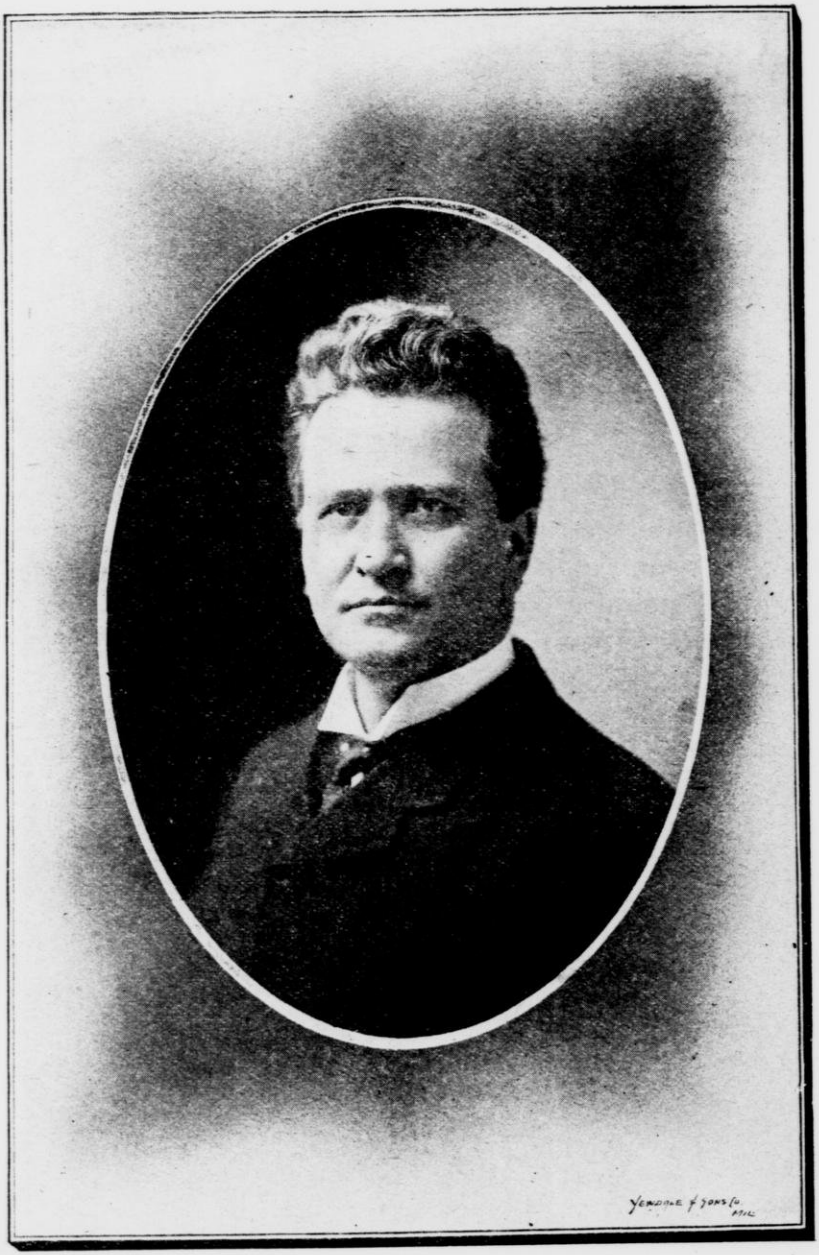
Wisconsin Farmers' Institutes : a hand-book of agriculture. A report of the fifteenth annual closing Farmers' Institute held at Oshkosh, March 19, 20, and 21, 1901. Bulletin No. 15 1901

Wisconsin Farmers' Institutes
Milwaukee, WI: Evening Wisconsin Co., Printers, 1901

https://digital.library.wisc.edu/1711.dl/36H74WJQE432G9B

"Good farming is and must ever be a paying business, subject, like all others, to mischances and pull-backs, and to the general law that the struggle up from nothing to something is ever an arduous and almost always a slow process. In the few instances where wealth and distinction have been swiftly won, they have rarely proved abiding. There are pursuits wherein success is more envied and dazzling than in Agriculture; but there is none wherein efficiency and frugality are more certain to secure comfort and competence."

HORACE GREELEY.



ROBERT LA FOLLETTE, GOVERNOR STATE OF WISCONSIN.

WISCONSIN

FARMERS' INSTITUTES

A Hand-Book of Agriculture.

BULLETIN No. 15.

1901.

A Report of the Fifteenth Annual Closing Farmers' Institute held at Oshkosh, March 19, 20 and 21, 1901.

"I know of no pursuit in which more real and important service can be rendered to any country than by improving its agriculture."—*George Washington.*

Edited by GEORGE McKERROW, Superintendent.

SIXTY THOUSAND COPIES ISSUED.

Stenographic Report by Mrs. R. Howard Kelly, Chicago.

ILLUSTRATED BY
YEWDALE & SONS,
MILWAUKEE, WIS.

EVENING WISCONSIN CO.,
PRINTERS,
MILWAUKEE, WIS.

TABLE OF CONTENTS.

J. H. Stout, President of University Board of Regents.

LETTER OF TRANSMITTAL.

HON. J. H. STOUT,

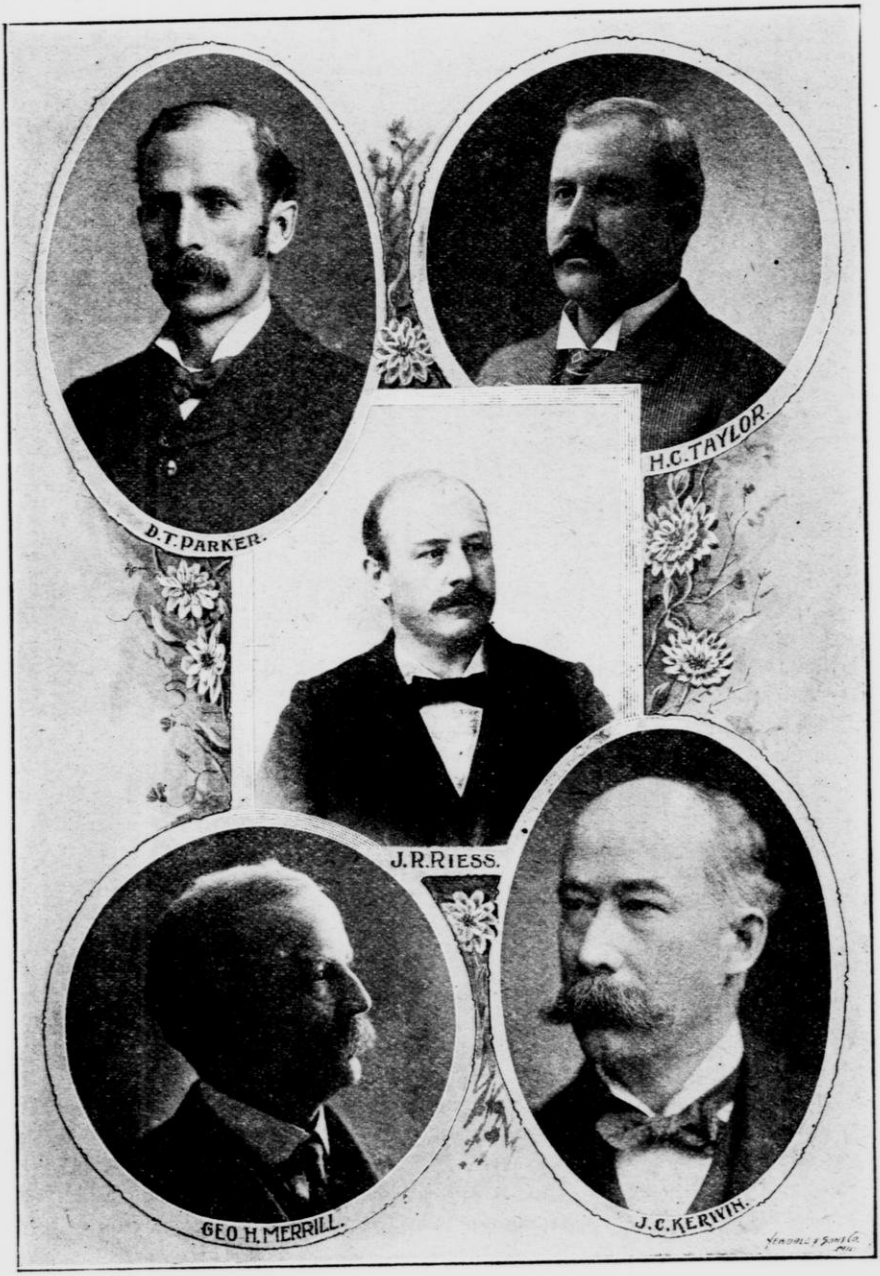
President of Board of Regents, University of Wisconsin:

SIR:—I have the honor herewith of presenting to you Bulletin No. 15, of Wisconsin Farmers' Institutes.

Most respectfully yours,

GEORGE McKERROW, *Superintendent.*

MADISON, WIS., Nov. 27, 1901.



COMMITTEE ON COLLEGE OF AGRICULTURE AND COLLEGE OF MECHANICS AND ENGINEERING.

UNIVERSITY OF WISCONSIN.

Board of Regents.

The President of the University, *ex officio.*
The State Supt. of Public Instruction, *ex officio.*

State at Large, George W. Peck.
State at Large, William F. Vilas.
1st District, H. C. Taylor.
2d District, B. J. Stevens, Vice-President.
3d District, Dwight T. Parker.
4th District, Almah J. Frisby.
5th District, George H. Noyes.
6th District, John R. Riess.
7th District, Byron A. Buffington.
8th District, James C. Kerwin.
9th District, E. A. Edmonds.
10th District, George F. Merrill.
11th District, J. H. Stout, President.

Colleges.

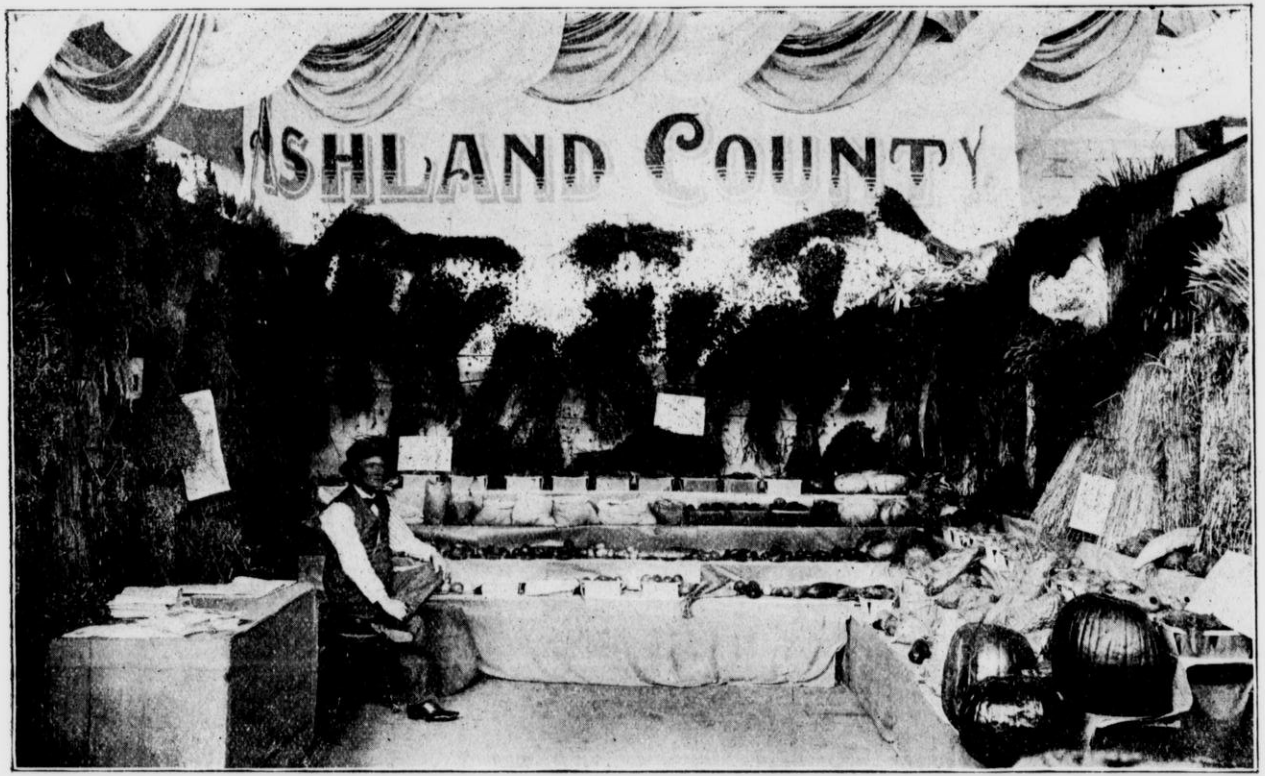
College of Letters and Science.
College of Mechanics and Engineering.
School of Pharmacy.
School of Economics and Political Science.
School of History.
College of Agriculture.
College of Law.
School of Music.
School of Education.
School of Commerce.

Courses.

Long Agricultural Course.
Mechanical Engineering Course.
Electrical Engineering Course.
Law Course.
Ancient Classical Course.
General Science Course.
Short Agricultural Course.
Dairy Course.
Civil Engineering Course.
Pharmacy Course.
Modern Classical Course.
Sanitary Engineering Course.
Pre-Metallurgical Course in Engineering.
English Course.
Civic Historical Course.
Courses in Economics and Political Science.
Special Science Course, antecedent to Medicine.
Special Courses for Normal School Graduates.
Collegiate and Academic Courses in Music.
General Course in Engineering.

Branches of Study.

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



ASHLAND COUNTY AGRICULTURAL EXHIBIT AT THE STATE FAIR, 1901, SHOWING PRODUCTS OF THE COUNTY.

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 woman's gymnastics by the construction of an addition to Chadbourne Hall, which has been fully equipped. This furnishes ample facilities for systematic courses for young women, and is under the immediate direction of a trained instructor.

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

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

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

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

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

General Facilities:—The Faculty embraces upward of 170 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. *Seminars* are held for advanced study in History, Language, Literature, Mathematics, and other branches.

The libraries accessible to students embrace that of the University, 70,000 volumes; of the State Historical Society, 215,000 volumes, including pamphlets; of the State Law Department, 35,000 volumes; of the city, 18,000 volumes, besides special professional and technical libraries, making in all more than 338,000 volumes, thus affording very exceptional opportunities for reading and special research.

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

C. K. ADAMS, President.

Wisconsin State Horticultural Society's Exhibit at the Pan-American, 1901.

UNIVERSITY OF WISCONSIN.

COLLEGE OF AGRICULTURE.

Committee on College of Agriculture and College of Mechanics and Engineering.

JOHN R. RIESS, Chairman,	Sheboygan.
GEORGE F. MERRILL,	Ashland.
J. C. KERWIN,	Neenah.
H. C. TAYLOR,	Orfordville.
DWIGHT T PARKER,	Fennimore.
DEAN E. A. BIRGE, Acting President of University,	Madison.

Officers and Instructors.

THE PRESIDENT OF THE UNIVERSITY.	
W. A. HENRY,	Dean and Director.
S. M. BABCOCK,	Chief Chemist.
F. W. WOLL,	Chemist.
E. S. GOFF,	Horticulturist.
W. L. CARLYLE,	Animal Husbandry.
H. L. RUSSELL,	Bacteriologist.
E. H. FARRINGTON,	Dairy Husbandry.
A. R. WHITSON,	Agricultural Physicist.
U. S. BAER,	Cheese Instructor.
R. A. MOORE,	Agriculturist.
T. F. MCCONNELL, JR.,	Assist't in Animal Husbandry.
ALFRED VIVIAN,	Assistant Chemist.
J. H. NICHOLSON,	Assistant Bacteriologist.
F. CRANEFIELD,	Assistant in Horticulture.
L. H. ADAMS,	Farm Superintendent.
IDA HERFURTH,	Clerk.
DAISY G. BEECROFT,	Librarian and Stenographer.

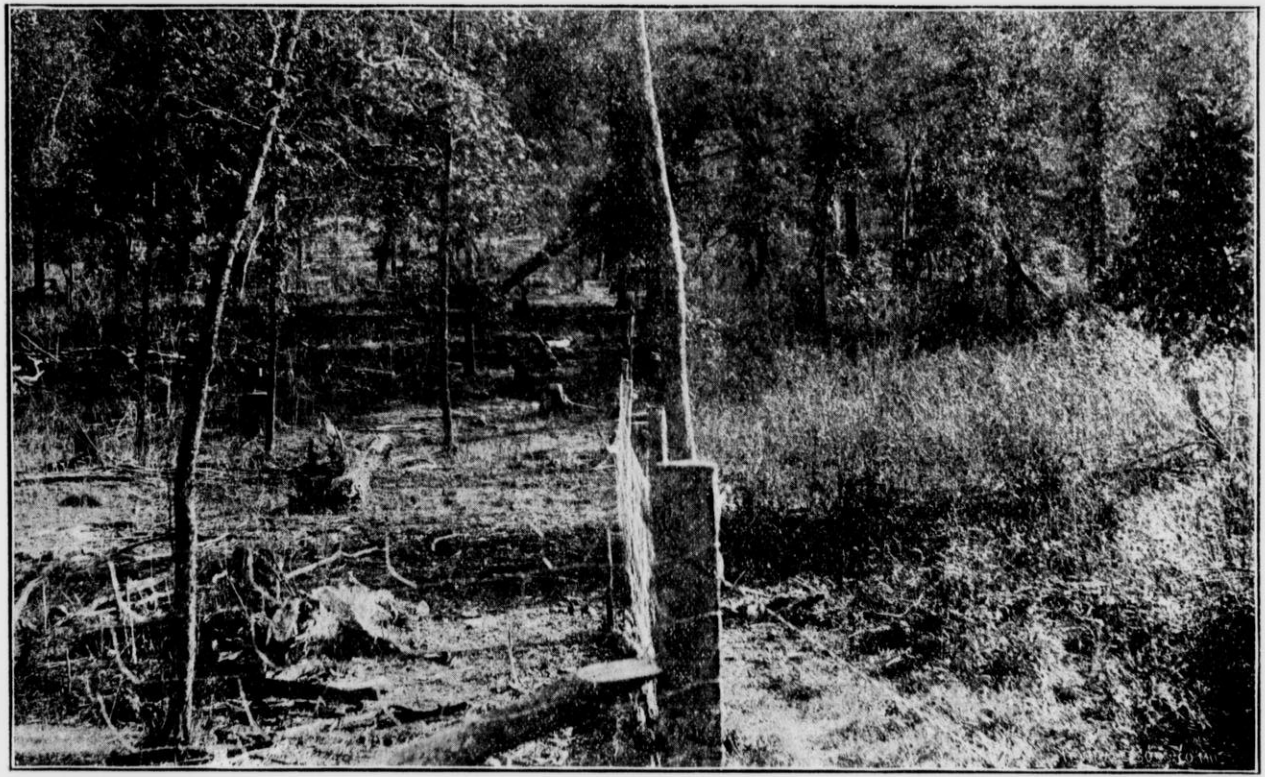
Farmers' Institutes.

GEORGE MCKERROW,	Superintendent.
HARRIET V. STOUT,	Clerk and Stenographer.

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

II. Agricultural Instruction at the University. The College of Agriculture offers instruction in agriculture to graduates of our own or other colleges, a four years' course leading to the degree of Bachelor of Science in Agriculture, special instruction to students of mature years, instruction in the Short Course in Agriculture requiring two winter terms of fourteen weeks each, and the course in Dairying lasting one term of twelve weeks. For information concerning these courses see this bulletin and write for catalogue, illustrated circulars, etc., addressing *W. A. Henry, Dean, College of Agriculture, Madison, Wis.*

III. The Farmers' Institute. Each year this practical school for the farmer holds more than a hundred two-day meetings in the farming districts of our commonwealth. These meeting are for practical instruction and conference on all matters pertaining to the farm and farm life, and at them 60,000 copies of the Farm Institute Bulletin are distributed annually. Any community can secure an institute upon early application to the Superintendent. For further particulars concerning this school for the farmer, write *Geo. McKerrow, Supt., Madison, Wis.*



PART OF THE LAND AND BRUSH ON NORTHERN WISCONSIN FARM NEAR KNAPP, DUNN CO., WHERE GOATS WERE CONFINED AND A STRIP OF LAND AND GROWTH ON SAME ADJOINING. FOR DESCRIPTION SEE PAGE 191.

WISCONSIN FARMERS' INSTITUTES FOR 1901-1902.

Arranged by Counties.

County.		County.	
Adams	Big Spring, Spring Creek.	Marquette	Endeavor, Montello.
Barron	Cameron.	Milwaukee	Brown Deer.
Brown	Greenleaf.	Monroe	Shennington, Wilton.
Buffalo	Fountain City, Modena.	Oconto	Sobieski.
Calumet	Stockbridge.	Outagamie	Kaukauna, Medina, Seymour.
Chippewa	Bloomer.	Ozaukee	Freistadt.
Clark	Greenwood, Thorp.	Pepin	Durand.
Columbia	Columbus, Lodi, Pardeeville.	Pierce	River Falls.
Crawford	Eastman, Mt. Sterling, Wauzeka.	Polk	Osceola.
Dane	Rockdale, Mt. Horeb, Waunakee.	Portage	Arnott.
Dodge	Neosho, Reeseville, Theresa.	Racine	Kansasville, Western Union (Corliss),
Door	Valmy.	Richland	Rockbridge, Yuba.
Dunn	Caryville, Knapp, Ridgeland.	Rock	Newark.
Eau Claire	Augusta, Fall Creek, Fairchild.	St. Croix	Deer Park, Woodville.
Fond du Lac	Brandon, New Prospect, St. Cloud.	Sauk	Baraboo, Spring Green.
Gates	Ladysmith.	Shawano	Angelica, Tigerton.
Grant	Boscobel, Potosi.	Sheboygan	Cascade, Cedar Grove, Franklin.
Green	Albany.	Taylor	Medford.
Green Lake	Kingston.	Trempealeau	Blair, Eleva, Independence.
Iowa	Edmund, Ridgeway.	Vernon	La Farge.
Jackson	Hixton, Millston, Shamrock.	Walworth	Elkhorn.
Jefferson	Palmyra.	Waukesha	Brookfield, North Lake, Oconomowoc (Closing Institute).
Juneau	Elroy, New Lisbon.	Washington	Barton.
Kewaunee	Krok.	Waupaca	Scandinavia, Symco.
La Fayette	Blanchardville, Gratiot.	Waushara	Tustin, Wautoma.
Lincoln	Merrill.	Winnebago	Town of Algoma.
Manitowoc	Cato, Cleveland, Kiel, Larrabee.	Wood	Marshfield, Pittsville, Vesper.
Marathon	Athens.		
Marinette	Harmony Corners.		

