is only worth two, for I have seen a lot of acres right here in Wisconsin where the weeds seemed to cut the value right in half.

Now, one-seventh of our birds are weed seed eaters and they have enormous appetites for weed seeds. You take the finches and the sparrows, and during most of the year seventy-five per cent of their feed consists of seeds and weeds.

Prof. Beale, of the Biological Survey, has ascertained that one family that is, one species of the family of sparrows, the tree sparrow, a little gray bird—many of you never saw it—according to its distribution in the state of Iowa eats eight hundred and seventy-five tons of weed seed annually. It is not a migrant, it winters over. There is the Song and the White Throat and the Vesper and the Fox and the Chippy and the Swamp and the Tree and the Grasshopper and the Field, and I have not enumerated them all yet.

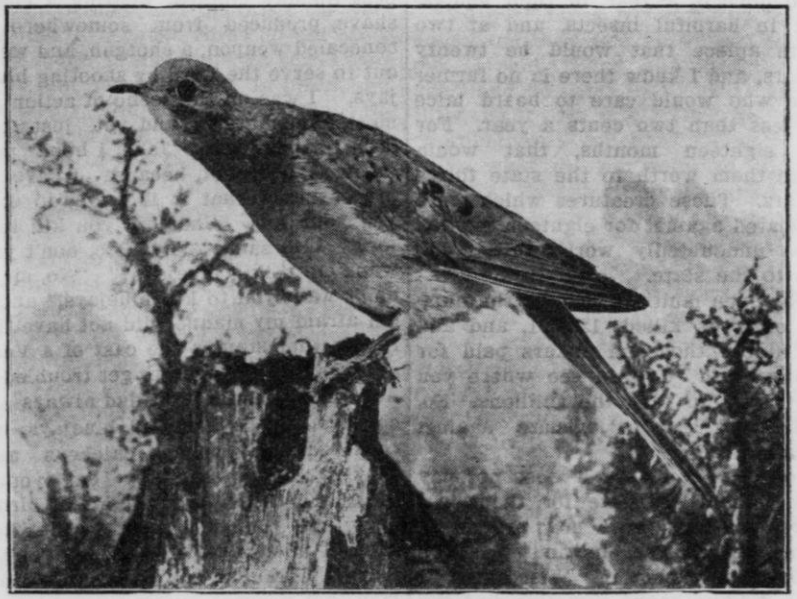
Gentlemen isn't the best time to kill a weed just before it grows, if possible, to prevent its growth? Just think what a multitude of weeds could be grown from eight hundred and seventy-five tons of weed seed!

Supt. McKerrow, Mr. Roberts and everybody interested in sheep will tell you that they are grand things to have on the farm on account of the weeds they destroy, and that is perfectly true, but I want to say that a hundred mourning doves will destroy more weeds than a hundred sheep; I want to say that a hundred quail will destroy more weeds than a thousand sheep. Take a mourning dove and a fairly moderate breakfast would be about three thousand pigeon grass seed, and on a Christmas Day a quail was killed that had made a very pretty Christmas dinner, it had eaten a little over ten thousand pigweed seeds for that Christmas dinner. During the days of Audobon, quail sold for a penny apiece. These are significant facts—they come now from the south to Chicago, you can buy them out of cold storage and they will charge you five or six dollars a dozen. Do you know what that means? It means that we are slaughtering them—exterminating them.

Oh, well, you say, the gun clubs will look after them. Yes, so they will, just as a nice tabby cat will look

after a good dish of luscious cream if you leave the two together.

Do you know what we did with the passenger pigeon? You have heard a good many references to them; some of the papers have been offering one hundred dollars for a good specimen. I had a circular I received a week ago, which I intended to bring, and in that is an offer of seven hundred and twenty dollars for a single pair of undisturbed passenger pigeons which are found nesting in America. But they are gone, never to come back.



Mourning Dove.

Bird Protection from an Economic Standpoint.

Now gentlemen, instead of legislating for protection, sometimes we legislate against birds. The old state of Pennsylvania did that in what is known as the "Scalp Act." They offered a premium of fifty cents for every owl, hawk, mink and weasel killed in that state, and twenty-five cents went to the man making out the affidavit; seventy-five cents it cost. Now, that was to protect the chicken industry of Pennsylvania, and I want to show you how it worked. In just eighteen months—before the law could be repealed—the tax payers paid out ninety thousand dollars. Now, we will suppose that the hawks and owls and minks and weasels in the state killed five thousand chickens annually. There were comparatively few minks and weasels killed, mostly hawks and owls, and the owls killed very few chickens, unless they were allowed to roost in the trees, and if you take care of your poultry that way they are doing you a kindness, because you are better off with-

out them. We will say they killed five thousand annually, at twenty-five cents apiece, which would be a good price, because some of them were taken when they were young, that would be $1,250.00 lost for the year, and for the eighteen months, $1,875.00, so the taxpayers of the state of Pennsylvania paid out ninety thousand dollars to save $1,875.00.

Now, it is estimated that a hawk and an owl will kill at least a thousand mice in a year, or their equivalent in harmful insects, and at two cents apiece that would be twenty dollars, and I know there is no farmer here who would care to board mice for less than two cents a year. For the eighteen months, that would make them worth to the state thirty dollars. These creatures which were legislated against for eighteen months were undoubtedly worth thirty dollars to the state.

Now, you multiply that by the number of birds killed, 128,571, and add the ninety thousand dollars paid for killing them; do you see where you are, right up into the millions. So, it did not pay to legislate against them, did it?

Now I want to say it does not pay very well to legislate for them. Of course we have laws now protecting them—let me see, haven't we laws protecting game in Wisconsin? I think I have heard something of the kind. I believe there are game wardens in Wisconsin and you know how they protect the game. Mere legislation does not amount to anything; there must be education.

Gentlemen, Shakespeare makes one of his characters say, "I would love but little if I could tell how much." Now, I am a bird lover and if I talk thirty minutes or three hours, it doesn't make very much difference, because I never would get through, so call me down, Mr. Chairman, when I exceed my time.

The Story of "Yorick."

Now, I want to talk a little about bluejays (showing a dead bird). Do you see that fellow? That is what is left of him and his name was Yorick. He was a fellow of infinite jest and excellent fancy, and a near neighbor of mine. He lived near my home in the trees and I knew him passing well. One Sunday morning a new hired man of mine, like McGinty, dressed in his best Sunday clothes, wearing a clean shave, produced from somewhere a concealed weapon, a shotgun, and went out to serve the Lord by shooting bluejays. I was on the scene of action almost immediately, and yet just too late. I said to him, "Jake, I hope you made a good shot, because I have a presentiment that it is going to cost you your job. What did you kill him for?" He said, "Why, Doc, don't you want me to kill bluejays?" "No, sir, I don't want you to kill bluejays," and I am afraid my manner did not have the repose that stamps the cast of a Vere de Vere, for he began to get troubled a little and he said, "But dad always encouraged us boys to kill bluejays, because they kill young chickens and they suck eggs and they eat young birds and they destroy a lot of birds' eggs, and you ain't going to kick because I killed that old jay, are you?"

Well, I want to say there are some jays that deserve extermination; the jay that works the individual members of opposing parties during political contests, he may deserve extermination, but with Yorick its the old story—give a dog a bad name and hang him. Everybody hates a bluejay, and why? I really would like to have somebody tell. Because he sucks eggs and kills young chickens and eats other birds? That is the indictment. I said to Jake, "Jake, your father is a fool, he didn't know what he was talking about. All the trouble with your statement is simply that it is false."

The whole trouble is prejudice, just the need of education. Professor Hinshaw, of the Biological Survey, examined the stomachs of 292 bluejays, extending over a year and taken in almost every state and territory, a great many right in breeding time, and I will tell you what he found. He found in two of them the remains of birds and in three of them the remains of shells. Now, two of the three whose stomachs contained shells were shot, one in October and the other the very last day of August. Birds do not breed very much at that time, so those were eggs that had been left in nests, undoubtedly: And who can say that the remains of the birds found in the stomachs of two others were not birds that had died in the nests and by the mother bird had been thrown to the ground?

I want to defend Yorick, a fellow of infinite jest and most excellent humor. He used to love to whistle to the old shepherd dog when he was asleep. He loved to mimic the fool hen, which, after laying an egg, would cackle and call everybody's attention to the fact so birds without feathers could come and steal it. He was a good bit of a cynic and our relations had been cordial but not intimate, and that fellow shot him at my own door. Alas! poor Yorick!

Now, boys, see that. That is a rose-breasted grosbeak. I found him on the walk at Green Lake one morning about six o'clock and I took him home and skinned him. I was going to address the school there on the subject of bird protection, and I took that melancholy specimen with me. I said, "I hate to think that the boy who killed that bird is here—no, I don't think he is here, I think he ran away from school after doing that." The skull had been fractured with a stone from a sling shot, and I said, "I am sorry for that boy; maybe he didn't know any better, but I wouldn't tell his name if I knew it, because you wouldn't like him. I am sorry for his mother, because his mother probably thinks he is going to grow up and be a fine man, but," I said, "how can a boy be anything who starts out in life as a robber? He robbed you and he robbed me, and he robbed everybody that loves exquisite melody and beauty and song. He robbed the spring of something of its beauty."

The next day a boy came up to my house and they said he wanted to see me. I said, "Send him into the office," and he came in. I said, "Hello, Billy, what is it?" "Oh," he said, "nothing very much!" "What is it, Billy, what do you want to see me about?" "Nothing very much." He walked over and looked out the window, and I could see the side of his face; I saw his chin trembling a little, so I said, "Billy, I won't tell anybody you killed that grosbeak." He turned around, and he said, "Won't you tell?" "No, I won't tell." He said, "I don't think the fellows would care so much, but the girls wouldn't like me, and I think my mother would just 'spise me,'" that is the way he put it, "if she knew it," and I saw he would never do that thing again.

Now,—oh, Lord, I ain't half through, and my time is more than up.

Just leave a place for the birds, give them a chance.

A telephone company came to me, they wanted to clear up a quarter of a mile of tangle on the highway, and I said, "I can't give you the right." "Why?" "Well, I dont own it." "But they told us you owned it." "Well," I said, "the birds have had undisputed possession for twenty years and have gained title."

Give them a chance; put out water for them in summer, feed them in

winter; leave them a place to nest; they are your best friends.

It is estimated that the destruction of birds costs America eight hundred millions of dollars annually, and when the time comes that the last bird is slaughtered, life will cease.

You see I am making this plea for the birds because of their economic value; I am making this plea for the birds because of the way they appeal to the thrift of man, to the intellect of man, ornithology being one of the most baffling, inscrutable and wonderful among the sciences.

I am making this appeal for the birds on account of the spiritual uplift they give us. The bird lover on the wings of the bird he loves, in some true sense, is lifted up, up, up, where Alps on Alps rise, to those far heights where he could never climb alone, and this was the feeling in the heart of the poet Bryant, when he watched the wonderful waterfowl take her flight and cried out:

"Thou'rt gone, the abyss of heaven
Hath swallowed up thy form; yet on my heart
Deeply has sunk the lesson thou hast given,
And shall not soon depart.

"He who, from zone to zone,
Guides through the boundless sky thy certain flight,
In the long way that I must tread alone,
Will lead my steps aright."

ALFALFA.

Supt. Geo. McKerrow, Madison, Wis.

It is about time to feed alfalfa rather than talk it, but I am going to first ask all those who are growing alfalfa to please raise their hands. There are a number here in the front seats that I know are doing this, and I think we will have to take it that they are the best farmers, because alfalfa is a wonderful plant, it reaches down deep, very deep, into the subsoil for a great many elements that have been going down there for centuries and it produces from those long working roots a wonderful feed for your animals, what we term a protein feed, a feed that makes muscle, lean meat, that builds up the nerve centers, a feed that puts the casein and the albumen into the milk; a wonderful hay that will save the farmers of Wisconsin, when they all grow alfalfa, millions of dollars which they are now paying for the wheat bran, the middlings and the oil meal that come from the wheat and flax fields of the west.

Over here in Fond du Lac county, a farmer this last season grew twelve acres of alfalfa, sufficient hay to fill four mows in a large barn, estimated at eighty tons, from twelve acres, at four cuttings. From twelve acres of clover and timothy on the same farm, he filled one mow, or one-quarter as much. This alfalfa hay that he has in his barn, which was early cut and well cured, is worth today twenty dollars a ton, while the clover and timothy would be well sold at fourteen dollars.

Now, there are enough farmers in this audience raising their hands to show that alfalfa can be grown even in this part of the state. It is grown

all over the state, but not in as large quantities as it should be grown, because there is great value to it.

What is Necessary to Grow Alfalfa?

Now, if you are going to grow it, what is necessary?

Good seed; seed that will grow, twenty pounds of it to the acre, and I would say, if possible, seed that is northern grown, grown in Minnesota, Montana, or even in Wisconsin—but not much of it is grown in Wisconsin. I never saw any Wisconsin grown seed until a few days ago down in Waukesha county, a farmer brought in some heads that he had plucked from the field, where they had failed to cut the second crop, and I have seen no class of seed plants of that kind that was so full of good seed as was that second crop of alfalfa. There is no question in my mind but what it can be grown in Wisconsin, but I would not know where to find Wisconsin grown seed yet.

Then it requires a good soil, I would say a soil rich in nitrogen, that has been well manured, well cultivated, so well cultivated that grass seeds and weed seeds have all been exterminated.

Preparing the Soil for Alfalfa.

I have about come to the conclusion that the best method to get the soil ready for alfalfa in Wisconsin is this: Take a soil that has been used in rotation, growing clover, a soil that has been well manured, plow it in the fall, if you please, or early in the spring, work it with your disk and your spring-tooth harrow, and every kind of a tool that will make it fine and bring the weed seeds as they start to the surface, and keep that going once a week, once in two weeks at the outside, until the middle of June, or even the first of August. Then put in your seed. You have cleaned your land then practically of all foreign plants, and every plant which grows on there outside of your alfalfa is foreign and a weed. Clean up your soil, give your alfalfa a chance.

Many of the best fields of alfalfa I know of in the state of Wisconsin were seeded in June and July after this kind of cultivation. On lands well tilled in fall and early spring, it can be sown early in the spring with a small amount of barley and cut for hay in June or July.

One of the great enemies of the alfalfa plant in Wisconsin is June grass. June grass is good in its place, but when it gets out of its place, it is all wrong, and it is out of its place when it is in an alfalfa field.

Inoculation for Alfalfa.

Now, we hear a good deal about inoculation and there is something in it, but the best inoculation is to have the land rich in nitrogen, made so by the previous growing of clover and plenty of rich manure.

I believe another good plan for the farmers of Wisconsin to follow along the line of inoculation, or of getting proper germs into the soil, is to sow a pound or two of alfalfa seed with their clover, not for the purpose of growing alfalfa, but of establishing the germ that works on the alfalfa root in that soil. We have been doing it on our farm and we haven't an ideal alfalfa soil, but we are growing alfalfa and we are growing it a great deal better than we used to once, and one of the reasons, I believe, is that by putting this alfalfa into the clover that we sow every year on the farm, we have helped along this inoculation.

If you sow alfalfa and see parts of your field yellow, showing there is a lack of nitrogen which makes that

dark green color in every plant, then I think it is a good plan to take some of the best, richest and finest manure on the farm, top dress and harrow it in to feed these plants that are sick for want of nitrogen. If you have some sweet clover growing on the roadside, probably it will be wise to take some soil from that and spread on the weak spots, or if you have some plots in the field where the alfalfa is growing a rich green and you dig up the roots and find the little nodules, showing that the bacteria is present, take a few shovelfuls of that soil and put it on the weak parts of your crop.

Making the Hay.

Cure this hay well. It is important to have it cut early and to get it out of the way of the second growth. Examine it down at the crown and if you see the little buds starting up, that will be about the time the first blossoms show, and that is the time to cut it for hay. A crop that is cut early is very digestible. Every crop that the western growers cut early and cure they feed to their own live stock, and when they cut it late, so it is woody, they sell it to the alfalfa mills to grind up into alfalfa meal and sweeten it with cheap molasses to sell to the farmers of Wisconsin who are too backward or too lazy to grow their own alfalfa.

DISCUSSION.

Mr. Imrie—Do you think you can do any good in this matter of inoculation of soil by feeding alfalfa on the farm and putting manure out?

Supt. McKerrow—Yes, I think if you feed it sufficiently, it will help to develop the germ.

A Member—Don't you think that twenty pounds of good seed is too much?

Supt. McKerrow—Well, Gov. Hoard and others used to fight me ten years ago when I said twenty pounds was enough. I wouldn't say it is too much.

A Member—I put twenty pounds to the acre, but when the seed came up it was too thick and the roots didn't stand the winter. It was like felt, like the hair on a dog.

Supt. McKerrow—There are some now who are saying that fifteen pounds is enough.

A Member—I think for our climate, fifteen pounds would be plenty; I believe we would get stronger roots and it would stand the winter better.

Supt. McKerrow—You are offering the argument that I always offered for not sowing twenty-five or thirty pounds. We want a large root, rather than many small ones.

Mr. Bradley—This year I sowed fifteen pounds to the acre on land where I sowed thirty pounds years ago, and now I have twice as many plants on that land as there were in the first sowing, because the land had got used to it, the land is in better condition.

A Member—Yes, in raising this I believe you get better crops every year.

Supt. McKerrow—Yes, we are getting a better crop, a better stand, a better growth every year.

A Member—I have had it three years. The first year it was very fine, also the second year, although I always have two crops, but last summer I had three crops. I had about seven acres of it and I had thirteen loads.

A Member—What length of time would you let it lie before you plowed it up?

Supt. McKerrow—When the June grass and white clover get in so thick that you don't get a good crop of al-

falfa, I would plow it up. If these do not come in, I would let it stay, no matter how long.

A Member—I had a piece about four years and the frost killed it. I tried plowing it up last year, but I couldn't, there were such large roots.

Supt. McKerrow—Get a good, sharp plow, put on a good, strong, three-horse team and put your best hired man at it, then go away from home while he is doing it.

Mr. Convey—Will it pay to disk it up and re-seed?

Supt. McKerrow—Yes, if you want alfalfa there, and the only trouble is its thinness, disk it thoroughly, put in a spike-tooth harrow and pull out the grass that is there, then sow your seed again, although, on general principles, I think it is better to plow up and cultivate thoroughly, and cultivate for two or three months in the early season and kill out the grass, then re-seed.

The Chairman—I want to say that the plan you have of getting alfalfa started will work all right on level land, or land that is comparatively level but when you come to try it on hilly land, it won't work, because it washes too badly.

Supt. McKerrow—That is very true, then you will have to work it according to your soil, and in that case I would say rather early spring sowing. I would prefer fall plowing, if it is not too hilly; then early working in the spring, and I would prefer to sow that year about a bushel of beardless barley to the acre. Then cut the barley for hay as soon as it is well in the milk stage, cut it that early and that gives your alfalfa plant a good chance. On level land I think it is better to cultivate and sow as late as June or July, but not later than August 1st.

Adjourned to 7:30 p. m., same day.

EVENING SESSION.

The convention met at 7:30 o'clock. Superintendent McKerrow in the chair.

RURAL HIGH SCHOOL EDUCATION.

W. E. Larsen, Wisconsin Rural School Inspector, Madison, Wis.

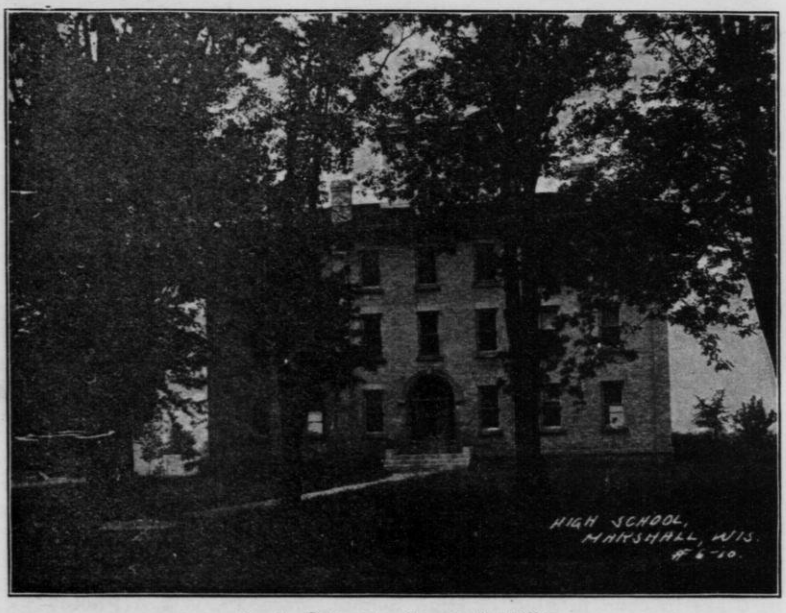
Prof. Larsen.

Much has been said and written during the last few years about the conservation of our natural resources. In solving the problems of conservation, we should always keep in mind that the fundamental factor in such conservation is always the man himself. Nature has given the soil, water power and other resources, but it is for man to use these in such a way as to get the most out of the earth for himself and at the same time conserve these things for future generations. The proper education of man, then, lies at the foundation of all questions relating both to development and conservation.

Great progress has been made during the past century in every department of industry. This progress has also included agriculture. Farming today is not what it once was. The high price of land, the increased population, the growth of cities—all these make it necessary for farming to be carried on differently. We must increase the productivity of the soil. Every acre must be made to produce more than it has in the past. Acres that are yet unused must be brought under cultivation. All this must be done by men trained for this particular work.

In the past, rural education has been confined largely to the work done in the one-roomed country school. Some of this work has been good—much of it has been poor. Country education, however, has not been limited to the work done in the schoolroom. Boys and girls have been educated in their home to do things. As a result many of the men and women who have done great things have come from the country communities. Because of this fact there are persons who believe that what has been done in the past is good enough for the present and future. Thinking men, however, realize that we must adapt ourselves to the changing conditions. Years ago boys

and girls attended the country school up to the age of twenty years. Now children finish the common school course at the age of fourteen or fifteen. At that age they are "sent off" to some other school and that other school is very often in the city. The result is that the brighter children from the country, those who have had the best opportunities to get an education, those who have attended regularly and completed the course, are taken from the rural community into the city environment, with the result that but very few of them ever return to develop that country community in which they were brought up.



High School, Marshall, Wis.

The Great Need of Rural Communities.

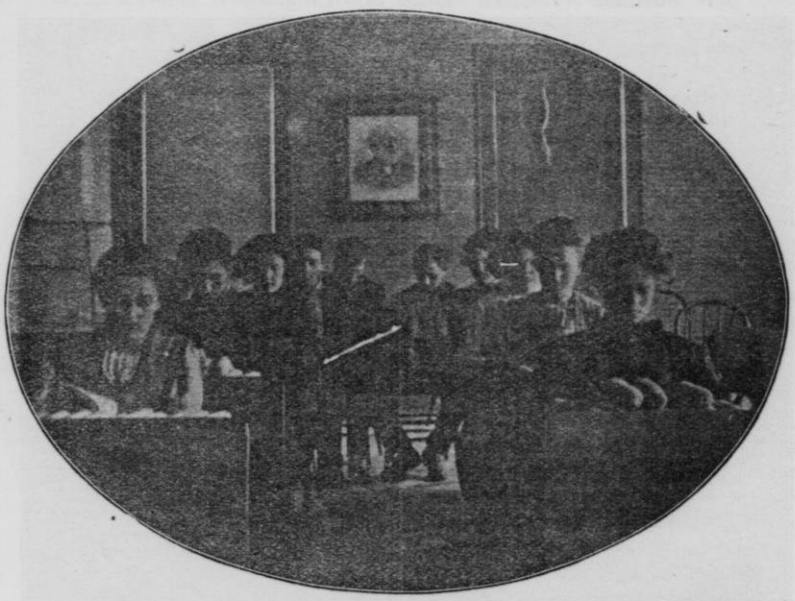
The great need of many rural communities today is a school in which these common district school graduates can go to school between the ages of fourteen and nineteen and yet remain at home. We need country high schools.

A country high school is a high school located in a country community in which these boys and girls can receive the benefit of a broader and more thorough education and yet remain with their parents. There are two great reasons for having such a school. In the first place, we need such a school in order that the children may be under the care of their parents during the years that this care is especially important. It is a great risk to send a child away from home at the age of fourteen to be among strangers. In the second place, we need such a school in order that the young people may be made to realize the great possibilities of developing the community in which they are living. A country high school

should have its work so planned that the young people who attend it will become more efficient as men and women in the community where they live.