INSTITUTES WITH DATES AND CONDUCTORS.

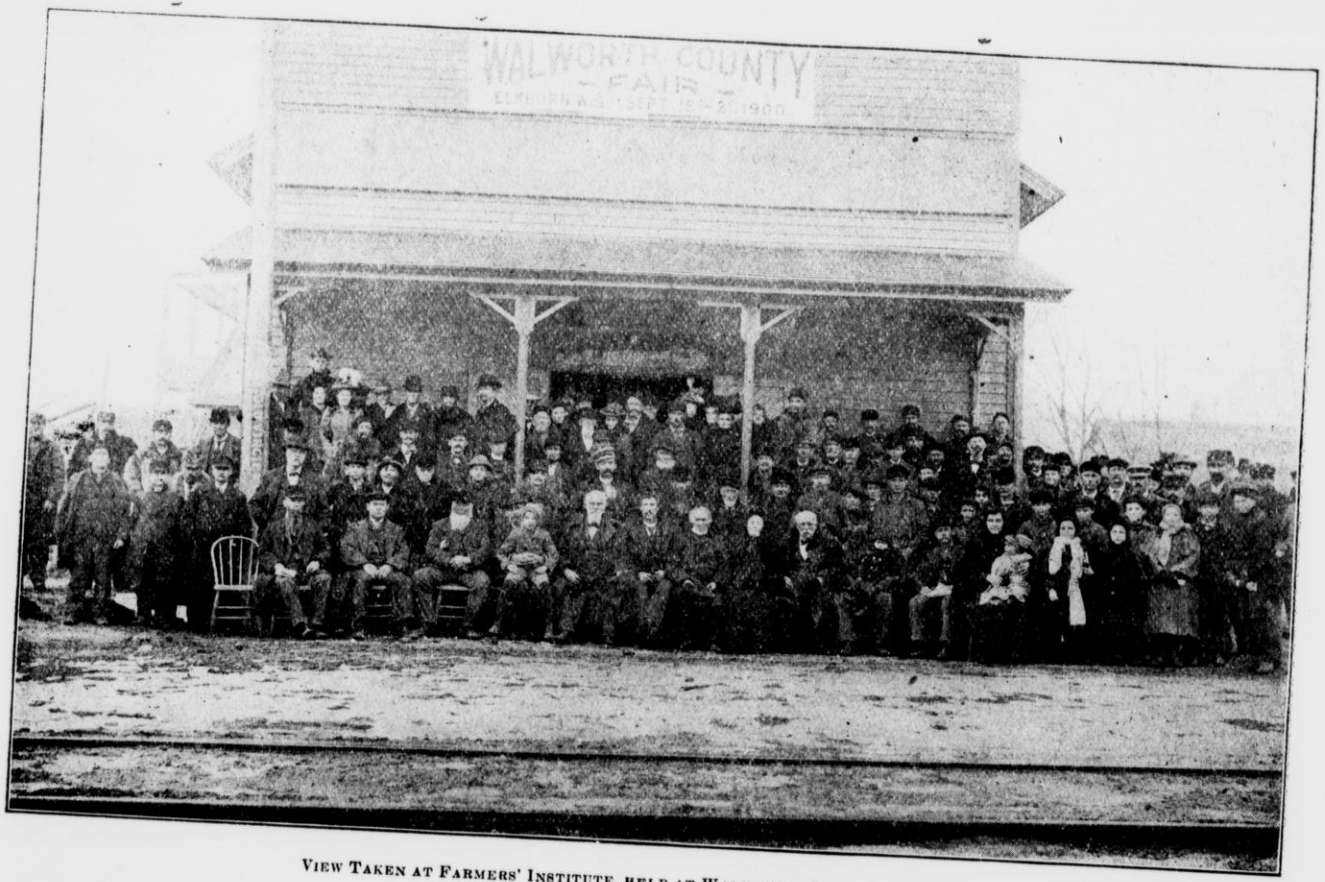
DATE.	W. C. BRADLEY.	L. E. SCOTT.	GEO. WYLIE.	R. J. COE.	H. M. CULBERTSON.
December.					
10-11	Cameron	Osceola	Fall Creek	Deer Park	Woodville.
12-13	Ladysmith	Ridgeland	Knapp	River Falls	Bloomer.
17-18	Caryville	Modena	Augusta	Athens	Thorp.
19-20	Durand	Eleva	Greenwood	Merrill	Medford.
January.					
7- 8	Larrabee	Harmony Corners	Angelica	Greenleaf	Valmy.
9-10	Cleveland	Tigerton	Seymour	Sobieska	Krok.
14-15	Millston	Independence	Mt. Sterling	Wauzeka	Hixton.
16-17	Blair	Fountain City	Eastman	La Farge	Shamrock.
21-22	Kiel	Cedar Grove	New Prospect	Brown Deer	Theresa.
23-24	Cascade	Franklin	St. Cloud	Barton	Freistadt.
28-29	*Fairchild	Scandinavia	Arnott	Stockbridge	Town of Algoma.
30-31	*Marshfield	Vesper	Symco	Medina	Tustin.
February.					
18-19	Shennington	New Lisbon	Yuba	*Baraboo	Lodi.
20-21	Spring Creek	Pittsville	Waunakee	*Wilton	Elroy.
25-26	Pardeeville	Brandon	*Kaukauna	Neosho	Endeavor.
27-28	Big Spring	Kingston	*Cato	Wautoma	Montello.
March.					
4- 5	Blanchardville	North Lake	Rockbridge	Ridgeway	*Boscobel.
6- 7	Edmund	Reeseville	Rockdale	Mt. Horeb	*Potosi.
11-12	Brookfield	*Elkhorn	Newark	Western Union	Albany.
13-14	Columbus	*Spring Green	Kansasville	Palmyra	Gratiot.

*Cooking School held in connection with Institute.

Sixteenth Annual Closing Institute, Oconomowoc, March 18, 19, 20, 1902.

All inquiries relative to Institutes will be promptly answered.

GEO. MCKERROW, *Superintendent*,
Madison, Wis.



View Taken at Farmers' Institute, held at Walworth, January 22-23, 1901.

PROCEEDINGS

OF THE

FIFTEENTH ANNUAL

CLOSING FARMERS' INSTITUTE

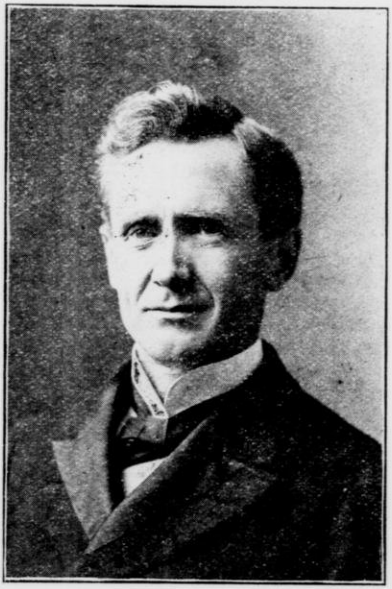
HELD AT

OSHKOSH, WIS., MARCH 19-20-21, 1901.

The meeting was called to order by Superintendent McKERROW. Conductor THOS. CONVEY in the Chair. Prayer by Rev. E. H. SMITH of Oshkosh.

ADDRESS OF WELCOME.

Hon. E. R. Hicks, Attorney-General.



MR. HICKS.

Mr. Chairman, Ladies and Gentlemen:—In the name of the City of Oshkosh and the merchants of this city, and in the name of the University of Wisconsin, which this Institute represents, I am pleased to extend to you and to all who may attend this closing Farmers' Institute, a very cordial welcome. Having said this much, I suppose you will think that I am through, that I have discharged my duty, but I assure you that you are not to escape quite so easily as this. I think it would be an idle and a perfunctory performance if I merely said to you that you are welcome to this Institute. Of course you are welcome; it is your Institute, it does not belong to the City of Oshkosh; it does not belong to the highest educational institution in the State, but it belongs to the agricultural classes of the State, to the farming element of the State, and you are always welcome to your own, and when you come here together for the purposes of this Institute, I take it for granted that you expect to get something out of it. This is altogether too intelligent an age for people to be running around the country and carrying nothing back to their homes, and when we come to the Farmers' Institute, as to any other gathering, we expect we

are going to get some great benefit from it which we can take home with us.

A Good Word for Institute Work.

Now, the Farmers' Institutes of this country have provoked a great deal of superior thought. When we listen to the papers on different subjects presented and to the pointed questions that come during the discussions at these meetings, we cannot but realize that something is to come out of these Institutes, something that will be a positive and great advantage to us as individuals. We hear it talked on every hand that the place to go in this country is to the city, on account of its superior advantages, educational, social and otherwise. All these things are inducing the people to come in from the country and live in the city, but we go to the city and we hear men who have been bred upon the farm, and they are looking to the time when they expect to own a little piece of land and go back upon the farm.

When we come to study the conditions that surround our people, we find there is going on to-day an entire redistribution of population. We hear men talking of the great evils of the city, urging people to get out of the congested centers and go upon the farm, and on its surface that looks like a good solution of the problem, but when we stop to look down into the causes that are tending to bring about these congested conditions of the city, we find it is not altogether a matter of choice; we find, as one writer has very tersely put it, that the economic conditions that are upon the country to-day do not consult preferences—they create necessities. Man goes where he is obliged to go, and he makes himself comfortable where he is obliged to be when he gets there. Now, men come into the city for a reason. In the beginning men only went into the cities at night, and they went out to farm their farms in the daytime, coming into the city at night for protection. After that, when the communities had centered the protection was extended, and they came to reside upon their farms, which they did until about the middle of this last century. Then we find such conditions coming upon the people as absolutely changed their surroundings unconsciously to the people, and the main factor in that change, if you will study into it, you will find is the application of the genius of America to the invention of machinery. This compelled two circumstances that stare us in the face as a people to-day, and those were diametrically opposite when applied to the country and to the city.

Changed Conditions.

In the beginning, a manufacturer was a man who made by hand, an agriculturist was a man who tilled the soil practically by hand, but as we came to invent ingenious machinery and apply it to the soil where heretofore we needed three, four, five or half a dozen men to produce a crop, we find now we get along with one or two very comfortably. Now, where are the others going? When, on the other hand, we come into the city, we find the productions of the city originally hand-made, every article, every chair and cap and coat and pair of boots and piece of furniture, anything that is useful, the individual learned the whole trade in those days, and knew how to make a whole article. To-day what is the fact? The inventive genius of the Yankee has made us peculiar and intelligent machinery and grouped around that machinery we find men in a division of labor; one man knows only one thing, but the whole machine demands a great many men, and as a result we find that in the manufacture of goods, a settled demand is always present for people.

Now, then, apply these two facts to another condition that is inherent in man, and we have the solution of the population question of this country to-day. Man cannot eat any more food to-day than he ever could, and if ten men were placed upon an island where they had to produce everything they consumed, they could eat only just so much—so much pork, so many eggs—no more today than they did a thousand years ago. But the men who produce from the soil find there is a great human family, which is to-day demanding of producers of the soil a certain amount all the time, but they cannot consume any more, compara-

tively, than they did a thousand years ago, but the result is that with the appliances, the conveniences we have to-day in this country, if all remained farmers as we once were, the result could be easily seen. Some of us have got to get out of the farm business. In the city a man is not limited by his consumptive power, the size of his appetite, but he pays the price for the quality of his taste, and the scale of his education, and he pays the larger price, according to his ability to pay for it. If he has a hundred dollars, he will pay a hundred dollars instead of a dollar; he will buy good shoes, he will buy good hats, he will buy the better thing to-day than he did a thousand years ago; there is no limit, there is an unbounded market for the congested population, and the intelligent machinery in manufacturing, while there is ever a narrowing market for the product of the soil and fewer men to produce it by reason of the application of modern machinery.

Survival of the Fittest.

How does this affect us here? Why, this way, and it is true, whether we live in Winnebago County, whether in New York, in Denmark, or Japan, that the agricultural element can only have so much market for their products, and they have to compete in the markets of the world for it, because of the modern ability to produce and to distribute by modern means of distribution. And what is the result of that? Why, we know that it is the intelligent men, the fittest survivor, who comes out of it, while the weaker men go to the wall. Who is going to raise the crops in this country, whether corn, tobacco, beef, whatever it may be? Who is going to raise it? The man who knows best how to take advantage of modern conditions and put the products of his acres upon the markets of the world. Intelligence in this country is a higher factor and worth more than it ever was before in the history of the world. When this Institute comes into your midst and when it scatters its benign influence over this State and over you yourselves, it is not a mere empty performance, it is something that is putting into the individual and the race the power to win against the world. Men cannot shut their eyes and turn away from this proposition.

During the past years millions of dollars have been given to us by virtue of our inventiveness; we have flooded the markets of the world with our superior produce until we have offered a challenge to the old world to furnish to her own people as cheaply and as effectively as the American farmer could do it. What is the result? The governments of Europe have aroused themselves. They are trying to wake up their people through every means to the productive and industrial situation, through their universities and schools they are urging upon them the necessity of waking up to intelligent action that they may husband, not only their markets, but capture some of the other markets of the world.

The result is we find in Denmark to-day more than six thousand of these co-operative institutes; France has seven thousand; in Prussia there is one for every single county, and what is the result? We have got to face the conditions in this country. If we don't wake up with our fortunate conditions, our magnificent acres, our superior intelligence and machinery, we will find ourselves getting behind, and Europe capturing the markets for us. What are you going to do about it? Attend the Farmers' Institutes; think upon these questions; do better to-day than you did yesterday; keep our local market and by working with our full intelligence and the great advantages we have, we may hold our own.

A Few Figures.

Right here in this county we must look at these things. Look at the dairy interest alone. In this country to-day I believe I am right when I say that there are sixteen million dairy cows, producing butter, not beef. Last year they produced one and one-half billion pounds of butter. Now, how much is that per cow? A little more than ninety-four pounds to each cow, not two pounds a week, and at twenty cents a pound, that makes forty cents a week, about $18.80 per cow a year. This is the average from all the producing dairy cows in the United States, and if the average is $18.80, what can

we say of those below the average and down to the lowest? A man showed me his book yesterday, showing that this last year his cows had netted him $100 apiece. How is that in comparison with $18.80, the average of the whole country? That man is a progressive farmer; he looks upon the soil below him as a key to fortune, and he takes advantage of it.

If we expect to keep the markets of the world, we must bring up that average. Four-fifths of all this butter is made in the dairy, only one-fifth in the creamery. Are we going to keep our farmers' wives toiling and moiling to make $18.80 per cow? What we need to do is for farmers and their wives to come out and think of these things; get out of the rut they have been traveling in, lift themselves up by main strength, if need be.

I heard of one farmer's wife who went crazy, and in speaking of it her husband said: "I declare I don't see what made her go crazy; she hasn't been out of that kitchen in thirty years." I wonder they don't all go crazy. What we need is to apply to the farm and its work the same kind of energy, the same brain effort that the merchant and the manufacturer puts into his business, and then we will drive the agricultural interests of other countries into their holes.

Now, how are we going to do this? Attend the Farmers' Institutes; go to the fairs, and when you find anything interesting consult with your neighbors; raise this average of $18.80 a cow one or two or three dollars a year; get the best information you can in every direction, and the best counsel. I can do no better for you than to urge these things upon you. I thank you very much for your presence; we appreciate your interest in coming here during this storm. We are glad to see you in Oshkosh and welcome you here, but do not think that you must leave your farms and come to live in the city. It is a mistaken notion. The farm is the place that gives us the best men, the best intellects in this age of the world. We appreciate that, and we welcome you to this Institute.

RESPONSE TO ADDRESS OF WELCOME

W. C. Bradley, Hudson, Wis.

Mr. Chairman:—We who have come from the four corners of the State, who represent the different localities and the different interests, are gathered together in this Round-up Institute in Oshkosh to be with you for three days. We hope, in view of the hearty welcome that has been extended by Mr. Hicks, and the reception we have been accorded by the citizens, indeed, we are sure, that our stay will be pleasant and profitable. I wish that Superintendent McKerrow could induce Mr. Hicks to follow us and take part in some of the Farmers' Institutes that we hold in some sections of this State. I wish he could have been at one held thirty or forty miles from here, for I believe that if those people could have heard him talk, they would be more interested in their own work and in this Farmers' Institute work. There are a good many people in Wisconsin who come to the Institute without any regard for the work that it is intended to do, without, in fact, taking home anything they may have learned at these meetings and without trying to put them into practice. In many places they come simply to get some fun out of the meeting, but this is the farmers' school, and it should be, as it is intended to be, an educational work, not simply to better the condition of our farmers in money-making, but if there is anything that has been done in these ten or fifteen years' work of the Farmers' Institutes, it has been to build up better characters and better farm homes in the State of Wisconsin. We can talk about money-making on the farm, and that is all right, but it is not money-making alone that makes the farmer, and the best work that these Institutes have done is toward building up a better citizenship for the State of Wisconsin.

We ought to see more young men in these meetings. There are to-day in this audience over half of them old, grey-bearded fellows like myself, but we ought to see more of the younger men.

We are glad to meet with you, and we hope that these three days will be pleasant to you and we are sure it will be profitable to us.

OUR EXPERIENCE IN RAISING POTATOES.

J. P. WURTZ, Brownsville, Wis.

MR. WURTZ.

Within the limits of a short paper it is impossible for me to do justice to, or thoroughly explain this subject, as I dare say, of all the crops which we raise there is none that needs closer attention than the potato crop to make it a success to the average farmer. As we principally have a mixed farming in this State, it is necessary for us to follow a rotation of crops; therefore it would be very unwise for us to adopt or rely only on one crop where we have opportunities above the large portion of our farm country. For that reason I would urge upon you that not a crop that can be raised in this State is valueless enough to be overlooked, whether we raise it to any extent or not. And let us be master of what we raise. I think it would be unwise to try and raise twenty-five acres of potatoes where we are so situated that we can only take care of five acres properly.

Now, the question that stands before us is how to properly take care of them, and how to get the best results, or, in other words, how to get the most dollars out of them, as the latter is the principal thing we are really after. I will simply give our experience as we have found it year after year, and leave it with the audience to decide what is best for them after the discussion is ended.

Preparation of Soil.

In preparing the ground where we have no sandy soil we must get it as near sandy-like and as mellow as possible. Therefore, if we have tough sod we plow it shallow in the fall previous to our planting; in the spring we cultivate and harrow thoroughly, cover it well with manure, and then replow it from seven to eight inches deep. We take the greatest pains in plowing as level as possible, so as to prevent the use of more tools on the ground than is necessary after it is plowed, especially when the ground is wet. I will have to repeat that we keep the ground as mellow as possible, as this is one of the most important points. Where we plow the ground twice we seldom go over it more than once with the drag harrow, and once with the smear; we never use a roller, as it packs the ground too hard. After that we mark it in checks two and a half feet one way and three feet the other. We prefer checks, as we can cultivate them more thoroughly.

Planting.

We are now ready to plant. In the first place I should like to advise you not to cut your seed potatoes too long before planting time, as they will dry too much. We plant by hand. We mean to plant about three inches deep. Where the ground is in the condition that we wish to have it we simply throw the potato in the mark, step on them and cover them with the hoe.

By so doing, we leave the potato solid in its place, where it will soon sprout, and the loose ground on the top will soon allow the potato to come up and get a vigorous growth, providing the seed has been well selected and has had proper care. This is a point that is so often overlooked by so many of our farmers, and then they wonder why they cannot make a success in raising potatoes.

If possible we pick out our seed potatoes in the field while digging in the fall, as this is the best place. We never choose a potato that varies in any way from its proper kind; we choose a smooth, middle-sized potato, with as few and shallow eyes as possible. Care must also be taken for the so-called "sports." If you will watch your crop closely, you will find that even if you take the best care you will find different-colored potatoes in one variety, and if you are not careful you will soon run out your potatoes, and you may not know why. During the winter we keep our seed potatoes dark and as near to the freezing point as possible, so as to prevent them from sprouting, until about ten days before planting, when we carry them up in the barn, where they will soon begin to sprout. We can easily see those which are not thrifty enough, and those we throw out. It is also much better to get your potatoes started from the first sprouts, as they are much stronger.

POTATO FIELD ON FARM OF MR. WURTZ.

Cultivation.

The first cultivation we give our potatoes after planting is to run through with the weeder just before the sprouts come out of the ground, unless we should have a heavy rain before those potatoes get so far along. In that case we should prefer to go through with the weeder or drag harrow, as soon as we see fit to do so. After that we use the Planet Junior one-horse cultivator, and keep them thoroughly cultivated until they are fit to hill. We hill them with an old-style hilling plow and after this we never apply another tool to them un-

til we dig, as the potato will soon take care of itself after it gets so far along, providing it has had proper care up to this time. If they have, the tops will soon cover the rows, hold moisture and keep down the weeds.

In regard to digging and storing them in the fall, it appears to me there is little or nothing to be said on my part, but I would like to suggest that anyone with muscle and a good lot of solid ambition would be very welcome to call at our place during digging time. I am sure I could make it more clear to them what there is to be done than I can tell them at this time, and at the same time prove to them that they can be more useful than ornamental about that time, as we dig with a fork.

DISCUSSION.

Mr. Culbertson—Why do you take a potato of medium size?

Mr. Wurtz—We have had better results from taking a potato of medium size, because they have the better quality, and they are about the size that we wish to have them.

Supt. McKerrow—What do you mean by medium size? About the size that commands the best price in the market?

Mr. Wurtz—Yes; I would call them table size. We have an Empire State which grows quite large.

Mr. Culbertson—Is the planting of very large potatoes likely to injure the quality of the following stock?

Mr. Wurtz—Well, I won't say that it would be injured, but there would be too much waste; for instance, the Rural New Yorkers, which grow very large, I would not take the largest ones because they grow too large, as a rule. Such large potatoes would not be as marketable as a smaller variety.

Supt. McKerrow—If you had a smaller variety, would you plant the largest of them?

Mr. Wurtz—Yes, I would.

Mr. Furbeck—How fine do you cut your potatoes—how many eyes?