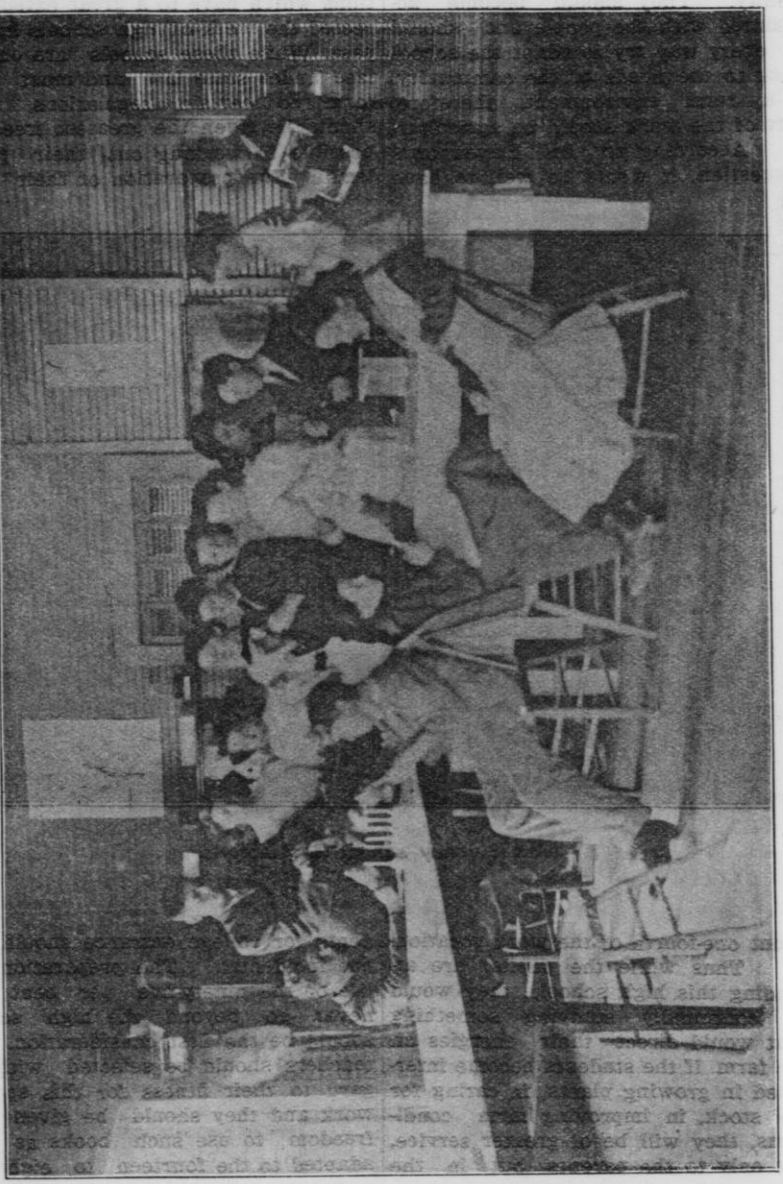
The Aim of the Country High School.

It would be well in this connection to consider what the work of such a high school should be. It is a continuation of the district school. Children who have their common school diplomas would continue their work in this high school. The branches taken up in such a school would be largely the branches that are taken up in any high school, but the work ought to be given an agricultural trend. This should be done for two reasons. In the first place, it is good pedagogy to use the environment as material to develop the mind. The boys and girls of the country are familiar with country surroundings. These surroundings should be used as material for their mental development. In the second place, most of the boys and girls living in the country will remain on the farms. They should have this training in order that they may be able to get as much out of farm life as possible, not simply financially, but socially and spiritually. In this connection it should also be mentioned that the work done in this school should include a thorough study (not merely a brief review) of the so-called common branches—arithmetic, geography, grammar, etc. That the high school should be above teaching these subjects is deplorable, as their mastery is absolutely essential to all good work.



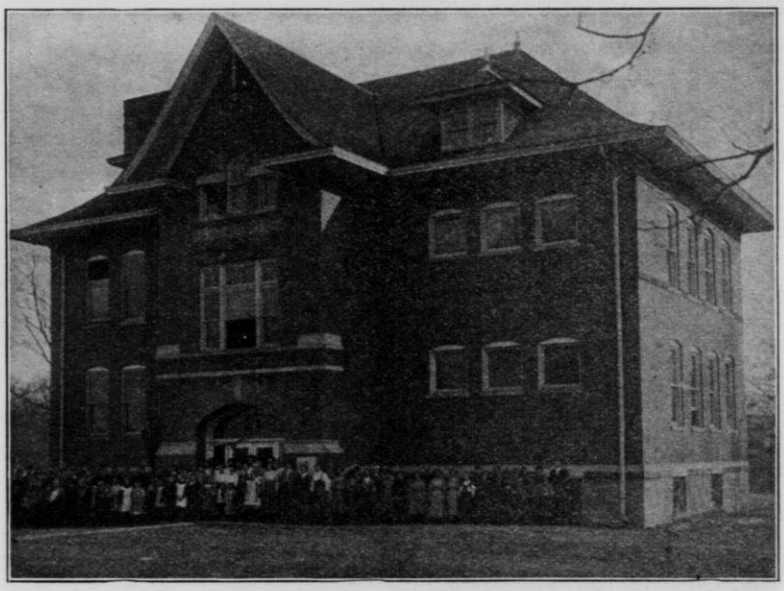
Class in corn judging in High School, Marshall, Wis. (Photo courtesy "Wisconsin Journal of Education.")

The aim of a country high school should be, first of all, the development of the community in which it is located. The teachers in such schools



Class in dairy husbandry testing milk. High School, Marshall, Wis.

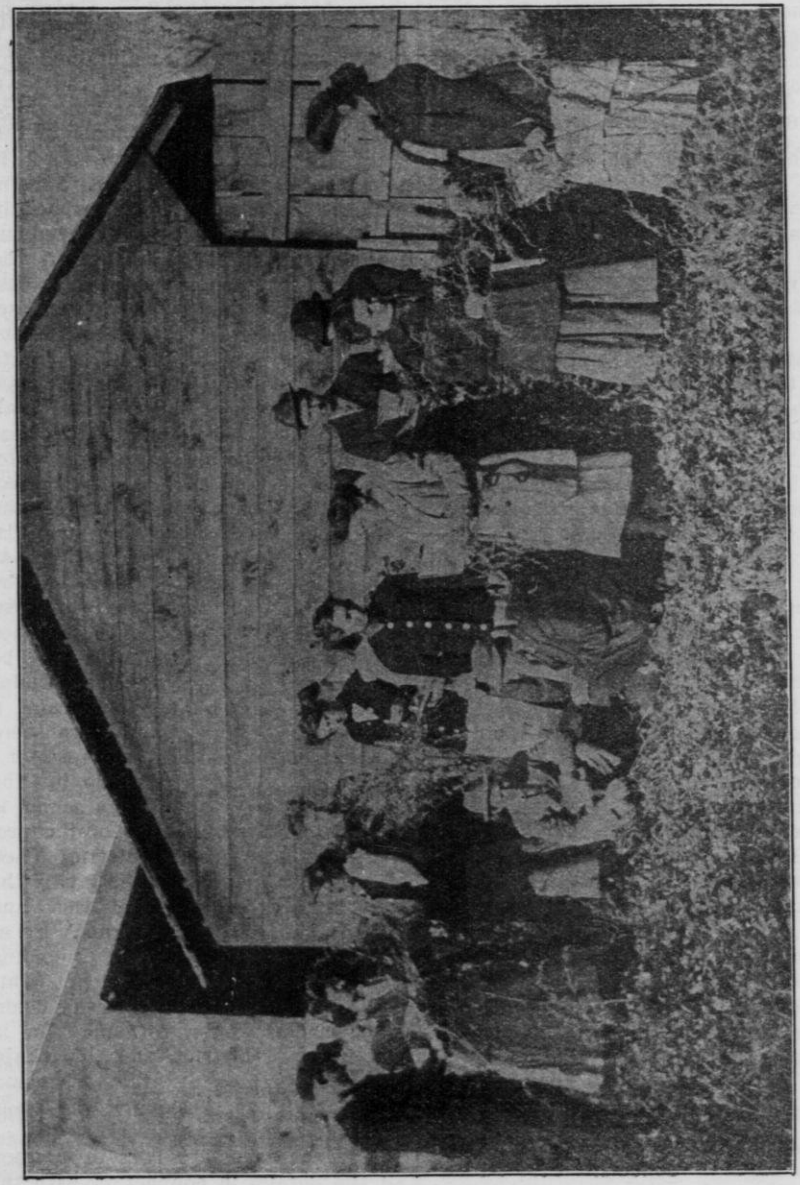
should study the needs of the community They should become acquainted with the people and should in every way try to adapt the school work to the needs of the community. In a rural environment, therefore, part of the work should be agricultural According to Dr. Davenport's suggestion, it would be well to have pose, must be free from certain traditions which have to a great extent directed the work of high schools in the past. While these schools are organized under state law and must conform to certain regulations, they should be given the greatest freedom possible in working out their problems. The preparation of their stu-



John Swaney school, McNab, Ill.

about one-fourth of the work vocational. Thus while the pupils are attending this high school, they would be continually studying something that would direct their energies on the farm. If the students become interested in growing plants, in caring for the stock, in improving farm conditions, they will be of greater service, not only to the parents but in the community at large.

It is clear, of course, that these schools, in order to fulfill their purdents for college entrance should be but incidental The preparation for life of the ninety-five per cent who never go beyond the high school should be the first consideration. The teachers should be selected with regard to their fitness for this special work and they should be given the freedom to use such books as are adapted to the fourteen to eighteen-year-old pupils and to use such methods as are best suited to instructing pupils of that age. In other words,



Class in agriculture studying weeds on a field trip, High School, Marshall, Wis.

the college standard, which often brings with it subject matter and methods unsuited to the high school student, must give way to the more rational standard of personal efficiency.

Some Noteworthy Examples.

We have such high schools. In Putnam county, Ill., is located the John Swaney school. It has become known far and wide for the work that has been introduced into its course of study. At present there are forty-six farmers' boys and girls attending this high school, situated right in a farming community, and while they are taking the regular high school course, they are taking special work in soils, grains, dairying and the like.

In Wisconsin agriculture is also being introduced into some of our high schools. One of the schools with which I am acquainted is located in the village of Marshall, Dane county. This school has been attended by about sixty pupils, most of them being from the farms. Pupils in this school nave had work in judging and grading grains, judging corn, testing milk and the like. Many practical results could be told to show how this school has been a direct benefit in developing the surrounding country. The boys and girls are thoroughly interested in their work and this interest has also shown itself in the home as well as in the school. The fact is that they are learning to do something and this doing does not stop with a schoolroom, but is carried on into the homes. They become more efficient in helping their parents and with this desire for doing things on the farm it is much more likely that they will go into farm work gladly and thus become progressive farmers.

How To Establish Country High Schools.

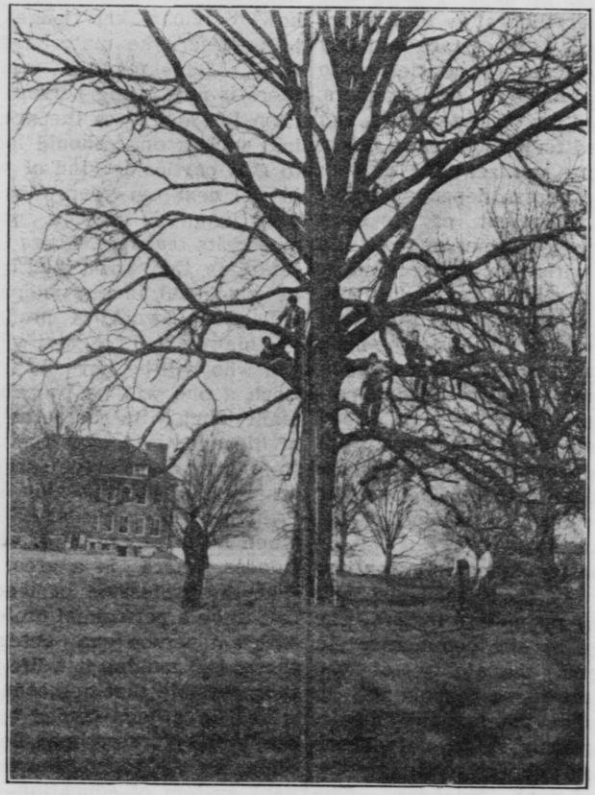
Under the present law it is possible to establish such high schools in two different ways. We have had for some years what is known as the "township high school." A town or two towns together may establish a high school. This is maintained by the town and the pupils of the town attend it. At the present time there are about thirty such schools in the state. In many cases, however, it is somewhat difficult for a town to maintain such a school. This is especially true where there is not a convenient location for such a school near the center of the town. Swamps, marshes, locations of villages and other factors may make it very inconvenient for any particular town to locate such a school. Under the new law a school known as the "union high school" may be established anywhere. After the approximate location has been decided upon, a district may be laid out around such school, the only requirement being that such district shall include a territory of at least thirty-six square miles and be bounded by section lines. In case of impassable streams, lakes, marshes etc., such natural boundaries may be substituted for section lines. Under this law it is possible to locate a high school at any point where there is a convenient and accessible center.

The first thing to be done in the organization of a union high school is to lay out the boundaries of the proposed union high school district. Then a petition must be prepared giving the boundaries for such district and this petition must be signed by at least one-fifth of the voters (including women) in such school district. This petition is given to any town chairman, part of whose town may be in the proposed district, and this chairman calls a meeting of other chairmen (or village president) who make arrangements for an election.

It is not necessary here to mention all the details in connection with the organization of these two kinds of high schools. Any community the citi-

zens of which wish to establish a high school in its midst can get the required information by reading the statutes or by writing to the state superintendent. The great purpose we have in bringing this before the people is to call attention to the opportunites we have and to emphasize the fact that each locality must largely develop its own resources for itself. A high school, like any other school, should be an institution for the training of the young people of its own community for the highest living. An institution that is supported by public money should have as its great purpose the development of the people that come under its influence. These schools will vary somewhat with the different localities in which they are situated.

In an indirect way a school of this kind would do many things for the community. Besides being a place for the training of the young people for industrial, political and social efficiency, thus bringing up a class of workers to develop to the fullest extent the resources of the community, it should be a center where all the people come together to listen to addresses, lectures, debates and the



Tree pruning on the campus, John Swaney school.

like. In such a school the farmers' clubs could hold their meetings. The school should be a unifying influence, bringing together into harmonious cooperation the various educational factors of the locality. Such a school would develop leadership—an element much needed today in many places.

It should also be kept in mind that the state is very liberal in its support of these schools. The state will pay one-half of the teachers' salaries, up to nine hundred dollars for two teachers, twelve hundred for three teachers, and fifteen hundred for four or more teachers. The state realizes that its own welfare and progress depends largely upon the development of its farm lands. Every young person who can be equipped with the proper kind of education to develop a portion of Wisconsin's soil is an asset to the state. Wisconsin needs thousands of young men and women to enter this wonderful field of labor—the twentieth century agriculture. To give our young men and women the proper insight into the great opportunities before them and to fill them with enthusiasm for this work, we need a school of the character here spoken of.

Another matter deserves attention. The efficiency of these schools will depend largely upon two factors—the interest taken by the community in the school, and the ability of the teacher. That these schools will be in demand when the farming population realizes their value is self-evident. Now, it is for us to begin the preparation of such teachers. The teachers of these schools should, as a rule, come from the farm. They should be familiar with the practical phases of farm life. They should be able to get out among the people, converse with them about the conditions prevailing and should in every way be members of the community in which they live. The excellent agricultural work done in the Marshall school is due to the fact that the principal thoroughly understands the relation that should exist between the school and the community. Added to this fundamental requirement, should be the ability to teach. They should know how to impart knowledge to others, to organize the material for instruction. This requires training. If there is any young person who loves farm life and loves the work of teaching, such a one should look forward to this particular kind of work. Within the next ten years Wisconsin will need hundreds of such young people among its teachers. There is an opportunity in this work that can scarcely be paralleled in any department of educational work. A proficient country high school teacher will be a person who will be virtually independent. Such a one will be brought into constant touch with the actual conditions of life and the longer the experience the more valuable the services. It will scarcely be possible that such a one "will be laid on the shelf" at a time when he is at the zenith of his usefulness. There is a great possibility that the profession of teaching is at last to be a permanent profession—one which a person can enter with the thought of making it a life work. Thus it is possible that our country schools which have been lauded by some and despised by others, may be the means of laying the foundation for a permanent system of education—an education which will take as its problem the development of the state industrially, intellectually, socially, politically and spiritually.

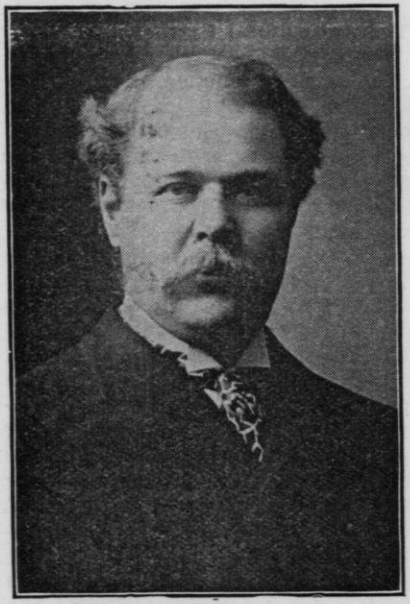
Music, Orchestra.

Song, High School Girls.

THE AGRICULTURAL COLLEGE EXTENSION.

(With Stereopticon Views.)

Dean H. L. Russell, Madison, Wis.



Dr. Russell.

When I look into the faces of the hundreds of young people who are here tonight, I wish I might give my time to the continuation of Professor Larsen's address, for it is such addresses as this that mean much to this commonwealth, for the question of education along the lines he speaks of, is one of the most important things that we, as a commonwealth, have to consider.

The question I am to present to you tonight is that of educating the older boy and girl, the boys and girls who are of mature years, and who perhaps have not had in their earlier years these opportunities which the professor has spoken of as so desirable in our own state, and which unquestionably we are going to have within a comparatively short time.

Superintendent McKerrow has asked me to present tonight a phase of our college work which is comparatively new, so far as its field of organization is concerned. The Wisconsin College of Agriculture has always stood for getting as close to the people as possible in its work. The Short Course, the work in the Long Course, has been such as to command the attention of educators all over the country, and it has yielded rich fruitage indeed.

Much of the work of the College of Agriculture relates to the work of its Experiment Station. Many of you are more or less familiar with some of the work which has been done there. I need not say to a Wisconsin audience anything regarding the Babcock test, or relating to the very valuable work which has been done with reference to feeding and the working out of the principles as applied to scientific agriculture; many of you are familiar with this work. The difficulty we find, however, not only in Wisconsin, but in all parts of the union is that the Experiment Station has outrun the application of the principles discovered in the minds of the people. There have been established in every state these so-called Experiment Stations where phenomena of nature are studied with reference to determining the laws and principles which govern the same. It is often impossible for the man working in the laboratory to take the results of his work and carry them to the man who needs them on the farm. Very frequently the scien-

tific worker cannot do this work in a satisfactory way; to do it successfully requires a peculiar type of man to serve in this capacity. To fill this need we have begun to develop within the last few years, more extensively than ever before, the Agricultural Extension service, because we have seen the necessity of it become more and more urgent.

This Extension work is carried out along two general lines; (1) in the nature of demonstration work; (2) farmers' courses, farmers' schools and the like. You have had here this week a splendid example of what the teaching side of the work can be made to cover, because in the Farmers' Institute, we have in a sense a type of Extension work. The men who are carrying this Farmers' Institute work are propagandists, taking the results of scientific investigation to the man who needs them. As I said a moment ago, the results of scientific work had accumulated in this country but in a large measure were not utilized; they were like the dynamo whirling in the engine room, creating power which was not used, because there was no motor connected with the generator. The man on the farm is the motor power that is moving this commonwealth; the scientific truths which are being determined in the laboratory are the motive force to be applied; you have to have a connection—a live wire—joining the dynamo to the motor before these forces can do their work. This so-called Extension work is this type of work which carries the result of scientific inquiry to the man who needs it most.

I shall try to present in the little time I have at my disposal some lantern slides which I have with me that illustrate the various phases of the work which are incorporated under this Extension service.

As it is impossible to report a lecture of this character, and as it would be of but little service unless accompanied with the illustrations which were presented, the following circular is presented which describes the purpose of the Agricultural Extension Service and how aid may be secured in the various lines of work by the farmers of the state.

The Agricultural Extension Service.

The primary function of an agricultural experiment station consists in conducting original investigations and experiments bearing directly upon the agricultural industry of the state. Having determined the best methods to be pursued in various lines of agriculture as a result of such investigations, the next duty of the station is to give this information to the farmers of the state to be put to immediate beneficial use. In the past the major portion of the results of such investigations have been presented in station bulletins and the advice of members of the station staff has been given to many farmers through correspondence and addresses delivered at farmers' meetings. During recent years, however, a more direct and personal method has been developed at this Station which includes personal visitation and correspondence, co-operative demonstrations and experiments and the solutions of local problems by Station experts who visit the locality and study the problems on the farm.

A special appropriation by the State Legislature has made possible better organization and the expansion of this work in the College of Agriculture and Experiment Station along various lines of Extension Service. The purpose of this organization is to bring the benefits of this Station to a larger proportion of the two hundred thousand farmers of Wisconsin.

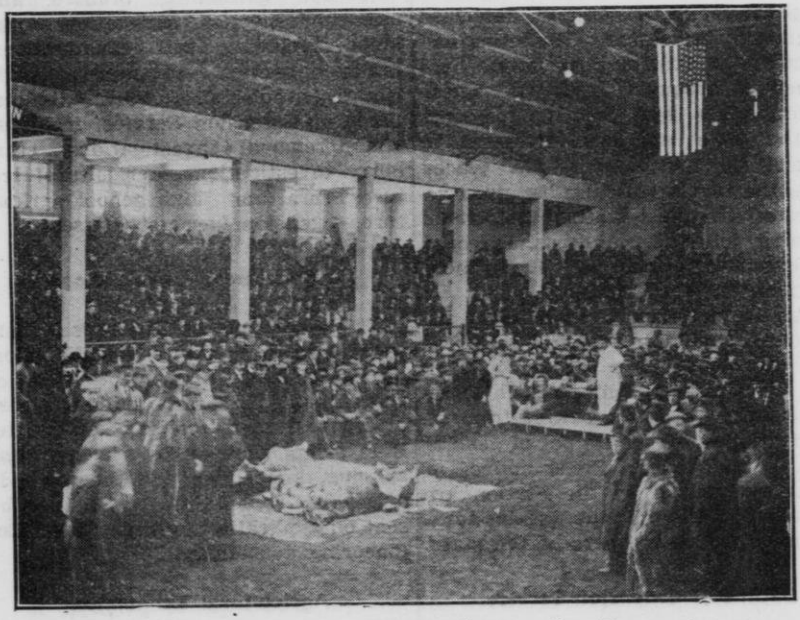
How Wisconsin Farmers May Secure This Service.

The lines of Extension Service offered to farmers of the state are un-

der the direction of the various departments of the Station, involving personal direction by the entire staff of the Station devoted to each particular subject.

Local demonstrations and experiments will be conducted, as in the past, at certain centers in various parts of the state in order to especially adapt the work of the Station to local conditions and to permit the maximum number of farmers to visit and inspect the experiments in progress. So far as possible the grouping system will be followed. A group of farmers of the same locality interested in the same business will be made the unit for these demonstrations, since the expense and scattered location of farmers prohibit personal attention in all cases. The demonstration or group method has proven in the past to be the most effective in giving farmers a good idea of a method of local improvement.

Where peculiar local problems arise, demanding investigation on the ground by Station experts, experiments will be outlined and conducted in co-operation with local farmers to determine the best methods of solving the problem. The locations and conditions of these co-operative experiments will be determined by the Station staff after studying the situation. The lines of co-operative work are mentioned in the following pages.



A post-mortem tuberculosis demonstration, at the Farmers' course, February, 1910, College of Agriculture, Madison.

Farmers who have particular problems upon which they desire advice, may secure it by writing to the department of the Station in charge of that subject. They will receive carefully prepared answers to all questions, as well as such available publi-

cations as may give helpful information upon the subject. If the problem is of such nature that it warrants personal visits by the Station expert, such a visit may be arranged either at the expense of the Station or at the joint expense of the farmer and the Station.

The results of investigations conducted by the Station, which are of a nature which will be of immediate practical use to farmers, are described in the regular series of Bulletins and Circulars of Information which are issued at frequent intervals. These bulletins are sent free to residents of the state who are interested in agriculture and names are placed upon the regular mailing list upon receipt of a request stating the line of farming followed. Address, Director, Wisconsin Agricultural Experiment Station, Madison, Wis.

The Annual Reports include the annual report of the Director, which is also distributed as a regular bulletin, and the Research Bulletins, which include technical data resulting from investigations such as are not of general interest to farmers. Press notices of all investigations by the Station are issued regularly to the agricultural journals and newspapers of the state.

Outline of Extension Service.

Agricultural Engineering, including farm building and construction; Agricultural Economics, including cost of producing farm products and student employment bureau; Agronomy, including pure seed dissemination, county and state farm tests, young people's corn contests, seed inspection, weed control and sub-station work; Animal Husbandry, including dairy cattle breeders' associations, sheep and swine breeding associations, live stock judging; Bacteriology, including animal disease control, water supply control, tuberculosis post-mortem demonstrations; Chemistry, including feed inspection, fertilizer inspection, dairy cow tests; Dairying, including butter and cheese scoring exhibitions, milk and cream testing, starter distribution; Horse Breeding, including stallion licensing; Horticulture, including potato spraying demonstrations, orchard spraying demonstrations, tobacco seed distribution, landscape gardening, orchard and nursery inspection, sub-station work; Soils, including soil examinations, drainage service, co-operative fertilizer tests, sub-station work; General Lines of Extension Service, including stump removal investigations, cranberry investigations, agricultural lectures, rural and high school agriculture, extension farmers' courses.

Agricultural Engineering.

This department will furnish plans for barns, hoghouses, cow stalls, silos, cement construction, ventilation of schoolhouses and farm buildings free of cost to farmers residing in the state. Blue prints showing belt lacing, rope splicing, knot tying and the methods of making rope halters will also be sent on application to Agricultural Engineering department.

Agricultural Economics.

Selected farmers are co-operating with the Station by filling out blanks showing what has been done on the farm. This work requires but a few minutes of time each day. These reports are tabulated by the Agricultural Economics Department in co-operation with the United States Department of Agriculture, and at the end of the year a complete statement of the profits in each line of production is sent to the farmer. This is of value in showing what kind of farm products are most profitable.

A limited number of farmers will

be added to this list from time to time. This work is done without cost to the farmer other than the time necessary to fill out the blanks. Progressive farmers who desire this co-operation should make application early in the year to Agricultural Economics Department.

An employment bureau is maintained for the mutual benefit of the students and graduates of the College of Agriculture and those farmers who may desire to employ student help. A large number of positions are filled for helpers, herdsmen, foremen, managers and farm superintendents. Numerous requests are received from teachers and experimenters in agricultural colleges, experiment stations, government work and other agricultural or educational enterprises. Address, Office of Farm Management.

Agronomy.

This department is engaged in the breeding of grains and forage plants for the purpose of improving quality and yield per acre. Former students of the College, members of the Wisconsin Experiment Association, are the parties with whom these seed grain centers are established and who have agreed to sell these grains to farmers and seedsmen at reasonable prices. A list of these growers will be furnished on application to the Agronomy Department.

Co-operative demonstrations are carried on with county and state farms for the purpose of illustrating the best methods of handling farm crops from seeding to maturity. The plan involves making these farms demonstration centers where the progress of the work may be conveniently observed at any time by farmers in the vicinity and where special meetings may be held at the time when crops are in the best condition for demonstration. The plan also includes special work with nearby farmers.

Seed is furnished by the Station to

A spraying demonstration by the Horticultural Department of College of Agriculture.

county and state farms engaged in the work for the purpose of making them seed growing and distributing centers. These farms agree in turn to sell the seed grain grown from Station seed to farmers at reasonable prices. Farmers desiring special advice regarding problems on their own farms should leave their requests with the superintendent of the farm belonging to the county in which they reside. County farm superintendents desiring this co-operation should apply directly to the Agronomy Department.

Young people's corn contests are held in co-operation with county fair associations and county superintendents. The object of these contests is to awaken in the boys and girls an interest in agricultural pursuits and to give pure bred seeds the widest possible dissemination. Assistance is also given in judging the grain grown in these contests.

Seed is furnished free for these contests by the Agronomy Department of the Station to county fair secretaries and county superintendents. These parties should apply for an outline of the regulations governing these contests and other necessary information to the Agronomy Department.

The Wisconsin Seed Inspection law provides that all grain and grass seed offered for sale in this state must be practically free from the seeds of noxious and common weeds and other foreign matter. The law places the control of this work in the hands of the Experiment Station. The inspector is required to procure samples of seeds sold in the open market and to determine if the same meet the legal requirements. The inspector is empowered to prosecute violations of the law.

Any resident of the state may have seeds examined by sending a sample of the same (taken in accordance with directions which will be furnished on application) accompanied by the fee of twenty-five cents to the State Seed Inspector.

The Agronomy Department furnishes full information with reference to spraying solutions, spraying apparatus and the most approved methods of weed eradication and control free upon receipt of application. It also identifies weeds and weed seeds free for residents of the state. Specimens for identification should be taken, if possible, when the plant is in full bloom and should include roots, stems and leaves. These should be packed in some substance to keep them moist and each specimen should be plainly marked or numbered. Each specimen of weed seed should also be numbered. Address, State Seed Inspector.

Agronomic tests and experiments are conducted on the sub-station farms, which are located in various portions of the state. The testing of pure bred seed grains, the growing of various forage crops, and the dissemination of these crops throughout the locality where the sub-station is located receive special attention. Rotation and acclimatization of farm crops are emphasized. For particulars regarding the work address the Agronomy Department.

Animal Husbandry.

This department assists in the organization of Breeders' Associations and aims to give practical assistance through literature, lectures, demonstrations and by personal letters in the breeding, feeding and care of herds. A tentative outline of a constitution and by-laws is furnished free on application and, to a limited extent, speakers are provided to already existing associations. Make application to the Animal Husbandry Department.

Sheep and Swine Breeders' Associations are organized on the same basis for the same purposes and under the

same conditions as the Dairy Cattle Breeders' Associations. Applications for assistance should be made to the Animal Husbandry Department.

The Station maintains lists of competent judges which will be sent on application to county fair secretaries and others desiring to secure judges. Address, Animal Husbandry Department.

Agricultural Bacteriology.

In co-operation with the State Live Stock Sanitary Board and the State Veterinarian, this department is prepared to investigate serious outbreaks of animal diseases throughout the state. Address, Bacteriological Department.

Tuberculosis post-mortem demonstrations are conducted in co-operation with the State Veterinarian and the State Live Stock Sanitary Board for county fair associations and other organizations, under prescribed rules. Address, Bacteriological Department.

The Experiment Station cannot undertake to analyze water samples for sanitary or mineral purposes. The State Hygienic Laboratory investigates water supplies of cities and villages free of charge. For any information concerning such work address State Hygienic Laboratory.

Agricultural Chemistry.

The Wisconsin Feeding Stuff Law requires that concentrated feeds, except whole seeds and unmixed meals made from whole seeds, be sold under a license and each sack must bear a label showing minimum fat and protein and maximum fiber content. Mill feeds and malt sprouts sold locally by the manufacturer, are exempt from the operation of this law. Samples are collected in feed stores by agents of the Experiment Station and analyzed, and the results are reported directly to the manufacturers and dealers and annually to the people of the state in the bulletins of the Station.

Samples of commercial feeding stuffs (taken in accordance with directions furnished by the Station) will be analyzed free of charge for farmers, and results reported directly to them with the least possible delay. Address, Feed and Fertilizer Department.

A similar law governs the sale of commercial fertilizers in the state. These must be sold under a license and each sack must show the manufacturers' guarantees for minimum nitrogen, total and available phosphoric acid and soluble potash content of the fertilizer. Analyses of samples are made under similar conditions to those governing the analyses of commercial feeding stuffs. Address, Feed and Fertilizer Department.

Owners of pure bred dairy cattle may have tests of these animals made and certified by the Experiment Station. The official tests are conducted for a period of from one to thirty or more consecutive days and cost the breeder as follows:

1-day test	$ 6.00
2-day test	8.00
7-day test	25.00
30-day test	80.00

Additional days, beyond two, seven or thirty days, three dollars per day.

Semi-official yearly tests are also conducted under direction of the Station. Address, Superintendent of Dairy Tests.

Dairying.

Butter and cheese scoring exhibitions were established for the purpose of improving the quality of dairy products in the state and are especially intended to be of assistance to butter and cheese makers whose products are below market standard in quality. They also aid in keeping the product from any factory up to the market standard throughout the entire year.

Packages of either farm or cream-

ery butter and of American, Swiss, Brick or Limberger cheese may be sent to the Dairy Department for expert inspection and advice, which is furnished free to all exhibitors. Write for entry blanks, addressing Dairy Department.

Samples of milk and cream are tested free for farmers and factory owners throughout the state, on conditions outlined in a circular to be had on application. Sample should be sent by mail or express and must be accompanied by a statement signed by all interested parties that the sample has been taken in accordance with directions furnished by the Dairy Department. On account of the dissatisfaction always caused by inaccurate sampling, no test of milk or cream will be made unless this signed statement accompanies the sample. Address, Dairy Department.

Another method used to improve the product of butter and cheese factories is the use of pure culture starters. To that end the Dairy Department will send, free of charge, on application, to any butter or cheese maker in the state, pure culture starters prepared at the station. Directions for use accompany each bottle. Apply to Dairy Department.

Horse Breeding.

The Wisconsin Stallion Law requires that before any person, firm or company shall use or offer for use for public service in the state any stallion or jack, he shall have caused the name, description and pedigree of the animal to be enrolled by the Department of Horse Breeding of this College, and shall have procured a certificate of such enrollment from this department and recorded the same with the register of deeds of the county in which the animal is to be used for service. To obtain the license-certificate the owner must submit his personal affidavit, or that of a legally authorized veterinarian, certifying that the stallion or jack is free from certain diseases specified in the law, together with the pedigree registry certificate of the horse and any other papers necessary to decide his exact breeding.

Unsound horses cannot be licensed. Stallions or jacks to be entitled to a license as "pure-bred" must be recorded in a stud book recognized by the Department of Agriculture, Washington, D. C. Horses not so recorded are given license as "cross-bred," "non-standard bred," "grade," or "mongrel or scrub," according to the exact character of the breeding of each. Exact copies of the license certificate must be printed and posted up in conspicuous places wherever the stallion or jack is used for public service, whether for a fee or without charge for service. The purpose of this law is to give farmers accurate information relative to the breeding of public service stallions to the end that better methods of horse breeding may obtain. The publications of the Station on the subject of horse breeding are to be had on application. Address, Horse Breeding Department.

Horticulture.

Potato spraying demonstrations are given in the potato districts to illustrate methods of controlling potato blight and other fungus diseases and insect pests. The Experiment Station furnishes the machine and necessary materials and a representative to supervise the work. The farmer who secures this co-operation furnishes team and other necessary assistance. No charge is made by the Station.

Owing to the length of time required to complete one of these tests and the limited facilities for this work, only a few demonstrations can be made each year. Such demonstrations

will be located where, in the opinion of those in charge, they will reach the greatest number of farmers. Address, Horticultural Department.

Orchard spraying demonstrations are given to illustrate the methods of controlling diseases and insect pests which infest the orchard, under the same conditions that govern potato spraying work. Address, Horticultural Department.

The Station has developed an improved variety of tobacco, and is now growing a considerable quantity of seed which will be distributed in small lots to the tobacco growers of the state as long as the supply lasts, on condition that those receiving it agree to make a report requested by the Horticultural Department. Growers to whom this seed is furnished are urged to grow their own seed for future supply. Address, Horticultural Department.

This department answers queries regarding the selection of plants, trees and ornamental shrubs used for shade or decorative purposes. In the case of public schools, planting plans will be furnished free of cost to two schools in each county. Expenses incurred in securing data for these plans must be borne by the school. This Station cannot furnish nursery stock for decorative purposes. All questions with reference to cultural methods, varieties to be grown, treatment of pests and other questions of a similar nature regarding fruits and vegetables grown in the state are answered free for residents of Wisconsin. Address, Horticultural Department.

The Wisconsin Nursery and Orchard Inspection Law requires that all nursery stock grown and offered for sale in this state must be inspected by an authorized official inspector, appointed by the Director of the Experiment Station. All shipments of nursery stock must bear official inspection tag. All agents canvassing for nursery stock must have agent's duplicate licenses. Nursery inspection fee is ten dollars and agent's fee is one dollar. Address, State Nursery and Orchard Inspector.

The Horticultural Department is carrying on trials in fruit growing in various places in the northern part of the state, and the testing of varieties for these several sections. This work is carried on in connection with the experimental work of the department at the northern Sub-stations. At the present time various fruits are being grown at the following places: Superior, Iron River, Ashland, Bayfield, and on Madeline Island. Address, Horticultural Department.

Soils.

Examinations are made of individual farms by personal visitation to determine best methods of managing special types of soils, as marsh, sandy and heavy clay lands, proper fertilizers, crop rotations for same and drainage possibilities. It is desired that individuals requesting such examinations secure the co-operation of others in the vicinity so that the service of the department may be extended to as many farmers as possible. Address, Soils Department.

Drainage service is planned to aid in the organization of drainage districts and to promote the reclamation of swamp lands. Plans are made for drainage systems and, when required, aid is given in the organization of drainage districts. Plans and specifications for either tile or open ditch drainage are also furnished, but individual assistance is given only in localities where little drainage has been done and only for the purpose of demonstrating its value to that locality. No charge is made for time or traveling expenses. Instruments are loaned to competent and reliable

parties for nominal fees. Address, Soils Department.

A limited number of co-operative fertilizer tests are made annually on three types of soils as follows:

1. To demonstrate the effect of phosphates on clay soils.

2. To demonstrate the value of certain fertilizers, through cultivation and legumes on sandy soils.

3. To show the effect of special fertilizers, drainage and crop adaptation on marsh soils.

These tests are made only after personal examination by a representative of the department. The farmer on whose land the experiment is made must agree to care for and harvest the crop in accordance with directions furnished by the Soils Department. The farmer furnishes the necessary labor. The Station furnishes the fertilizer and other material necessary for the experiment and supervises the work free of cost. Address, Soils Department.

Demonstrations and experiments are made on the soils of lands controlled by the state in several widely separated localities. At present these demonstrations are being made on clay soils at Superior and Ashland, on sand at Sparta and Iron River, on marshes at Marinette, Mather and Phillips. Address, Soils Department.

General Lines of Extension Service.

This Station in co-operation with the Minnesota Agricultural Experiment Station and the Office of Farm Management of the U. S. Department of Agriculture, is conducting a series of tests to determine the most efficient and economical methods of removing stumps from cut-over lands in the northern section of the state. Farmers and others interested in this special line of work may get valuable aid from the expert in charge, or may render aid by describing methods now used. Address, Director, Experiment Station.

This Station is carrying on five special lines of cranberry improvement—

1. Tests of culture methods.

2. Co-operative tests with insecticides.

3. Co-operative tests with fertilizers.

4. Giving advice and assistance in laying out and management of cranberry bogs.

5. Tests of varieties and methods of propagation.

The Station furnishes the necessary material and superintends the work, the cranberry grower furnishing necessary help and carrying out investigation as directed by the Station's representative. When assistance is furnished in making preliminary surveys of marsh areas, the traveling expenses of the representative are paid by the party aided. Address, Superintendent Cranberry Sub-station, Grand Rapids, Wis.

The Station receives many calls from schools, agricultural societies and breeders' associations for men to give lectures on special phases of agriculture.

While it cannot undertake to send out its men indiscriminately it does aim to comply with these requests where a goodly number of farmers are certain to be reached through the lecture. To secure this service, application should be made several weeks in advance to Agricultural Extension Service.

There is a constantly increasing demand for Station publications to be used in the rural and high schools of the state. Certain numbers of the regular series of bulletins and circulars are particularly adapted to the needs of these schools. These will be mailed free to all rural school teachers on application of the County Superintendent accompanied by a list of teachers in the county. These bulle-

tins and circulars are also available for the use of high schools, county training schools and other educational institutions in the state.

The College is prepared to furnish, to a limited number of county superintendents, special lecturers for short term institutes, free of charge. Applications should be made at least sixty days in advance of the time when the institute is to be held.

The Station will loan to schools and colleges enlarged photographs and a traveling library of slides to accompany special literature on agricultural subjects. Application for this material will be received and filed and the material supplied as rapidly as possible in the order in which applications are received.

Other means of assisting rural and high schools in improving the teaching of agriculture are being developed. County and city superintendents and graded, high and training school principals may secure these aids by applying to Agricultural Extension service.

Extension Farmers' Courses are given in co-operation with county schools of agriculture at the sites of these schools and in a few other particularly favorable locations. Homemakers' Conferences are held in connection with these courses in charge of the Home Economics Department of this college. Lectures and demonstrations on such subjects as home management, foods and cooking, home decoration, nursing, etc., are given.

County school authorities and others desiring to secure these courses should make application early in order to secure favorable dates, as only a limited number of these courses can be given each season. Address, Agricultural Extension Service.

RESOLUTIONS.

The report of the committee on resolutions was presented by Mr. Bradley and unanimously accepted, as follows:

Resolved, that we tender our sincere thanks to the committee of arrangements for the kindly and hearty way in which they have helped to make this Round-up Institute a success, and be it further

Resolved, That we also heartily thank the band boys for the way in which they have responded to the calls on their patience and kindness. There is an old saying, "Be just a little more kindly than is absolutely required of you," and the boys have certainly carried out this sentiment to the letter. They have not shown that they were merely playing for hire, but have entered into the spirit of the occasion with a hearty good will.

Resolved, That we respectfully ask our representatives in congress to use all honorable means to maintain the present tax on oleomargarine for the protection of the farmers and a safeguard to the public.

Resolved, That we command the place given to Nature study in the public schools, and look forward to a more prominent place being given to the same, which shall include the protection of our birds.

CLOSING REMARKS.

Supt. Geo. McKerrow, Madison, Wis.

Before calling on the orchestra for another piece of music, I wish to say in closing the regular exercises of this Institute, that we have been well pleased in the results so far as we can see those that have been attained by holding this Twenty-fourth Closing Annual Farmers' Institute of Wisconsin in the city of Two Rivers. We have found here preparations well made; your local committee that worked so hard to secure this meeting, worked so hard last year to make a success of the Institute at that time, have also worked harder than ever to perfect the arrangements for this meeting. They have even secured good weather, and the only fault we have to find is that they did not secure good roads that the local farmers might come in from greater distances.

Farmers' Institute at Somers, Kenosha Co., Wis., March 8, 1910.

Thanking you all for the pains you have taken in making this meeting a success, after a closing piece by the orchestra, we will consider this meeting adjourned.

WOMAN'S DEPARTMENT.

COOKING SCHOOL.

Held at Two Rivers in Connection With the Closing Farmers' Institute, March 15, 16 and 17, 1910.

Conducted by Miss Edith L. Clift, Chicago, Ill., and Miss Nellie Maxwell, Neenah, Wis., assisted by Miss Mae Ross, South Bend, Ind., Miss Marie Fenton, Neenah, Wis., and Mrs. Grace G. Durand, Lake Bluff, Ill.

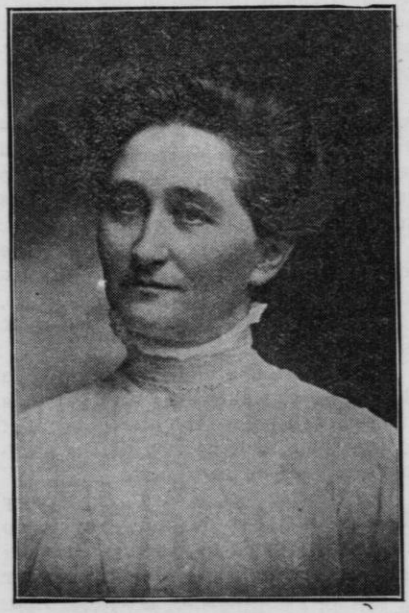
Stenographic Report by Miss Nellie E. Griffiths, Madison, Wis.

FIRST SESSION.

Tuesday Afternoon, March 15, 1910.

THE PREPARATION AND SERVING OF CHICKEN.

Miss Nellie Maxwell, Neenah, Wis.



Miss Maxwell.

The Carving Set.

One of the first things to look after when we are getting ready to carve is to secure a good carving knife and fork, one with a guard which will protect the finger, and have a good keen edge on the blade. There is nothing so exasperating to a carver as to be presented with a carving knife that is as "dull as a hoe" and be expected to exhibit his skill by using a dull blade.

The best carvers, that is those who have had the most practice, like to leave the fork in the bird and never remove it from the time they start the carving.

Hold the fork with the finger next to the guard, first cutting off the leg at the second joint and, carefully finding the joint, remove the leg. A woman has a much greater advantage in learning to carve than a man, because she has the fowl to cut up for stewing, etc., and she learns where the joints are. A man does not have that privilege so often.

When you are roasting a fowl, never let the wings come over on the breast. I do not want to criticize the roasting of this chicken, because it is done very nicely, but when preparing a fowl for roasting if you tuck the wings under the back it makes a much better appearance.

The tips of the wings are sometimes taken off. They are parts of the bird you cannot eat any way and they go very nicely in with the giblets or with the soup stock; nothing should be wasted.

Cut the wing at the joint and remove that. Then the second joint is removed from the leg and then the breast meat. "The wing of the walker and the leg of the flier are considered choice tid-bits," because the wing of the walker is very much like the meat of the breast and the leg of the flier, not being exercised, is tender.

The tip of the carving knife should be as keen as any part of the blade, because that is the part which is used to cut the joints of the bird. Sometimes the tendons about the joint are very tough and it is hard to cut through them.

After cutting off the wing and leg, slice down the breast in very thin slices, so each may have a portion of the white meat, which is considered one of the delicacies. When you are choosing a chicken get one with a good full breast, so it will have a good deal of white meat on it.

In carving you may stand if you like, it is just a matter of training which one prefers to do, stand or sit. In standing you have a little better advantage, because you can get hold of the bird a little more firmly and have better use of the arms.

Carving is an accomplishment which every young person should learn. It may be taught in the home, the head of the house might give up the place of honor occasionally to the boy or girl and let them practice. Any one may have to carve sometimes and it certainly is an accomplishment for a man or woman.

Have your platter large enough to spread out the pieces in a nice, attractive way, that it may not be overcrowded and so hinder the carving.

A great many people like to carve the fowl with the head from them, others with the head at the left. It is just a matter of how you have been taught; either way is good.

When a guest at a dinner party and your host is carving, do not stare at him, because it may embarrass him greatly. You came to dine, not to a lesson in carving. The duty of the hostess at that time is to make herself very agreeable in order to divert the attention.

Now we will remove the wish bone, which lies just at the point of the breast, then these little pieces of breast meat. We are going to use these pieces of breast meat for a salad. Right at the end of the back are some very choice pieces, which are called oysters. These are delicate morsels liked by many people.

In serving chicken the carver always asks the preference, but we as guests must learn to be unselfish and remember that there are only two second joints, two legs, two wings and a limited quantity of breast meat.

We cut the second joint from the leg, separating those, always disposing the meat with the brown side up, so it will look attractive when it is being served.

When there is stuffing, as there is in this case, the skewers and strings are removed before the bird is brought to the table. A portion of the stuffing is placed on each plate.

The carving of a bird is a very simple thing, but the only way to do it easily is simply to practice. One can get very little from seeing another person carve unless he practices himself.

Question—Would you advise to tie back or skewer back the wings?

Miss Maxwell—If you just simply fold them back and turn the tip under they will stay perfectly well.

I want to show you how to plump out the neck of the fowl when it is ready for roasting. In the first place, never cut open the neck where the crop is, because it thus disfigures the prettiest part of the bird. Leave that closed and remove the crop through the back of the neck. If the crop is empty, as it should be, slit down the back of the neck, removing the crop with your fingers, then you have the plump part of the neck to stuff.

Fold the wings back, push up the legs and then skewer them, or just simply push them up and tie them. I think the tying is better, because the juices are apt to ooze out through the punctures if you skewer the fowl.

This carving set is just the usual size, but for a woman it is a little large. Be sure that you have a good guard, especially if you are carving a roast, your knife is apt to slip and that is the only protection from severe cuts. What we call a game set is a nice size for a woman to handle, because it has small handles.

Remove all of the white meat in just as large pieces as possible, then serve a little of the white and dark meat to each person. The leg can be cut down and served for two helpings, or three pieces if it is a large bird. The wing is also a very delicate serving, though of course there is not very much meat on it.

Question—Would you place any gravy on the platter?

Miss Maxwell—No, I should not; it is apt to spatter.

Question—In carving a roast, how do you carve it?

Miss Maxwell—Across the grain. It depends on the roast. A rolled roast is carved parallel with the platter and lies round side up.

Here we have a fresh fowl. This is what I wanted to show you about the wings. Fold them and lap them over on the back like this. That gives a surface to support the fowl when it is cooking and they do not get the crispness they would on top of the breast.

Never cut a fowl here in the front of the neck. Cut it open on the back of the neck right here and cut off the neck, using a cleaver. Every housewife should have a cleaver. Cut off the neck so the skin may be brought up and lapped down over the back. If that had been left unopened, I could have lapped this down and skewered it next to the wings, just using a tooth-pick through the skin. Then you have a plump breast to fill here. You can fill that just as you would an opening here; fill it through the neck.

Question—If you cut the wings, how do you fasten them then?

Miss Maxwell—They may be tied back.

Question—Don't you think it is quite easy to draw a string around the wings and the skin of the neck at the same time?

Miss Maxwell—Yes; just draw a string underneath the tips of the wings. In that case you would have to leave the tips on.

A great many people like to know how to take out the tendons in a chicken. I had the feet left on for that purpose, and for one other. You can judge of the age and the quality of a chicken by its feet. If they are soft, pliable and smooth, it is a reasonably young chicken. These spurs here grow right out straight on an old chicken or a fowl and as the fowl grows older they lengthen.

Another thing is to test the end of the breast bone the farthest from the head. If it is pliable it is fairly young. This bird has never seen more than one spring, but this will probably be his second.