Mr. Wurtz—We cut them down from two to four eyes. This potato I hold in my hand has too many eyes right on the point, and we cannot get good satisfaction, unless we cut the seed end off from it. If we leave all those eyes on the end when we cut the top in two, it will leave too many eyes, and it gives too much of a top, and the result is that there are a good many small ones in the hill, so we cut off that top part. There are two eyes in this piece and that will bring good results. We mean to cut our potatoes from the top downward, generally. By holding them up to the light you can see that the roots run downward, and when we cut the wrong way we get more of the part that forms in the root in the potato.

Mr. Matteson—How many pieces do you put in a hill?

Mr. Wurtz—One in a hill; there are four eyes there, but one would not amount to a great deal, because it is too thin, and there are two eyes in each of the other pieces.

Mr. Scott—Have you carried on an experiment with reference to the seed end?

Mr. Wurtz—We throw them out entirely. We have left the seed end on, and in some varieties it makes a pile of difference, because we have too much of the growth of the top and then they are all small potatoes in the hill.

Mr. Scott—Is not that in contradiction of the experiments at Madison and at the Ohio Station? I understand they carried on three years' experiments to determine this fact at Madison, and what little difference there was, was in favor of the retention of the seed end, and like results were reached at Ohio.

Mr. Wurtz—It was not so with us. I am telling you our experience along that line.

A Member—Do you think you get better results by cutting the potatoes or planting them whole?

Mr. Wurtz—I think it would be a great waste to plant the potatoes whole. On small potatoes there are generally more eyes than on the larger ones, and, of course, I would not advocate planting small potatoes then.

Mr. Gillingham—You do not think the small potatoes so productive?

Mr. Wurtz—No, sir; in time your potatoes would run out—grow small by and by. Probably one year would not make much difference, but if you followed out that rule for some time I

think you would find that your potatoes would run out.

Mr. Scott—I would like to ask Mr. Gillingham about this.

Mr. Gillingham—The experiments at the Station show that they have had practically as good results by cutting down the seed end. I know there are farmers throughout the country who have that opinion, but I think they carry this opinion for the reason that there are a good many sprouts, of course, if they plant that end of the potato. Perhaps there is not plant food enough for that number of plants, but if that potato is cut down through the end I think there is no object in cutting it off, for the reason that we get our strongest plant from the end of the potato. That is my idea.

Mr. Cook—How about the blight; do you have any trouble with it?

Mr. Wurtz—We do to some extent, but we have not done anything to guard against it.

Supt. McKerrow—You have not used the Bordeaux mixture for it?

Mr. Wurtz—No, sir; but I think even land plaster is a good thing to guard against it partly. A year ago we plastered about one-third of our potatoes on a piece of about six acres, and those that we plastered were a great sight better, and they did not show blight as much as those we did not plaster.

Mr. Culbertson—What is your object in covering potatoes with the hoe?

Mr. Wurtz—Simply because we think we can get the proper amount of ground on top of the potato that it requires. In covering with a horse power, we find that we get them down deeper, some of them, than we wish to have them, and on our soil we have to be very careful not to get them down too deep.

Mr. Scott—What is the proper amount of ground?

Mr. Wurtz—We aim to plant about three inches.

Mr. Arnold—I think the gentleman made a good point when he said that he treads down the potato, and has it firm in the ground. I think too many of us plant our potatoes and leave the ground loose around them; then when dry weather comes on, they don't grow as they should, on account of having only loose soil on top of them. That is the trouble with a machine. There is a pressure of earth on the potato when you tread it that way. Then, again, he says, take a medium-sized potato and in that way prolong the life of the potato. If you get it too large there is waste, and if you get it too small it will run out. It seems to me there is a good deal of sense in that.

Mr. Everett—Do you cut your seed from the seed end or the stem end of the potato, Mr. Culbertson?

Mr. Culbertson—I cut my potatoes with a little tool or instrument made for that purpose, which does not count eyes, and we get just as good results, and we can do the labor in one-third the time. These tools are becoming very common with us. When I cut a potato by hand, I begin on the opposite end from this gentleman. I have been taken to task for doing so, but I begin at that end for the reason that I want a potato split, and I want all of the eyes left on.

Mr. Scott—Would you prefer to have the pieces long and slim, or in as chunky a form as possible?

Mr. Culbertson—The object of using this little machine is that it cuts in a very chunky, compact form, and it is my idea that it ought to be in better condition to stand unfavorable conditions than a long, slim piece, or a thin, slabby piece.

Mr. Wurtz—That is my idea, and experience, too.

Mr. Cook—What about bugs, do you have any?

Mr. Wurtz—We do. We use land plaster and Paris green; about a tablespoonful of Paris green to about three quarts of land plaster, and apply it by hand. We find better results than where we apply the Paris green with water.

Mr. Cook—In our State we are finding a great deal of damage from this Paris green burning the foliage, and very much of the trouble that had been laid to the potato beetle and to the fungus has been found to be due to Paris green, and many of our potato growers are coming to put lime with the Paris green, which neutralizes the caustic effect of the Paris green, just the same as you put lime in the Bordeaux mixture to neutralize the effect of the copper.

Mr. Culbertson—Please give the formula.

Mr. Cook—Just enough to cover it; there is no formula.

Mr. Culbertson—One pound of lime to one pound of Paris green, half and half?

Mr. Cook—Yes, that will do, being sure that the lime is dissolved so it will be free from lumps.

Mr. Wurtz—Would it not do something against the blight also?

Mr. Cook—In a measure it would.

Mr. Arnold—I don't think anybody would criticise your remarks as to the manner of preparing the ground, but under those conditions, what do you call a good crop?

Mr. Wurtz—An average crop we call about 200 bushels, but we have raised as high as 250 and 260 bushels to the acre, and we have raised less, but I think never less than 175 bushels.

Mr. Arnold—And did not plant the seed end, either?

Mr. Wurtz—No, sir; we didn't.

Mr. Scott—What kind of soil have you, Mr. Wurtz?

Mr. Wurtz—A heavy clay.

Mr. Scott—If we all had a sand farm, like Mr. Arnold's, it might be all right, but I am quite convinced that compacting your soil upon heavy clays is not the thing. If the soil has been prepared so as to conserve moisture, I am of the opinion that it is much better to keep that soil as mellow as possible, on all sides of the potato.

Mr. Arnold—I will agree with Mr. Scott in that proposition, but the potato is nothing but a root, and you have to have the soil come into close contact with it in order to encourage its growth, and a certain amount of compactness is absolutely necessary for any kind of plant life.

Mr. Scott—That is not a parallel case. In the first place, we don't want as many seed ends on our potatoes as usually have been on the roots of trees. Any properly prepared soil will furnish food for plant life.

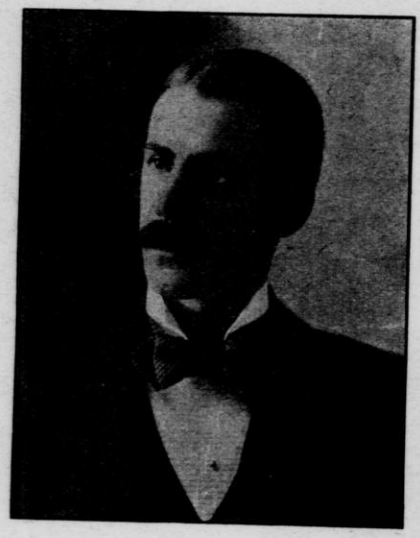
Mr. Thayer—I must take issue with Friend Scott and side with Mr. Arnold. I believe the proper way is to roll and then harrow any kind of soil.

Mr. Wurtz—For my part I wouldn't advocate it on any soil whatever.

Mr. Culbertson—This gentleman uses a good tough sod, it wouldn't be hard, and I think he is right.

SMALL FRUITS.

J. L. HERBST, Secy. of the State Horticultural Society, Sparta, Wis.



MR. HERBST.

I am not informed as to how I am to treat this subject, whether from the commercial standpoint, or simply the farmer's fruit garden. I shall endeavor to talk on both.

My experience in growing small fruits has been for commercial purposes. Each year a good many of the farmers of our State are persuaded by the glowing accounts of the successful growers and the smooth talk of the nursery agents to purchase fruit plants to a great extent, with the idea that they are going to make big money by marketing small fruits. A good many such cases have come under my observation in the past ten years. I will say that I do not consider it advisable for the average farmer to go into the small fruit business with the idea that he is going to make a big thing out of it, and I shall try and give a few reasons why I think so. Remember, I speak only of the average farmer, and not those who pretend to make a business of it.

Best Quality Demanded.

There was a time when small fruits of almost any size and quality could be placed upon the market in almost any shape and command a good fair price, but that time is past. In order to demand a good price today, fruit-growers must place upon the market fruit of the best quality and put up in neat, clean and attractive shape. The average farmer of to-day cannot do this without neglect to his other produce.

Unlike the other crops of the farm, small fruits have to be disposed of at one certain time or be a total loss. Most other crops of the farm can be held for a time until the price is favorable. Small fruits must be disposed of whether the market is favorable or not. It is necessary that you dispose of the pickings each day, which will require a trip daily to your shipping point, and in doing this you will neglect the work necessary to the other crops. The work of attending the small fruit business comes just at the time when your other farm products need care and attention. You have to neglect one or the other, and it lies with you which one to abandon. A few days' neglect in the harvesting of the corn, potatoes or most any of the general farm crops will make but very little difference, but a few days' neglect of the small fruit crop when it is ready to market will mean a total loss.

I might mention a good many reasons why I do not consider it advisable for the average farmer to go into the small fruit business, but time will not permit. I will say, however, that there is the proper location to take into consideration as regards soil, distance from shipping point, and outlet to different markets. The required amount of help in picking time should also be considered. I do not wish to discourage the planting of small fruits, but

rather encourage it, providing one can do it the proper way.

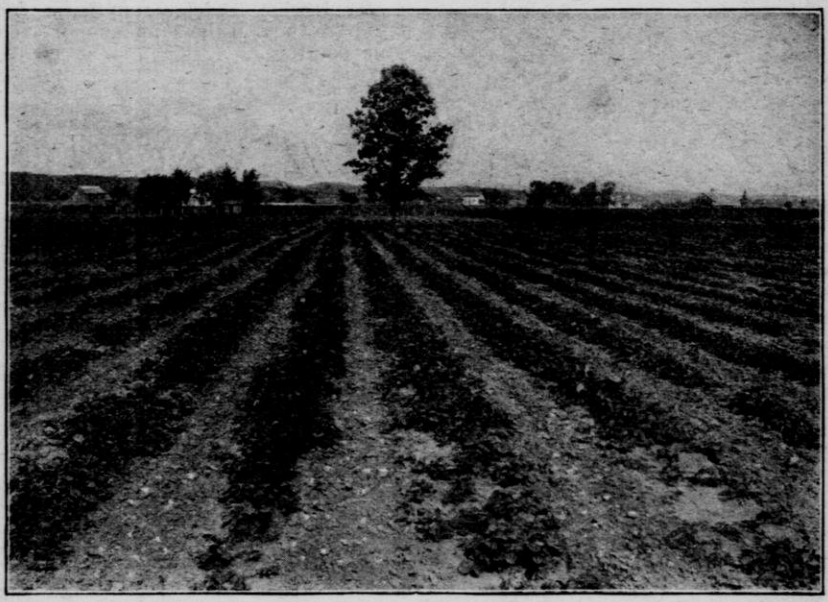
Small Beginning Best.

If anyone has any idea of going into the business, start out on a small scale. Plant only those varieties which will succeed and which have succeeded in your locality. Give them the best care and attention, and place your fruit fresh upon the market in neat and attractive shape. Fruit of good size and quality placed in neat and attractive boxes and crates sell quickly and for a good price, while poor quality fruit sells slowly and brings a low figure.

While I do not advise the average farmer to go into small fruit for commercial purposes, I do strongly advocate the planting of enough for home use. There was a time when the farmer could take a pail or basket and go to the woods and get the wild strawberries, blackberries, gooseberries, wild grapes, plums and cherries, but as the land is cleared fruit disappears, and the farmer has to plant and cultivate it if he would have it. Once used to having fruit, he will not be without it. No more work is required to care for the fruit garden than the ordinary vegetable garden.

The Farmer's Fruit Garden.

Small fruit succeed on almost any soil if proper care and attention is given. A plot of ground three rods wide and twelve and a half rods long planted to strawberries, raspberries, blackberries, currants, gooseberries and grapes, and given proper attention will produce all the fruit necessary for the average farmer from the middle of June until the first of September. In the plot you would have three rows of strawberries, one row each of red raspberries, black raspberries, and blackberries, half a row each of currants and gooseberries, and one row of grapes. Each of these rows twelve and a half rods long. The strawberry rows would be three and a half feet apart, all other rows seven feet apart. This would require about 300 strawberry plants, 75 red raspberries, 75



Strawberries for Following Year's Fruiting.

black raspberries, 75 blackberries, 25 currants, 25 gooseberries, and 40 grapes.

I would plant the following:

Strawberries—100 Warfield, 100 Bederwood, 100 Haviland.

Red Raspberries—50 Cuthberts, 25 Loudon.

Black Raspberries—50 Nemeha, 25 Older.

Blackberries—50 Ancient Briton, 25 Snyder.

Currants—15 Red Dutch, 10 White Grape.

Gooseberries--15 Downing, 15 Houghton.

CORRECT METHOD OF SETTING STRAWBERRY.

TOO DEEP.

Grapes—10 Concord, 10 Moore's Early, 10 Delaware, 10 Niagara.

Planted in rows most of the work can be done with horse and cultivator. Keep all weeds down and apply barnyard manure liberally. Keep the strawberries in rows, and in the fall cover lightly with straw to protect them from thawing and freezing. Trim out the fruit-bearing canes of raspberry and blackberries every fall and give winter protection to the new growth by bending over the tops and tacking down with dirt.

Keep the currants and gooseberries well trimmed out in the center to give light and circulation of air. The grapes should be severely trimmed each fall, cutting back new growth to one or two buds of the main vine. These should be bent over and covered with dirt, straw, or any coarse litter.

I have been rather brief in describing the care and attention that should be given this fruit garden, but will be glad to give further instructions to any desiring them, in the discussion.

DISCUSSION.

Mr. Arnold—What is your soil?

Mr. Herbst—Black, sandy loam. You prepare the soil the same as you would for potatoes.

TOO SHALLOW.

ROOT NOT SPREAD.

Mr. Arnold—You recommend that soil to be the best?

Mr. Herbst—I would; still small fruits are grown in Sparta on any variety of soil.

Mr. Arnold—How would you set out strawberries?

Mr. Herbst—I would set them out in rows, three feet and a half apart and two feet and a half in the rows, using a trowel to set them out. It is no trick to set a strawberry plant any more than a cabbage or a tomato plant.

Mr. Arnold—Give us your method.

Mr. Herbst—We always set out on a large scale. One man uses a spade and one boy spreads the roots with his

hands and puts them in back of the spade, and the spade is withdrawn and the man presses the dirt on that with his foot. We cut the roots about one-third off.

Mr. Arnold—What do you press the dirt around the roots for?

Mr. Herbst—We wish to get the soil firm about the root so the new rootlets will start.

Mr. Price—What time of the year do you plant strawberries?

Mr. Herbst—All small fruit plants should be planted as early in the spring as possible.

Mr. Roe—Why do you select the Red Dutch currant?

Mr. Herbst—Because it will stand more abuse and has been more generally grown throughout the State. There are plenty of new varieties, but for the average farmer I think that will do the best, as it has been tested.

Mr. Matteson—It requires less pruning than some of them.

Mr. Herbst—They all require a good deal of pruning.

Mr. Matteson—You speak from the standpoint of the sand farm.

Mr. Herbst—I speak from the standpoint of any farm. You should go on as soon as you can work your soil to advantage.

Mr. Cook—How many years do you carry the strawberry?

Mr. Herbst—Two or even three years.

Mr. Cook—If you get an average crop the first year you expect to duplicate that the next year?

Mr. Herbst—I never have seen the time when the second year's crop exceeded the first crop.

Question—How are you going to carry this bed over?

Mr. Herbst—I believe the most successful manner of cleaning out a strawberry bed is to take a small plow and plow a back furrow, cutting down the rows to about six inches, and then go over with a drag, dragging in both ways. After that cultivate just the same as you would a new bed.

Mr. Cook—Which way would you turn the furrow, onto the row or away from it?

Mr. Herbst—Away from it.

Mr. Matteson—Why not take the mold board off and let the dirt fall right down?

Mr. Herbst—I never tried that.

Mr. Matteson—I heard that suggested and I thought it a good idea.

Mr. Catt—I am afraid the weeds will be too thick.

Mr. Herbst—Oh, no, they will shade them. Dr. Loope raises strawberries right in the weeds—he says they protect them.

Dr. Loope—I am advocating a new method, but I want to warn you just the same that it won't always succeed. Several years ago we planted out a few acres of strawberries and fruited them the next year; during the first year we cultivated up until the middle of July, and we were very busy and we had to stop cultivating. We let the weeds come and they shaded the plants all right. There was some grass came in, too, but we picked the next year, and we had over 25,000 quarts, more than we could sell. Then we let it go, of course. The next year we mowed it after we picked it, and then we mowed it for hay.

Mr. Cook—I am one of these average farmers, and I noticed this word seven or eight times in your address. I used it two or three weeks ago, and one of the gentlemen in the audience called my attention to the fact that there are no average farmers in Wisconsin. We have a lot of them in our State and we have difficulty with weeds.

Mr. Herbst—You don't take care of your plantation right the first year. If you keep it clean then you won't be bothered the second year.

A Member—I have carried it over four years and have had good results.

Mr. Convey—Tell us the proper method of taking care of the bed the first year?

Mr. Herbst—Anyone can do the work on the bed the first year after the vines are set out; it is simply cultivating and hoeing, keeping your vines in rows. Simply keep them clean, the same as you keep your potatoes clean.

Mr. Convey—Do you mow or burn them after picking?

Mr. Herbst—In an old bed we generally mow it, if it is very bad, if weeds happen to get in it.

Dr. Loope—Then don't you get weeds four feet high?

Mr. Herbst—No.

Dr. Loope—You haven't any soil then; we have soil.

Mr. Bradley—I notice in your paper that you recommend to plant twenty-five Loudon and fifty Cuthbert raspberries. I should think it ought to be the other way.

Mr. Herbst—Well, they are both all right.

Mr. Matteson—Won't twenty-five Loudon yield just about as much as fifty Cuthberts? That is my experience.

Mr. Herbst—Not in ours.

Mr. Bradley—That is just our experience. I think the Loudon is a great deal the better berry of the two.

Mr. Herbst—The soil makes a good deal of difference with most any variety. You hear of some variety that is being originated that does exceptionally well on a certain soil, but if taken to some other place it does no better than lots of other varieties.

Mr. Roe—I have a bed of strawberries that was well attended to last spring, and into the summer; then it came along a wet week or two, and the berry vines grew so it is a perfect mat. What am I going to do with it?

Mr. Herbst—You will get berries. I have never seen strawberry vines get too thick to yield well. We hear a good deal about the new method of cultivation and about thinning the plants, but I know of plantations that have not been equaled by the row system. I think J. M. Smith's Sons could tell great stories.

A Member—Can you plow in between the rows on clay ground?

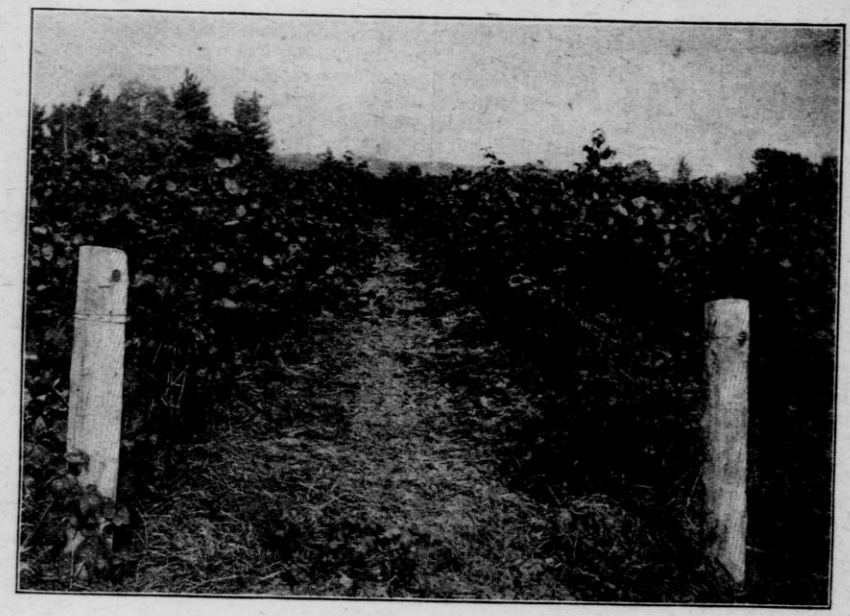
Mr. Matteson—I practice it every year and follow it up with the cultivator, but you want to take a narrow plow or take the mold board off.

Mr. Bradley—One of the biggest strawberry growers in our country takes a potato digger for his second crop, in order to root up the bed. The plow with the mold boards off loosens up the ground between the rows and lets it fall right back.

Mr. Spurbeck—Why do you prefer the Cuthbert to the Loudon?

Mr. Herbst—I just named these two varieties as they happened to come to my mind as I was writing.

Dr. Loope—We must always remem-



NEW GROWTH OF BLACKBERRIES FOR FOLLOWING YEAR'S FRUITING.

ber there is a great variety of soil to be considered. Our friend, Mr. Herbst, has deep, sandy soil, but they do not grow just the same over on my soil, which is clay loam. The Cuthbert is practically the queen of the market. On the other hand, there is no doubt but the Loudon will bear more berries.

Mr. Convey—The Loudon has given more general satisfaction throughout the east than any berry I know of.

Mr. Snyder—I have tried many ways of cultivating, but if we have dry weather it won't do. I take a hoe and go through along on the edge and then cultivate, and I think that gives better satisfaction. You cut along on the side first.

Mr. Cook—Can you grow the large Industry gooseberry?

Mr. Herbst—We cannot; they mildew.

Mr. Arnold—Mr. Herbst speaks about three rows for the average farmer's garden. I think he ought to have nine rows. I have a garden fourteen rods long, and it is more trouble than any other twenty acres on the farm, but I raise some weeds. On your land you can't grow weeds, it is too poor; I wouldn't give a cent for land that wouldn't grow weeds. We can get too much manure on our land. Now, you set out three rows this year, four feet apart, and the same distance in the rows that you suggest, and you can keep the weeds out the first year, but the next year you cannot, but you get a good crop the next year. Set out another three rows this next year and another the next year. You will mow the first year and turn that over, and you have a rotation of crops. It seems to me that that is a practical thing for the farmer. He gets a good crop of berries and he mows every year.