The pin feathers are another thing to notice You do not want a bird that is full of pin feathers. The skin must be firm. We, in this country, call for a yellow fowl. We like the yellow color. The flavor of the bird, of course, depends upon how it has been fattened, but we do not put a great deal of stress upon the flavor here, it is more on the growth and maturity. We want to get a good fowl for our money, of course, and we want to look for the one that has a good round, full breast, for that is where the choice meat is, and we are anxious to get as much of that as possible.

In removing the tendons from the legs, we cut just through the skin on the joint. If you cut too deep it is apt to cut the tendon. Then run a steel skewer up under the tendon until you get hold of it. Do not take more than one at a time; you can draw one at a time easily This is not necessary in a chicken, it is just a process that is always done when you are studying chicken, but it is a very nice thing to do with a turkey, because there is so much meat on a turkey's leg and it makes the meat more desirable, removing all of those thick tendons. Sometimes the tendons are stronger than I am. They make a very much more tender piece of meat when they are removed. You see by pulling that tendon it shows which part of the muscles of the feet are fastened to that tendon. A round instrument is much better for drawing these out than a fork, because it holds without breaking them. There are nine of these little tendons, counting all of the small ones, in each chicken leg. That is the part in the meat, of course, which makes it tough.

Question—Do you mean nine of the tendons, in each leg, or nine in the whole chicken?

Miss Maxwell—Yes, nine in each leg, I think. I have not looked it up in so long I do not want you to take that as reliable.

I am not going to take out any more, but I will leave that here for any one who wants to practice on it.

In cutting up a chicken, just cut through the skin, do not cut through the flesh, then you can see where the muscles lie and separate them and the joints.

Question—When do you wash a chicken, before you cut it or after?

Miss Maxwell—Before it is cut up. A chicken should be scrubbed with a little vegetable brush and soda water. After the feathers are removed there is always dust and things we do not care to have in our food and just simply washing it in cold water does not seem to get it clean enough. It should be plucked dry and preferably after it is plucked it should be washed. If you scald it to remove the feathers use care or it will cook the flesh. Most of us prepare fowls that way, but it does not give us as nice and clean a looking bird.

Singe it quickly after the feathers are removed, then give it a good scrubbing with a brush and soda water, a teaspoonful of soda to a quart of water, then wipe it dry and it will be much more appetizing, I am sure.

The feet are cut off and you know there is nutriment in chicken's feet. If you are serving a half a dozen chickens, they make a very nice soup, or if you want to serve chicken in aspic there is a large amount of gelatine in the feet, and by putting them in boiling water and skinning them, half a dozen feet will make a dish of soup which has a large proportion of gelatine.

Question—Did you ever try using the tips of the wings and stewing them together with pearl barley?

Miss Maxwell—No, but I should think it would be very good, especially for an invalid.

Question—Yes, using the barley for a sort of thickening and it is very nourishing.

Miss Maxwell—This is just a house-

keepers' conference; we are glad to hear of others' experience.

Question—A lady here says to remove the feathers in steam; it softens the skin so they may be removed without breaking it, which scalding will always do. Sometimes we can scald a chicken without having the skin broken, but we are apt to leave it in too long.

Miss Maxwell—The oil bag must be removed, of course. It is just at the end of the backbone, and when you are removing the internal organs be careful that you take the gall bladder from the liver where it is fastened. If you have ever had anybody serve you a chicken that had the gall bladder left in, you will know why.

When removing the internal organs just put your fingers in a little bit of salt, that keeps the fingers from slipping.

You see the liver and heart are fastened together and there is the little gall bladder right in the center. That is full of a green liquid extremely bitter, "as bitter as gall." That must be carefully cut out.

The gizzard must be opened and the contents removed. The gizzard has been taken from this one, we are using it for giblet sauce.

The lungs should be removed; those are the little porous particles that lie right under the breast bone on the back.

The fowl has no kidneys. What corresponds to them lies near the back bone. It is a very soft tissue and has no fibre in it at all; it is very much like the liver and should be removed.

After a chicken has been cut open, it can be cut right down through the back, the back bone broken and cut off, and of course these pieces must be quickly washed.

The neck may be cut off and the breast left intact, or it may be cut in fillets. There are two sets of muscles, one on each side. By removing the second you can see just how they lie.

The skin of the fowl should always be left unbroken whenever possible, because a great many people like that part of the fowl and it is a very choice morsel to many.

Now, in cutting a fillet from the breast, just cut down towards the breast bone closely and run the finger under the muscle until you find how far it runs out, cutting it. This is a very choice morsel that can be served broiled for an invalid. It is the choicest of the breast meat.

Question—Does that lay right next to the bone?

Miss Maxwell—No, this is on the outside; the one next to the bone is small. This is the second one. There are two on each side.

This is the way to cut up a fowl for stew or for fricassee. The neck can be cut. you see the neck being cut across the front does not make any difference for a dish of this sort, although it makes a cut in the breast which is not desirable.

There are some chefs who are considered very fine, who serve meat by using a cleaver. That is in hotels where they serve it in large quantities, just cutting it right down through the fowl, giving a small portion of the white and dark meat to each person, and they think in that way they get a better division of the fowl.

Remove the wishbone here. That lies right at the neck.

On this side is where the fillets have been removed.

Question—Do you remove them for stew?

Miss Maxwell—No, but if you want a very delicate piece of chicken to serve for an invalid, broiled, for instance, they are a very delicate morsel.

Question—Supposing you were leaving the meat on, how do you divide the breast for a fricassee?

Miss Maxwell—You can divide it more easily after cooking.

The second joint is considered a very choice piece of meat also; many people prefer that to the white meat. You see what a large, delicious piece of meat the second joint is; it makes a very good serving; it is also called the thigh.

We have the soup to prepare this afternoon.

Chicken Soup.

Recipe.

Cover the bones of a stewed or roasted fowl with cold water, bring to the boiling point and simmer several hours. The last half hour add a slice of onion and two stalks of celery (the coarser leaves are just as good) and cook until tender, then strain the broth from the bones. Bind with two tablespoons each of chicken fat and flour cooked together, then add to a quart of the broth a cup of rich cream. Beat two eggs until light, add salt and cayenne pepper to taste and pour the hot soup very slowly over the eggs. Garnish with minced parsley.

If you have fat from chicken, it is always a good deal better to use it than the butter for a soup of this kind. I am going to make a little sauce, using two tablespoons of butter, level measurement. When you get a cake of butter from the store, like this, just divide it into halves and there you have two cups, divide it again and you have half a cup. In that way you can take your measurement, any you want for a cake, it will save dishes and save time. That is what we are anxious to do, save as much time as possible.

We will put some butter in a sauce pan. Now, if you are doing this at home and cannot watch it, always use a double boiler, because butter browns very quickly and browned butter is not easily digested. Two tablespoons of flour and two of butter. Flour should always be sifted before being measured, because you are apt to get too much thickening if you are careless about not sifting. It is lighter after sifting and makes less, so in all these recipes it means sift before measuring.

Let the butter melt, then stir in the flour and let it cook. This is what we call a binding for soup. It keeps soup from separating. A binding is a dressmaker's term and is to keep two parts of a garment together, and so a binding in a soup keeps the parts from separating.

We will let the butter and flour cook until they are smooth and then cook it for five minutes after the milk is added to be sure the starch grains are thoroughly cooked; to be digestible the starch grains must be thoroughly cooked. Starch is one of our foods which must be cooked in boiling water, at the boiling temperature. The meats we are cooking in the cook-box are not cooked at the boiling temperature. Meats, eggs and milk need to be cooked at a low temperature to make them tender and digestible. We are going to hear about the cook-box on Thursday, so I am not going to talk about it much today.

Many people have the idea that soup meats are not good after the extractives and flavors have been taken out. Soup meat is nourishing; it has lost some of the extractives, and if we add seasonings like onion or tomato, we have a very wholesome dish. It is highly extravagant and wasteful to throw away meat that has been used for soup.

The pieces of bone from a roast chicken that has been carved may be used for soup stock and we are going to have this afternoon a stewed chicken in milk.

The chicken has been cut up just

as it was cut up before you in small pieces and parboiled for a short time; we parboiled it because we were afraid we did not have time to cook it as long as we would like in the milk, then pour on the boiling milk and put into the fireless cooker, letting it stand for six or eight hours, and if the chicken is not too tough it will be cooked in that length of time. You can take it out, make a sauce or gravy with the milk, serving that with the chicken, seasoning it as you wish when you re-heat it. We are now going to put that in the cook-box, just in milk, and the seasonings.

Question—When you use a chicken for fricassee, what do you do with the liver?

Miss Maxwell—I use it for a breakfast dish. I do not like the flavor with the other parts of a chicken, although there are many who do use it. The liver and gizzard chopped very fine after they were stewed until tender, then put through the meat chopper, we are going to serve today on toast, which makes a very nice way of serving giblets for a breakfast dish.

Question—Do you use them fried with the chicken?

Miss Maxwell—Yes, they are very nice. They are very good seasoned with any kind of good fat, bacon fat is well liked by most of us. Some people do not like the smoky flavor with the chicken. There are a great many nice ways to serve giblets. Croquettes may be made of them. Chicken left-overs are quite a point to most of us; one can make a very choice chicken salad from left-over chicken. If we have a very little we can add a little veal, it gives bulk and is very much more economical. It used to be so, but perhaps veal is getting as high as pork and cannot be used with any degree of economy.

Chicken loaf is very good. Get gelatin from the feet by long cooking and use the liquor with some chopped chicken and cold cooked eggs. It will make a beautiful jelly which may be sliced and used as a salad.

Chicken left-overs may be used by taking cold boiled rice to line a baking dish, fill in the center with chicken, then cover with a layer of rice about an inch thick, put it in the oven in a pan of water and bake three-fourths of an hour slowly, or steam it, and you have a loaf that can be turned out.

Chicken croquettes are another nice dish to be made with chicken left-overs. Mix with white sauce, roll in bread crumbs and fry in deep fat, and that with a tomato sauce would make the main dish for a meal.

We are apt to think that chicken is an extravagance, but when you have a roast chicken for Sunday dinner and you have some left-overs for a made dish for breakfast and a simple salad for another meal, and soup from the the bones, you find that chicken is not so extravagant. There is quite a little waste, of course, in chicken, but there is not as much waste, weight for weight, as there is in many of our cuts of beef.

The fat of chicken makes a very nice fat for frying. You can use it in place of butter; when butter is as high as it is this winter we are glad to have some substitutes for it without using oleo.

Then we can use chicken with macaroni. Put it in a baking dish, then a layer of minced chicken with a highly seasoned sauce poured over, then finish with buttered crumbs on top. It makes a very delicious dish for supper.

Chicken sandwiches are always nice. Minced and seasoned with a little mayonnaise and a bit of lettuce makes very dainty sandwiches.

Then we can always have hash, a mixture of meat and potatoes. There are any number of ways of serving chicken, which I won't weary you by

repeating. There is fried chicken and boiled chicken and devilled chicken. This is made with a sauce of cheese, mustard, paprika and a few drops of Tabasco and Worcestershire sauce, making a sauce with flour and butter and serving it on toast. That is called devilled chicken. Then there is chicken pie, which we are going to have this afternoon; chicken curry, which is made with curry sauce, that highly seasoned powder which many people like. There are numbers of ways of serving chicken.

Our soup, which we now have on the stove cooking, is just a few chicken bones and the tips of the wings of some of the chickens, two or three small pieces of celery and a slice of onion, all cooked until the broth is rich with the flavor. Then it is strained and a white sauce made of cream and some chicken fat may be used if you have that, if not, you may use butter, making a white sauce, which is used to make a binding or thickening for the soup.

We may garnish the soup with chopped olives, chopped parsley, or just a little green lettuce shredded, any thing of that sort that will give a touch of color to it.

Whipped cream may be added at the last and stirred in and the yolks of two whole eggs may be beaten and added at the last. They add richness to the soup and make a very nourishing one.

Question—You spoke a moment ago about paprika. I think some of the people do not know what it is.

Miss Maxwell—It is a mild red pepper, the sweet red pepper of our gardens, but a milder form than cayenne, which is very wholesome, less irritating to the stomach than the ordinary white or black pepper. Black pepper should be excluded from our diet, it is very irritating to the stomach. White pepper is less so. The paprika can be used more freely. I think many use too many condiments in food; we like highly seasoned foods too well, and if we get into the habit of eating highly seasoned food we lose that delicate sense of taste which is such an enjoyable attribute to appetite. We ought to keep it, to know the fine flavors, to be able to distinguish them. If we dull that quality by over-stimulation, we are going to lose it. In fact, I have heard people say that those who become habitual drunkards have often been started on the road by highly seasoned foods on their mothers' tables. Now, we do not want to have that to remember, that we have started any one in that direction.

Giblets on Toast.

Recipe.

Simmer the giblets in boiling water to cover until tender. Chop fine, cook a slice of onion in two tablespoons of butter until yellow in color, remove the onion and add two tablespoons of flour, stir until smooth and bubbling, then add a cup of rich milk, cook until thick. Serve on buttered toast.

We are going to put the minced giblets through the meat chopper, add a little soup stock and rich milk, thicken it with flour and serve it on toast. There is a small onion fried in a little fat to flavor the giblets.

The soup stock will be strained and while we are waiting for those things to be prepared I will mix the salad.

Chicken Salad.

Re ipe.

Cut cold boiled fowl or remnants of roast chicken in one-half inch cubes and marinate with French dressing. Add an equal quantity of celery, cut in small pieces, chilled in ice water and dried in a towel. To a cup each of

chicken and celery, use a half cup of Mayonnaise dressing. One green pepper cut very fine and half a cup of blanched and shredded almonds added to the chicken and celery makes a very delicious salad.

Mayonnaise Dressing.

Recipe.

Mix one-half teaspoon each of salt and powdered sugar, a dash of cayenne and one egg yolk. When well mixed add a quarter of a teaspoon of vinegar. Add three-fourths of a cup of olive oil, at first drop by drop, and stir constantly. As the mixture thickens thin with lemon juice and vinegar until a tablespoon of each has been added. Add the oil and acid alternately until all is used. To be successful in making this dressing, all the ingredients should be cold.

This salad is a combination of chicken and celery cut in small pieces and a little green pepper cut very fine, giving it just a touch of pepper for flavor.

Cut, not chop, the chicken. The white meat makes a more dainty salad, of course, but the dark meat must be used, as there is not enough of the white. Use equal quantities of chicken and celery, or more chicken than celery may be used if you like that proportion, and I am going to add a cup of almonds which have been blanched and shredded. They add to the nutritive value of the dish and also to the flavor.

It is not necessary to serve the salad in any special form, but one nice way is to shape it in an ice cream dipper, put that amount on a lettuce leaf, or if you can get head lettuce it is much prettier to use that formed in a little cup, and the salad may be molded in a cup.

The salad dressing, a Mayonnaise, was made this morning in this mixer.

Question—Will that dropper work on your Dover egg beater?

Miss Maxwell—I think not. You can use this for an egg beater, or you can use it for cream, or for Mayonnaise dressing, anything you would use an egg beater for.

Question—I find you can buy those that just fasten to the Dover egg beater.

Miss Maxwell—I have not seen them. I should think it might be a great convenience.

Question—Yes, I do not know who gets out those others, but they are very satisfactory.

Miss Maxwell—I always like to marinate the chicken salad with a little French dressing just before the Mayonnaise is added, but I am going to prepare this at once so we may serve it.

I am going to add a little green pepper. I have added some red pepper to the dressing and I hope I won't get too much to spoil it for you.

Question—Do you always use a knife to stir it with?

Miss Maxwell—No, I like to use two forks for a fruit salad, or anything of that kind. This spatula seemed to be the only thing I had in reach. Any kind of salad can be mixed better with two forks than with a spoon.

Question—When do you add the seasonings to the dressing?

Miss Maxwell—I add the seasonings and the yolks of the eggs as I begin to make it.

A fruit salad is often spoiled in the mixing, especially if you have grape fruit or oranges, or any such juicy fruit to be mixed. Always leave those out until the last, or do not make such a salad until ready for use. I once made a grape fruit salad that was ruined by the mixing; after standing for a short time it was mushy from the weight of the other ingredients.

You can always add cream to your

salad dressing; it tones the flavor and makes it go farther.

Ruskin says to be a good cook means "Much tasting and no wasting," and every cook should be a good taster. Dishes that have been well prepared and carefully put together may be spoiled in the seasoning, without having any seasoning, or too much. Cayenne is a pepper one has to use very carefully not to get too much.

I always save a little of the Mayonnaise to decorate the top of the salad; it looks nice and a little touch of green in the green pepper, if some of that is left to garnish the top, gives a pleasing effect. One thing we have to be very careful about in garnishing and that is not to use too many colors. We must avoid the over-decorated dish, we do not want that; we want to have it dainty and attractive in its appearance.

Question—What is the cost of the mold you are using?

Miss Maxwell—I do not know. One of the ladies says this one is $1.50. They are used for dishing ice cream. The salad must be packed very firmly and tightly in the dipper to make a good shape, otherwise it might just as well be dropped on the lettuce with a tablespoon.

Mayonnaise dressing, of course, is very wholesome dressing. I think we should use it more than we do and the French dressing too. It is easier digested than the heavy, cooked, mustard dressings.

I am just going to arrange two or three of these salads and garnish them with little pieces of fringed celery, which is prepared by cutting in one and a half inch lengths and fringing nearly to the center, beginning at both ends, and allowed to stand in a little water with vinegar or lemon juice in it, which will cause it to curl. This would not be an individual serving, but I am putting it on to show the manner of decorating, and then add the very thinly sliced radishes. That bit of color adds greatly to the attractiveness of the salad. Radishes are very nice this way served with cucumbers. Just a few radishes will go a good ways in garnishing. We really have nothing in flowers that have more beautiful coloring than we have in vegetables. The beautiful white and the red and green make a very pleasing combination.

For the chicken pie we are going to use some remnants of the chicken, a broth made with the water in which the chicken has been cooked and a little cream and thickening, making a sauce, then always adding a little seasoning, like onion or bay leaf.

Question—How do you keep cream of tomato soup from curdling?

Miss Maxwell—In making tomato soup we must be careful to have our tomatoes well seasoned and if they are too acid to sweeten them by adding a small portion of soda, and then, instead of stirring the milk into the tomato, just have the hot milk and the binding in the tureen and pour the tomato on that, and you will never have curdled soup.

Chicken Pie.

Recipe.

Cut up two fowls and simmer until tender with a slice of onion, a sprig of parsley and a piece of bay leaf the size of a dime, cover with boiling water and when boiling hot put into the cook-box to simmer, or on the back part of the stove. When nearly done season with salt and white pepper, reheat and return to the cooker to finish. Place the chicken with only the large bones removed in a baking dish, strain the broth, which should be about a pint, pour over the

chicken. Thicken the stock with a third of a cup of flour diluted with milk to pour easily, then add a pint of thin cream. Cover when boiling hot with baking powder biscuits.

Baking Powder Biscuit.

Recipe.

Mix and sift three times two cups of flour, a teaspoon of salt and two teaspoons of baking powder. Cut in with a spatula two tablespoonfuls each of butter and lard, gradually add the milk, mixing it as soft as can be handled. It is impossible to determine tne exact amount of liquid, owing to differences in flour.

I will now prepare the chicken pie. I use part butter and part lard for the ı ixture. I am going to bake the chicken pie in this dish; have chicken with the gravy in the bowl and put the biscuit on the top.

The baking powder should be mixed well with the flour and sifted several times in order to be well blended. Shakespeare was a great epicure; and he said a great many wise things about cooking. "Dine well and early and the cares of life will slip from you, its cares and vexations will slip into nothingness." "With dainty chicken serve sun-dried fruit."

Lettuce, of course, is a vegetable which has a very soothing quality, good for the nerves. Shakespeare said, "Did I eat any lettuce to supper last night that I am so sleepy?" Of the water cress, which is a very wholesome salad dish, he said, "A cheap but wholesome salad from the brook."

I am going to use two level teaspoons of baking powder, two cups of flour well sifted, the flour sifted first before measuring, to be sure we have it light, then take two cups of flour and two teaspoons of baking powder, and if you use all butter you would not want to use very much salt, but as we are using part butter and part lard, we will use at least half a teaspoon of salt for this amount.

I like to sift the flour and baking powder on a paper, because I can handle it much quicker that way and we get it quickly blended. This will take a pint of flour, adding the baking powder.

Always do with the baking powder as you do with the flour, lighten it up a bit with the spoon before you take the measurements, or you get too heavy a measure.

Sift them several times. That is the secret of making any flour mixture—see that it is well sifted.

Then we will rub the fat into the mixture. The salt may be sifted with the baking powder.

In measuring always measure level; then you will have uniform measurements. There is such a difference in the way cooks measures; some say a teaspoonful means a heaped up spoon, which is about three level spoonfuls; to others a teaspoonful means a rounding measure, which is about two level spoonfuls, but for all the measurements in our book you will find the level measure, leveled off with a knife, is the measurement. The measuring cup we use holds just one-half a pint.

I am going to use four tablespoons of shortening, two tablespoons of lard and two of butter, and cut it in with a spatula.

Then we moisten it with just enough milk to be able to pat it out and cut the biscuit.

You cannot always tell the amount of milk you need to add to a mixture like this, because flours differ in the amount of moisture they absorb; some flours take more than others.

I find the shortening can be cut into the flour as quickly with a spatula as

by rubbing it in with the hands, and the fat is not thus warmed by handling.

In making a baking powder biscuit dough, I like to add just a little milk at a time to part of the flour, continuing until all is moistened. In this way the mixture is not made tough by too much handling.

It is not necessary to have a molding board to mix biscuit, you can turn them out on a well-floured piece of manilla paper. That is a good point for you boys and girls to remember when you are camping.

We cut out the dough in rather small biscuit and place them on top of the meat.

Question—You do not use a rolling pin for biscuit?

Miss Maxwell—If you have one you may use it; if you haven't you can get along very nicely without it, also if you haven't a biscuit cutter, you can use the top of your baking powder can, as I am doing.

Cut the dough as soft as possible, they are much nicer when they are baked.

The chicken must be boiling hot when the biscuit are put on, otherwise they will be soggy on the bottom.

I always like to add a small slice of onion to the chicken pie, it adds flavor to it. Some people like bay leaf. One bay leaf will do a great deal of seasoning, too much is rather too strong a flavor.

Question—Then you mean a small bay leaf?

Miss Maxwell—Yes, or a small piece of a leaf. I think a half a bay leaf would be all I would use for an ordinary chicken pie and then remove it after it was cooked for awhile in the stew before you add the biscuit.

I am now going to add the biscuit to the pie and put them in a very hot oven and as they are very small they will bake in a short time.

Question—Do you put anything on top of the biscuit; you do not brush them with milk?

Miss Maxwell—No, I have not. Brushing them with milk would perhaps give them a nice brown glaze, so does the white of an egg.

Now in this chicken pie, of course, the gravy is the broth of the chicken in which the chicken has been cooked, with cream and a little thickening of flour, and some of the bones will be left in the meat so the biscuit will not entirely sink in the mixture. I like the biscuit on top of the chicken pie better than a crust, because the spaces between the biscuits offer an opportunity for the gases to escape. You know we are so apt to have chicken pie that is not palatable, for we are not careful about cooking it properly. Chicken pie that is covered with a close pie crust, through which the gases of the chicken cannot escape, is not wholesome.

Question—Would it have been all right if you had made the biscuits about half an hour before you wanted to bake them? Would they have been all right then?

Miss Maxwell—I never tried it, but have heard of its being successfully done.

Question—Could you do that way with a rich cake—let it stand awhile before baking?

Miss Maxwell—Yes, but never leave it in the mixing bowl, because when you turn it out you lose some lightness that has been developed by the baking powder. Let it stand in the pan in which it is to bake.

If your giblet sauce has stood until it has thickened, you may add a little cream. Remove the onion that you have used to season it. Be sure that this is seasoned with salt and pep-

per, a very little salt is sufficient for this small amount.

We will prepare the toast. Dip it in boiling water for an instant to soften it; butter it and pour on the minced giblet. This makes a very nice breakfast dish. It may be garnished with just a sprig of parsley. Never garnish a dish too lavishly; a touch of green makes an attractive dish, but too much spoils the effect.

When we have served the chicken pie, I think that will finish the demonstration for the afternoon.

The chicken as it has been cut will lay out here on the table where you can examine it, if you care to, the different cuts, the two fillets, where they lie, etc.

Question—I do not quite understand, Miss Maxwell, about the giblets. Did you stew them first?

Miss Maxwell—Yes, the giblets were stewed in water until they were tender; they were stewed at a very low temperature, then put through the meat chopper and seasoned. The onion may be fried in a little bit of fat, or you may just put in a little onion and remove it. It makes a difference in the flavor whether you brown the onion or cook it in the milk. Browned onion gives a different flavor. If you just want a delicate flavor, draw an onion across a grater so you will get a drop or two of the juice, so if your husband does not like the flavor of onion, you will have the satisfaction of knowing it is in and he will never discover it.