Mr. Baker—How do you manage about pruning your raspberries and blackberries?

Mr. Herbst—We don't prune our raspberries at all; we let them grow, that is, our red raspberries. With black raspberries and blackberries we pinch out the point of the new cane when it gets about eighteen inches high. This will throw out lateral canes and give you much more fruiting surface. In the spring of the year we cut them back, both red raspberries and blackberries. With the red raspberries we simply cut back the dead cane, but with the black raspberries and blackberries we cut back these laterals to within about eight inches of the cane stock. We leave about four or five canes in each hill. In the red raspberries it all depends on the size and strength of the cane.

Dr. Loope—You prune your blackberries about eighteen inches from the ground for laterals. You don't touch your red raspberries. Now, what do you want laterals for?

Mr. Herbst—Bearing surface.

Dr. Loope—Why wouldn't the same principle apply to the red raspberry?

Mr. Herbst—It does not. Red raspberries, in our experience, will not send out the laterals that the other cane berries do.

Dr. Loope—There is a difference again. I can raise red raspberries very high if I don't prune them.

Mr. Herbst—We cut them back.

Dr. Loope—Where the soil is good and where they are well taken care of, we pinch them when they get two feet and eight inches high, and we get fruit from the laterals.

Mr. Baker—Do you make a practice of laying down the raspberries for the winter for protection?

Mr. Herbst—We do; we pull the tops over and lay them as nearly flat to the ground as possible. It is best to lay down the cane on a damp day, because your canes will bend a great deal easier and there will be less breakage.

A Member—How do you kill the currant worm?

Mr. Herbst—Use white hellebore, a tablespoonful to a sprinkler of water, a common pail. We have used Paris green, but people don't like to buy the fruit if they know you have been spraying with Paris green. It will do it quicker than the hellebore, with less application.

Dr. Loope—Our practice has been to use Paris green, and you don't have to spray your fruit; all you have to do is to sprinkle the under leaves from the ground. You will notice the worms always come up in the daytime and go back at night. You need not put the Paris green all over the bush, you can put it under, sprinkle it all around; a teaspoonful to a pail of water is enough.

Mr. Convey—Half that strength will answer the purpose just as well.

Mr. Baker—Last summer I used a knapsack sprinkler and the Bordeaux mixture and Paris green, and the effect was very good, and no harm was experienced.

Mr. Matteson—What is your method of covering strawberries?

Mr. Herbst—We cover them in the fall after the first frost and use straw or any coarse litter, marsh hay is all right, putting on just enough to cover them, not too much. In the spring we take the fork and pull it off, placing in the middle of the row. It will protect the berries and keep them clean. We take it off after the growth begins to come.

Mr. Baker—How do you manage to prevent some varieties of strawberries from matting too thickly?

Mr. Herbst—You can keep this in check by pulling off the first runners that appear for a time, leaving the later runners to set a plant.

Mr. Baker—We have sometimes tried to keep them thin, but it requires a good deal of care and attention to keep them from matting too thickly. I want to ask Mr. Herbst, do you have the rows of strawberries run one way or both ways in setting?

Mr. Herbst—We mark our rows both ways and cultivate both ways, until they begin to send out the runners; then we cultivate one way.

Mr. Bradley—You wouldn't advise a farmer with four or five rows to do that?

Mr. Herbst—No, sir.

Mr. Convey—Does the currant or the gooseberry need any special pruning or trimming?

LAYING DOWN CANES FOR WINTER.

Mr. Herbst—The trouble with the currant and gooseberry is that they grow very thick in the center of the bush. The center of the bush should be kept open, take it out so as to give circulation of air in there. If you do not they are inclined to start mildew.

Supt. McKerrow—How many main stems would you allow to grow in the currant bush?

Mr. Herbst—About four, and about the same in the gooseberry bush.

Mr. Matteson—What variety of gooseberry do you recommend?

Mr. Herbst—The Downing and Houghton; the Red Jacket is recommended a good deal.

Dr. Loope—What is your measure of value in comparison with the small ones and the large berries?

Mr. Herbst—There is not the demand for the gooseberry that there is for other fruit. Heavy fertilization is absolutely necessary for the currant and the gooseberry.

Mr. Arnold—If you cut out the center of the currant bush without regard to the age of the stem, you might not have any fruit.

Mr. Herbst—The growth that grew this year will bear next year, and in trimming out the bush you want to be careful not to cut out the new growth.

Mr. Convey—How do you guard against the currant borer?

Mr. Herbst—The only preventive that you can use is to cut out the canes and burn them up.

Mr. Convey—Then, in pruning, if you will cut out the black canes you are likely to get the diseased ones as well?

Mr. Herbst—Yes; the diseased cane has generally a dead appearance.

Mr. Arnold—When do you put on the hellebore?

Mr. Herbst—No use in putting it on before you have something to put it on.

Mr. Convey—The President of the Horticultural Society said that if you put it on before you will have trouble all the season.

Dr. Loope—No, I spoke about spraying the first time. The worms always grow in the ground and come out in the daytime. The idea is to spray the under side of the leaves and catch those fellows before they lay eggs.

DISEASES OF POULTRY.

C. E. MATTESON, Pewaukee, Wis.

Mr. Chairman, Ladies and Gentlemen:—In taking up the subject of poultry diseases I will say that I have always tried, in my practice of some thirteen years, to go a little further than just simply to treat the disease, but to try and locate the cause and then use as much prevention as possible. The old saying that "an ounce of prevention is worth a pound of cure" is a good adage to use here; in fact this has always been a pet hobby of mine. Instead of first trying to treat the disease, I hunt up the cause and try to prevent it, if possible; the treatment always to come last.

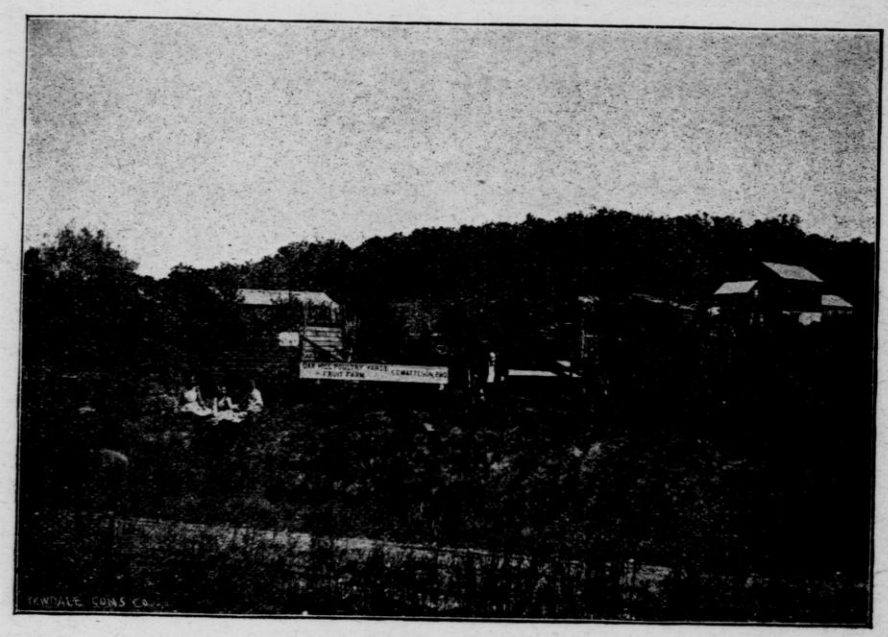
Roup.

For instance take roup, that great scourge. Practical poultry men laugh at this much-dreaded disease. It is usually the result of a neglected cold. The symptoms at first are a hoarseness, sneezing and a slight running at the nostrils, with sometimes a looseness of the bowels. The bird is sometimes compelled to keep the beak open in order to breathe, while during other stages the eyes are closed. Large lumps appear on the head and the houses are filled with a foul, disagreeable odor. Upon examination of the throat there will be indications of the formation of a membrane covered with a whitish mucous. Although this disease is sometimes called canker, every affection of the kind is a form of roup. In the third and last stage the head swells, ulcers form in the mouth and throat and sometimes around the eyes, the appetite fails, the comb turns black and the fowls die. Now as to the cause.

There are many conditions which cause roup. These top ventilators are probably one of the greatest causes. Overcrowding is another great source of this trouble; the air being generally foul and the houses filthy, the result is they spend too much of their time out of doors when the weather is such that they should be indoors. The result is

that after being kept in that heated, sweaty condition by overcrowding, they are sure to take cold at the first exposure.

This same rule applies to young chicks and turkeys that are reared in the so-called "A-shaped" coop. Under this condition, sooner or later they are almost sure to contract a cold of some kind which, if neglected, is sure to develop into roup. Too close in-breeding is also a source of this malady, as is anything else that tends to lower the vitality of your stock.



CENTER VIEW OF POULTRY YARDS AND FRUIT FARM OF MR. MATTESON.

Remedies.

Select all birds that are so affected, that have taken on what is generally called the "stinking stage," cut their heads off and bury them deep or burn them. Then remove those that are slightly affected to warm quarters and wash out their mouths and nostrils thoroughly with a saturated solution of copperas. After being dried off, apply carbolated vaseline to nostrils and all affected parts of the head. I have also had fair success by using kerosene oil instead of the carbolated vaseline. Also use the Douglas mixture in the drinking water and keep a watchful eye on any new cases that may appear. Too much care cannot be taken to keep the feeding hods and drinking fountains clean; they should be scalded every day, for it must be remembered that this disease spreads by the mucous from the mouth, going to the drinking water and feeding hods. Disinfect by burning not less than four pounds of sulphur to every ten feet square of poultry house, closing up doors and windows during fumigation.

Chicken Cholera.

Then again, we have the so-called "chicken cholera." I am here to say, and I am perfectly honest in my convictions, that the real disease chicken cholera rarely exists, but what is known as chicken cholera is indigestion, or the result of over-feeding. Cholera always kills quickly and is always accompanied by intense thirst. This disease not being thoroughly un-

derstood we are liable, at the first appearance of any sickness among our fowls, to throw up our hands and call it cholera. It is a well-known fact that this malady usually puts in its appearance during warm weather. This being the case, let us stop for a moment and think of the conditions in which we keep our fowls during the heated seasons of the year. For instance, a house that fowls are kept in during winter is usually quite warm, or at least it should be, and as the ing warm, the fowls sit there all night long with their mouths open, scarcely getting a particle of rest; and yet we have not added enough to their tortures and so we come in the morning with a feed of corn to heat their systems up still further. Now, put all these conditions together, and I would like to ask any sane person if it is not enough to bring on the so-called chicken cholera. I could name to you hundreds of cases that have come to my own personal observation where

A Colony of Barred Plymouth Rocks, 4 Months Old, at Feeding Time, at Poultry Farm of Mr. Matteson.

busy season comes on we leave these fowls right in this same house, the droppings are allowed to accumulate, not a particle of ventilation is thought of, except perhaps the small ingress or egress hole (and in some cases this is closed up at night). In this filth the little red mite is multiplying very rapidly so as to be ready to play his part in the deadly work which is sure to follow. Night comes on, the fowls go to roost, the red mites commence their deadly work. The nights usually be- this disease could be traced to just such conditions.

Treatment.

Remove the cause by taking out your windows and opening the doors on all warm or hot nights. Keep the droppings accumulated, daily using land plaster or road dust on the dropping board as a deodorizer, and instead of feeding corn feed largely on bran and oat feed. And be sure you furnish them something to grind their feed with and

something to keep down the red mite. Take those birds that are slightly affected, remove them to separate quarters, take a teaspoonful of carbolic acid added to two quarts water, and give them no other water to drink; also mix up their soft feed with this same carbolated water, and as soon as they commence to recover reduce the percentage of carbolic acid. Of course this treatment is a deadly poison, but it takes poison to kill poison, which is the reason we use such a rigid treatment. Of course all houses and runs must be thoroughly disinfected and for this I know of nothing better than the well-known Douglas mixture.

Gapes.

Then we have a disease called "gapes," which is usually brought into our flocks by some infected bird being brought in. As to the exact cause we are somewhat at sea, but it is claimed by the best authorities that the earthworms containing the embryo are eaten by the chicks, the embryos are liberated from the earthworm in the digestive organs and find their way to the lungs and hence to the windpipe, where they fasten themselves and multiply very rapidly. The faster they multiply the more difficult the breathing, and if allowed to go on the bird will soon choke to death.

Treatment.

I only recommend two treatments, first, to catch all the affected chicks, take a few at a time and place them in a barrel where you have already placed some air-slacked lime. Cover with a cloth and cause the chicks to flutter slightly. By doing this they inhale a great deal of this lime dust down the windpipe, and in this way you not only kill the gape worms, but the chicks cough them up, as well. Another, or second treatment, is to take a primary feather from the wing of the fowl, strip it smoothly, nearly to the tip, insert this quickly into the windpipe, give it a quick twist, and draw out. In this way in a majority of cases you will remove a whole bunch of gape worms. When chicks are affected with this malady they should be removed to fresh grounds quite frequently.

Scaley Legs.

Scaley legs is something very easy to prevent and cure, even after it has once gotten a foothold in our flocks. It is first noticeable by a chalky-like growth on the fowls' legs.

Treatment.

Kerosene in some form or other is always recommended, but it is too powerful when used by itself, so I recommend using it mixed, equal parts with sulphur and lard. Two applications applied about two weeks apart will usually effect a cure.

Bumble Foot.

Bumble foot is an ugly disease if neglected, and it usually comes on our heaviest and best fowls. It is caused by roosting too high, which causes them to bruise the sole of their feet as they fly downward; it is also sometimes caused by fowls roosting on small, round perches.

Treatment.

I have been most successful in treating this disease, by first removing the fowls to dry quarters that have no perches. Take a sharp knife and lance the sole of the foot crossways, in the form of a cross. Squeeze out the pus, wash out thoroughly with a solution of carbolic acid and water, and after being well dried off anoint with carbolated vaseline until a cure is effected.

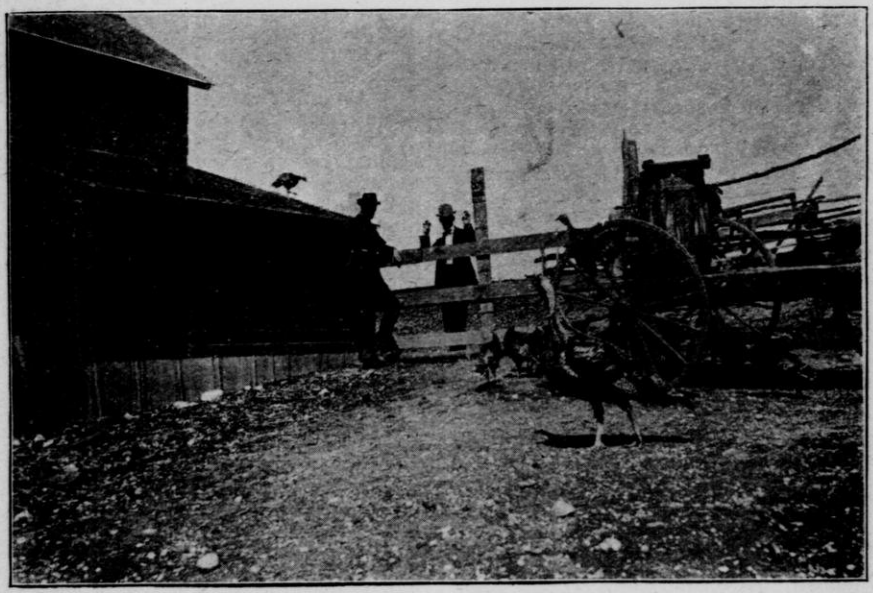
Other Troubles.

Egg-bound is not a disease but an unnatural condition that usually troubles pullets that have passed the time that they should have gone to laying. As a result, when more favorable conditions occur for them to go to laying they are usually too fat, and some are sure to be troubled with egg-bound. Hundreds of fowls are lost every year with this difficulty; they die because people do not know what the trouble is. The symptoms are a bright, red comb, droopy wings, and in most cases they lose the use of their legs.

I am fully aware that a great many of our poultry editors claim there is no cure for this difficulty after they are once affected, but I am here to-day to offer quite a sum of money for a single

case of egg-bound that I cannot cure in three minutes, and the fowls be as well as ever in a very short time. My treatment is to extract the egg. Of course it is much better not to allow this condition to exist by giving your fowls all the exercise possible.

Then we have feather pulling, which is not a disease, but a vice contracted through keeping your fowls in constant idleness. The females first commence to strip the feathers off the neck of the male, just below the wattles. At first this seems to be sort of a love affair. Seemingly the male will stand and allow the last feather to be pulled from him. The vice soon spreads to the whole flock and when once adopted is rather hard to handle.



MAMMOTH BRONZE GOBBLER, 15 MONTHS OLD, WEIGHING 33 LBS. BRED AND OWNED BY MR. MATTESON.

Treatment.

First remove the cause by compelling your fowls to work for all their whole grain, and to stop the habit simply sponge the hackle of the fowl slightly with kerosene oil, being careful not to use too much. Two or three applications will usually do the work.

We have a sickness among our fowls that is usually called liver trouble, or enlargement of the liver, and seems to work largely among turkeys. The symptoms are a droopy appearance always accompanied by a looseness of the bowels with bright yellow excrement. At first, in a mild form, it is in a sort of congested state, but later if neglected the liver becomes inflamed and then passes on to the enlarged or torpid state. This malady is usually brought about by growing your stock too fast when they are real young.

We usually feed our young stock on a stimulating, growthy food when real young, which is all right for a short time, but if this stimulating, soft feed feeding is kept up too long the result is that the gizzard is kept in idleness, the gastric juices doing all the digesting, and after they have reached a certain stage of growth and they are commencing to grow their adult feathers, the gastric juices are not capable of doing all the digesting, and must be assisted by the gizzard. It is not necessary to say that the only way to get the gizzard into action is to commence

to feed whole grain as early in life as possible. By doing this you create a demand for grit, which means a good, thorough digestion. Then as your stock grows older and the time comes to use forced feeding, the digestive organs are in such a condition that they will stand all kinds of forced feeding, which we are obliged to resort to in order to obtain the best results.

In Conclusion.

When your hens seem to care nothing for anything you give them, just offer them a little grit.

When hens moult slowly it is usually due to impaired digestion, which means that you should give them a little grit if you wish to prevent chicken cholera by keeping your flock in full vigor. Just give them a little grit. If you want to derive every particle of lime from the food given your poultry, just see that they have plenty of grit. If you want to starve your hens to death, give them plenty of good, wholesome food, but withhold the grit, and they will starve in the midst of plenty.

The best general purpose medicine I know of is good, sharp, well-prepared grit, connected with a whole lot of exercise every day in the year.

DISCUSSION.

Mr. Scott—What is the Douglas mixture?

Mr. Matteson—Half a pound of common copperas dissolved in four quarts of lukewarm water. After thoroughly dissolved, add one-half ounce of sulphuric acid; mix thoroughly. This is used in the drinking water, a tablespoonful to a quart of drinking water. Cork it and keep it for use as you want it.

Mr. Culbertson—How about feather pulling?

Mr. Matteson—After that habit is once contracted, there is no doubt that it is a difficult problem to deal with. I believe we can largely overcome this by not keeping old fowls around, and then compelling our fowls to work for all the whole grain we feed them. The old fowls are harder to break of a habit after it is once adopted.

Mr. Hill—Does not Nature prepare round roosts?

Mr. Matteson—Yes, but we have domesticated our fowls, and instead of roosting in trees we supply them with a roost. We use 2 by 4's.

Mr. Bradley—Which side do you roost them on?

Mr. Matteson—The flat side, of course.

Mr. Hill—The chicken can't get a foothold on four inches.

Mr. Matteson—No, that is not necessary. We want our fowls warm and comfortable at night in the winter. If you will examine your fowls you will see they are not grasping anything in the house; there is no wind to blow them off; they will simply sit on the flat board comfortably. You will notice their claws do not close even when they have a chance.

A Member—What do you think about incubators?

Mr. Matteson—Practical poultrymen cannot get along without them. The incubator and the brooder to the poultryman is what the self-binder is to the farmer. You must understand though, that there are too many incubators on the market, and the only practical way that an incubator should be sold is the same way as the self-binder, that is, a man should come and set them up and put them into operation. There would be less trouble and there would not be over two per cent. of the machines on the market that there are now.

Mr. Convey—Give us some of the essentials of a good incubator.

Mr. Matteson—The first all important part of an incubator is to have a uniform temperature, and next to have that temperature under perfect control. I would test a machine thoroughly in all its working parts before putting in your eggs.

Question—You use a Monarch, don't you?

Mr. Matteson—Yes, I have had a number of years' experience with them and they are a splendid machine.

A Member—Have you any interest in the Monarch?

Mr. Matteson—No, sir; I have no interest in any way in that or any other machine.

A Member—Which method would you recommend, hot air or hot water?

Mr. Matteson—Hot water, by all means. If you have a small hot-air machine, you will get a fair, uniform temperature, but it never can be de-

pended upon to distribute the hot air as evenly as the hot water. I tested a hot air machine over at Fond du Lac last week, and there was a difference in the temperature of something like six degrees from the center to the outside, and it is so with nearly all hot-air machines, you cannot distribute the hot air evenly over a large machine as you can the hot water.

Mr. Herbst—What kind of a room do you want to run one of these incubators in?

Mr. Matteson—A good, dry cellar is preferable, and even a damp cellar is preferable to an upstairs room, unless you can furnish an upstairs room without any light in it.

Mr. Herbst—How about the north side of the building?

Mr. Matteson—As a rule you get better results, particularly an inexperienced person, in a cellar than anywhere else.

Mr. Arnold—Can you get a good hatch without moisture?

Mr. Matteson—Oh, yes; I have hatches in now, nearly time to come out, and I have not used a particle of moisture. As far as moisture and the ventilation question is concerned, you have to be governed largely by the weather, the season of the year, etc. There is no given rule.

Mr. Arnold—I understand some machines use moisture and some machines on the market now are without moisture.

Mr. Matteson—If you have those same machines in different locations, different seasons of the year, you have got to supply moisture. That is only a point they place on the machine in order to try to sell it.

Mr. Arnold—When a hen sets upon eggs there is more or less moisture. Now, can you get as good a hatch without any?

Mr. Matteson—You cannot compare a hen with an incubator. The conditions are so different. As far as the moisture and ventilation are concerned she imparts an oily secretion to the eggs, which closes up the pores and stops evaporation, but we cannot do this with the machine. We must use some kind of moisture to stop evaporation, and that is all we use moisture for. We have got to get no less than twenty per cent. of the moisture out of the eggs in order to get our chicks small enough to enable them to get out of the shell. If we allow them to use up all this moisture, the result is that all those chickens can do is to pip through, they are too large, they can't make any circumference inside of the shell. We have got to get our evaporation just right.

A Member—Have you ever had any practical experience with the Des Moines machine?

Mr. Matteson—I have not, but there are several of them around my place and have not given the best of results.

A Member—What percentage do you hatch in your machine?

Mr. Matteson—When the season is favorable for getting fertile eggs we get from seventy-five to ninety per cent. In the winter time about fifty per cent. is a good fair average.

Mr. Convey—Do eggs ever get chilled before you put them in the machine?

Mr. Matteson—Yes, one all important point when we are doing spring or winter hatching is not to get the eggs chilled.

Mr. Convey—Can you tell by the looks of the egg whether it has been chilled?

Mr. Matteson—I can after they have been incubated a few days; yes.

Mr. Convey—Everybody can then?

Mr. Matteson—No, sir; everybody can't.

Mr. Baker—How do you combat the little red lice?

Mr. Matteson—They are the hen bedbug, so to speak. They simply prey on our fowls at night, and they go back to the perches, and nest boxes in daytime. Of course we are obliged to take care of every nesting box and perch, everything in the roosting room. If your house is lathed and plastered, good whitewashing will keep them down nicely. Then you should have your perches and nest boxes movable, and keep a barrel of whitewash standing handy in the summer time to dip these things into.

Mr. Arnold—What is your remedy for head lice?

Mr. Matteson—There are two different varieties of vermin on the body of the fowl. Those on the body are not the same species as those on the head. For the body lice, dust your fowl thoroughly with insect powder and be sure

to keep them off the little ones by dusting the mother hen freely with powder. For the head lice, use equal parts of kerosene and sweet oil, just using it on the feathers. It is a mistake that a majority of people make, thinking they have to get this in onto the skin of the bird. They are right in the quill, just at the base of the feather. We just use a sponge and run over the inside of the feather, and we don't want to touch the skin at all; it only takes a little bit.

Mr. Convey—I notice you spoke of the necessity for using pure blood, and that would also imply the necessity of taking precautions against the introduction of disease and vermin.

Mr. Matteson—Yes, all the new fowls brought into our flock should always be in quarantine for at least two weeks so we can notice any new disease they may have. We can thus avoid the disease that any bird might bring into our flock.

Mr. Convey—Do you think any of these diseases are hereditary?

Mr. Matteson—I believe that liver trouble is, but it can be overcome by breeding from good strong vigorous stock.

A Member—How many Monarchs do you use?

Mr. Matteson—I only have one Monarch, and three machines that I manufactured myself. The results are about equal, as far as hatching chickens is concerned, but the Monarch will give me a little better result in hatching duck's eggs, because I get a little better evaporation. My own machines are top heat only, and we cannot get a free circulation of air. That is not the same for chickens.

A Member—Did you ever hatch turkeys with incubators?

Mr. Matteson—All my turkeys are hatched with an incubator.

A Member—Do your raise turkeys with a brooder?

Mr. Matteson—No, sir; I tried that once and probably that cost me two for every dollar that I got. I could raise them all right, but I had to put them to bed at night and take them out in the morning. The question is asked over here about the importance of introducing fresh blood into our flocks. It is very important but not as important with the common fowl as with the turkey. As far as the hen is concerned we can largely interbreed; in fact, I recommend that always being careful and select our best birds and have practiced it for a number of years, but it is different with turkeys.

Mr. Wurtz—It is the practice in our neighborhood to use carboline to get rid of these insects. Is that injurious to the fowl?

Mr. Matteson—I think anything in the form of these liquid lice killers is more or less injurious to the fowl. Anything that has power enough to penetrate the feathers of the fowl by the fumes going up to kill the body lice on the fowls, is sure to injure the vitality of the stock more or less, because they are obliged to breathe these same fumes.

Mr. Roe—What do you do with your turkeys after you take them out of the machine?

Mr. Matteson—They are given to the parent hen to raise, after she has a desire to set, of course. My practice is after she has finished laying her first clutch, break her up and put her right to laying again and after she has finished laying her second clutch she is allowed to sit on decoy eggs until I have a lot of young turkeys for her. The first night that she sets on the nest she will take the turkeys. I had turkeys last year that laid three eggs after they were brooding turkeys.

Mr. Roe—What kind of stock, chickens and turkeys, do you recommend?

Mr. Matteson—That would depend upon your market, whether you want for that market egg production, or market poultry. I don't think we can combine the two. We have an American class of fowls that come very near to it, but I don't think there is such a thing as a dual-purpose bird. If you want heavy layers you have to resort to the smaller breeds. As far as turkeys are concerned, Holland turkeys command two cents more in the Boston market than the bronze, but I have the bronze for Milwaukee or Chicago; the demand is about even. They don't give quite as plump an appearance as some of the other breeds, but they are large and sell well. The Boston market wants a plump round bird that is not so large. There is a man in our locality who ships to the Boston mar-

ket and he will pay more for the White Holland turkey than for the bronze.

Mr. Roe—Would you pay more for white ducks than for colored ones?

Mr. Matteson—Yes, and they will in Chicago or Milwaukee—all the way from one to three cents a pound.

A Member—According to your experience, what is the best breed of chickens for laying?

Mr. Matteson—Now, I am speaking from the standpoint of the number of eggs laid, and the Leghorn is the best to do that, but the Minorca lays a larger egg and not quite so many. In weight they will probably be about even.

A Member—Which variety of the Leghorns?

Mr. Matteson—I don't think there is any difference, providing they have not been too closely inbred.

Mr. Herbst—What is the best breed for market purposes, the Western market?

Mr. Matteson—Of course if you are going to sell large roasting fowls, there is no doubt but you can command a little bit more for the large Brahmas.

A Member—Do you use a brooder?

Mr. Matteson—Yes; several of them; and I recommend them.

A Member—May I ask your opinion of the Cypher?

Mr. Matteson—I place that about the third in the market. I recommend the Prairie State ahead of that and the Monarch first; but I will say this, I would not recommend either of these first named in the hands of an inexperienced man. I never built but one machine in my life that I have not operated, and I am not here to recommend any particular make. If you are to have a manufactured machine get a Monarch?

Mr. Roe—Can you use yours?

Mr. Matteson—You will find my plans and specifications in last year's Bulletin, on page 133. Full specifications are given there for building these machines, and you can build them yourself. There is no patent, you have a free right to build as many as you wish.

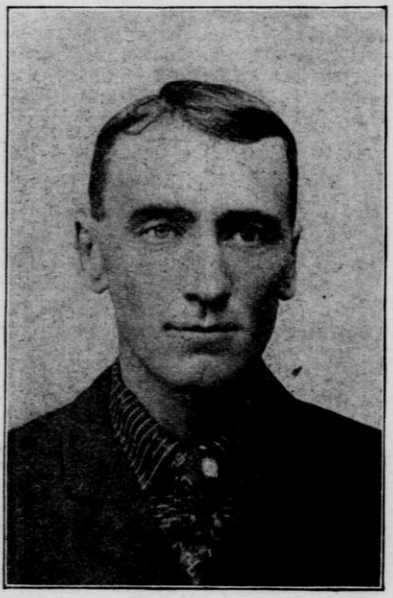
The Institute adjourned to 1:30 p. m.

AFTERNOON SESSION.

The Institute met at 1:30 P. M. Conductor George Wylie in the Chair.

SWINE BREEDING.

JAMES FISHER, Eastman, Wis.



MR. FISHER.

Mr. Chairman:—It is not every man who engages in the breeding of swine who makes a success of it; perhaps as many fail as succeed, in the long run. In my judgment, any man who does succeed must comply with three things: First, he must have a good foundation herd of swine to start with; next, he must feed that swine right; and third, he must use intelligence in breeding and care of his swine. You have all seen men who were all right in one or more of these points but were careless or regardless of the necessary importance of some of them, and consequently they were failures in their business.

There is one thing that has not been thoroughly understood, even by many men who have gone deeply into the study of this subject, and that is, the laws of heredity, but we all agree that like has a tendency to produce like, and if it were not for this fact, there are none of us who would have the courage to go on and breed as we do; therefore, in selecting our breeding stock we have to be careful in selecting the right kind for breeders.

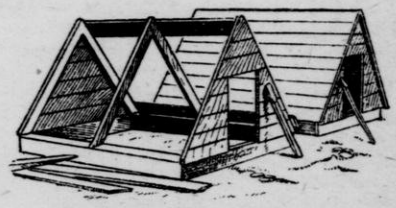
The Head of the Herd.

It has often been said, and well said, that the male is one-half of the herd. If that is true, you should take a great deal of pains in selecting the right kind of a hog to head your herd. If you succeed in getting a good hog, and he breeds what you expect, or near what your expectation is, keep him, be slow to discard him and take up another that you know nothing about; in fact, I would try the new one before I discarded the old one.

We have to be careful about the way this hog is fed, and also about the surrounding conditions and how he is handled.

The Brood Sow.

The next thing would be the selecting of your brood sow. If the male is half the herd, we must remember that

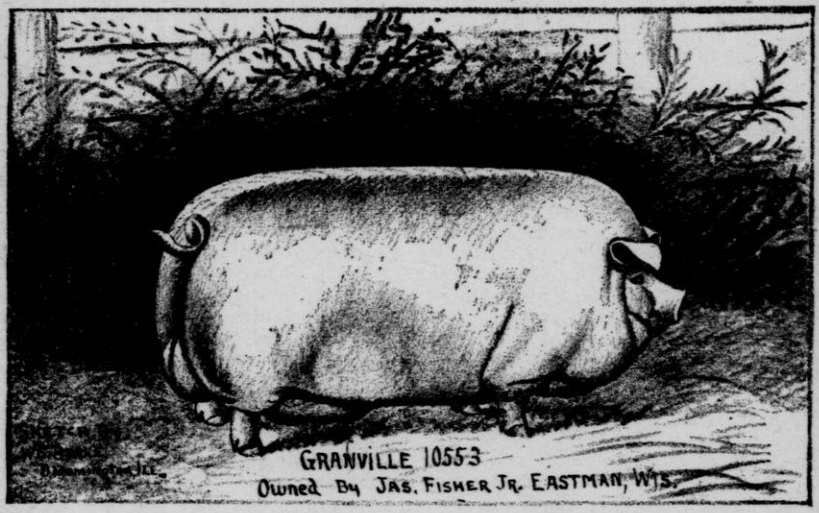


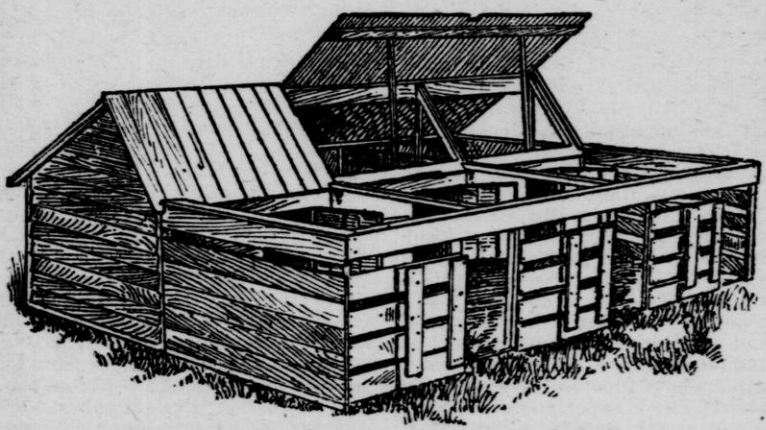
SINGLE HOG HOUSE.

Showing Its Construction. Size 6 x 7. Used on Mr. Fisher's Farm.

the brood sow is the other half. A great many men will take young sows regardless of what their mothers or their fathers are. I think if you have an old sow and she raises a good litter of pigs, you will be wise to keep her, which we do as long as they raise good pigs; I believe the matured animal is the best. When the pigs are born, I would take notice of every sow, notice her as a mother and a nurse, up to time of weaning pigs, then select the young sows you intend to keep for breeders from these litters, and by that method of selection we will get a strain of hogs that is superior in qualities you selected for.

For a brood sow you want one that stands on four legs, well set inside body, not too short nor too long; avoid extremes lest these extremes should become hereditary defects and pick her out on her merits. I would rather have a good pig that had a poor sire





BREEDING PEN USED BY MR. FISHER, HOLDING THREE BROODSOWS.
House 18 x 6. Feeding floor 12 x 18. Movable partitions.

and a poor dam than a poor pig with a good sire and a good dam, but, of course, I would rather have them all good; back several generations farther the better.

In-Breeding.

In breeding there is another point that has brought lots of swine breeders to ruin, and that is the principle of in-breeding. Many breeders can breed along in line breeding and make a success of it, but they must be careful, and for the average farmer it is a very dangerous thing, and the chances are nine out of ten that they will make a failure of it.

In selecting a sire, we ought not to pay any attention to the price in comparison with the quality. If we are going to breed from immature animals, there is only one way to do it and be successful, and that is to feed them along and make all the growth possible, not fat, but bone and muscle; feed them protein rations, not all corn, but oats and barley, or mill feed and milk; mature them as fast as you can before the time comes for breeding. If you don't you are running your pigs backward and can't expect good results as if they are further matured before breeding.

Common Sense Suggestions.

Now, every man that is handling swine should watch his pigs and know every weak point; he should study them closely and know what to pick out for his breeding purposes. He ought to know the strong points in his herd, and the weak ones, and in order to overcome the weak ones we must select pigs that are especially strong in the points that these others are defective in. If we are prudent men we will do this. We will study the history of our herds. We will study the actions of our fellow breeders and see who it is that is making a success and who it is that is making the failures; also the doings of our Experiment Stations. Thus we can often avoid the mistakes of the one and emulate the success of the other.

SWINE FEEDING.

THOS. CONVEY, Ridgeway, Wis.

Mr. Chairman, Ladies and Gentlemen:—There are several points that I want to call your attention to, and one is making rapid growth while the animal is young. Very many of you may not know that in many Experiment Stations they have made tests along the line of feeding swine, and have found in many cases they could produce a pound of pork on an animal weighing in the neighborhood of one hundred pounds for about two and a half pounds of food, whereas on an animal weighing seven or eight hundred pounds, it would take seven or eight pounds of food and in some cases thirteen. These experiments show almost invariably that a young animal will give a larger amount of product or growth for a given amount of food. Therefore there is no reason or excuse for farmers growing pigs and giving them just a sufficient amount of food to keep them in their present condition. That may do in handling breeding stock, where you have maturity, but in the case of feeding stock for market purposes there is a loss in profits that you might get by a better system of feeding. The reason of this is that it requires a certain amount of food to keep the animal in its present state of condition; this requires about two-thirds of the full ration. The other third given to the animal will keep it in the very best possible state or condition of growth, and in the absence of that surplus which is necessary to produce the extra growth, you get no returns whatever from the food given; in fact, the animal is not in as good condition to take on gain successfully as he would be had he been fed well from the beginning.

Many farmers think that because animals put on gain very rapidly they are economical feeders, but that is not always the case. They put on gain

rapidly because they eat abnormally; they develop an abnormal appetite and they eat more than they can digest.

Marketing.

Then I want to say a word in regard to marketing hogs. There are several months in the year that it is not wise to market hogs; those are in October, November and December, because at that time the market is usually glutted and prices are anywhere from half a dollar a hundred to a full dollar a hundred lower than in other times of the year. Now, in order to keep them in condition, it is not wise to allow hogs to run on scant food in the summer time. This season of the year is favorable to rapid growth, and a small amount of feed at that time will give you a handsome amount of gain, while in the absence of that small amount of feed you get practically no gain. Later on you waste your feed by feeding to a hog that has developed an abnormal appetite, so I would in all cases recommend that you feed grain in addition to the pastures. Swill and milk will not answer the purpose. Corn at that time of year gives the best results and I would advise that it be soaked before feeding.

Winter Feeding.

In regard to feeding in the winter season I will give you our practice, and of course we follow that system, because we think it pays. We feed anywhere from one-third to one-half of the ration, corn, depending on the condition of the hog and the temperature. If our hogs are apt to take on much flesh it is our rule not to feed more than one-third of a ration of corn. The other two-thirds is composed principally of peas and oats, and swill. That swill is from the by-products of the dairy and ground feed of some kind, preferably wheat middlings, one of the best-ground feeds that I know of for hogs. Of course, in feeding finely-ground middlings, for instance from Red Dog flour or ground rye, you can do a lot of mischief by feeding it in a thick, doughy mass that cannot be acted upon by the juices of the stomach, so I would recommend that you feed it in the form of a thin slop or

SOME OF MR. CONVEY'S POLAND CHINA SWINE.

mix with lighter foods. The only remedy that we give hogs in the line of medicine is to feed some ashes in the swill, especially in the winter time, and we have not been troubled with our hogs getting out of condition. I don't know why ashes have a beneficial effect on hogs, but we know they have, and of course we want to mix them so that some hogs will not get a great deal and others only a little. We mix them thoroughly in the swill by the shovelful, hardwood ashes, and if you get in some coals all the better. We have placed ashes where the hogs could have access to them and they will pick out the charcoal. As a rule we do not feed much salt, because we have a great deal from the dairy which is already salted, although we leave salt where they can get it. As a rule I don't think it is well to mix salt with stock food; to dose them with a large amount would be a very dangerous practice.

Another thing I want to call your attention to. Do not feed hogs in the mud. The practice has been very much condemned, but there is another condition that is equally as bad, and that is feeding on dusty floors. The hog has to hold his head close to the floor, and he is snuffling in dust all the time; it is liable to give him a cough and get him out of condition and give young pigs catarrh.

Mixed Pasture.

I would recommend that you have mixed pasture. Some people say that clover is the most desirable pasture, others say blue grass. I want them both, the blue grass will come first, then the clover later on. At any rate make some effort to have a special pasture. We sow peas and oats. We turn the hogs in on those peas when they are fully ripe, not a day sooner. If you turn them in too early, they pack the feed down and it will rot if we have wet weather, but after they are ripe they can't do much harm, and if the hogs have a good supply of water you need not give them much feed in addition to the pea feed. Of course the oats are there for the purpose of holding up the peas, and later on they make good pasture, as they will seed the ground. Between times we like to have some rape to turn them in on and it gives good results, so you have continuous pasture.

We cannot afford to feed hogs in small quarters. It is simply a waste of food; it is unhealthy and there is bound to be a waste of fertility. The droppings from hogs are the richest we have on the farm, and in many cases they are wasted, because people pay no attention to getting them out on the pasture.

Water for Swine.

Furnish a sufficient supply of pure water. Neglect in furnishing abundant pure water is the cause of more ill-health and lack of thrift than most people realize. The water contents of the animal system range from 39 to 60 per cent.; it is the most variable part; it is the vehicle for conveying the elements of nutrition to different parts of the body. It is also the means of eliminating effete matter from the system; it is cheap; do not spare it.

DISCUSSION.

A Member—Why do you feed ashes?

Mr. Convey—Because I know good results are obtained.

A Member—They seem to satisfy the hogs. I am of the opinion that they are food for the hog, in a measure.

The Chairman—Do I understand you mix ashes with the slop?

Mr. Convey—Yes, mix them thoroughly with it.

The Chairman—Would not a hog take all the ashes that his appetite might crave if you left them where he might have free access to them?

Mr. Convey—I like the system of feeding them every day; then we leave them where they have access to them also. They don't take very much if they have something else. It is quite a risk to put them under cover. They don't show any desire to take mortar or anything of that kind.

Mr. Imrie—Did you say it was not good to feed slop?

Mr. Convey—Not in connection with corn, but in the absence of corn on grass it don't seem to give good results. I like the milk and middlings, also soaked corn and pasture; those are ideal conditions for feeding hogs.

Mr. Bradley—In trying to lengthen out or breed larger stock for our markets shall we look to the sire more

than to the sow? How shall we avoid making our pigs too chunky?

Mr. Fisher—The best way would be to look to both, but I would rather have the range in the sow, because the result is not as good where you have the sire the larger, as a general rule, and you also get an increase of the bone by feeding food that has a tendency to grow bone and muscle. I like a good, coarse, roomy sow to raise pigs from.

Mr. Goodrich—Is it profitable or practicable to raise a bacon hog in this country such as they raise in Canada, which brings a dollar a hundred more than our hogs?

Mr. Fisher—No, sir, I don't believe it is. If we had a bacon hog here we wouldn't get any more for it than we would for the others, and I don't think we would get as much.

Mr. Everett—I think there is another reason why it pays us better to raise large hogs here, and that is we are producing cheap food in this country, in the way of corn, which they cannot produce in Canada.

Mr. Fisher—We could raise a cheap bacon hog as well as Canada can, but we have that cheap corn food, and so it pays us better to grow the hog more for fat.

Mr. Arnold—Do you think there is any danger, Mr. Fisher, in giving the hogs water first and grain afterwards?

Mr. Fisher—That is exactly what I would do, because the water has a tendency to wash the grain from the stomach before there has been time for the process of digestion to do its work.

Mr. Convey—Our system is to feed grain in the morning, and about 10 o'clock we feed slops. At that time the hog's stomach is pretty well emptied out and there is no danger of the stomach being overloaded. Another thing, we never want to feed cold swill in the winter time. In fact, I would condemn the practice of hogs filling their stomachs with grain, and getting swill or water at the same time.

Mr. Arnold—It is very common among our farmers to leave the feeding of the hogs to the hired man, but there is really no class of work that requires more intelligence on the farmer's part.

Mr. Fisher—I feed my own swine; one man to feed to-day, another to-morrow, will never bring good results. I also want to say that I don't like a V-shaped trough, I like a square-bottom one much better. I like the oats to be scattered evenly over the floor or on a clean place on the ground, so the hogs can pick them up slowly and chew them better.

Mr. Arnold—Why don't you grind the oats?

Mr. Fisher—We do grind some of them, but we do not raise all the feed that we use and we have to buy some, so we buy what will do to make slop (such as shorts and middlings). We feed the oats whole and it is a good feed, fed in that way.