There is a mistake made in the way children are trained in early youth about eating things. As a rule they do not care very much about vegetables and so must be taught early to like them, for there are none that are not wholesome. The more kinds we like, the greater variety we have in our food. We all know people we have entertained who "do not eat cabbage and can't eat onions," they do not like stewed meat and never eat this and the other. It is a problem to know what to serve them.

Sup. McKerrow—Quite often the young ladies are to blame for young men not eating onions.

Miss Maxwell—We do not like things second-hand. The reason the onion odor is so bad on the breath is because the volatile oil in the onion passes into the blood and that odor is expelled from the lungs and goes out on the breath. It is, of course, the one unpleasant thing from eating the vegetable; but it is such a wholesome article of food we should overlook that little failing and remember that to "eat onions in May no doctor you'll pay." Onions are valuable as medicine, they are quite soothing to tired nerves. I think we do not use enough of them. We should eat them at least once a week. Garlic, a first cousin to the onion, is a vegetable that is not mentioned in good society, because of its strong and characteristic odor it has been abused, but it is a very pleasant flavor if it is used carefully. The French are very fond of it, there is scarcely a dish that has not a touch of garlic, but only a touch, as the wholesale use of it is what has brought it into disrepute. The French have that wonderful quality of combining flavors in such a manner that one cannot be distinguished above another.

Question—You say to eat onions once a week. Do you mean boiled or raw?

Miss Maxwell—Any way that they are the most digestible. Some people cannot eat strawberries and others cannot digest raw onions, but onions that are cooked in milk agree with most people. The trouble with most of these vegetables is, we serve

them in the same old way and our families soon get tired of them; make a change so they will wonder what is in the dish. In the serving of onions, we are so apt to serve them stewed and served with butter or cream, when there are so many nice ways of serving them.

Onions with Cheese.

Recipe.

Parboil half a dozen uniform sized onions. Put the onions in layers in a buttered dish with a good white sauce and a sprinkling of cheese. A half cup of cheese is sufficient. Place in the oven and bake until the onions are tender.

Stuffed Onions Baked.

Recipe.

Parboil a half dozen medium sized onions until tender, remove the centers and fill with any seasoned meat, sausage is especially good. Put in a baking dish and bake, basting occasionally with butter and water. Spanish onions are very nice served this way.

I do not think we take pains enough to study the right combinations of foods. Most housekeeper's are so busy they let the meals take only a minor place when they are the most important of the household work. Menus should be well thought out. Some time when you are having a little spare time, just plan out the meals for a week, and it will be a wonderful help in using up the leftovers to plan the meals for several days in advance, and then you get out of the rut of serving boiled potatoes six times a week. For instance, on Monday have French fried potatoes, on Tuesday baked potatoes, on Wednesday boiled, and so on. Serve rice some day in the place of potatoes. Rice is always very reasonable in price and it takes a very little to make a dish.

The chicken pie is done and should be served as soon as it is baked, allowing it to stand does not add to the quality of the biscuit.

Question—What kind of a knife sharpener is that which you use?

Miss Maxwell—It is two little steel wheels. You run the knife between the two wheels and they do the work.

SECOND SESSION.

Wednesday Afternoon, March 16, 1910.

SIMPLE DESSERTS.

Miss Edith L. Clift, Chicago, Ill.

Miss Clift.

Yesterday we were very much interested watching Miss Maxwell prepare the early part of the dinner and today we will consider the latter part of a meal. Every one enjoys a good meal, well balanced, and very often the dessert makes or mars the whole dinner, for it is, as a rule (at least at an informal dinner), the last thing served, and the taste is apt to linger, so we should always try to have something quite suitable for the occasion. We have probably all heard of the old lady who liked to serve lemon pie whenever she had company because she said it was "so dressy looking." Many of us are somewhat similar, that is we think of something that looks pretty, or else something that is particularly good, without stopping to consider as to whether or not that is just the right kind of dessert to serve with that particular dinner. Many of our very nicest desserts are the simple things and we hope to prove to you today that some of the simple, inexpensive things, easily put together, are just as pretty and taste as well as the much more troublesome ones. Today we will prepare and serve Farmers' pudding with apple sauce, Chocolate blanc mange with whipped cream, Short cake with banana filling, Caramel custard, Sweet omelet, Rice and prunes in cook-box.

We will prepare the farmers' pudding first, as it will take the longest time to cook. Always be sure and steam everything the required length of time, as steamed things are particularly objectionable if not thoroughly cooked.

Farmers' Pudding.

Recipe.

One pint milk, one-half cup corn meal, one-half cup currants or rai-

sins, two teaspoons baking powder, one-half cup chopped suet, one-half teaspoon salt, one teaspoon ground ginger and one-fourth cup flour.

Heat milk, when hot stir in corn meal and cook until smooth and creamy. When cool, not cold, add currants, salt, ginger, suet, flour and baking powder sifted together; turn into a greased mold and steam three hours. Serve hot.

The milk has been heated, so we will stir in the corn meal. Be sure not to cook it too long or it will thicken too much. We will now place this aside until it cools. It does not need to be cold, just cool, before we put in the rest of the seasonings. We have here the ginger, raisins, soda, salt, baking powder and suet. Sift the baking powder and ginger with the flour and salt. We always like to mix these things together whenever possible. It is such an easy way to put them through the sifter at one time and then we know everything is thoroughly mixed. This recipe calls for one-fourth cup of flour. We have taken a half a cup of corn meal. Sometimes it is easier to use a spoon when we are measuring small quantities. A level cupful is sixteen tablespoons. At school we are always taught to measure off our spoon, dividing it lengthwise for the half, and a little nearer the bowl of the spoon for a quarter. It saves time for the busy housewife to use a little salt spoon instead of dividing the teaspoon each time, so for the salt we fill the salt spoon once and are quite sure we have the correct amount. I will put the ginger through this fine mesh wire sifter first, because I find it is quite lumpy. It is a very good plan to have a fine strainer on hand, as most of the powders get lumpy when kept for any length of time.

We are using seeded raisins instead of currants for the pudding. The seeded raisins taste quite good. The Sultana raisins are good also. These were picked over to get rid of any stones and separated. They do not require any washing as the currants do. Currants should be washed freely and if we want to dry them in a hurry, we put them in cheese cloth and wring them quite dry. We always like to use fruits which have been dried, never those that are very wet.

Question—When do you put the chopped suet in the pudding?

Miss Clift—When mixing the dry ingredients. Always have your suet chopped fine and packed down tightly in the cup, never lightly filled. The one-half cup of suet we are using is equal to a quarter of a pound in weight.

We are using butter for greasing our mold today. It has been melted over hot water and now the salt has settled to the bottom. It is always well to do that, otherwise the salt will cause the mixture to stick almost as badly as if you had not greased the mold at all.

If you do not use a brush for greasing purposes, and it is not practical unless you get a very good one, it is much cheaper in the end to buy a thirty-five-cent rubber set brush, as you are sure with care it will last a long while. If you do not use a brush, always use unprinted paper. I have seen printed paper used for greasing purposes, but it is not a good thing to use. If you do not use the brush, be sure to take either unprinted paper or a clean piece of rag.

If we wish to boil the pudding, we would take a piece of clean white cloth, dip it in boiling water, then

dredge lightly with flour, this would prevent it becoming water-soaked, then tie the cloth on very tightly, gather up the four corners and knot them at the top, so there would be something to lift the pudding by.

This is a very nice steamer to use, we want the water to be quite half way up today, because the pudding will then cook more quickly. We will use a trivet to stand the pudding on. Never allow any steamed mixture to set on the bottom of the kettle. If we do not have a trivet, we may use some folded newspaper, or a few nails, anything to keep the dish from the bottom of the kettle. Sometimes it will scorch a little, especially if you allow it to boil dry, but if you have something in the bottom of the kettle it is a prevention. Be quite sure to add more boiling water as the water boils away.

This pudding is quickly prepared and I am quite sure will be always found most satisfactory, providing you leave it long enough to cook, but like all corn meal mixtures it should be cooked very thoroughly. We have no eggs and no butter in this mixture, so for that reason we do not think it could be considered expensive. The raisins are the most expensive things, but as we only use a half a cup of them they do not really cost very much.

For our apple sauce we allow one pint of water to a quart of apples, one-half cup of sugar and the yolk of one egg. Wash and quarter the apples, then add the water and cook them quite slowly. Press through the colander and add the sugar after the apples are cooked, as we do not then need so much sugar with the fruit. The reason we do not pare the apples is because there is so much waste unless we pare them very carefully, and in this way if you cook them very soft there is very little waste at all, and we find by leaving in the cores we get a better flavor with the sauce.

Never use tin dishes in connection with fruit; granite or aluminum are the best. Apple sauce is easily prepared if made according to this rule. Some apples are less sweet than others and so it is best to taste the sauce. Good cooks always taste sufficiently of their own cooking to know whether or not the dish is rightly sweetened or seasoned. We will put in the egg yolk when the sauce has cooled a little.

Question—Could this pudding sauce be used as a cake filling?

Miss Clift—Yes, if it was thick enough and the cake were to be used at once, but if it staid on the cake very long before using it would make it soggy.

Caramel Custard.

Recipe.

Two cups of milk, three eggs, one-fourth teaspoon salt, one-half cup sugar, one-half teaspoon vanilla. Melt the sugar in a pan to a light brown syrup, add gradually to the milk and stir until the sugar is melted. Add eggs slightly beaten, salt and flavoring. Turn into small pail, place pail in a larger one and pour in boiling water until it reaches within three inches of the top of the small pail. Bring to a boiling point and then place in the cook-box.

We are preparing this in the fireless cooker. I am going to talk about the cook-box tomorrow. It is very good for anything that can be cooked at a low temperature. Egg mixtures are very good cooked in the box.

We have here a half a cup of sugar and will melt that over the stove to reduce it to a caramel. The sugar will break down and become liquid. We have to stir it, otherwise it will burn very readily. This gives a good flavor to the custard and also makes a pretty color. This is an easy dessert and one which is so very acceptable that we think it is a very good thing to remember, especially when we have unexpected visitors. You can do without the caramel if you have not time for it. Other flavors can be used and will make a very delicious custard; vanilla, nutmeg, cinnamon bark put in the milk, any of these give a good flavor.

This afternoon we have warmed the milk. It is not hot, but is quite warm because we have to hasten the work. We can use the cold milk and cook the custard in the box in two hours, but when the milk is warm it can be cooked in one hour.

Question—Why do you break the egg in the cup first?

Miss Clift—The first egg I broke into the bowl. At this time of the year, we are not always sure the eggs are fresh, so we break them into the cup first; it is advisible to do this at any time, however.

When making custard or pumpkin pie, we do not beat the eggs light, but add the sugar and mix just enough to combine the two. You may have noticed little holes in the custards occasionally, or a deep hollow in a pie. The reason is the same; air has been beaten into the mixture, causing it to rise and then fall again.

If you wish to turn the custard out of the dish to serve it, it is best to grease the mold with butter before using.

If the custard is a plain one, just a few spoonfuls of some kind of bright canned fruit, such as cherries or strawberries, placed on the custard at serving time is an improvement. Custard is always the best when served quite cold.

We can make the caramel for the custard just as brown as we wish, but take care lest it should burn.

We can make the same kind of custard with two eggs, but we will not have such a fine, close-grained custard, it will be more like a jelly combination, but this will be quite firm.

Exactly the same result would be obtained by putting it on one side of the stove and cooking it there below the boiling point, or in a steamer for about forty-five minutes.

If you have no cover, put on a greased paper and that will keep out the moisture.

Question—Is it possible to over-cook a custard in the cook-box?

Miss Clift—Yes, if left there too long, but not quite as bad as if left cooking in the oven too long. When baking in the oven, stand the dish in a pan of water. If you do that, the custard gets brown on the top, giving it a very pretty color, and it will be found very satisfactory, unless the oven is too hot. A very good way to test the custard to see if it is done is to put the handle of the spoon in the center. If it comes out with no custard sticking to the spoon, it is done.

The water is now boiling around the custard, so we will put it directly in the cook-box.

Chocolate blanc mange is the next thing on our program.

Chocolate Blanc Mange.

Recipe.

One pint milk, three tablespoons corn starch, one-half cup sugar, two ounces chocolate, one teaspoon vanilla.

We have cut up the chocolate in small pieces so it will melt quickly, will place it in a cup and stand in a saucepan surrounded by hot water. It is easier than grating and answers the purpose just as well. It is the quickest and easiest ways we are looking for in our work.

Question—How do you get two ounces of chocolate?

Miss Clift—We are using Baker's chocolate, which comes marked off in one ounce squares. If you are using cocoa in place of the chocolate, then take a quarter of a cup and that will give you two ounces in just the same way. Generally speaking, two level tablespoonfuls is an ounce.

Save out a little cold milk and mix the corn starch to a paste with this, then add the hot milk and sugar. There is never any trouble with the corn starch lumping if you mix it correctly. Stir quickly when adding the hot milk. The result is the same with the cold milk, but it takes more time.

The reason many people do not like to consider corn starch desserts is because quite often too much of the corn starch is used, and then again it is not cooked sufficiently. Corn starch should be boiled for ten minutes and it will leave the sides of the pan when thoroughly cooked, and will be found to have a very different flavor to what we get when insufficiently cooked.

We will now add the chocolate and last of all the vanilla. Never put in the vanila until you are through with the cooking, as we lose so much of it by evaporation.

We do not dry out the mold after rinsing with cold water, just drain so there won't be any water left, that is all.

This mixture looks rather thin now, but we shall find it will be of a jelly-like consistency when cool. Today we will use whipped cream, slightly sweetened, with it, but plain cream or boiled custard sauce is very nice.

This rule can be varied a great deal; we could have a plain corn starch mold and use chocolate sauce with it, or it may be made richer by using the yolk of one or two eggs.

We will now prepare the short cake. For that we use baking powder biscuit crust. Some people like to make a very rich crust, but these are supposed to be simple, practical, economical desserts, so we are using the ordinary rule for biscuits. These are very good and can be made richer if you wish.

Flour differs so much that some need a little more milk than others. If you have not a very light hand, do not roll but pat out the dough; do not handle dough any more than is absolutely necessary. Biscuits are very often spoiled by a heavy rolling pin. The mixture should be handled quickly and lightly.

Sift together the flour, salt, and baking powder. We will not use any butter with this, because we want to prove to you that you can make good biscuit with lard alone. When biscuits are made with butter they brown much more readily, but we can always brush the biscuits over with milk and get a very good crust in that way.

For these biscuits we will take one cup sifted flour, one tablespoon lard, one-half teaspoon salt, one and one-half teaspoons baking powder, three-fourths of a cup of milk.

We like to have our lard rather firm for biscuit. Everything pertaining to biscuit or pastry should be very cold. Never use warm flour, for it will not give the same good result that cold flour will. You readily understand that with one tablespoon of lard we

get a very plain mixture, but it is something we can use every day. There are many things that can be used for filling which are very good. Prunes or apricots make a nice change. We can have short cake in the winter, if we use a little ingenuity.

You may find it easier to chop the shortening into the flour in this way. It is better than to use your hands in the flour; if they are at all warm they so often spoil the lightness of the mixture. Wash the hands thoroughly and then rinse them in cold water the very last thing, so you will be sure they are quite cold.

Question—What are you mixing that with?

Miss Clift—A small spatula. They cost twenty cents and we are quite sure every woman would have one if she only knew how useful they are. They seem almost a necessity after one becomes accustomed to them. They are so handy for the things we do each day. Those with the steel blades and wooden handles are more expensive, but this kind is just as acceptable for everyday use.

We have here a nice clean piece of paper to take the place of a paste board; it saves work and answers the purpose very nicely. Flour the paper, toss the biscuit lightly, do not knead the biscuit, it is unnecessary.

Question—How much milk do you use?

Miss Clift—The rule calls for three-fourths of a cup, but one-half a cup will just mix this amount of flour. The more shortening we have, the less liquid we will require for the mixture.

Drop biscuits are very good and quickly made. Mix very soft and drop from a spoon into gem pans. They are convenient when we want to hurry our work.

It is no trouble to make biscuits when you just know how. That is true of so many things. It does make a decided difference if we know the best and quickest way to go about our work. We need a hot oven for biscuit. With the blue flame oil stove, the oven should be heated about ten minutes before they are put in. We are going to brush them over lightly with milk. It will only take about a teaspoonful for this amount. If you have no brush, a piece of soft paper may be used.

Question—Does it injure baking powder biscuit to let them stand for a while?

Miss Clift—No, not if you put them in a cold place. They will be rather coarse grained, but equally as good, but always remember to put them in a cold place. Those biscuits should bake in about twelve minutes.

A Lady—I am afraid those biscuits won't go around.

Miss Clift—I hardly expect them to; we do not advise eating between meals.

This is the size cutter we like to use for our biscuits. I know some of the ladies will frown at the size of it. Sometimes we see biscuits as large as a good-sized plate, but they are too large. We find many people bake the biscuits closely together. It is better to place them apart, then they will have a nice crisp crust all around. Let us have our biscuits well cooked. The one thing that we have to complain about the most is that they are not cooked through the center. They are very bad for our digestion, and certainly are not appetizing.. Dip the cutter in the flour when cutting them out, then the mixture will never stick. This quantity will make twelve biscuits. They are very small, but they will go a long way. Don't you think I would do well in running a boarding-house? The last biscuit won't be quite such a good shape as the others, but we think it is better to just pinch the edges together and not roll it any more.

For the banana filling we will pre-

pare a syrup with three-fourths of a cup of sugar, one cup of water, and five tablespoons of lemon juice. Cut the bananas across, then lengthwise. Cut in uniform pieces and place in the prepared syrup for an hour or more. The lemon juice takes away the insipid taste and most people like this filling very much. Always use a silver knife when preparing any kind of fruit. Place on cake in usual way.

We are going to make an omelet this afternoon, because we find it is a dessert that interests almost every woman.

Omelet.

Recipe.

Separate three eggs, with the yolks, add two tablespoons cold water, three teaspoons of sugar and one-fourth of a teaspoon of salt. Beat the whites to a stiff froth, lightly mix in the yolks. Make a pan rather hot, grease lightly, pour in the mixture, cook three minutes on a hot stove, then place in a moderately hot oven and cook until just setting. Fold over and turn onto a hot platter. If your oven is not warm, turn the omelet carefully over and cook a few minutes on the other side. Minced ham or beef, with a tablespoon of chopped parsley is very nice, either stirred into the mixture or placed on top. Grated cheese is very nice sprinkled over the omelet just as you put it into the oven.

There are two or three things which are very essential in the making of a good omelet. Quite often if it is not a success, it is because the eggs are not beaten sufficiently. I am sure you will agree with me that they are not hard to prepare if you only go to work in the right fashion. Have your eggs cold. If they have set in a warm kitchen you will find the whites will not beat light very quickly, and sometimes it will happen that they will not beat light at all; even though you do beat for a long time.

If we put our egg yolks in a bowl and then use our Dover egg beater, we think we have just so much loss there, so we would rather use a fork. Never add the cold water until you have mixed them thoroughly. It is better to keep the people waiting for the omelet, instead of the omelet for the people. Any egg mixture will become tough and stringy if left for any length of time.

It is possible to beat the whites of eggs so much they will lose their lightness; we should have them not quite dry, but do not have any of the liquid around the edge of the platter.

We only grease our pan slightly for omelet Never have any surplus fat, just enough to keep it from sticking. It is very hard to give any set time for cooking, but this quantity should take about ten minutes. If we cook it over the fire, then we have to turn it. When we use a spatula we can turn it very readily. Run the knife around the edge and turn carefully We get just the same result by putting it into a moderately hot oven, and it is less trouble.

Sometimes when we are making the meringue on lemon pie, it gets a pretty brown, but if we let it stand it becomes syrupy because the oven was too hot. A similar thing happens to the omelet. It may be brown outside but raw inside if cooked too quickly. It is always a good plan to take the spatula and try the omelet in the center, which is very much better than depending on the looks.

We are going to use grape jelly with this omelet this afternoon. We take a half cup of jelly, have it warm and as soon as the omelet is done we pour the jelly in the middle of the omelet and fold it over. This is especially good for an invalid. If we do not cook it too much it will be found very digestible. All egg mixtures should

be cooked at a very low temperature. When we get a hard, tough egg we know it has been boiled and a boiled egg is a spoiled egg, we think.

We add a speck of salt while we beat the whites, it hastens the work and they will retain the lightness very much longer. Always use two cups when you are separating your eggs. We find it is not wise to try to save dish washing at this time. If you get a speck of yellow in the white be sure to remove it, as that makes it very hard to beat the egg light. If your eggs are not fresh, you had better scramble them than use them for an omelet, because they will never make a good omelet, the whites of the eggs will be so watery they will not beat up light.

If we use a different flavor with an omelet each time, we will not tire of them very readily. We can use beef finely chopped, ham, or cheese, and use exactly the same rule we are using this afternoon. To use corn akes a very nice change. Take three-fourths of a cup of corn to the above rule, prepare the omelet the usual way, then stir in tse corn the last thing just before putting in the pan.

Question—Have you ever used strawberries or fruit with an omelet?

Miss Clift—No.

The Lady—It is very delicious, use the raw fruit.

Miss Clift—I am sure some of us will be glad to experiment. I suppose we would chop them in pieces just as we do for a layer cake.

Always use salt sparingly in an omelet, it is better to use more at the table than to have even a little too much. With any of the savory omelets, paprika, the Hungarian sweet pepper we use so much these days, is always very good.

The pan we use for our omelets also requires some attention. It should be quite a thick, smooth pan; if it has a rough surface the omelet will stick. The old-fashioned iron spider is one of the most useful things we can have in the kitchen. Instead of wearing out they seem to improve with age. An aluminum pan is very good for an omelet, but a granite pan is not so satisfactory. Just a little scorching of the egg will spoil the entire amount.

If we beat the whites in a deep bowl with the Dover egg beater we will get a nice, fine grain, but it will not be so fluffy as if beaten on an open platter. If we beat it too long we beat the air out.

You will remember I used one tablespoon of sugar with the yolks and the amount of salt that the rule calls for.

Always mix an omelet with your egg beater. Do not use a spoon, for that will break the air bubbles that have already formed. Just mix it lightly, then put it in the pan at once.

Always remember to have a warm platter and warm plates on which to serve an omelet. That will make a great deal of difference. If the platter is very cold it will rather spoil the lightness of the mixture, especially if left standing even for a few minutes.

Question—Do you always take the pan off from the stove?

Miss Clift—Yes, if we leave the pan on the stove it starts cooking at once while we are putting it in the pan.

We like to have a piece of zinc on our kitchen table to stand sauce pans and kettles on, it is a great convenience.

We will now make some cup puddings. They are very simple and are called fifteen-minute puddings. This is Miss Maxwell's rule and it is cheap as well as good.

Cup Puddings.

Recipe.

Sift together one cup of flour and two tablespoons of baking powder with a little salt, add enough rich milk to

make a drop batter. Steam with or without cherries, or any fruit desired, for fifteen minutes. Serve with cream and sugar.

We will place the mixture in six tea cups. You can put a little fruit in the bottom, but we think it is just as well to steam the mixture and then use the fruit with them. If the fruit is very cold it is better to slightly warm it, otherwise it may spoil their lightness. Any sweet sauce can be used with these puddings in place of fruit.

Mix your baking powder and flour together quite thoroughly. Do not shake the pan during the steaming and there is no fear of failure.

Today we will serve the canned raspberries with them and it makes a very pretty combination.

We have a prune pudding cooking in the cook-box, but it is not exactly as the rule calls for.

Prune Pudding.

Recipe.

One pound prunes, one-half cup of rice, three pints of water, one-fourth teaspoon salt, one-half cup sugar. Wash the prunes and soak over night, add the well washed rice, sugar and salt, and bake for two and one-quarter hours in a slow oven. Serve with whipped cream or sweet sauce.

The recipe calls for one pound of prunes, a half cup of sugar and one-half cup of rice. That is too sweet and rich. I took a half pound of prunes, washed them thoroughly and left them soaking over night, then this morning we put the rice with them and the salt, but no sugar. We find the prunes are so sweet it makes the pudding too sweet.

Prunes cooked a long slow time develop a much better taste than when cooked rapidly. They are very good cooked in the fireless cooker. This quantity makes enough to serve a large family. You can see it is quite a firm mixture. It is not necessary to use the whipped cream with this dish, plain cream is very good.

Prunes are very good for use occasionally; rice is also good, and it is very inexpensive, and this is really a very nice dessert. It is little trouble and would be especially good on wash day or ironing day when we are busy.

We whipped the cream early this afternoon and have kept it in a cold place. It was whipped quite thick with a Dover egg beater in a deep crock.

The chocolate pudding is not starchy at all but is just firm. Put it in a pretty dish, either glass or china, when it is thoroughly cooled and spread the thick cream over it. We will add a little sugar with the cream.

And now we will serve what we have prepared, for we all know the old adage, "The proof of the pudding is in the eating."

THIRD SESSION.

Thursday Afternoon, March 17, 1910.

THE COOK-BOX.

Miss Edith L. Clift, Chicago.

The cook-box has been discussed so much the last few years that it is hardly possible to say anything new on the subject, but if it is possible to have it more thoroughly understood we feel that the time spent in talking of it will not have been in vain.