Mr. Wurtz—How can you give your hogs exercise in the winter time when the thermometer is below zero?

Mr. Fisher—If you have your hog pen or sleeping quarters near the barn yard, it is never so cold but what your brood sows will be out every day. Mine are, and the exercise they get is voluntary. We feed in different places, on one side one time, and on the other side the next time, which causes them to move around some, which is very necessary for breeding stock.

Mr. Convey—I think it is very largely the farmer's own fault in many cases, that the hogs don't take more exercise. I notice many people think that hogs can be kept housed like sardines in a box without sufficient air and very little exercise. The atmosphere becomes damp and the hogs get sort of tender; they come out in a hurry, eat, and get back just as fast as possible, and those are conditions which will never give good results. I am of the opinion that mature stock among hogs are more like sheep, they do not need an excess of heat. They must have pure atmosphere, but they don't want to be in draughts. If you keep them damp you will have rheumatic hogs.

Mr. Fisher—That is my opinion. If they come from their sleeping places damp, it is hard to get them out, but your brood sows want plenty of room, and if they are kept in a dry place they will stand a good deal of cold. If they have a good, dry place to sleep in they are a great deal more apt to take exercise, and that condi-

tion will be better brought about by having a sleeping place that is a little cool. If it is extremely warm they will not take so much exercise, for the reason that just as soon as they strike the cool air they begin to shiver and they will go back.

Mr. Richards—How do you protect your pigs from having thumps?

Mr. Fisher—Why, we prevent that by feeding the sow. If you feed her plenty of protein food through the winter and be careful not to feed too much to excite a great flow of milk when pigs are young, you are not apt to have thumps. Of course, there is a great deal in the exercise, and if a pig is not healthy they won't take it. I think a great deal of the diseased condition of young pigs they get from the sow when they are born. You must be careful about feeding the sow so as to produce a big flow of milk until pigs begin to exercise; then I would feed her just the same as I would a dairy cow. I would watch her pigs carefully and give her gradually a little more feed as the pigs demanded it. You must have good milkers or you cannot raise a good litter of pigs.

Mr. Matteson—What kind of hogs do you raise?

Mr. Fisher—Chester White; any of them is a good enough breed if you handle them right.

Mr. Arnold—Don't you like plenty of hair?

Mr. Fisher—Yes, I like to have a good coat of hair, not too fine or too coarse.

Mr. Arnold—You don't have any bristles on your hogs at all, do you?

Mr. Fisher—Well, I don't like to have. We have a sloping floor in our pens; that is to prevent the little pigs getting down into the corner and getting smothered.

Mr. Scott—What is the value of skim milk as hog food?

Mr. Convey—That depends on the price of pork. It is easily worth twenty-five cents a hundred, with pork at present prices, and under some conditions it may be worth considerable more in developing breeding stock.

Mr. Scott—How would you feed that, in proportion to their grain?

Mr. Convey—About three pounds of milk to one pound of grain, I think, gives the best result. We have been recommending that the milk be fed sweet. The Experiment Station seems to have demonstrated that in many cases it is just as well to feed it sour and it is not so constipating as sweet milk, but that means sour skim milk, lactic acid developed to some extent, not rotten or decayed milk, or milk that has gone off in flavor.

Mr. Convey—I want to say with reference to the thumps, that the disease is a fatty degeneration of the heart due to excess of food and lack of exercise, but I am of the opinion with Mr. Fisher that it is also due to the condition of the animal in a measure. Where we have sows farrow in November, December or January, when the weather conditions are just as unfavorable, in fact, sometimes more unfavorable than in spring, we rarely are troubled with them, but the condition of the sow herself is very much better at that time and for that reason it is wise to feed some kind of laxative food, and at the same time try to get the young pigs to take exercise, in fact compel them to take exercise even if you have to shut the pigs away from the sow. If they start to exercise, and you get them over the first month in good condition, there is little danger of thumps then.

There is one other matter I want to call your attention to. I forgot to speak about the balanced ration, and that is the most important part of the whole subject, to feed a balanced ration. At the Stations they have tested that matter and they find where they feed a ration as wide as corn is, it takes from thirty to fifty per cent. more food to make a pound of growth than with a narrower ration. Some stock that are not young can be fed a fattening ration to good advantage. At the Station they tried feeding a pea ration and middlings together as compared with a mixed ration where corn formed half the ration, and they got the most economical results from the latter; so we don't want to be foolish about not feeding corn; we can feed a certain amount of it to better advantage than almost any other class of food we raise, but we want to be careful in feeding it to breeding stock and to young stock; it takes so much more that it is not economical.

Mr. Bradley—How long do you let the little pigs stay with the mother before weaning?

Mr. Fisher—If I don't wish to breed the sow again, I let them suck as long as they want.

Mr. Bradley—How does sweet whey compare with skim milk?

Mr. Convey—It is worth about one-half as much but it is a good deal harder to get whey in as good condition. A whey ration contains a good deal of sugar of milk, and that is fattening, of course, and to balance it up you have to feed something in the protein feeds. Buttermilk is equally good with skim milk, but of course you don't generally get it in good condition, As obtained on the farm it is worth fully as much as skim milk is.

Mr. Price—Does it take more food to produce the second hundred pounds than the first hundred?

Mr. Fisher—Very nearly twice as much.

Mr. Durbin—Do you think it is a good plan to keep the hogs fat from the beginning?

Mr. Convey—You can't afford to crowd your breeding stock to the full capacity. You can get the greatest possible growth up to the first one hundred pounds. It is not wise to get the greatest possible growth by fattening foods if intended for breeders, but if they take a great amount of exercise and you feed a balanced ration, you cannot get them too fat. You want to have them fully matured. Some are better matured at eight months old than others at sixteen or twenty, and it is due to the manner in which they develop. A well-grown hog can never be stunted; if they are stunted you never can feed them economically after that. The Illinois Experiment Station says that the largest amount of gain you can get in a given period is the most economical gain, and from that we understand they never can be starved at any time. You cannot get the first one hundred pounds as rapidly as possible without feeding a properly-balanced ration. The first one hundred pounds we feed to produce bone and muscle, to build up the frame; the second one hundred pounds produces more fat.

A Member—What brings on hog cholera?

Mr. Convey—It is a contagious disease.

Question—Does the food have anything to do with it?

Mr. Convey—Why, the condition of the animal has very much to do with their ability to resist disease if they come in contact with it, but I never heard of a case that came spontaneously; it always comes from contagion, but if your hogs are in the best condition there is less liability of their contracting the disease.

Question—Is there a floor in your pen?

Mr. Fisher—Yes, I would always have a floor for the reason that the hog will root down into the dirt. I would prefer it also for the hogs to sleep on, because I can keep it clean, but I would have it close to the ground, have no air space under it, or have the floor doubled.

Mr. Arnold—The Chairman says to put on the first one hundred pounds as rapidly as possible, but he says it cannot be done with corn; you must have a mixed ration, largely protein. I think it is hardly possible to crowd the pig without the right kind of food to one hundred pounds.

The Chairman—That is it exactly, the right kind of food. Corn is not the right kind of food.

Mr. Convey—Now, Mr. Wylie, that isn't what you mean.

The Chairman—I mean corn exclusively.

Mr. Convey—Oh, well, that is different.

Supt. McKerrow—Our old friend, Mr. Goodrich, has been off to Canada and the East, and undoubtedly he has learned something while he was away. Let us hear from him.

Mr. Goodrich—I want to say a word or two about the bacon hog. I was over in Canada in January; I picked up a Toronto paper and I found that live hogs were quoted at $6.80 a hundred. I then picked up a Buffalo paper, just on the other side of the line only a short distance from there, and the highest price was $5.80 a hundred, just one dollar difference. I said to a Canadian who is largely engaged in raising hogs: "Isn't this a mistake?" He answered me, "No, our hogs grade one dollar more than they do on the other side of the line." I said, "Why

is this?" "It is because we have bacon hogs." "Oh," I said, "that is the long Tamworth." "Well," he says, "but most of them are Berkshire hogs, the same as those on the other side of the line." I asked him what made the difference, and he said it was the difference in the feed, and they are worth that much more because they will sell for that much more, and if there is any community on this side of the line that raises enough of them, they can get just as much for them as they can in Canada. Now, down at Fort Atkinson there is a man engaged in making sausage and bacon. He wants bacon hogs and he don't have to pay more than twenty-five cents more a hundred for the food, but he only gets a few to use in his business, but I do believe that if any community would raise enough of these hogs to attract buyers who would ship them to the markets where they are using bacon hogs they could get just as much for them in the United States as they can in Canada. I am not saying that they could make more money; I don't know but the food to produce a bacon hog would cost enough more to make the difference, but I doubt it. Skim milk, middlings, and very little corn will do it, and that is just the kind of food that these gentlemen say is the cheapest kind to make a hog grow.

Mr. Convey—We realize the mistakes we make in breeding hogs. All breeders throughout the country are making an effort to have a type that will be more desirable. We want to have a long-bodied hog, with good back and good ham, and by the use of the proper food we will have a good bacon hog in no very long time. We have already made improvement along that line. We never had any satisfaction with the short, chubby type of animal. They have small litters and take poor care of them after they have them, so we are all aiming to breed hogs that will give much better results. At the International Stock Show at Chicago, it was the Poland China that took first prize on carcass. They ought to know enough to give premiums for the kind of hogs they want.

Supt. McKerrow—That hog wouldn't have won in Canada or in England.

Mr. Goodrich—We want our hogs to win in the highest market of the world, and we must feed in that direction.

Mr. Pingree—I believe it will cost a dollar a hundred more to raise a bacon hog than the hog we commonly raise.

Supt. McKerrow—This question will turn very largely on what part of the State you are in. If you are in a good corn-growing district, in all probability it is better for you to keep on doing as you are. If you are in the pea district, or in the dairy district, where you have lots of skim milk, it would not be amiss to raise bacon hogs, for you can certainly get this dollar a hundred extra. I am inclined to think we can get it, because we Americans will get as high in the ring as anybody if we only keep at it long enough. We will make bacon and ship it to the English markets, side by side with the Canadians in a short time, and we will do it right up in Northern Wisconsin, in the pea-growing and dairy districts of this State.

Question—Do you cook your pigs' feed?

Mr. Convey—With ground feed and warm water it does not need to be cooked; soaking for twelve hours will give as good results. If we wish to feed roots, we cook them the same as for the table, put on the ground feed, cover it up and let it stand until the next day. Hogs will not do well on cold swill or cold water, in the winter time; they get out of condition. If my hogs have been fed on cold swill for a week, I can tell it when I get home. I believe in the soaking, I feel satisfied that eighty bushels of soaked corn is worth more, especially for summer feeding, than one hundred bushels of dry corn.

Mr. Imrie—Do you shell that corn?

Mr. Convey—Yes, we shell it, because it takes up so much less room and water.

Mr. Burroughs—In feeding oats and peas mixed together, would you cook them?

Mr. Convey—I have cooked wheat and cooked oats and cooked barley, and I worse than wasted my time. There are certain classes of foods that contain a large amount of protein, and cooking seems to create a degree of indigestibility. I do not recommend cooking grains of any kind. You can

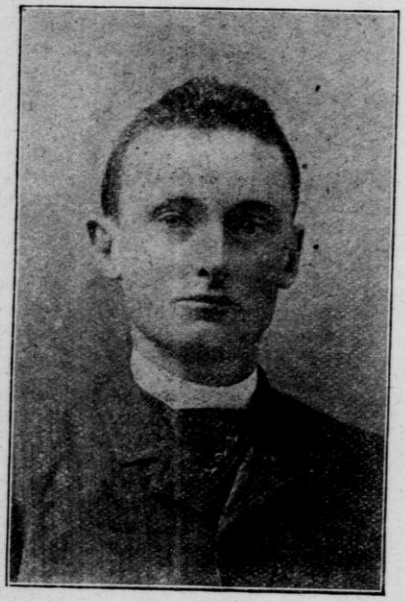
cook corn and get good results, because it is more digestible, but when you go to feeding all cooked food to hogs, it is too much diluted with water; they can't get the proper amount of food to get the best results, so that at the Stations where they have cooked food they did not get nearly as good results as where they use partly cooked and partly uncooked food.

Question—What proportion of oats and peas do you sow in a pasture?

Mr. Convey—We started with about half a bushel of peas to a sack of oats, but we found that our land couldn't stand that much. They would lodge. We do not sow a bushel of oats now without sowing peas with it. It is better for the land, and better food material for any class of stock that you raise, especially for hogs.

SHEEP FOR THE FARMER.

J. H. DIXON, Brandon, Wis.



MR. DIXON.

It is a fact well known by every observing person that as a rule dairy, beef and sheep-breeding sections are less exhausted and the people more prosperous than where grain growing is practiced, and if properly done, raising this class of stock is not only profitable, but actually makes the farm grow better. There are conditions imperatively essential to dairying that do not exist in sheep husbandry, so all will not be dairymen or beefmen either. To those who do not wish to follow dairying or beef production, sheep husbandry affords a profitable solution to the problem.

Wisconsin for Sheep.

I see no reason why Wisconsin should not rank with the first States in the Union in the production of high-class mutton and wool. In the first place, we have the natural surroundings, plenty of good water and grazing lands. We can raise all varieties of foodstuffs necessary for their best development, and last, but not least, we have undoubtedly as intelligent a lot of farmers in Wisconsin as can be found in any State in the Union. To verify these statements I only need refer you to the sheep awards at the leading State Fairs and the Chicago International of 1900, also to the Chicago lamb and sheep markets, which have often been topped by Wisconsin feeders and shippers.

The breeding and feeding of sheep is a fine art, and the ability to breed animals with more merit than their immediate parents is a gift that few men possess. Of course none of us like to be told that we lack this ability, but nevertheless such is the case.

A Word to Breeders.

Breeders should aim to breed the kind of sheep that will make the most mutton and wool on the least food, and in the shortest time. When sheep are bred for mere fancy points, and when

constitution, substance and vitality are lost sight of, they cease to be profitable assimilators of food, and are not what practical sheepmen want. The ultimate end of all sheep is the stockyard or the butcher's block, and the animal that gets there with the greatest profit to the man who feeds him is the kind that will win in the long run.

We must not forget the practical side of the question. Breeders of stud flocks too often lose sight of this. Most people breed and feed sheep for the stockyard; those who do not are the exception, not the rule. The breeding and mating season seems to be the one that is filled with important and anxious results. The influence of a single ram goes down through the flock for generations. He may leave his mark of excellence or give us work in weeding out, year by year, his faulty descendants, and as the ram is conceded to be half the flock, we cannot too highly emphasize the possibilities for improvement or degeneracy involved in the selection of a ram. Of course a perfect ram cannot cover the defects of a poor mother. Constitution, appetite and milk are necessary in the ewe for bringing up a good lamb.

My Methods.

I will now give you some of my methods of caring for them. My sheep have a yard of their own. I separate into as small flocks as convenient, as they do enough better to pay for the trouble.

Clover is the model hay for sheep, but I have had good results with good corn fodder. Timothy and marsh hay are fairly good if cut early and supplemented with a heavier grain ration. My grain ration is usually bran, oats and corn, according to their relative cost, time of year, kind of sheep, and for what purpose they are being fed. This grain ration is placed in troughs in the yard, and usually once a day. During the middle of the day they get cornstalks or shredded cornstalks in the yard. I feed hay twice a day in the barn, in racks with bottoms in them, and to prevent the accumulation of chaff and dirt in the fleece we always feed when the sheep are out. I never allow them access to hay or straw stacks and always keep plenty of good water and salt before them.

Thus fed and cared for during the winter, they should come to spring or lambing season in good shape. I always save some of my best hay and corn fodder until then, as it is the worst time in the year to scrimp sheep. If there is any time of the year when breeding ewes should have extra care it is then. Another reason is that from the middle of March to grass time they are more apt to get off feed and hence more dainty about what they eat. During this season I feed plenty of bran, roots or potatoes, and their grain ration I feed twice a day.

The Lamb.

I always tag or shear my sheep before turning to pasture or before lambing season, as it saves a great deal of trouble in starting the lambs. I usually have my lambs come from the middle of March to May 1. See that every lamb gets started; if the ewe has not enough milk at first, feed the lamb a few times with warm milk from a bottle. Have a lamb creep where they may go in or out at will. Place clean feed in it every day; a little feed stimulates the digestive machinery and so creates more appetite. More appetite means more feed, consequently more growth. In other words, early maturity is due to the cultivation of the appetite from the beginning of the life of a lamb.

Shearing.

To get back to the shearing question again, I say, take the wool off just as soon as the weather seems settled and warm enough to admit of it with safety to the sheep. The practice of shearing before turning to pasture is fast coming into favor, at least in my locality. It makes it much easier to start the lambs, the wool is much whiter and cleaner, and hence more salable, and the sheep do better than if allowed to run until June. By this method sheep do better, feel more comfortable and are a great deal less trouble than by the old method.

This is also the best time to cull out, as you can readily see which are inferior in fleece and as breeders. Mark them so you will readily know them when selling time comes. Do your own selecting, always keeping the best. They are worth as much to you as to anyone else, so long as you are not overstocked.

After sheep are sheared and turned to pasture with shade, pure water and salt, they need but little attention, though that little is necessary until about the first of August, when the lambs should be weaned and placed in a field away from their mothers. This field should contain the best feed possible. Put the ewes in as dry pasture as you have for a few days, at least, in order to dry them up. I always strip them out two or three times so as to make sure none are spoiled. Afterward give as good feed as convenient.

THE CHICAGO FLEXIBLE SHAFT SHEEP SHEARING HAND POWER MACHINE AT WORK.

Fall Feed.

In order to get good fall feed for sheep I sow clover, rape and turnip seed in all my small grain in the spring, and if I do not get good feed it is because of an unusually poor season for such. I have practiced this method for the past four years. In 1897 I had eleven acres of barley sown in this way, producing over forty bushels to the acre, and afterwards probably 150 bushels per acre of flat turnips. The same season I grew rape with as good success. In '98 it proved almost a failure. In '99 I had good feed. In 1900 or the past season, I had an abundance of feed again. There is no feed that will make sheep gain as fast and as cheap. In this way a flock owner can have his sheep in good condition to enter winter quarters and his lambs fat enough for market any day you wish to sell. In addition to this keep them out of all heavy rainstorms after the first of September, and you will be surprised to see how much better they will do and look. The old saying that "A sheep well wintered is half summered" is a true one.

A Few Suggestions.

Do not keep more sheep than you have first-class arrangements for. Do not make "airship" calculations and then quarrel with the sheep because your dreams are not realized. Do not depend too much upon tariffs or anything outside of your own judgment and energy to increase your income

from the flock. Do not abandon sheep husbandry because prices are temporarily unsatisfactory, or jump head over heels to expand your business when a boom sets in. Wool and mutton, like everything else, will vary in price, and the changes in price will come faster than any man can change his business without sacrifice.

I have just one thought more. When my fellow farmers are thinking of engaging in some line of stock husbandry which may be pursued with pleasure and profit that should reward honest labor, free from many objections that may be urged against most other lines of livestock husbandry, one in which manual labor is comparatively light, with many hours and even days that may be devoted wholly or in part to other work, rest, recreation, social entertainment, or intellectual pursuits, in short, when a man is looking for a business that will be likely to bring him in close contact with comfort and happiness on earth and better fit him for enjoying the happiness of an endless hereafter, he will look long and anxiously before he finds one better adapted to such ends than that of sheep husbandry. Yes, the sheep, that useful animal, proclaims its own worth, its snowy fleece and majestic carcass add beauty to hillside and valley, and gold to the shepherd's purse.

TWO-YEAR OLD OXFORD DOWN RAM.
From Photograph by Webster. First Prize winner at leading American shows, and a winner at the English Royal of 1901. Weight over 400 lbs.
Owned by Geo. McKerrow & Sons, Sussex, Wis.

DISCUSSION.

Mr. Culbertson—What do you use for your first green feed in the spring?

Mr. Dixon—I have clover that they can run on first, before I plant my corn.

Mr. Culbertson—Have you ever tried rye?

Mr. Dixon—No, I have not.

Mr. Culbertson—I like rye very much; it is the first food we have in the spring.

Question—What kind of sheep do you prefer to raise?

Mr. Dixon—Whatever I can sell the best. I started in two or three years ago with Shrops, and they sell well. Other breeds sell just as well.

Question—Would you advise to start in with high-grade stock?

Mr. Dixon—No, I wouldn't advise that; I would advise a man to start in with the best he had and get a good mutton ram.

Question—Suppose he had Merinos.

Mr. Dixon—I would start in with a Merino foundation.

Mr. Convey—Do you consider Cotswold of the best mutton type?

Mr. Dixon—No, I don't. I think the Southdown or Shropshire is better.

The Chairman—What is the matter with Cotswold mutton?

Mr. Dixon—I don't know that there is anything the matter with the mutton. It is not as salable, it is more leggy and not always of that nice, firm condition that the Southdown or Shropshire has. They never command the best Chicago price, they don't look as plump and nice. I never raised any. My observation is that they are not as good as the others.

Mr. Bradley—What time do you have your lambs come?

Mr. Dixon—From the middle of March to the first of May.

Mr. Bradley—When do you sell your lambs?

Mr. Dixon—Understand that I am not breeding for the lamb market; that is the Chicago market. I keep pure-bred sheep mostly, and of course we have to keep the males until they are a year old, usually, that is, with Merinos and Shropshires, high-grade lambs, I sell in the fall, September and October, or whenever I get the best price.

Mr. Bradley—What do you use to fatten those lambs?

Mr. Dixon—Rape, and turnips and clover, the aftergrowth in the stubble.

Mr. Bradley—Do you feed any grain to these lambs?

Mr. Dixon—Usually I do not.

Mr. Goodrich—Do you take special pains to breed sheep that will shear large fleeces of wool?

Mr. Dixon—For the mutton sheep, mutton is the first consideration, the fleece second, and the tendency is that way with the Merino sheep.

Mr. Goodrich—Well, the best mutton sheep don't have the heaviest fleece; that looks reasonable. If a sheep turns her food into wool, she can't use that same food to make meat. Now, which do you prefer, that the sheep should turn their food into wool or into meat?

Mr. Dixon—As I said, meat is the first consideration, but we have those that consume their food so it goes both directions.

Supt. McKerrow—Then you believe in dual-purpose sheep?

Mr. Dixon—Yes, to a certain extent.

Supt. McKerrow—What kind of food do you feed your lambs in the summer?

Mr. Dixon—We hardly ever feed grain in the summer.

Supt. McKerrow—Ought you not to?

Mr. Dixon—Yes, possibly.

Supt. McKerrow—Isn't that the time to feed them?

Mr. Dixon—They will make the most gain then, I will admit. If a person will provide plenty of good rape and turnips and clover, there is nothing that will make gain so cheaply and fast as that food, and I don't think it is necessary to feed but very little grain at that time.

Supt. McKerrow—Wouldn't you get a good price for your grain if you fed a little at that time.

Mr. Dixon—Yes, I think it would be all right.

Mr. Bradley—How do you feed your breeding ewes during the winter?

Mr. Dixon—Well, I feed hay twice a day, corn fodder, or shredded corn fodder, once a day, my grain ration I feed once or twice a day, and my grain ration consists of oats and bran and corn, according to the kind of sheep I am feeding it to, and the purpose for which I am feeding it.

Mr. Arnold—What kind of hay do you prefer.

Mr. Dixon—I prefer clover hay. If I can't get that, I will take the next best thing I have, which is corn fodder.

Mr. Arnold—You spoke in favor of early shearing. There is one objection to that. The fleece is not as heavy, would we get as much more for the fleece by shearing early and having less weight? I was talking with a man who is feeding five thousand sheep, and he shears them right in the winter, and the second day turns them out in the yard. He says they gain faster, not only in the growth of wool, but in flesh, than with the fleece on. I think it is very desirable that we should shear early, if possible. I

would like to hear from the gentleman about this.

Mr. Dixon—I do not advocate as early shearing as some people, but any time after the first of April, when the weather is good. If we should advocate shearing any earlier, lots of people would go home and try it, and lose some sheep. If you shear any time after the first of April, when the weather is good, your sheep will do better, they are more active, and you can raise the lambs more easily. If you do have to sacrifice a little in the price of your wool, you can save enough more lambs to make up for it. At least, that is my experience and the experience of every one of my neighbors.

Mr. Arnold—We have lambs coming this time of year and the little fellows run out in the yard and seem to be perfectly comfortable with very little wool on. I don't know why the old sheep cannot stand that as much as the little ones.

Supt. McKerrow—A good dairy cow that is giving a full mess of milk cannot stand as much cold as if she were not. Of course it is different where you take a lot of sheep that are not producing lambs, that are being fed for meat, that is a different thing. Experiments have been carried on where they shear lambs in the fall of the year, and the results went to show that there was not much gain, but in my own experience I think, if they are free from ticks, they will do practically as well with the fleece on until the weather becomes quite warm, about the first of May. That is early enough shearing unless it is for the show ring. I won't tell how early we shear for that.

Mr. Goodrich—Your sheep have long wool by lambing time?

Supt. McKerrow—Yes, we raise a sheep that grows pretty long wool.

Mr. Arnold—Are you an importer, Mr. Dixon?

Mr. Dixon—No, sir, I am not.

Mr. Arnold—You said if you couldn't get hay you would use corn stover. Now, corn stover is very fattening food, and clover is protein food. How do you account for it that sheep will do so well on that kind of a ration? Isn't it a fact that the leaves of corn have about as much protein in them as clover?

Mr. Dixon—There is more protein in the leaves of corn than in the stalks. If you feed a cow one hundred pounds of corn leaves a day, she will get enough protein to get a full milk flow, and she will have to eat a hundred and fifty pounds of stalks to get a full milk flow.

Mr. Arnold—And yet we are talking all the time that corn fodder is not a good milk-producing food, whereas if you keep corn fodder so they don't have to eat anything but the leaves, it is a good food.

Mr. Bradley—Are February and March lambs as subject to troubles as May and June lambs?

Mr. Dixon—I don't know as they are, but I can't raise as good a lamb, that is, a lamb that will develop as symmetrically, as nice a mutton form. It costs too much to raise a February lamb. I haven't a silo, and with the feed that I have, I can't do as well as to have my lambs come after the middle of March.

Mr. Culbertson—Sometimes the lamb crop is quite weakly. Can you tell us how to have them stronger?

Mr. Dixon—Well, I should judge that your flock had not been properly handled and fed.

The Chairman—Is not exercise an important element with breeding ewes?

Mr. Dixon—Exercise, fresh air, sunlight, and plenty of good food are necessary in the ewe flock.

Question—In feeding from the bottle, how much do you feed at a meal?

Mr. Dixon—That depends on the age of the lamb. The young lamb, for the first day or two, should have but very little, and that little often.

Mr. Culbertson—Don't you think that succulent food all winter would cause lambs to be stronger?

Mr. Dixon—I don't know as it would unless the ewes had plenty of exercise.

Supt. McKerrow—All other things being equal, a reasonable amount of succulent food will give you a better lot of lambs.

Mr. Convey—I wish we might have Supt. McKerrow's opinion as to ensilage.

Supt. McKerrow—Good ensilage is good sheep feed, if you don't feed too much of it nor too little. From one-third to one-half of their coarse ration

in corn ensilage gives good results. Of course, when you are feeding corn ensilage, you must feed a little more protein food in the form of hay, or if your flock is not up in flesh, you can feed them some oats and some bran. Too much ensilage causes a derangement of the digestive organs; the trouble with feeding too little is that they don't do as well as they would if they had enough. Good, sweet ensilage you can feed twice a day, although with average ensilage I would say one feed a day, what they will eat up clean in an hour's time, is about right.

Mr. Convey — About how many pounds?

Supt. McKerrow — Well, sir, I couldn't tell you, but I should judge about three, just an estimate.

Question—What causes goitre in lambs?

Supt. McKerrow—I have been trying a long time to find out. I knew more about it twenty years ago than I do now, so I will not answer that question. I have a suspicion that on a ration containing too much protein, lack of exercise cuts a good deal of figure. In my own experience and in my own observation, I never have seen December and January lambs, and but very few February lambs, that were goitred. The ewe flocks have plenty of exercise in the fall of the year, and therefore I think exercise cuts a figure there. I know of one flock in this State where a gentleman lost thirty-one. These lambs were being dropped in April or May, and he kept losing them. At last he tried January lambs, and he had not a goitred lamb among them. He is positive that exercise cuts the figure, and that early lambs are all right. He says now when he gets an occasional late lamb, it is very apt to be goitred. There are some people who think it is caused quite largely by the hard condition of the water, but I know of cases where they had goitred lambs and the water was rain water, cistern water. I don't think we know a great deal about it, but I am inclined to think that lack of exercise is one of the chief causes or promoters of the trouble.

Mr. Bradley—It seems to me there is another thing we ought to consider, and that is the difference in the kind of food that the sheep have in the early winter, and in carrying the lamb crop clear to April or May. She has a good deal of dry food into April.

Supt. McKerrow—I think some of the trouble is that in order to develop the lamb, the sheep have too much protein, the object has been to develop muscle and bone as fast as possible, and I think we should be careful about giving the succulent food. However, I may be wrong; I don't know anything about it, I only theorize along this line.

Question—Is goitre as prevalent as it was a few years ago?

Mr. Dixon—As far as I know it is.

Mr. Imrie—Which do you consider better for sheep, whole or cut ensilage?

Supt. McKerrow—I like whole ensilage better, because it is sweeter than cut at the same stage and put in the silo. If you are going to put it in whole, you must put it in earlier. But your sheep won't eat it as close as cut ensilage. For sheep-feeding I am sure I like the whole ensilage best, because you can feed more of it without any bad effects.

Mr. Matteson—Wouldn't you have more waste by feeding the sweet ensilage?

Supt. McKerrow—No, I think about the same. Where you put in the small corn they will eat it up pretty clean.

Mr. Arnold—There is a great tendency to feed sheep timothy hay. Now, my experience is that timothy hay is pretty sure death to the lambs, if not to the ewes, if fed exclusively. I have always had good success with sheep except one year when I fed timothy hay, and since then I think it is pretty dangerous food.

Question—At what stage of growth do you cut your timothy hay?

Mr. Arnold—I am aware of the great variety of protein elements in timothy hay according to the time when it is cut, and whether it is on high land or low land, but early-cut timothy hay is certainly the best for sheep, while later cut is better for some other animals, but as timothy hay is generally cut it is dangerous food for sheep.

A Member—It is a good food, if it is cut early enough before it gets dry and woody.

The Institute adjourned till 7:30 p. m. same day.

EVENING SESSION.

The Institute met at 7:30 P. M. Conductor H. C. Taylor in the Chair.

WHY I LOVE THE FARM.

MRS. ADDA F. HOWIE, Elm Grove, Wis.

The history of nearly every country can unfold page upon page of notable incidents tribute to woman's efficiency in the management of farms and herds while the stalwart members of the family were engaged in warfare. In short, the annals of our own land are so replete with stories evidencing the stability of character acquired by the pioneer women of our agricultural districts, that one ceases to wonder that when the mettlesome steeds of government, stung and maddened by virulent gnats of oppression, were frenzied beyond control of plausible rhetoric or terrifying threats, that an All-Wise Providence selected the firm, sinewy hands of a farm-bred boy to grasp the trailing lines and guide in safety the coach of state. Indeed, in every critical period of our nation's existence the farm has not only yielded its stores of provender, but has ever stood ready to supply brain, brawn, and courage, and the farm women have as quickly and courageously taken their places in field and barn while the herds and flocks have continued to multiply and flourish, notwithstanding the change in management.

Woman in Colonial Times.

In the early struggle of our colonies it required the possession of a higher standard of valor and skill in the heroic women who unhesitatingly assumed the care of lands and cattle, the tilling of the soil and cultivation of crops, while their natural protectors, the sterner sex, engaged in the all-absorbing contest for liberty.

Many a tale indicative of strength of character has found its way through a blur of busy years to the present time. We listen with pleasure to narratives that tell of stately dames and aristocratic belles who bandied wit and sentiment with renowned statesmen of that period, who danced the minuet with courtly grace and made themselves so attractive and popular that select American society of to-day is supposed to still bear the regal impress of distinguished courtesy.

A Pointed Story.

Yet it is interesting to find that the settlements did not give shelter to all the noteworthy people, and a little story showing the quality of our countrywomen comes vividly to mind. It was during the most trying time of that historical conflict when the army was reduced to such sore straits that orders had been issued from headquarters to confiscate all the horses and cattle to be found within a certain radius. A captain and squad in search of animals to be used for transporting guns and ammunition chanced, while passing a field, to see a handsome span of large gray horses pulling a plow that was guided by an old darkey. The captain's eyes fairly sparkled, for it was by all odds the best team he had seen for many a day, and he at once notified the driver of his intentions to put them into government service. The old darkey gravely shook his head, saying respectfully, "I don't think we can spare 'em, sah; you'll have to see the boss." "Where is the boss?" asked the captain, thinking it might not be bad policy to at least inform the owner of his plans. "You'll find the boss over there," was the darkey's reply, as he pointed to the dwelling and went on with his work.

A knock on the farmhouse door brought no less a personage than the boss herself. "Madam," the officer politely began, "we have come to take

your horses." In vain she explained that every other horse on the place had already been given over to the army, and that this team was a necessity to aid in cultivating the land and harvesting crops on which so much depended. The captain insisted while the woman endeavored to convince him that the team could not be spared. "I have orders to take them, nevertheless," said the captain, whose practiced eye had noted their qualities. "And by what authority do you demand my team?" questioned the woman with flashing eyes. Somewhat nettled by her resistance, the officer replied, "Madam, by the greatest authority, that of our commander, Gen. George Washington." Then asserted itself the masterful dignity of a nature nurtured by wholesome country environments, and the woman farmer, stretching forth her hand, said "Go back to your commander and tell George Washington that his mother says he can't have her horses." The message was delivered and it was reported that the general bent over his papers and smiled, but that the big gray team continued to tread the furrows of that well-managed Virginia farm.

SOME OF MRS. HOWIE'S JERSEYS.

Agricultural Education.

Our government has recognized the dignity and importance of this vocation, and at the present time in nearly every State University the department of agriculture is given an honorable and prominent place. Stock judging, the feeding of domestic animals, horticulture, care of soil, together with every known science pertaining to dairy interests and plant life, is intelligently taught and demonstrated on experimental farms by competent instructors.

This department is open to women as well as men, and with the knowledge thus acquired, supplemented by the actual experience that must be gained in every other line of human effort, there is ample opportunity for one who so desires, to become a master of the art.

Choosing a Vocation.

Now that women have successfully invaded nearly every known field of

industry, the question, from a controlling force of circumstances, is, which will prove the most desirable, rather than the old one of how to gain admittance to either profession. And, strange as it must appear to one who has already made a careful survey of the ground, the very vocation that affords so many superior opportunities for acquiring health, wealth and an ideal mode of living and that for centuries has been indebted to the wisdom, skill and sympathetic qualities of women for much of the renown of its achievement, should be so conspicuously unfamiliar in its every phase to the numerous clear-sighted, energetic wage-earners and ambitious business women of the present time. For while a few may be prominently quoted as attaining an enviable reputation as breeders of choice cattle and promoters of farming interests, they are at this period so rare as to be regarded by some almost in the same category as freaks, or, possibly, in the still more repulsive light of one possessing a coarse, masculine nature, that would boldly seek to gain notoriety for eccentricity; when the truth, if told, would simply reveal a shrewd business instinct judiciously coupled with the desire to lead a quiet and unpretentious life amidst sincere and soul-helpful influences which has been the all-potent factor in the selection of a vocation that can offer innumerable possibilities for study and permanent advancement. For when one has become proficient in the several branches of this line of business, neither age nor more modern innovations will be likely to startle her with the humiliating realization that her services are no longer available. In short, that she is "just behind the times;" that years of devotion and experience must step aside to make way for the attractions of a more vigorous and "up-to-date" youth, at the clamoring demands for a flippant and restless change that is doing so much to unsettle the stability of this age.

Stock Breeding.

If the woman whose choice falls on stock breeding and dairy farming is by nature and education adapted to her work, each year of experience will increase both the value of her knowledge and the bulk of her coin, for while she undoubtedly must from the start rely on more brawny arms to execute many of her carefully formulated plans, nothing short of a weakened brain or a total physical collapse can compel her to lose interest in her surroundings or become less valuable to the welfare of the business. This condition of itself must present a favorable and exhilarating influence in marked contrast to the certain ultimate destiny of nerve-exhausted nurses, clerks, stenographers, lawyers, doctors and teachers, and while it will require much study and a patient, conscientious performance of manifold duties to become a capable and self-reliant director in this vocation, the wholesome environments, variety of labor, together with the constant daily changes, are a harmless stimulant to exertion and a forceful preventive to settling down to an aimless monotony of action, thought and aspiration. The student and lover of nature may readily find and recognize art and science in every branch of farm life.

Requires a Good Brain.

It is only the ill-fed imagination of a cramped and woefully undeveloped mind that can conceive nothing but the erroneous idea that intellectual forces are unnecessary or wantonly wasted in the occupation of a breeder or farmer, for he has doubtless formed his impressions from coarse caricatures and witless quotations, rather than from a personal contact with a class of people whose sterling merits if better known would undoubtedly tend to cause at least a brief reflection if they did not serve to temper with mercy many a rudely unjust criticism that springs from a shallow soil over-fertilized with ignorance. For in no other calling is there greater need of a keen and unwavering discrimination; not only must one be quick to take advantage of the conditions of season and weather in the planting and harvesting of crops that will affect to a marked degree the amount of her yearly loss or gain, but one must plan intelligently with a view to the temperament and many essential requirements of domestic animals if they would insure a profitable compensation for time and labor.

And while both exalting sentiment and practical common sense may be wisely utilized in the accumulating and breeding of a superior race of cattle, the provisions for their numerous wants must be regarded of no less importance in the calculations of a successful manager. All this may appear somewhat formidable to one unaccustomed to the expanding influences of broad fields and roomy farm buildings. Still, the woman with sufficient physical strength and brain capacity equal to the strain of supporting a family on the revenue derived from a well-ordered and cleverly-conducted boarding house need harbor no fears in assuming the responsibilities of this independent and certainly more lucrative vocation.

Are Staples.

One pleasing feature, from a financial standpoint, is the fact that dairy products are a staple that without regard to style or season are always in demand and usually grade in price according to merits that are largely due to painstaking care in the handling. Who, then, is better qualified than a dainty woman of refined and artistic instincts for an occupation bearing so weighty a consequence on the health and cultured taste of delicately-nurtured patrons? Who better fitted to anticipate the needs or more skillfully provide for the care and comfort of animal mothers than the compassionate-hearted human mother, for, in dairy farming, it is the natural functions of maternity that are artificially developed in order to produce a wholesome nourishment for memebrs of the human race. And when one pauses to consider of what vital bearing such a calling may have in regulating the life and death statistics of a community, it is readily apparent that no greater or more laudable field of misisonary work has ever appealed so clearly or pathetically to those whose impulse is to be of benefit to fellow beings.

Surely it must be one whose eyesight cannot have penetrated beyond the brick walls and smoke-impregnated atmosphere of a densely-populated city who believes the boundaries of a farmer's existence to be of too limited a compass for a soaring ambition and commendable achievement, wholly forgetting to count as gain a busy, useful life wherein the teachings of God's Golden Rule may be as fittingly applied to His lowly creatures as to men; where one may see from day to day the gratifying results of conscientious labor and loving influence, and where nature and art may be so happily blended that one never for an instant could feel like questioning the wisdom and judgment of Him who after creating man in His own image, with fatherly solicitude selected the Garden of Eden as the most fitting place for his abode; where one untrammeled by the dictates of conventional ethics may look beyond the formalities of a stilted etiquette and with unrepressed emotions of joy and gratitude go about the necessary tasks that fall to her lot, strengthened in the thought that her lines have fallen in pleasant places and that it lies within her power to accomplish a noble and useful work in the span of what may be made a happy and elevating life.

No Dreaded Isolation.

There need be no dreaded isolation, even in a sparsely-settled locality, for she above all others may select the wisest and most steadfast companions. Her regular calling acquaintances can come in the current literature of the day, while her heart may freely and safely go out in full confidence and sympathy to many old and trustworthy friends, the brain children of Charles Dickens, Sir Walter Scott, Thackeray and many other beloved and appreciated authors whose well-thumbed volumes are to be found fondly cherished in the home of numerous refined and intellectual farmers.

Nor have the country women of the past been found lacking in the elements to excite coveted admiration. The charms of the milkmaid have been for ages a fruitful theme of inspiration to more than one poet whose verses have won merited distinction and who no doubt has eagerly offered the sparkling, ruddy wine of his muse in exchange for the invigorating oxygen of picturesque hills and vales and the harmless, soothing draught received from the fair hand of some attractive, unaffected country maiden.

Woman's Influence.

Indeed, for centuries women have taken so prominent a part in the development of dairy cattle and in raising the standard of dairy products, that it might not be amiss to call attention to the fact that this profession has had its representatives of women from all ranks and conditions in life from the hapless Queen, Marie Antoinette, who found relief from the nerve-taxing etiquette and political intrigues of a corrupt French court in the simple tasks and peaceful atmosphere of her beloved dairy, to the peasant of lowly birth and humble aspirations, who willingly permits herself to be yoked to the family cow and patiently trudges along the furrow beside this dual-purpose beast while her husband contentedly holds the handles of a primitive plow, and all along the line in a meager history of one of the greatest and most ennobling callings may be traced the indelible imprint of woman's work and influence.

The Jerseys.

In the year 1734 one Philip Falle was so impressed with the beauty and meritorious qualities of a breed of cattle to be found on a small island in the English channel, near the coast of France, that he considered it worthy of especial comment, and we are told by this able historian that centuries of gentle care under the management of women had wrought this marvel of excellence.

A little later this same writer mentions in a calm, matter-of-fact way, without the least suggestion of a desire to wink or smile at the maudlin sentiment of these simple-minded managers, that "at time of calving the cows are regaled with toast and cider to which has been added a little powdered ginger." Surely this is but a brief description of the care accorded these little bovine mothers, and yet one may read between the lines and the entire secret of a remarkable record of successful breeding stands out

MR. HOWIE AND HORSE

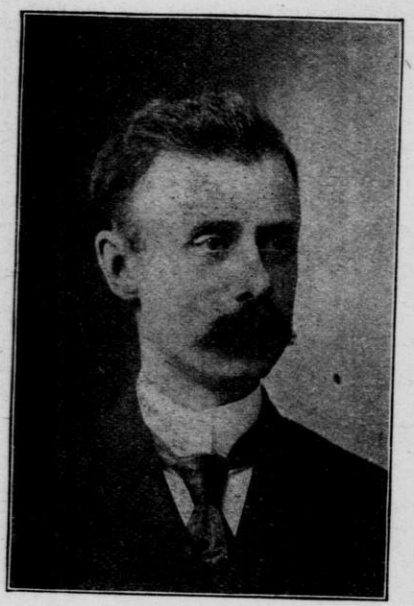
clear and strong, unaffected by time or change, and by that sign we of a later day may infer that the women of this now famous isle, instead of placing their affections upon an unremunerative poodle or parrot, being of a more practical turn of mind, had expended their best energies in developing the finest breed of dairy cattle in the world. In their devotion to the cause they had given more than gold and silver and precious jewels; they had poured out upon the altar of advancement the wealth of loving hearts and kindly natures. They guarded their cattle with the tender impulse of a true friendship.

Humane Treatment.

Some of a more stern and less refined organization may have laughed loud and heartily at the mere suggestion of offering a cow toast and cider, and yet the alert, shrewd dairyman of to-day might quickly recognize a practical value in this unusual diet, for who can deny that spiced cider at such a time might not stimulate the enfeebled action of the stomach and thereby tend to ward off that to be feared monster, milk fever. At any rate, whether or not this mode of treatment meet the approval of persons versed in cattle ailments, one can but admire and respect the sympathetic qualities that would prompt an owner to provide her pet with what no doubt was the rarest delicacy of her own liking. More than an hundred years have passed away since that dim insight into the method employed in developing this renowned breed was noted in a world's history and blazed upon the sturdy trees bordering a faint trail that has steadily led onward to a type of almost perfection; and yet the sentiments carried by those womanly hands may still be seen clearly defined beneath the prominent ridges of a many years' growth of the bark of Progress. We look back with a feeling of awe, not unmingled with envy, on the wondrous skill of breeders long since passed away, and yet it is simply the "old, old story" handed down with accumulated experience from generation to generation, and all successful dairymen and women of the present time may trace their prosperity to certain gentle methods that are in part but a repetition of the means employed in bygone centuries.

THE RURAL SCHOOL.

PROF. W. C. HEWITT, Normal School, Oshkosh, Wis.