One reason why I particularly like to talk of the cook-box is because it is a labor-saving device and anything and everything that can be used to lessen the work of a busy farmer's wife should be at her service.

How to Make a Cook-box

The box we have used for the last three winters is twelve inches by twelve inches by twelve inches; it is a well-made box. The cover is hinged and fastens with window fasteners, which make a very close, firm cover. The box is lined with asbestos paper and the pail, a two-quart granite pail containing the food to be cooked, is firmly packed with wool cushions. The box should have a good thick cover; if the cover is very thin it does not hold the heat sufficiently long. Do not forget to use the asbestos paper for a lining, because that helps to retain the heat. This box would not be big enough for a large family.

For the packing we have six of these wool cushions. One is placed in the bottom of the box and one on each side, space being left to make a nest in which the pail containing the food to be cooked will fit tightly, the remaining cushion to be placed on top. These cushions are made from the wool such as we would use for comforters. When you make your cushions, have a lining; then you can take the covers off and wash them very readily. They do not need washing very often, but it is good to keep them quite fresh. Whatever we do or use with our food should be very sanitary. When we are through using the box we put it out in the open air and air it thoroughly. Anything that is closed for a considerable time will always have a slight odor.

Wool is not the only thing that can be used for cushions by any means. We use chicken feathers—most farmers' wives have them. Pluck the chickens without putting them in boiling water, then the feathers are very good for this purpose. Be quite sure to bake them thoroughly in a hot oven and there will be no objectionable odor that feathers have which have not been baked for a considerable time. The baking will also kill any insects which may be on them.

Fresh, fine hay is one of the nicest things, the box was formerly called the hay box, but some people object to the slight odor you get when putting in or taking out the hot dishes. If using hay, be sure to pack it down very closely. Any pieces of flannel goods, or old comforters could be used, and these are satisfactory on account of being easily laundered. Crushed paper answers very well also.

Last winter I met an old lady in the

northern part of the state who told me she went as a bride of eighteen to help clear up some land to make a home there. She found cooking one of the hardest things she had to do because they could not afford the best cuts of meat and it took so long to cook the coarser ones and she had not time to watch the cooking, as she helped her husband out of doors so much and she had already found that "meat boiled is meat spoiled." One lucky day she met a woman from Norway who told her of the cook-box and together they made one, using an old trunk for the purpose, lining it first with several thicknesses of newspaper and then using some flannel shirts to pack in between and around the kettles. In this way the greater part of their food was cooked, and I very truly agreed with the old lady when she said she had no doubt that the cook-box was in a great measure the cause of their good health while in the woods, the reason being, of course, because the meat was always tender and easy to digest; the mush and oatmeal always thoroughly cooked. The beans were not boiled so that the food value was given off in steam, but cooked in a kettle with a closely fitting cover so that all moisture was absorbed in the beans.

If you do not care to make the box, use a candy pail or a cheese box. These can be bought for a few cents and will prove very satisfactory. Be sure the lid of the box is held in place with a hook and staple, or something else equally satisfactory.

The quesion has been raised several times this winter as to whether the box is sanitary. I see no reason for its being otherwise, supposing, of course, it is given an airing each time after being used, as I have before suggested. If the kettle lids fit as closely as they should do, it is impossible for steam to escape. By the way, be sure to see that the kettle lid has a rim around the edge, as that is the only kind that will stay in place. Aluminum ware is really the best to use and is not expensive when you consider how long it outwears the other kinds. A home-made cook-box is often more satisfactory than the ones we buy, as sometimes it is almost impossible to cleanse the cushions of those boxes.

What to Cook in the Box.

A few of the things which we like to cook in the box are celery, dried peas, beans and beets. A great many of our vegetables are best cooked in an open pan, but these we mention are equally good covered.

To cook dried fruit, such as apricots and prunes, we would wash them thoroughly, leave them soaking over night, then bring to a boil and place in the box. This is without doubt one of the most satisfactory ways of cooking these fruits.

Oatmeal and cereals are delicious if cooked a long, slow time and certainly much more digestible. We would prepare the oatmeal when washing the supper dishes. It is not absolutely necessary to stand the oatmeal in another kettle of water, but it will be found much better if cooked in this way. Be sure to let the oatmeal cook ten minutes before placing in the cooker.

Everyone that tastes a custard cooked in the box declares it is more like New York ice cream than ordinary custard. If using one pint of milk and three eggs, the custard will cook firm to the touch in two hours, surrounded, of course, by the boiling water. If the milk is made quite hot before adding to the eggs, then one hour will be sufficient to allow for the cooking.

Some reasons for using the box are that it reduces our bills for fuel, whether the fuel be gas, coal or wood; our kettles are never blackened, there-

fore they are much more easily washed and last longer. Nothing wears out a granite kettle more quickly than scraping off burnt food. Another reason is, food cooked in this way is more nutritious and digestible. When we have a small kitchen, we are very glad to keep it as cool and sweet as possible in the summer. Still another reason is, it will reduce worry and surely that alone is worth considering.

There is no luck or guess work about it, for we always allow everything ample time. In a general way, it is sufficient to allow everything just as long again as you would on the stove. Milk or water may be kept hot at night in case of sickness. We have found that boiling water placed in the box is sufficiently hot for the washing of dishes twenty-four hours afterwards. Hot tea, coffee or cocoa is always enjoyed at a picnic and it is so convenient to carry it along already prepared.

There are other good things that could be spoken of, but I have already exceeded my time limit, but hope those of you that have not already tried it will lose no time in becoming acquainted with the housewife's helper —the fireless cooker.

HANDY THINGS FOR THE FARM HOME.

Miss Nellie Maxwell, Neenah, Wis.

The subject we have this afternoon of course is a very large one. There are, too, a great many utensils which are necessary in the kitchen that are not here.

The Kitchen.

First I want to say just one word about the kitchen. There was a time when we had large ones and it was a day's journey from the kitchen to the store room, but we are learning better. The modern kitchen is a workshop or laboratory and we want it small enough so that we can work with great ease, be able to reach things, without moving far from the stove and the table.

The table is an important thing to choose. Most people buy a kitchen table without regard to the height; they are all made the same height and as some women are short and some are tall, they do not fit. We should have the table made to suit our height. It should be high enough so when working one does not have to stoop. It is one of the most back-breaking processes in the world to have to stoop in working.

Have a zinc-covered table; it does not cost very much, you could probably get it covered for $1.50, and it lasts a lifetime if properly put on. You can set anything on it and it can be cleaned easily.

Some Handy Utensils.

The first thing we have here this afternoon is a bread mixer, and this is one of the most useful utensils. This size holds enough to make eight loaves. After you have once used one you would never be without it. The price is $2.50.

The scales are another i portant kitchen utensil; they are such an indispensable article, we need them for the weighing of so many things. We are getting more and more to use them instead of liquid measure, because they are more accurate. We find very

often that the measures we buy are not strictly standard.

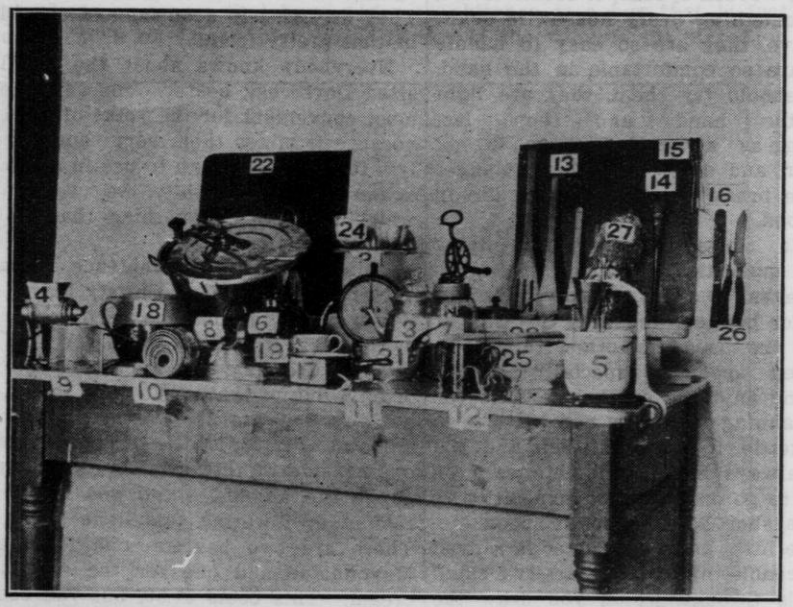
This is a new kind of flat iron which I think is especially nice for ironing ruffles. You see the point of this iron will go into the gathers and run in the top of the sleeve, and makes a very convenient iron. There are three in the set. These are $1.75.

The coffee percolater is something we should see in every home. It is a most useful utensil, for coffee made in it will be perfectly wholesome without any grounds and none of that bitter principal that causes so much gastric disturbance. There are a good many kinds of percolaters; this is a very simple one.

Then the meat grinder. That is another utensil that should be in everybody's kitchen, farm or city. It can be used for so many things; grinding vegetables, nuts, meats, sausage, left-over meats for croquettes, pineapple, and things of that sort.

Here is a small saw which may be used in cutting meat, and the cleaver, another very useful meat utensil for cutting up a soup bone.

Here are two kinds of fruit presses and these may also be used for po-



1. Bread Mixer; 2. Scales; 3. Percolator; 4. Meat Grinder; 5. Mayonnaise Mixer; 6. Tea Pot; 7. Egg Beater; 8. Flat Iron; 9. Ricer; 10. Set of Biscuit Cutters; 11. Knife Sharpener; 12. Fancy Cutters; 13. Wooden Spoons; 14. Brush; 15. Whisk Beater; 16. Spatula; 17. Ramekin; 18. Bean Pot; 19. Measuring Cup; 20. Dover Egg Beater; 21. Sauce Pan; 22. Baking Sheet; 23. Double Boiler; 24. Moulds; 25. Bowl; 26. Carvers; 27. Dish Mop; 28. Sleeve Board.

tato mashers; for ricing potatoes, ricing egg yolks for garnishes, for salads, and any number of things.

The paddles are very good for the little butter balls. With them you can make the butter balls, an attractive way of serving butter.

The wooden spoons, it seems to me, are something every housewife ought to have, they are so easy to handle and are so comfortable in the hand. You should try them, they are light in the hand and they last as long as a granite spoon, if not longer, and do away with the danger of the breaking off of the granite in the food.

This slotted spoon is for mixing large quantities of batter, like griddle cakes for a large family, it is just fine for beating, and then the smaller sizes are used for other things. A wooden spoon is especially nice for stirring anything on the stove. If you are canning fruit, you can leave it in the kettle, it never gets hot and you can always find it. Sometimes you have to go on a hunting expedition to find a short-handled metal spoon.

The little knife sharpener is a most serviceable thing. Here are two small wheels through which you draw the knife. It is so easily used and is a great convenience.

You have heard both Miss Clift and me mention the spatula. I do not see how one can get along without one of these in the home. Three strokes with one will completely clean a bowl. You will save enough in that way which you formerly wasted to buy one in a short time.

The glass measuring cup I like better than the aluminum for everyday use. The glass cups are very convenient things, you can see the mixture in them. The tin or aluminum are a little cheaper perhaps than some of them, although you can get the glass ones for five or ten cents.

These cutters for cookies and biscuits come in sets—different sizes of cutters for different articles. They are made of very fine tin and have a keen edge

This is a vegetable slicer. Latticed potatoes are prepared on one of these little affairs. Slice down the potato, turn it around and slice it again. They are fried in deep fat and served in that pretty form.

Everybody knows about the small sized Dover egg beater, one of the most convenient for the yolks of eggs, because it mixes them very thoroughly. It is small enough to use in a cup. When we beat a white, we prefer a whisk like this, something that will beat air into the egg.

This is a little convenience I am very fond of myself, a Christy Mayonnaise mixer. It may be used for an egg beater, it may be used for Mayonnaise dressing, for a cream whip, or anything of that sort. It is so simple any one can use it without even studying it. The little dropper sets on the side of the bowl and you can gauge the amount of oil you use by raising or lowering this little piston. There are two beaters—one for the Mayonnaise and one for the egg or cream. This costs $1.50, but you see you have three utensils in one.

Here is another kind of a beater that is a great convenience; this costs fifty cents and can be used for egg beating or whipping cream. As this is perfectly tight, it prevents the cream from spattering. This would make a fine churn.

Here are some very practical things, inexpensive and almost indispensable in the home. When you are washing dishes and have very hot water, you can use one of these mops and do the work in half the time you can with the hand. The smaller ones can be used for washing out milk bottles, etc.

The double boiler is another thing which is invaluable in a kitchen. Everybody should have a double boiler,

two or three of them if you can afford them. For cooking custards, white sauce, anything of that kind which needs slow and careful cooking, especially custards and salad dressings, they cook perfectly over the hot water.

These granite plates may be used for custard pie or others that have a deep crust, such as lemon pie; you can see what a nice deep crust it will make.

I wanted to mention these single loaf bread pans, different sizes. The bread we like so much better, you know, baked in the single loaves, because we think the crust all about the loaf is more easily digested and the center more thoroughly baked.

Have a good many nice paring knives in your kitchen. Have your knives sharp and well looked after. In a great many well equipped kitchens, there is a small piece of board fastened on the wall near the kitchen table. On that board are hung the knives and the utensils that are used every day where they can be reached from the work table. It is a great convenience.

Another very useful article to have for the kitchen is a box that is just the size of the window sill placed on the outside. In the winter you can use the box as a sort of cold storage room. Have it braced with just ordinary brackets and you reach it through the window by raising and lowering the sash; it is protected from the dust and is cool. Everything you would put in an ice-box may be kept here.

Home made fireless cooker. Old trunk; newspaper packing.

We are not thoughtful enough of the strength savers in the kitchen. Every woman who does a great deal of cooking should have a high stool

to sit on, on which she may sit and prepare her vegetables, beat eggs, or even wash dishes or iron. When you iron standing, have a pad for the feet. Nowadays many nice kitchens have soft wood floors and are covered with linoleum. Where one stands a great deal have small rubber pads that are like door mats to stand on. You will be surprised at the amount of strain saved and how much less tired you will be after standing on one of these than on the hardwood floor. If you haven't one, fold a carpet four or five thicknesses and stand on that when ironing; it will have the same effect.

Money spent in saving strength and time for the housekeeper is money well invested.

THE CARE OF MILK.

Mrs. Grace G. Durand, Lake Bluff, Ill.

It is a great pleasure to have the privilege of talking to you at this, your annual Round-up of Farmers' Institutes, which includes the Domestic Science work. What the Farmers' Institutes are to each state in benefit derived cannot be overestimated, not only in bringing information and scientific knowledge in all that pertains to farm work and housekeeping, but the gathering together of the people in social intercourse is an untold value.

The title of "The Care of Milk" given me by Mr. McKerrow is rather limited if I were to confine myself to that title alone, for there are but two words—"Cleanliness and Cold," which covers the whole thing. However, there are different degrees of cleanliness, according to one's idea of it, and there are different methods of cleanliness, that may or may not produce clean milk.

In the Health Commissioner's of Chicago plea for pasteurization, that it is impossible to have clean, pure milk from the average farmer, I take issue. I believe it is rare indeed when we find a man so callous in right doing, or whose conscience has become so blunted, that in his heart of hearts he does not want his product to be all that it should be, but there may be an ignorance as to the proper methods or lack of help and time to accomplish the good result.

We are all ignorant in a way and all at all times find much to learn, and either through observation or experience in time find better ways.

When the dairy farmer can receive the proper price for his products, which should never be less than four cents a quart in can and five cents is none too much, he is able to hire sufficient help to take the necessary pains to produce clean milk.

Healthy Cows First Essential in Producing Clean Milk.

Milk cannot be clean produced from diseased cows, so the first thing for a dairy farmer to do will be to eliminate from his herd all the tubercular and otherwise unhealthy cows, establishing a paying, healthy herd, and if a wise farmer he will select one breed with a pure bred sire and begin the work of reproducing in the offspring the best of his herd.

It is not necessary to have expensive buildings, for with proper drainage, taking the manure daily from the stables to the fields, with plenty of lime and the flushing done with water and a disinfectant, even if one

does not have concrete, a good clean stable may be obtained.

Have plenty of air through the King system of ventilation, which any farmer can install himself, and many windows for the sunlight to penetrate.

With the necessary help the increase of price will permit, the dairy farmer can take time to make his cows clean for milking. A little brushing off, a wiping down of the flanks, tail and belly with a damp cloth, a second cloth used in a more thorough washing of the udder, and but few moments have been consumed, provided care has been taken in properly bedding the cow, so the flanks are not caked with manure, which is not infrequently seen.

The Utensils.

So far, so good. Now for the utensils. It seems to me almost as important for the farmer to have a small steam boiler on his farm as water, even a small feed cooker where only wood is used can secure for him sufficient steam to sterilize and make sweet his cans and milk pails. With his own hands clean, there is a reasonable belief that when the milk reaches the straining cloth it is pretty near being clean.

That straining cloth is going to play an important part in spoiling this milk unless great care has been exercised. First rinsed in cold water over and over again, until the water is free from milk, then thoroughly rubbed in hot water and soap powder, rinsed in clean water and put on to boil in a porcelain kettle, is the only safe way to have these cloths sure. A straining cloth made of two-fold cheese cloth is far better than any wire strainer and a fresh cloth should be put on every eight-gallon can. If a man is producing six cans of milk in the morning, he should have six strainer cloths and these cloths should not be left to the exposure of dust and dirt during the milking process, but a second cloth laid over them to protect them from any dust.

Cooling the Milk.

Instead of filling the cans in the stable aisle, it would be far better for the dairy farmer who is interested in doing the right thing to have at a convenient place a small weighing room, where either an up-to-date or a "Chilly King" cooler can be placed with small expense and each pail of milk instantly cooled. A water vat can stand in the same room, where the cans may be placed as soon as filled. None of this would add much time to the milking and it may be the means of giving the consumer a better product, which the increased prices should demand.

The dairy farmer, unless producing certified milk, does not have the problem of bottling and with the can of milk placed in a vat of cold water, his work, except for the delivery, is practically done. But in the bottling plant or creamery, some complications arise where milk received clean and pure from the dairy farm may easily be made unfit for use. I have seen much milk that I felt was clean and good absolutely spoiled in the handling at the bottling plant through filthy bottles and dirtier bottler.

The Farm Separator.

It is a recognized fact that creamery butter of today is far below grade in quality than it was before the time of the farm separator.

I, myself, am greatly opposed to the farm separator if it cannot be kept clean, as well as pasteurization, for where farm separators are used, my experience in visiting such farms shows few are ever properly cleaned.

I have even known of cases where, with the exception of allowing water to run through immediately after the separating, the separator was not cleaned, it is not taken apart but once or twice a week, and sometimes I believe not at all, until it becomes so foul that necessity compels the owner to get at it. I doubt very much if one in a hundred is ever taken apart twice a day, and in visiting a separator factory recently, where old separators were sent in to be repaired from the farms, I was completely nauseated at what I saw.

Lack of Competent Help Serious Difficulty.

The average milk dealer in every town or city is far from having his plant, his utensils and bottles as clean as he should, but the question of employees plays a significant part in this respect and is the "bugaboo" of dairy farming and of the bottling plant. It is a difficult thing to find good, reliable men and it is seldom that there are enough members in a family to do the necessary work and furnish extra help that is required. I do not believe there is a business anywhere that is more irksome or tedious or exasperating than the production and handling of milk, and yet more interesting. Hard as it is, one seldom finds a dairy farmer who does not love his herd and his work.

Interest in Dairying Tremendous.

The interest shown throughout the United States, in fact, abroad in all countries, in the production of milk and milk products is tremendous.

Through our splendid agricultural colleges, government work, Farmers' Institutes, Dairyman's Associations, etc., widespread interest is shown in building up for the dairy farmer a more profitable business, in more scientific methods employed.

The Place of Milk in the Dietary.

Speaking to you women in the Domestic Science work, I believe there is no article of food more important than milk, or of more value to mankind when good, but which becomes the most dangerous of foods if unclean and impure. Even if the dairy farmer produces through clean cows, clean hands, clean utensils, a clean milk, and the bottling plant with distributer takes the same watchful care to bring that milk to the door of the consumer clean and pure, with the careless keeping of the milk in some American households in unkept refrigerators, uncovered, that milk soon becomes unfit for use.

I believe firmly if the consumers in the cities would pay nine cents a quart for milk, milk would even then be the cheapest article of food purchased in its relative value of nutrition with other foods. The many delicious cream or milk soups, desserts, custards, in the cooking of vevetables and fowl, no food is of greater usefulness.

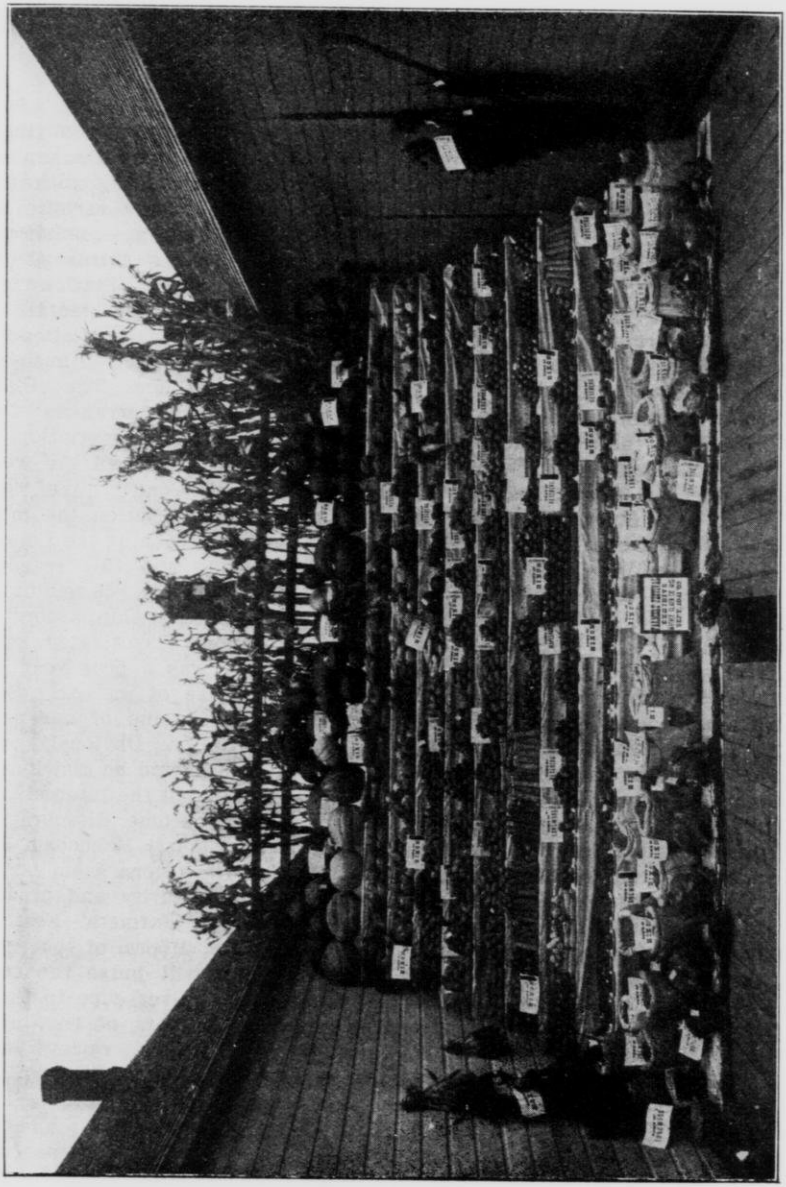
It is indeed happy that with this splendid awakening of scientific farming there goes hand in hand with it a great awakening in household economics or science. Home-making is a blessed pursuit and I have always contended that more unhappiness, drunkenness and sin comes through bad house-keeping than almost any other cause. Man needs to be fed well, cared for well, and he is content and amiable. There is an animal instinct still in the human being that wants good food and comfortable surroundings. Then, women of America, let us create such a splendid interest in all that which pertains to good homes, good housekeeping, that we may make our husbands and sons, fathers and brothers, grateful and appreciative of our endeavors.

Thanking you all for your courtesy, I will close.

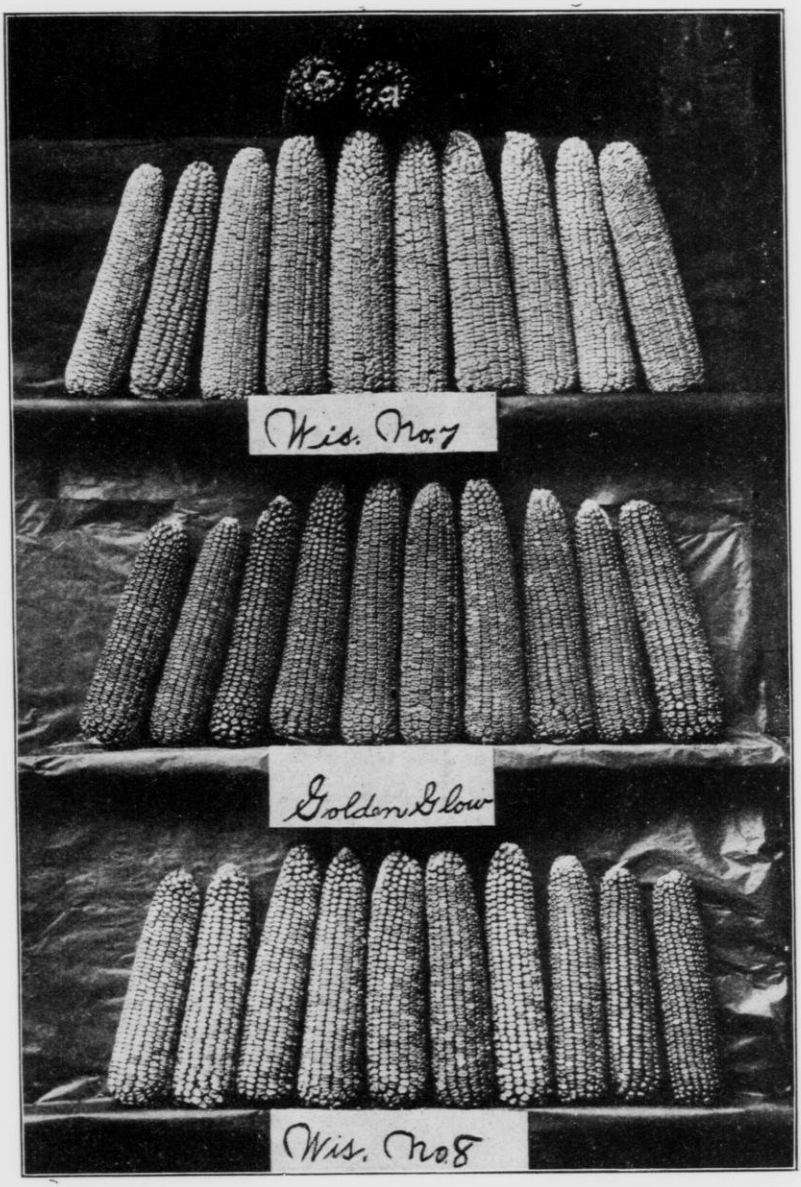
CO-OPERATIVE AGRICULTURAL EXPERIMENTS AS CONDUCTED BY FARMERS' INSTITUTE AND FESTIVAL ASSOCIATION OF CLARK COUNTY.

By B. G. Packer, Secretary, Withee, Wis.

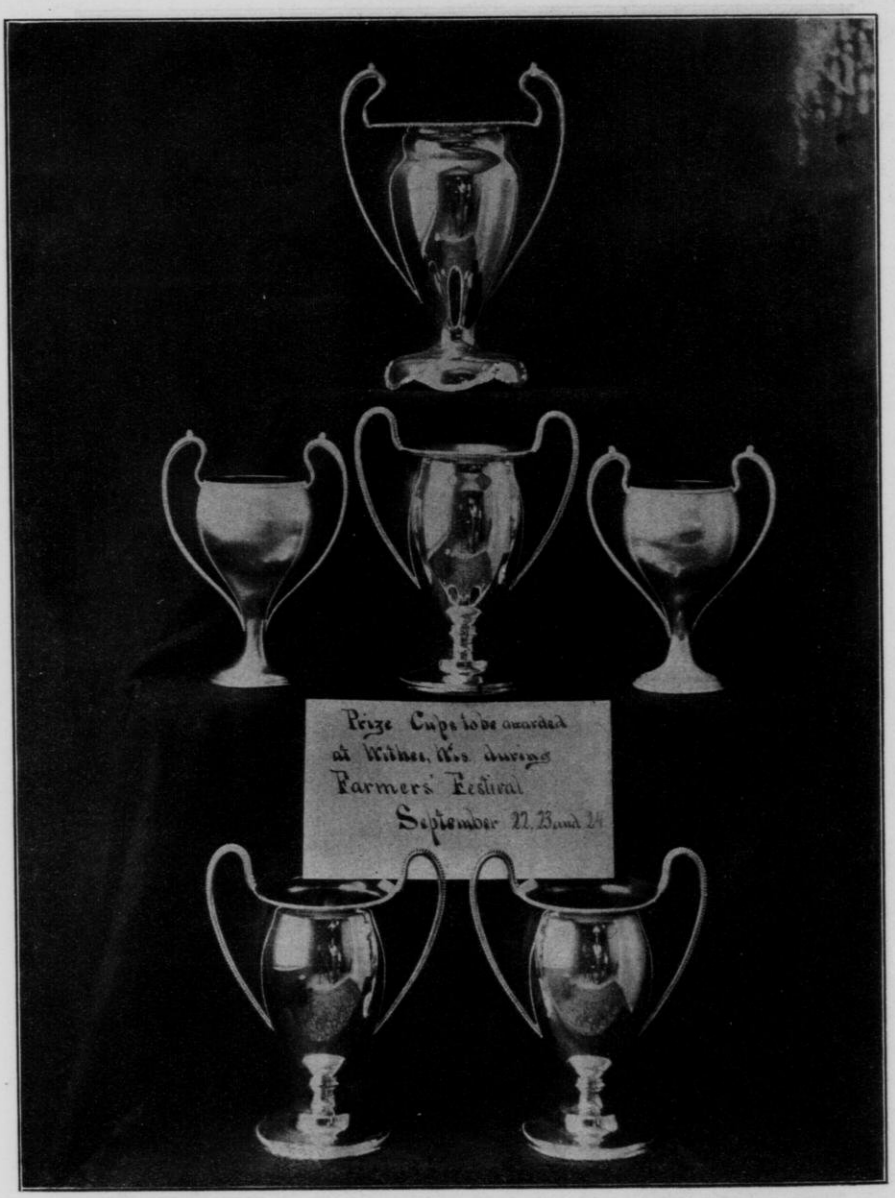
Society includes three classes; those who produce, those who consume and those who distribute. While the producer may be something of a consumer and distributor himself, his product is what establishes him as the most useful member of social life. The most indispensable producer is the farmer and the disproportionate increase in the number of consumers makes it imperative that our farms yield more food-stuffs. One way to increase these products is by way of experiment, trying out the best yielding varieties of grains. Co-operative agricultural experiments will give the speediest results. What would otherwise take years of time can, to a great extent, be thus determined in a single representative season. This is the purpose of our society to which we have given the name of "Farmers' Institute and Festival Association" for the reason that we hold Farmers' Institutes and Farmers' Festivals or agricultural exhibitions. We are incorporated under the laws of this state, with nominal capital stock subscribed by men in business in the village of Withee. We call each man growing our seed a co-operator and each co-operator participates in a series of systematic agricultural experiments, in one acre tracts, designed to test the comparative merits of the different varieties of grains. This season we have 127 co-operators trying out the following varieties of corn: Wisconsin No. 8, Wisconsin Golden Glow, Wisconsin No. 7, Minnesota No. 13, Wisconsin Sunshine, Sterling White Dent, Early Northwestern Red Dent, Canada Flint and Wisconsin No. 15, a Smut-nose Flint, each co-operator a single variety, with a few exceptions. Ten farmers are experimenting with five kinds of oats and three varieties of barley. Six are testing commercial fertilizers. Seed was furnished by the State Experiment Station and seed houses and the incidental expense, freight, postage, stationery, etc., has been met by men in business in this little village. The Clark County Board of Supervisors this spring made us an appropriation of $250 with which to extend the work throughout Clark County. We want to make this appropriation the most beneficial and far reaching the County Board ever made and this season's best yielders will be disseminated throughout each township according to its proportionate cultivated acreage. Last year was a poor year for seed corn because of an early September frost and some of our seed was of low vitality. Obviously only the best of seed should be distributed as poor seed will kill the interest and the co-operator become discouraged. At this time (August) Wisconsin No. 8 and Golden Glow corn seem far in the lead as to maturity and productiveness. At our Farmers' Festival next month Prof. Moore, of the Agricultural School, will judge the corn and award prize silver cups to those men showing ten ears of best pure varieties whether the variety was grown from our seed or his own, for some man may have something better than we have given out and we want to encourage him. These cups will be properly engraved with the winner's name and are works of art well worth working for. These ex-



Farm products exhibit at Withee's Farmers' Festival, 1909. 360 entries.

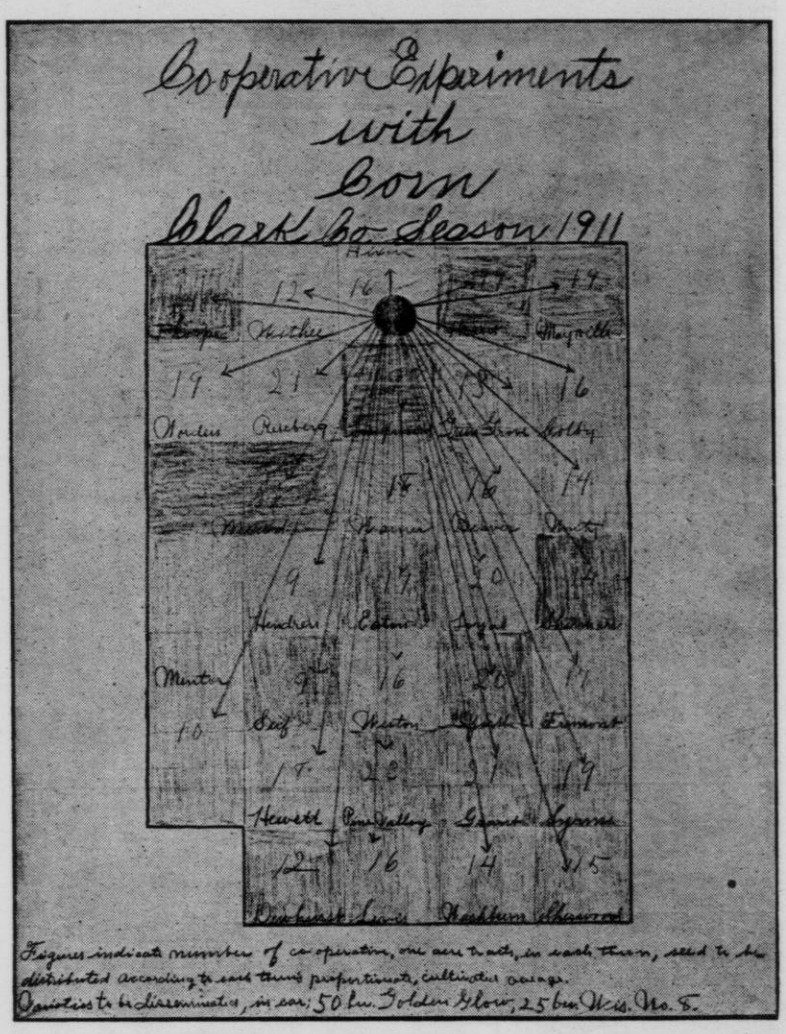


Three 10-ear exhibits at the corn show held at Withee, Clark Co., Wis., Sept. 22–24, 1910. Result of co-operative corn experiments.



Prize corn cups awarded at Withee, Clark county, 1909, by Farmers' Institute and Festival Association.

Field of Golden Glow corn on farm of John Blunk, Town of Longwood, Clark county, one of the 127 co-operators of Farmers' Institute and Festival Association of Clark county.


Cooperative Experiments with Corn
Clark Co. Season 1911
Figures indicate number of co-operators, one acre to each, in each town, seed to be distributed according to said town's proportionate cultivated acreage.
Varieties to be disseminated, in car; 50 bu. Golden Glow, 25 bu. Wis. No. 8.

periments will show us the best yielding corn adapted to our climate and by co-operating with each other, the business man in the small town and the adjacent farmer, the interests of both will be enhanced. This work will be pushed. A rugged and vigorous type of physical and intellectual manhood and womanhood is found today, as always, on the farm, among men and women who, as pioneers, are conquering an undeveloped country and they will soon compel this section of Wisconsin to stand in the front rank of the state that's leading the nation.

ANNUAL ADDRESS.

By Hon. Abram Lincoln, of Illinois.

Delivered at Milwaukee, Sept. 30, 1859.

Members of the Agricultural Society and Citizens of Wisconsin:

Agricultural Fairs are becoming an institution of the country; they are useful in more ways than one; they bring us together, and thereby make us better acquainted, and better friends than we otherwise would be. From the first appearance of man upon earth, down to very recent times, the words "stranger" and "enemy" were quite or almost synonymous. Long after civilized nations had defined robbery and murder as high crimes, and had affixed severe punishments to them, when practiced among and upon their own people respectively, it was deemed no offence, but even meritorious, to rob, and murder, and enslave strangers, whether as nations or as individuals. Even yet, this has not totally disappeared. The man of the highest moral cultivation, in spite of all which abstract principle can do, likes him whom he does know, much better than him whom he does not know. To correct the evils, great and small, which spring from want of sympathy, and from positive enmity, among strangers, as nations, or as individuals, is one of the highest functions of civilization. To this end our Agricultural Fairs contribute in no small degree. They render more pleasant, and more strong, and more durable, the bond of social and political union among us. Again, if, as Pope declares, "happiness is our being's end and aim," our Fairs contribute much to that end and aim, as occasions of recreation—as holidays. Constituted as man is, he has positive need of occasional recreation; and whatever can give him this, associated with virtue and advantage, and free from vice and disadvantage, is a positive good. Such recreation our Fairs afford. They are a present pleasure, to be followed by no pain, as a consequence; they are a present pleasure, making the future more pleasant.

But the chief use of Agricultural Fairs is to aid in improving the great calling of Agriculture, in all its departments, and minute divisions; to make mutual exchange of agricultural discovery, information, and knowledge; so that, at the end, all may know everything, which may have been known to but one, or to but few, at the beginning; to bring together, especially, all which is supposed to not be generally known, because of recent discovery or invention.

And not only to bring together, and to impart all which has been accidentally discovered or invented upon ordinary motive; but, by exciting emulation, for premiums, and for the pride and honor of success—of triumph, in some sort—to stimulate that discovery and invention into extraordinary activity. In this, these Fairs are kindred to the patent clause in the Constitution of the United States; and to the department, and practical system, based upon that clause.

One feature, I believe, of every Fair, is a regular Address. The Agricultural Society of the young, prosperous, and soon to be, great state of Wisconsin, has done me the high honor of selecting me to make that address upon this occasion—an honor for which I make my profound and grateful acknowledgement.

I presume I am not expected to employ the time assigned me in the mere flattery of the farmers, as a class. My opinion of them is that, in proportion to numbers, they are neither better nor worse than other people. In the nature of things they are more numerous than any other class; and I believe there really are more attempts at flattering them than any other; the reason of which I cannot perceive, unless it be that they can cast more votes than any other. On reflection, I am not quite sure that there is not cause of suspicion against you, in selecting me, in some sort a politician, and in no sort a farmer, to address you.

But farmers, being the most numerous class, it follows that their interest is the largest interest. It also follows that that interest is most worthy of all to be cherished and cultivated—that if there be inevitable conflict between that interest and any other, that other should yield.

Again, I suppose it is not expected of me to impart to you much specific information on Agriculture. You have no reason to believe, and do not believe, that I possess it—if that were what you seek in this address, any one of your own number, or class, would be more able to furnish it.

You, perhaps, do expect me to give some general interest to the occasion; and to make some general suggestions, on practical matters. I shall attempt nothing more. And in such suggestions by me, quite likely very little will be new to you, and a large part of the rest possibly already known to be erroneous.

My first suggestion is an inquiry as to the effect of greater thoroughness in all the departments of Agriculture than now prevails in the North-West—perhaps I might say in America. To speak entirely within bounds, it is known that fifty bushels of wheat, or one hundred bushels of Indian corn can be produced from an acre. Less than a year ago I saw it stated that a man, by extraordinary care and labor, had produced of wheat what was equal to two hundred bushels from an acre. But take fifty of wheat, and one hundred of corn, to be the possibility, and compare it with the actual crops of the country.—Many years ago I saw it stated in a Patent Office Report that eighteen bushels was the average crop throughout the United States; and this year an intelligent farmer of Illinois, assured me that he did not believe the land harvested in that State this season, had yielded more than an average of eight bushels to the acre; much was cut, and then abandoned as not worth threshing; and much was abandoned as not worth cutting. As to Indian corn, and indeed, most other crops, the case has not been much better. For the last four years I do not believe the ground planted with corn in Illinois, has produced an

average of twenty bushels to the acre. It is true, that heretofore we have had better crops, with no better cultivation; but I believe it is also true that the soil has never been pushed up to one-half of its capacity.

What would be the effect upon the farming interest, to push the soil up to something near its full capacity? Unquestionably it will take more labor to produce fifty bushels from an acre, than it will to produce ten bushels, from the same acre. But will it take more labor to produce fifty bushels from one acre, than from five? Unquestionably, thorough cultivation will require more labor to the acre; but will it require more to the bushel? If it should require just as much to the bushel, there are some probable, and several certain advantages in favor of the thorough practice. It is probable it would develop those unknown causes, which of late years have cut down our crops below their former average. It is almost certain, I think, that in the deeper plowing, analysis of the soils, experiments with manures, and varieties of seeds, observance of seasons, and the like, these cases would be found. It is certain that thorough cultivation would spare half, or more than half the cost of land, simply because the same product would be got from half, or from less than half the quantity of land. This proposition is self-evident, and can be made no plainer by repetitions or illustrations. The cost of land is a great item, even in new countries; and constantly grows greater and greater, in comparison with other items, as the country grows older.

It also would spare the making and maintaining of inclosures—the same, whether these inclosures should be hedges, ditches or fences. This again, is a heavy item—heavy at first, and heavy in its continual demand for repairs. I remember once being greatly astonished by an apparently authentic exhibition of the proportion the cost of an inclosure bears to all the other expenses of the farmer; though I cannot remember exactly what that proportion was. Any farmer, if he will, can ascertain it in his own case, for himself.

Again, a great amount of "locomotion" is spared by thorough cultivation. Take fifty bushels of wheat, ready for the harvest, standing upon a single acre, and it can be harvested in any of the known ways, with less than half the labor which would be required if it were spread over five acres. This would be true, if cut by the old hand sickle; true, to a greater extent, if by the scythe and cradle; and to a still greater extent, if by the machines now in use. These machines are chiefly valuable, as a means of substituting animal power for the power of men in this branch of farm work. In the highest degree of perfection yet reached in applying the horse power to harvesting, fully nine-tenths of the power is expended by the animal in carrying himself and dragging the machine over the field, leaving certainly not more than one-tenth to be applied directly to the only end of the whole operation—the gathering in of the grain, and clipping of the straw. When grain is very thin on the ground, it is always more or less intermingled with weeds, chess and the like, and a large part of the power is expended in cutting these. It is plain that when the crop is very thick upon the ground, a larger proportion of the power is directly applied to gathering in and cutting it; and the smaller, to that which is totally useless as an end. And what I have said of harvesting is true, in a greater or less degree of mowing, plowing, gathering in of crops generally, and, indeed, of almost all farm work.

The effect of thorough cultivation

upon the farmer's own mind, and, in reaction through his mind, back upon his business, is perhaps quite equal to any other of its effects. Every man is proud of what he does well; and no man is proud of that he does not well. With the former, his heart is in his work; and he will do twice as much of it with less fatigue. The latter performs a little imperfectly, looks at it in disgust, turns from it, and imagines himself exceedingly tired. The little he has done, comes to nothing, for want of finishing.

The man who produces a good full crop will scarcely ever let any part of it go to waste. He will keep up the enclosure about it, and allow neither man nor beast to trespass upon it. He will gather it in due season and store it in perfect security. Thus he labors with satisfaction, and saves himself the whole fruit of his labor. The other, starting with no purpose for a full crop, labors less, and with less satisfaction; allows his fence to fall, and cattle to trespass; gathers not in due season, or not at all. Thus the labor he has performed is wasted away, little by little, till in the end, he derives scarcely anything from it.

The ambition for broad acres leads to poor farming, even with men of energy. I scarcely ever knew a mammoth farm to sustain itself; much less to return a profit upon the outlay. I have more than once known a man to spend a respectable fortune upon one; fail and leave it; and then some man of modest aims, get a small fraction of the ground, and make a good living upon it. Mammoth farms are like tools or weapons, which are too heavy to be handled. Ere long they are thrown aside at a great loss.

The successful application of steam power to farm work, is a desideratum —especially a steam plow. It is not enough that a machine operated by steam, will really plow. To be successful, it must, all things considered, plow better than can be done with animal power. It must do all the work as well, and cheaper; or more rapidly, so as to get through more perfectly in season; or in some way afford an advantage over plowing with animals, else it is no success. I have never seen a machine intended for a machine plow. Much praise and admiration are bestowed upon some of them; and they may be, for aught I know, already successful; but I have not perceived the demonstration of it. I have thought a good deal, in an abstract way about a steam plow. That one which shall be so contrived as to apply the larger proportion of its power to the cutting and turning the soil, and the smallest, to the moving itself over the field, will be the best one. A very small stationary engine would draw a large gang of plows through the ground from a short distance to itself; but when it is not stationary, but has to move along like a horse, dragging the plows after it, it must have additional power to carry itself; and the difficulty grows by what is intended to overcome it; for what adds power also adds size, and weight to the machine, thus increasing again, the demand for power. Suppose you should construct the machine so as to cut a succession of short furrows, say a rod in length, transversely to the course the machine is locomoting, something like the shuttle in weaving. In such case the whole machine would move north only the width of a furrow, while in length the furrow would be a rod from east to west. In such case, a very large proportion of the power, would be applied to the actual plowing. But in this, too, there would be difficulty, which would be the getting of the plow into, and out of, the ground, at the end of all these short furrows.

I believe, however, ingenious men

will, if they have not already, overcome the difficulty I have suggested. But there is still another, about which I am less sanguine. It is the supply of fuel, and especially water, to make steam. Such supply is clearly practicable, but can the expense of it be borne? Steamboats live upon the water, and find their fuel at stated places. Steam mills, and other stationary steam machinery, have their stationary supplies of fuel and water. Railroad locomotives have their regular wood and water stations. But the steam plow is less fortunate. It does not live upon the water; and if it be once at a water station, it will work away from it, and when it gets away cannot return, without leaving its work, at a great expense of its time and strength. It will occur that a wagon and horse team might be employed to supply it with fuel and water; but this, too, is expensive; and the question recurs, "can the expense be borne?" When this is added to all other expenses, will not plowing cost more than in the old way?

It is to be hoped that the steam plow will be finally successful, and if it shall be, "thorough cultivation" —putting the soil to the top of its capacity—producing the largest crop possible from a given quantity of ground—will be most favorable for it. Doing a large amount of work upon a small quantity of ground it will be, as nearly as possible, stationary while working, and as free as possible from locomotion; thus expending its strength as much as possible upon its work, and as little as possible in traveling. Our thanks, and something more substantial than thanks, are due to every man engaged in the effort to produce a successful steam plow. Even the unsuccessful will bring something to light which in the hands of others will contribute to the final success. I have not pointed out difficulties, in order to discourage, but in order that, being seen, they may be the more readily overcome.

The world is agreed that labor is the source from which human wants are mainly supplied. There is no dispute upon this point. From this point, however, men immediately diverge. Much disputation is maintained as to the best way of applying and controlling the labor element. By some it is assumed that labor is available only in connection with capital—that nobody labors, unless somebody else owning capital, somehow, by the use of it, induces him to do it. Having assumed this, they proceed to consider whether it is best that capital shall hire laborers, and thus induce them to work by their own consent, or buy them, and drive them to it, without their consent. Having proceeded so far, they naturally conclude that all laborers are naturally either hired laborers or slaves. They further assume that whoever is once a hired laborer, is fatally fixed in that condition for life; and thence again, that his condition is as bad as, or worse, than that of a slave. This is the "mud-sill" theory. But another class of reasoners hold the opinion that there is no such relation between capital and labor, as assumed; and that there is no such thing as a freeman being fatally fixed for life, in the condition of a hired laborer, that both these assumptions are false, and all inferences from them groundless. They hold that labor is prior to, and independent of, capital; that, in fact, capital is the fruit of labor, and could never have existed if labor had not first existed—that labor can exist without capital, but that capital could never have existed without labor. Hence they hold that labor is the superior—greatly the superior of capital.

They do not deny that there is, and probably always will be, a relation between labor and capital. The error, as they hold, is in assuming that the whole labor of the world exists within that relation. A few men own capital; and that few avoid labor themselves, and with their capital, hire or buy another few to labor for them. A large majority belong to neither class—neither work for others, nor have others working for them.—Even in all our slave States, except South Carolina, a majority of the whole people of all colors, are neither slaves nor masters. In these free States, a large majority are neither hirers nor hired. Men with their families—wives, sons, and daughters—work for themselves, on their farms, in their houses and in their shops, taking the whole product to themselves, and asking no favors of capital on the one hand, nor of hirelings or slaves on the other. It is not forgotten that a considerable number of persons mingle their own labor with capital; that is, labor with their own hands, and also buy slaves or hire freemen to labor for them; but this is only a mixed, and not a distinct class. No principle stated is disturbed by the existence of this mixed class. Again, as has already been said, the opponents of the "mud-sill" theory insist that there is not, of necessity, any such thing as the free hired laborer being fixed to that condition for life. There is demonstration for saying this. Many independent men, in this assembly, doubtless a few years ago were hired laborers. And their case is almost if not quite the general rule.

The prudent, penniless beginner in the world, labors for wages awhile, saves a surplus with which to buy tools or land, for himself; then labors on his own account another while, and at length hires another new beginner to help him. This, say its advocates, is free labor—the just and generous and prosperous system, which opens the way for all—gives hope to all, and energy and progress, and improvement of condition to all. If any continue through life in the condition of the hired laborer, it is not the fault of the system, but because of either a dependent nature which prefers it, or improvidence, folly, or singular misfortune. I have said this much about the elements of labor generally; as introductory to the consideration of a new phase which that element is in process of assuming. The old general rule was that educated people did not perform manual labor. They managed to eat their bread, leaving the toil of producing it to the uneducated. This was not an insupportable evil to the working bees, so long as the class of drones remained very small. But now, especially in these free States, nearly all are educated—quite too nearly all, to leave the labor of the uneducated, in any wise adequate to the support of the whole. It follows from this that henceforth educated people must labor. Otherwise, education itself would become a positive and intolerable evil. No country can sustain, in idleness, more than a small per-centage of its numbers. The great majority must labor at something productive. From these premises the problem springs—"How can labor and education be the most satisfactorily combined?"

By the "mud-sill" theory it is assumed that labor and education are incompatible; and any practical combination of them impossible. According to that theory, a blind horse upon a tread mill, is a perfect illustration of what a laborer should be—all the better for being blind, that he could not kick understandingly. According to that theory, the education of labor-

ers, is not only useless, but pernicious and dangerous. In fact, it is, in some sort, deemed a misfortune that laborers should have heads at all. Those same heads are regarded as explosive materials, only to be safely kept in damp places, as far as possible from that peculiar sort of fire which ignites them. A Yankee who could invent a strong handed man without a head would receive the everlasting gratitude of the "mud-sill" advocates.

But free labor says "no!" Free labor argues, that as the Author of man makes every individual with one head and one pair of hands, it was probably intended that heads and hands should co-operate as friends; and that that particular head, should direct and control that pair of hands. As each man has one mouth to be fed, and one pair of hands to furnish food, it was probably intended that that particular pair of hands should feed that particular mouth—that each head is the natural guardian, director and protector of the hands and mouth inseparably connected with it; and that being so, every head should be cultivated, and improved, by whatever will add to its capacity for performing its charge. In one word free labor insists on universal education.

I have so far stated the opposite theories of "mud-sill" and "free labor" without declaring any preference of my own between them. On an occasion like this I ought not to declare any. I suppose, however, I shall not be mistaken, in assuming as a fact, that the people of Wisconsin prefer free labor, with its natural companion, education.

This leads to the further reflection, that no other human occupation opens so wide a field for the profitable and agreeable combination of labor with cultivated thought, as agriculture. I know nothing so pleasant to the mind, as the discovery of anything that is at once new and valuable—nothing that so lightens and sweetens toil, as the hopeful pursuit of such discovery. And how vast, and how varied a field is agriculture, for such discovery. The mind, already trained to thought, in the country school, or higher school, cannot fail to find there an exhaustless source of enjoyment. Every blade of grass is a study; and to produce two, where there was but one, is both a profit and pleasure. And not grass alone; but soils, seeds, and seasons—hedges, ditches and fences, draining, drouths, and irrigation—plowing, hoeing and harrowing—reaping, mowing and threshing—saving crops, pests of crops, diseases of crops, and what will prevent or cure them—implements, utensils, and machines, their relative merits, and to improve them—hogs, horses and cattle—sheep, goats and poultry—trees, shrubs, fruits, plants and flowers—the thousand things of which these are specimens—each a world of study within itself.

In all this, book-learning is available. A capacity, and taste, for reading, gives access to whatever has already been discovered by others. It is the key, or one of the keys, to the already solved problems. And not only so. It gives a relish and facility for successfully pursuing the unsolved ones. The rudiments of science, are available, and highly valuable. Some knowledge of botany assists in dealing with the vegetable world—with all growing crops. Chemistry assists in the analysis of soils, selection, and application of manures, and in numerous other ways. The mechanical branches of natural philosophy, are ready help in almost everything; but especially in reference to implements and machinery.

The thought recurs that education

—cultivated thought—can best be combined with agricultural labor, or any labor, on the principle of thorough work—that careless, half-performed, slovenly work, makes no place for such combination. And thorough work, again renders sufficient, the smallest quantity of ground to each man. And this again, conforms to what must occur in a world less inclined to wars, and more devoted to the arts of peace than heretofore. Population must increase rapidly—more rapidly than in former times—and ere long the most valuable of all arts, will be the art of deriving a comfortable subsistence from the smallest area of soil. No community whose every member possesses this art, can ever be the victim of oppression in any of its forms. Such community will be alike independent of crowned-kings, money-kings, and land-kings.

But, according to your program, the awarding of premiums awaits the closing of this address. Considering the deep interest necessarily pertaining to that performance, it would be no wonder if I am already heard with some impatience. I will detain you but a moment longer. Some of you will be successful, and such will need but little philosophy to take them home in cheerful spirits; others will be disappointed, and will be in a less happy mood. To such, let it be said, "Lay it not too much to heart." Let them adopt the maxim, "Better luck next time;" and then, by renewed exertion, make that better luck for themselves.

And by the successful, and unsuccessful, let it be remembered, that while occasions like the present, bring their sober and durable benefits, the exultations and mortifications of them are but temporary; that the victor will soon be vanquished, if he relax in his exertion; and that the vanquished this year, may be victor the next, in spite of all competition.

It is said an Eastern monarch once charged his wise men to invent him a sentence, to be ever in view, and which should be true and appropriate in all times and situations. They presented him tne words, "And this, too, shall pass away." How much it expresses! How chastening in the hour of pride! How consoling in the depths of affliction! "And this, too, shall pass away." And yet, let us hope, it is not quite true. Let us nope, rather, that by the best cultivation of the physical world, beneath and around us, and the intellectual and moral world within us, we shall secure an individual, social, and political prosperity and happiness, whose course shall be onward and upward, and which, while the earth endures, shall not pass away.—Transactions of the Wisconsin State Agricultural Society, 1858–1859.

AGRICULTURE AND DEMOCRACY.

J. L. Snyder, President Michigan Agricultural College.

Agriculture is the first occupation of man and the basic occupation as well. Out of it nearly all the other trades and occupations have been evolved. The greatest factor in the development of any nation, is its natural resources. Man must have food, clothing and shelter, and until he has these to at least a fairly liberal degree he cannot make much progress intellectually and socially. A great republic could not be developed where natural conditions were such as to keep people in squalor and ignorance.

Agriculture has played a very prominent part in the development of our country. Its location for agricultural purposes is ideal. It lies just the right distance from the equator, embracing neither of the extremes of heat or cold. It has an extended coast line. Its inland waterways are numerous and capable of wonderful development. Its mineral resources are abundant, and its soil varied and fertile. Had the location and selection of soil and climate been left to the highest genius of man to choose, we could scarcely have been more fortunate in natural endowments.

The first settlers were farmers. The little openings in the woods along the New England shores soon spread into large farms. The green fields pushed the woodlands back and far up the mountain slopes; the Indian trails over the mountains developed into highways of traffic, and in the valleys beyond, new settlements rapidly developed. This continued all along the Atlantic coast until we became sufficiently strong to free ourselves from the mother country. We were, at that time, known throughout the world as a nation of farmers.

Farmers as Wealth Producers.

While cities have grown and manufacturing has developed, yet farming has been the predominating industry in our country. It has produced the greater part of the capital which has dug our canals, constructed our railroads and built our cities. The fertile plains of the central west made Chicago, Kansas City and St. Louis. The wheat fields of Minnesota and the Dakotas, St. Paul and Minneapolis.

The agricultural output of the country has steadily increased from year to year. This country with its three million square miles is less than six per cent of the world's total area, and our eighty-five million people is but five per cent of the population of the world; yet the six per cent of the land and the five per cent of the people are raising annually forty-three per cent of the world's total production of wheat, corn and oats. This country produces seventy-nine per cent of all the corn grown. We produce of cotton, the most important article of clothing, seventy-one per cent.

Every time the sun goes down, the farmers of this country add to its wealth twenty million dollars. This is not such wealth as the traffic of the stock exchange produces. It is real. It means progress. It would require thirty billion dollars to buy out the farmers of this country. It would be necessary to more than double the entire money of the world in order to have sufficient funds to

settle the bill. The greatest of our corporate interests are insignificant as compared with it. The Standard Oil Company, which controls the railroads, banks, and sometimes legislatures, could be bought and paid for by the farmers' production of seventeen days. The gigantic steel trust, if the farmers were to place their earnings against it, could last but fifty days. It is the wealth taken by our farmers from our virgin soil that is pushing this country along on its prosperous career.

If it were to be materially decreased, our cities would suffer at once. If the trains richly laden with farm products were to cease running to our cities, industry would be paralyzed. Grass would grow in the streets. Whereas, if the trains carrying manufactured goods from the city to the country were to stop, the industry of agriculture would still be maintained. Not, of course, with so much vigor or success, for while the country is sufficient within itself and can get along without the city, it has learned to depend upon it for many of the comforts of life. But the city cannot exist without the country, a fact which shows conclusively the great and predominating place which the industry of agriculture holds in the commercial affairs of our nation.

It has been said that there was never a panic in this country when the granaries were full. They come after a season or several seasons of poor crops. If crops are twenty-five per cent short, it means a daily loss of five million dollars. After several years there must be a reckoning. The effect is first felt in our money centers. It will be remembered that the crops were very poor in this country from 1893 to 1897. Times were hard. On account of the general depression the meager crops which were produced brought very little money. We were told that the money which we then possessed had depreciated greatly in value; but when good crops returned, and a failure in European crops made a demand for wheat, conditions rapidly changed, and the American farmer brought back into this country one billion two hundred million of foreign money, which again put us on the highway to prosperity. Agriculture is a creator of wealth. The twenty million dollars, the income of one day, is real gain. If rational methods have been followed, our natural endowment is not diminished or made poorer thereby. This is not true in any other great industry. Every ton of iron, every ton of coal, every tree from original forest consumed by our great manufacturing industries, lessens by just that much the amount which this country has to use, and the time must come when our great natural resources in these products will have been exhausted. But our land, if rightly handled, will grow more productive year by year.

This brief survey may convey an idea of the magnitude of the agricultural industry and the prominent part it has had in the physical and commercial development of this country. However, we cannot estimate the greatness and grandeur of our nation by its fertile plains, its manufactories, or great cities, neither by its systems of public education nor by its magnificent institutions of higher learning. These in themselves are each and all great, even wonderful; but the true greatness of our nation lies rather in the freedom of its people. This country, to a far greater extent than any other, has developed the spirit of true democracy.

Every American citizen, if respectable, is the peer of any other man, and there is no position, political or

social, in this country to which he may not rightfully aspire. This country is not only free from class prejudice, but better still it is free from all classes or castes of any sort. The working man of today may be the employer of labor tomorrow and a capitalist next week or next month. There is no fixed standard or position for any one. Merit is the final test. The son of a tanner became the leader of our armies and the chief executive of our nation. Fourteen sons of tillers of the soil have filled the presidential chair. So common is it in this country for a poor boy to rise to a high position, that we give it no notice. We might say that it is the rule rather than the exception. The majority of those holding high positions in our nation, came from humble and modest homes. All our people worship at the same shrines, belong to the same organizations. There is no one debarred who is worthy. The fact that no political party has ever been able to control the labor vote indicates more strongly than words the measure of independence and freedom enjoyed by the individual and his ability to exercise his liberty. Each is free to think and act for himself and he usually does it.

Agriculture Fosters Democracy.

Agriculture has not only been the chief factor in our physical and commercial development, but it has also been one of the greatest factors, if not the greatest, in developing and maintaining the true democratic spirit. We are apt to attribute this spirit of democracy to our free schools, our freedom in religion, and to an untrammeled ballot. These are great influences, but they are the effect rather than the cause of democracy. At least they do not precede democracy.

Agriculture has aided the development of democracy in two ways: First, it has furnished an occupation for every man who was willing to work with his hands for a living, and for a great many it has provided homes. At one time it was said that Uncle Sam had a farm for every one of his boys. At any rate, agriculture has made it easy to change occupation. The opening up of new agricultural districts has taken care of the surplus farm labor caused by the introduction of labor-saving machinery. It has also kept the population scattered and contented, retarding thereby for many years the congestion which is now beginning to be felt in our cities and which does not seem to bode well for democracy.

In the second place, agriculture has contributed to democracy more than we estimate by furnishing our people with an abundant food supply. So fertile has been our land, so extensive our fields, so abundant our harvests of grain and fruit, that the best and highest grades of food have been within reach of every citizen who has been willing to do an honest day's work. It matters not what his occupation and social position; be they ever so humble, he and his family enjoy practically the same kinds of food as that enjoyed by families of wealth and prominence. In the dinner pail of the man who works in the mills, in the mine, or digs the ditches in our city streets, can usually be found wheat bread, meat, butter, fruit and coffee. What more does any one have? It matters not how great one's wealth may be, he cannot buy better food than this. He may spend money on luxurious surroundings, fine wares and costly linens. He may have a coterie of servants to do his bidding, but if he eats to live rather than lives to eat, he cannot nourish his body with better and more wholesome foods than those used daily by our common

people—the people who earn their bread by the sweat of their brow.

Thus it is that agriculture is not only the basic industry, the one upon which all others depend, but by providing an abundant food supply, it has been the greatest factor, not even excluding our public school system, in developing and maintaining the true democratic spirit.

The Food Supply is Lessening.

It is a fact that we at present have a surplus of farm products. During the abundant harvests of the past few years, we have been able to export the equivalent in money value of about ten per cent of our output. But with our population increasing at the rate of from two to three per cent per annum, it can be only a short time until this surplus will be needed for home consumption. It is plainly evident that the future must look for its increased supply to the land now under cultivation rather than to new territory. This means that every state in the Union must practically more than double its production within the next fifty years. When we think of taking care of the great increase in population from the land now under cultivation, the problem is anything but hopeful. A great part of the land now under the plow is annually growing less productive and less valuable. In many of our states the area is also growing less, as many of the farms are abandoned annually. In the eastern and some of the southern states, the area is not only rapidly growing less, but the value of the remaining portion, measured by money standards, has been steadily decreasing for many years.

It must be apparent, however, that the methods of farming in general have been and are such as to decrease rather than increase the productivity of the soil. The same statement may be made with equal force with regard to the corn belt, the northern wheat belt, and the fertile lands of the far west. Everywhere the hand of greed is robbing the soil. The virgin fertility is fast disappearing, and we are leaving to future generations the land much less productive than we found it. This is a general statement and is not true of all farms or all communities, but statistics carefully compiled bear out the statement that the annual yield per acre of our staple crops is growing less.

For example, in 1906, we had our largest corn crop, yet the yield per acre was not as great as in 1872. It can be shown that the same is true of wheat and other important cereals. Notwithstanding this general decline there has been a great increase in the aggregate value of farm products within the past few years, due to a large increase in acreage, bountiful harvests and high prices. There are many hopeful aspects to this problem; but to meet the demands that will be made upon it in coming years, agricultural development must make wonderful strides. The future growth and success of the nation depends upon it, if not indeed the ultimate destiny of our democracy.

How Can it be Increased?

The Department of Agriculture and the Agricultural Colleges and Experiment Stations must assume the responsibility of directing and in a large measure, carrying on this great work. The responsibility has been placed upon them and they must meet it.

In the last analysis, the problem is simply that of making two blades grow where one grew before; of increasing several fold the production of the land now under cultivation. Knowledge is the basis of all material progress, and knowledge comes through education and investigation.

The highest function, therefore, of our colleges is to educate the youth of the land; but the obligation of the college does not stop with this. Its work is wide in scope and it must change from year to year to meet new conditions. Its ultimate aim in all its work, however, should be to save the nation, to perpetuate democracy.

It follows that the education given by the Agricultural Colleges should be useful; should prepare the recipient for taking hold of the practical affairs of life; should prepare him to deal with things rather than with theories; to think in dollars and cents as well as by hypothetical formulae. It matters little to us at present what the exact terms of the Morrill Act were which called these institutions into being. Those who formulated the act were wise in their day and generation, but they could not divine the future any more than we can. They wisely left the working out of the system to those who were to follow. They struck, however, the keynote, unconsciously perhaps, of a great educational principle—so great that we are only now beginning to appreciate its significance and the influence which it is destined to exert in the educational world. Steadily have these Agricultural Colleges been working out a pedagogical standard, a fixed type of instruction.

The Colleges Can Help.

The short courses in practical agriculture offered during the winter are past the experimental state and should now be recognized as a permanent and legitimate part of the work of our Agricultural Colleges. There should be no confusion of this work in the mind of the public with the regular work. While it is not of college grade, it is legitimate and proper work and should be carried on in good faith.

The colleges must go even farther. They must carry the instruction to those who cannot or will not come after it. Already this is being done through our farmers' institutes, extension courses, corn and fruit trains and traveling schools. Methods must vary to meet local conditions. The problem should be attacked on all sides. A few institutions have inaugurated correspondence courses which give promise of great development. From the success experienced by the correspondence courses offered by private institutions along other industrial lines, it would seem that there must be a wide field for the development of such courses in agriculture. These might be carried on in co-operation with rural schools, the Grange, Farmers' Clubs and other rural organizations.

Conserving Public Resources.

We must not only develop our transportation facilities to meet this growth, but in so doing we must conserve as far as possible our irreplaceable resources. A few considerations may indicate the natural or advisable trend of this development. It is stated that it requires the employment of one thousand tons of steel in rails and rolling stock to move one thousand tons of freight ten miles, while it requires but one hundred to two hundred fifty tons of metal or from ten to twenty-five per cent of the former, to move the same freight by water, with a lessening of coal consumption of from fifty to seventy-five per cent. It is claimed that water carriage costs but one-sixth as much as rail carriage. Andrew Carnegie is credited with saying that "no single step open to us today would do more to check the drain on iron and coal than the substitution of water carriage for rail carriage wherever possible."

We now have 225,000 miles of railroad and our railroad experts tell us

that we need 100,000 more miles before we can catch up with the present delinquency. We have increased production in recent years very much faster than transportation. One naturally thinks of the railroads as our great carriers, when in fact, even with our undeveloped water-ways, they carry but one-third of our freight.

One steamer with a few men and a small outlay for fuel takes down the Mississippi, unimproved as it is, 67,000 tons of coal, and down the lakes at one tow, freightage of 20,000 tons. One grain boat brings down the lakes at one trip, the average yield of 27,000 acres of the fertile Minnesota soil.

Improving Transportation Facilities.

The future development of our country demands a rapid increase in our transportation facilities. Shall our railroad systems be multiplied under private ownership? There is a suspicion on the part of many that they already have too much power. Shall the government own the railroads and build more? This plan does not seem in accord with the opinion of a majority of our citizens

The government now owns our water-ways, and what a wonderful transportation system they could be made, and what wonderful assistance they would render, if improved, in the development of our country.

A ship canal from the lakes to the gulf with an extension of the system to the tributaries of the Mississippi, would be an undertaking well worthy the genius and energy of our American people, and easily within accomplishment. Were this great system completed the products of thirty of our great states lying between our eastern and western mountain ranges would enjoy the tremendous advantage of water transportation, and twenty thousand miles would be added to the coast line of the republic. Water routes are necessary for transportation and in fact indispensable to the future development of this country. Can the products of the great Mississippi basin, when the population shall have reached several hundred millions, be hauled in freight cars over the great mountain ranges on either side? Land transportation can only be solved by the co-operation of water transportation. The vast railroad problems can best be settled by the development of our inland water-ways.

The nations of the Old World which are our chief competitors, are moving with tremendous energy in the development of inland water routes. France, no larger than our greatest state, has spent seven hundred and fifty million dollars in quadrupling its water-ways. If the inland water-ways of Germany could be laid down in America, they would connect New York with Chicago, Minneapolis, Seattle, San Francisco, Los Angeles, New Orleans, Charleston and back again to the starting point, with several hundred miles to spare. In Belgium and Holland, canals connect almost every village with the sea, and a ton of raw material is brought to them one thousand miles for one dollar. The British Isles, comparatively very small in area with a very long coast line, have four thousand miles of canals.

America has the greatest natural system of water-ways in the world. The Mississippi river is the natural dominating center of this system. With its tributaries it touches all but sixteen of our forty-six states. In the fall, the 4,000 boats now engaged in lake trade alone and consequently compelled on account of ice to lie dormant for six months of each year, would load up with corn, wheat and hay, and ship this freightage at a very small cost to hundreds of south-

ern cities, and around the coast to eastern cities, which need them. This great fleet would pass out into the gulf, and south to Panama and the South American republics, and restore to the salt seas our merchant marine, earning profits during winters now idle. In the early spring they would start north with cotton for a hundred manufacturing centers yet to be developed; with the next year's supply of fuel for the North and the great Northwest from the coal fields of Alabama, or perhaps with coal to supply the great ship yards and other industries to be established near the ore deposits on our lakes. Southern lumber would come North almost as cheaply as it would float South on the bosom of the Father of Waters; cattle by the hundreds of thousands would be shipped to our wonderful grazing lands in the North and back to the corn belt in the fall to be finished for the market It would bring the ocean with all its marvelous advantages of water transportation, to the Western and Southern farms. This is the ship subsidy for which we should strive.

The Cement Era.

A few decades ago the idea of damming our streams and converting them into great commercial highways would have been thought an idle dream, but with the ushering in of the cement era, the construction of dams and locks is a very simple problem. Limestone crops out along the shores of practically all our streams. This suggests a cement factory on the shore, the product of which can be transferred cheaply to where needed for the construction of dams; the gravel can be scooped from the bottom of the stream, or rock from the adjacent cliff can be crushed at small cost. All the material is near at hand, and the construction can be carried on at a cost which would have been thought impossible a few years ago.

But deep channels in which to float boats is not all; where there is a dam there must be a water fall, and as only a small portion of the water of a stream will be necessary to float the boats through the locks, the balance of the flow may be used for water power. May these dams, which are necessary to give depth to the stream, not create sufficient power to move all traffic on the streams and build up manufacturing centers as well? We can scarcely realize the amount of power which might be developed by turning our rivers into highways of commerce. The Muskegon river was not known outside of the immediate neighborhood until recently. It is small and seemingly insignificant. There are three larger rivers in the State. But at present this river, partially dammed, furnishes the power for two systems of electric railways, including 100 miles of track running daily several hundred cars. It also lights four cities with an aggregate population of 150,000. This one plant furnishes 30,000 horse power.

Conservation of Natural Resources.

Our attention during the past few months has been called repeatedly to the conservation of our natural resources. In my opinion, the national movement in this direction should be encouraged, and we should render it all the assistance possible. While we should render aid and encouragement to all organizations striving to protect our irreplaceable resources, it should ever be kept in mind that the ends must be attained ultimately by natural and reasonable methods. If the present generation needs for

its progress and comfort, coal, iron and timber, it is folly to think it will forego these advantages simply that future generations, viewed from the standpoint of the present, may be better off. We can do little in the matter of controlling the use of these natural elements on sentimental grounds. This problem is a practical one, and must be viewed and handled from an economic standpoint. By far the greatest natural asset is the soil itself, and when the farmer is convinced that his land will yield greater returns, both to himself and his children, by following such methods of tillage as will conserve its fertility, he will be ready to adopt such methods.

The lumberman will harvest his crop in accordance with forestry methods when it will pay in dollars and cents to do so, and not before. He will plant trees from the same motive that the farmer plants corn and the merchant enlarges his store —simply for profit.

It is the duty and business of our colleges to convince the farmer that the best methods of tillage will not only give greater returns for the present, but will also conserve the energy of the soil for future generations. They must teach the lumberman that even with present prices it will pay to harvest the lumber crop in accordance with forestry methods. When they are convinced of this, the change will come at once.

By creating sentiment in favor of the improvement of our inland waterways, we will hasten the time when water transportation and water power will lessen the demand for iron and coal. Hence it will be seen that the conservation of our natural resources is in line with, and is really a part of, that greater problem of agricultural development.

Rural economics is also another phase of the same problem. Double the income of each farmer and the country districts will take on a new appearance and attractiveness at once. Modern conveniences, more pleasant surroundings, improved social conditions will be the immediate result. Country conditions are primitive not so much on account of ignorance as on account of the lack of the necessary means to make them better. To maintain and improve present standards of living, is the great problem that this republic has to face in the future. It can only be done by an aggressive and most rapid development of agriculture along all lines.

The Work of the Agricultural College.

To our Agricultural Colleges is entrusted the responsibility of carrying on this great work. They must train the men, they must assume the leadership in all lines of agricultural betterment. They must give thorough scientific training in agriculture to young men by the thousand rather than by the tens or hundreds, and elementary and special training to the millions rather than to the few who come after it. If our colleges do their part aggressively, honestly and courageously, they will help to maintain and improve present standards of living, and in this way to hold our people together, free from caste or class distinction, the worthy representatives of the highest type of democracy.—Michigan State Farmers' Institutes, 1908–1909, Vol. 15.