MR. HEWITT.

In the Articles of 1787 is found the justification for the common schools of Wisconsin: "Religion, morality and knowledge being necessary to good government and the happiness of mankind, schools and the means of education shall be forever encouraged."

The school, then, exists for the maintenance of good government. Good government depends upon the diffusion of knowledge among all the people, and to the end of diffusing knowledge the State has declared that certain "common" branches be taught to all children. These studies are supposed to react favorably upon the body politic, and in this reaction is the justification for their selection. Whatever defeats this reaction thwarts the will of the State.

In the rural schools much of the instruction is made of little avail for the following reasons:

1. Tenure of Teacher's Office Too Short.

To instruct a child properly the teacher must know the lights and shades of mind and heart.

Three years should be a minimum for which district boards look for the efficient teacher to continue his work.

It is poor policy to have a different "summer" and "winter" teacher.

The salary should be so arranged as to increase for three years: $30 per month for the first year, $35 per month for the second, and $40 per month for the third. Under this plan the teacher would take more pleasure in improvement and would build a broader foundation of usefulness.

2. Attendance Too Irregular.

Of necessity absence in rural schools will be greater than in cities or villages, but it may easily be made less than it is. Much inattendance is due to the selfishness and carelessness of parents, and the lack of vital interest among the pupils.

Parents must be reached through the Farmers' Institutes, the newspaper and the popular gatherings; the children must be reached by making instruction more *intensive, practical* and *interesting.*

3. Lack Efficient Supervision.

The supervisor of the rural schools is the county superintendent. He has many duties, and it is physically impossible for him to visit the schools of his large territory more than once or twice a year, and of necessity these visits are too brief to do the most good.

Supervision is the most valuable form of educational service; it makes good teachers many times efficient, it makes poor teachers better and reduces failures to a minimum. In no other business is there more pressing need for wise oversight, for in educational supervision the maxim is almost wholly true, that the "master's eye is worth both hands."

Remedies.

A change from the district to the town unit would be a step in the right direction.

1. One committee hires the teachers for the whole town. This would tend toward a lengthened term of service.

2. Emulation among the schools would tend to reduce absence; as it now is, of the various schools it may be truly said "the right hand knoweth not what the left hand doeth."

3. The secretary becomes a bona fide supervising officer, and besides his own efforts in that direction he would put the County Superintendent in direct touch with those teachers needing most supervision and help.

4. Inequalities of privileges in books and apparatus would be corrected.

5. Taxation would be more evenly spread, with injustice to none.

Under the present system no two districts are being taxed alike for the support of the schools; some districts paying by annual tax as high as $20 per child and others paying practically nothing.

6. Schoolhouses with too small an attendance would be more wisely located and in some cases abandoned.

7. As compared with the districts the towns would be fewer in number, more easily studied, and more easily improved.

The Course of Study.

Thus far we have discussed some of the weaknesses in the administration of the rural schools. Let us now consider another which concerns the course of study.

The absence of older boys and girls from the country school is everywhere noticeable. One of the influences bearing on this is the absence of those subjects which are calculated to interest, or which bear directly on the work the country child is bound to do.

Every kind of opportunity surrounds the older city boys and girls; high schools with half a dozen different courses all looking toward practical life; business colleges, schools of technology, schools of commerce, law and medicine everywhere invite them to share their privileges. The country child should be like favored, and simple justice pleads for him such instruction in the science of agriculture and domestic economy as will fit him to be a more intelligent farmer and a happier man.

Some Good Results.

Instruction in agriculture and domestic economy should accomplish two things:

1. It should increase the individual knowledge of the pupil so that he becomes a more perfect master of his enemies in air and earth. No fault is found with the basic subjects of the common schools. Their mastery furnishes the tools, but when buildings are to be erected tools alone are not sufficient—there is need of granite, and marble, and wood, and iron. The instruction of the rural school does not go far enough; nor after the first years, in the right direction. Ninety per cent. of the efforts in the higher classes are outside the pupils' interests and beyond their environment. Grammar, history, geography, are bundles of abstractions—while the child is interested in the world of realities; the price of wool, the clearing of land, the making of butter, the care of stock, the management of the home. The atmosphere is a thousand times more interesting to the farmer than language work, yet of the scientific cause and prediction of the weather the country child is usually ignorant. Man's journey out of barbarism is marked by his mastery of the air, the forest and the soil, but of these things he hears little, their place being taken by the gymnastics of geography and history and grammar, of which nothing is ever heard again outside the schoolroom.

Rotation of crops is as inspiring as the position of the preposition; the fertilization of apple and corn is as interesting as the location of cities and the course of rivers; the economy of horse and cow and sheep comes quite as close to life as the duties of the President and the causes of the Revolutionary War.

If it be said that the country child will of necessity be compelled to learn of practical things, the answer is that uninstructed he will learn the externals; but between him and the scientific reason and foundation of things will forever hang the veil of ignorance.

Love of the Farm.

2. The love of the farm is not less important than the knowledge of the farm. By concerted effort the public schools have built up a fine sentiment of love of country, and the flag is everywhere honored in spirit and in truth; and no less may rural school teachers create a body of sentiment looking toward the elevation of farm life and farm opportunities.

Every country child of suitable age should be taught "A man's a man for a' that," the "Cotter's Saturday Night," "The Elegy in a Country Churchyard" and Whittier's "Snowbound," until the words are upon the lips and the sentiments deep within the heart. Rightly do the city schools adorn their walls with the pictures of the old masters, and fill niche and alcove with bust and statue, but daily there is spread for the country child the picture of rock and stream and setting sun, of waving grain and bobolink and quail. The seasons shift the mighty canvas, but the picture never vanishes. How wise it is to open the eyes of the child that seeing he may know, and knowing, he may love the simple beauties that lie about his path.

To what agencies may we look for this happy result? Elementary agricultural instruction may be given wholly or in part by

1. The upper course of the rural schools.
2. The town high school.
3. The county agricultural school.

The legal machinery for the first and second are already in existence and need only intelligent co-operation on the part of farmers to put them into successful operation.

A Look Ahead.

The county agricultural school is the destiny of the future. Foreign countries have blazed the way, and in time the necessities of intelligence will establish in every county a school where every farmer's boy and girl will receive as much help farmward as the city boy and girl receives businessward, both meanwhile sharing in general intelligence alike.

But before planting the seed the soil must be prepared, and there must be sowers to sow.

Teachers must be instructed in the principle of agriculture, manual training and domestic economy. The seven normal schools, from their seven hills of intellectual ascendency, must be the first to lift the light of the new teaching. Every graduate must become an apostle, until every county school shall be a temple of the new learning, where use and beauty sit side by side.

When this shall come about the visions of the early settlers of a republic rich in resources and in men shall be realized, and we shall then understand the meaning of the great truth of our text: "Religion, morality and knowledge being necessary to good government and the happiness of mankind, schools and the means of education shall be forever encouraged."

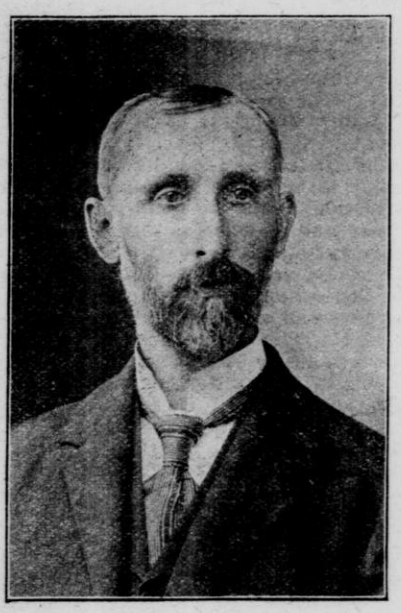
The meeting adjourned till 9 a. m. next day.

SECOND DAY.

The Institute met at 9 A. M. Conductor W. C. Bradley in the Chair. Prayer by Dr. J. P. Abbott.

STABLE SANITATION.

H. E. COOK, Denmark, N. Y.



MR. COOK.

As our population becomes more dense, and milk and its products are more fully appreciated and used as food, the necessity of sanitation for the animals becomes greater.

Corresponding to the increased mental activity of man in competing in the various commercial activities, and his constantly changing environments for comfort and health, so the dairy cow as we come more fully to understand her capacity for work, needs more congenial surroundings, providing plenty of sunlight, warm stables, and a dry atmosphere.

Tuberculosis.

Much agitation during the past few years relative to tuberculosis has produced unnecessary anxiety and fear—the slaughter of many animals that would have lived and died either by the hands of the butcher or some other disease than tuberculosis. Statistics prove that this disease in the human family is decreasing. Is it because we are less susceptible? Is it because we do not come in contact with the germs? No! It is due to better sanitary and hygienic surroundings. We dress more comfortably, warm underclothes are worn by both sexes, we keep our feet dry and sleep in warm rooms. We do not try to strengthen our muscle or renew our constitution by unnecessary exposure; waiting until midwinter before laying aside summer clothing that we may be able to endure the low temperatures was long since found to be fallacious. So this dairy cow, using up nervous energy in the production of milk, finds herself enervated, when forced to remain out of doors in the late fall months, when the weather is damp and cool, and through the winter standing in a foul, dark, damp stable.

While I do not care to say that tuberculosis legislation is unnecessary, I do say, without hesitation, that no statutory provision can free us from the disease so long as environments are such as to produce it. Four points in stable construction must be considered—sunlight, temperatures, floors, and ventilation.

Sunlight Necessary.

My observation is that stables are rarely constructed to permit sufficient sun's rays to enter the room. The admission of light alone is not sufficient,

hence the necessity of a southern and western exposure, with windows enough and so placed as to allow the rays of the sun to reach the opposite sides of the room. In case this large glass surface results in too rapid radiation of heat during the night, either double windows or curtains drawn during the night will aid in maintaining a uniform temperature.

Some experiments have recently been made by Dr. Pearson, of Pennsylvania, with two barns, one of them an up-to-date, sanitary stable, sunlight, warmth, cement floors, and ventilation. The other as usually found, no admission of sunlight, inability to control temperatures, and little or no regard for ventilation. Cows having tuberculosis to a greater or less degree were alternated in each stable and then after due time the diseased animals changed stalls with the healthy cow, in order to give every possible chance for contamination. Result: The well cows in the sanitary barn did not take the disease, and the diseased animals began to improve, while in the unsanitary stable the well cows were soon diseased.

Physicians have known for years the necessity of sunlight in the home as a germ destroyer, but in our stables we have almost wholly ignored it. Let in the direct rays of the sun! It is cheaper than medicine. Many barns are built with a hood on one side or so wide that a hay mow is taken from one side, or against a bank. 'Twould seem that our ingenuity had been exhausted in devising means to keep out instead of letting in God's most bountiful gift.

Temperature.

How warm should a cow be kept? Past history has been written at 40 to 50 degrees. I do not think as yet we have any more definite data on that point. I feel very confident no one will dispute this statement, that uniformity of temperature is absolutely necessary. A cow kept at 60 degrees, then 50, finally at 30, and then because the butter or beef ultimately goes into cold storage, the farmer seems to think it wise to put the cow herself there for an occasional twenty-four hours, will always result in very unsatisfactory production. My experience would seem to warrant this statement—that the highest temperature which will at the same time permit of a change of air providing good ventilation, will be a correct one. This range of temperature has been from 54 to 60 degrees, with the varying outside changes. I do not believe this temperature can be raised without artificial heat, which is presently impractical. The form, size, and wall construction will be the controlling factors.

Breathing Space.

I do not think we can safely state the exact amount of breathing space, but I am sure it is not above one-half cubic foot to each pound live weight. Possibly we might reduce this somewhat, but convenience and suitable room to feed and haul out manure, seem to require this space. In construction I have seen no side wall so cheap and effective as a ceiled surface outside and inside, with an air chamber between. The ceiling should not be more than nine feet from the floor, or in small stables eight feet will be enough. The value of the so-called modern stable has been ruined by high ceilings, making it an impossibility for the animals to warm the room. A good, well-fed dairy cow will lie down one-half of the time. Of what use is the warm air sixteen feet above her? In these stables are found cows suffering with bronchial irritation and many times tuberculosis, of which I have been many times an eye witness. It would seem, therefore, that 8 to 9 feet in height, 34 to 36 feet in width, and 3 to 3½ feet for each cow, and two rows of cows, was about the ideal size. The interior arrangement of the stable can be varied, without interfering with its sanitation. Briefly, however, we prefer cows standing heads to the wall, one driveway then suffices for hauling manure; the milking also seems more easily handled in this way. I do not like mangers of any kind. A smooth floor is easily and quickly cleaned. The manger can be, but my observation has been that usually it is a nasty, uninviting receptacle for food, especially where silage is a part ration. The manger dampened, grain adheres, and a sour manger follows.

The Water Supply.

For the same reason I do not like any permanent water device. They are very rarely kept clean. Our system is a very simple one, and comparatively inexpensive. A tank is placed in the barn at sufficient elevation to get pressure, connected by pipe over the heads of the cows, and drawn into movable troughs mounted on wheels, 10 inches deep, half round 18 inches in diameter, and long enough to water five cows. One trough for each row of cows provides pure water twice a day, which no experiment has yet proved was not enough, and it is very quickly given. But no possible arrangement can cows do their best and be forced to obtain water from a common drinking fountain outdoors. For one cause or another they rarely get their full supply.

Barn Floors.

The next important feature of stable sanitation is the floor. It may be possible to construct a plank floor and have it absolutely tight, but I have never seen one. Hence the cement floor, properly built, seems to be the only avenue of escape.

An experiment last summer will suffice to show the danger of contamination from decomposing matter under a plank floor. A mess of milk had been coming to one of our factories for several days off in flavor. The people were scrupulously neat about the barns, and in cleaning the cans, pails and strainers. A visit to the premises revealed an odor coming from the milking barn and passing directly over the milk cans, and taking up a plank in the floor proved the source of the trouble. No amount of surface sweeping could touch this decomposing mass beneath the floor.

Farmers object to cement because it is smooth and cold. Either difficulty is sufficient to condemn it unless removed. Have you thought why cement is cold and often damp? 'Tis often thought that the cold comes up from below, as well as the moisture. Not so! Stone cements, and metals are good rapid conductors of heat. You place your hand upon a cement floor and it feels cold because the heat of the hand is readily communicated into it, and one will need to warm the block through before the cold feeling ceases. If you will place a piece of heavy paper between the hand and the cement the cold feling at once disappears. The paper being a non-conductor, destroys the possibility of rapid radiation. If we can therefore construct so that a thin layer of bedding will always be found under the cows all will be well.

Making Cement Floors.

The first thing to do will be the grading, which can be done with plow and scraper. If this surface soil is not firm it should be made so by thoroughly tamping. A good firm foundation can be secured by hand setting with small round stones four or five inches in diameter, then filling the spaces with a thin cement and sand mixture, one part of cheap cement to three or four parts sand, or if hydraulic cement is used, one-half as much cement will do as well. Before this first foundation work is dry, the finishing coat of one and one-half to two inches thick, made of two parts clean, sharp, coarse sand to one part cement, should be applied. If the first coat gets dry the union between the two coats will not be perfect and cracking will follow.

After the last coat has begun to set, and is quite firm, it should be floated with a small board trowel, or float, which will put on the so-much-to-be-desired rough finish. This peculiar sandy or rough finish will be satisfactory or unsatisfactory in proportion to the coarseness of the sand used. Fine sand, if clean, may make a floor just as durable, but it will not present the rough surface.

Upon this rough surface the bedding will fasten itself with much greater tenacity than upon the usual plank floor, and serves to this floor and the animal upon it the same purpose in preventing rapid radiation of heat from the body that the thick paper did for the hand.

A word in regard to cements may not be out of place. There seems to be a common belief that only imported Portlands are the good hydraulic cements, and agents who are selling them claim superior merit. This claim, however, is not borne out by actual use and test. The best domestic hydraulic cements are being used in

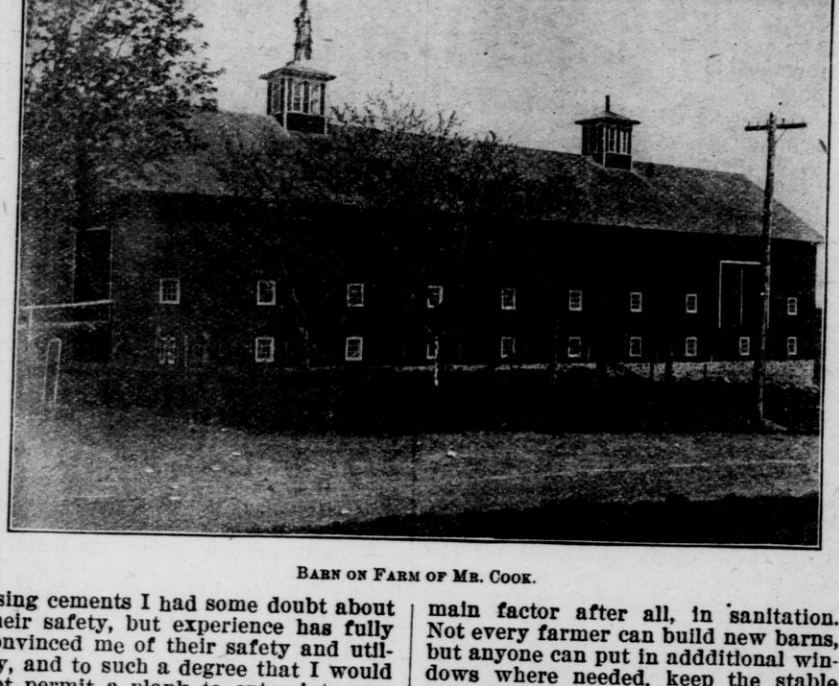
the most exacting construction work and are purchasable at about one dollar per barrel less. They can also be bought in sacks that are much more easily and economically handled. The expense of the cement floor will depend upon cost of labor, distance of hauling material, and whether the labor employed is all skilled labor or chiefly unskilled.

Hints About Building.

The feeding mangers or any surface where animals do not stand or walk should be troweled smooth. Before using cements I had some doubt about their safety, but experience has fully convinced me of their safety and utility, and to such a degree that I would not permit a plank to enter into any portion of its construction, even if it were done without cost.

A very simple and effective method of anchoring partitions, horse stalls, etc., will be found by anchoring short pieces of ¾-inch pipe, 10 inches long, protruding through the finished floor about one and a half inches. Upon these a 3x4 scantling can be placed as foundation timber. This method is much more satisfactory than bedding timber in the floor that sooner or later will decay.

A stable built on a plan similar to the foregoing, and provided with the King system of ventilation, the most perfect yet devised, will give as nearly perfect sanitation as modern building science has devised. But no study of the builder can overcome the evil effects of a shiftless owner, who permits an aggregation of refuse in the mangers, in the gutters, or on the side walls and ceiling. Cleanliness is the main factor after all, in sanitation. Not every farmer can build new barns, but anyone can put in addditional windows where needed, keep the stable scrupulously clean with the application of a new coat of whitewash once a year, and he will be surprised at the marvelous change with only a nominal expenditure of money.



BARN ON FARM OF MR. COOK.

Ventilation.

It seems quite useless for me to describe "The King System of Ventilation" to a Wisconsin audience. I be-

lieve Prof. King will finally accomplish for the health of our animals what Babcock has done for the dairyman and the dairy cow.

The principle involved is to free the stable of carbonic acid gas and moisture. Perhaps it is not generally known that nearly four quarts of water is daily thrown off from lungs and skin by the average dairy cow. We readily see, therefore, the cause of damp stable walls, barn roofs and often complete saturation takes place and floors and ceilings are wet. Continual dampness is fatal to every class of animals, not excluding man. Have you not observed the danger to health from a protracted damp "spell of weather," and how earnest the desire for a change, even though it be extremely cold?

An experience this winter may illustrate this point. While working in New Jersey Institutes we were driven about seven miles a damp morning, with the temperature just below freezing. Every member of the party felt the chilling effect of the ride with the usual result: a cold. Two weeks from that time I rode the same distance in extreme northern New York; temperature 6 degrees below zero; air, dry and clear. Result: no taking cold nor disagreeable result.

Dampness produces bronchial troubles in man, roup in fowls, cough in horses and rheumatic troubles in all of them, including the pig.

The "King" System.

The out-take flues which we have in use give one square foot surface to every six cows, built of double boards and tar paper, starting from the floor of the stable and following the side walls and roof to the apex, where the side tubes join and pass through the roof in one pipe. In a stable ninety feet long are four tubes, two on a side, with but two outlets through the roof. These flues must be as tight as a chimney, and so perfectly insulated either by keeping them inside the barn until they reach the apex of the roof, or construct the flue so that an air chamber will be provided between the inner and outer walls of these flues. Condensation of moisture must be prevented or constant dripping will take place, not unlike the difficulty often experienced with a stove pipe, when a portion of it passes through a cold room. Provide these flues with an opening and damper at the floor and the ceiling of the stable. In case of too high a temperature open the register near the ceiling. In times of extremely low temperature it may be necessary to partially close the lower opening. The greater the difference in temperature between the stable and outside the stronger the draft. The intake flues should be very small and placed upon each side of the stable, so that currents of air will form from all sides to the out-take flues. These tubes should be at least four feet long opening into the stable near the ceiling. They can be built inside the side walls, opening out or passing directly through into the stable and then up. These openings should also be provided with dampers, wind pressure and low temperature having a marked effect on circulation. I would like to add as a precaution that this system must have a closed floor or ceiling above, and side walls as well made, or it will refuse to work. We are now in a position to provide pure air and at the same time maintain the so much desired uniform temperatures.

DISCUSSION.

Mr. Arnold—How thick do you make the cement of the floors?

Mr. Cook—We lay small stones first, about the size of my fist, and then fill that in with a cheap cement, one part cement to four parts sand, very coarse, sharp sand. You cannot get the rough finish unless the sand is coarse and sharp. In places where the animals do not stand or walk that is troweled down smooth. We have found a way to anchor partitions, by taking pieces of gaspipe and putting them through the foundation, through the cement, and let them stick up through wherever there is a partition, and there is nothing to rot and decay. In the old way they had to put the timber down in the cement and it rotted and made trouble. Just one more point. Put in three or four box stalls in the barn. With the danger of this trouble of abortion, you want a place where you can isolate an animal, put her by herself, it may mean a saving of hundreds of dollars in your herd.

Question—Do you put these small stones on a clay or sand foundation?

Mr. Cook—That won't make any difference, providing you have drainage. If your barn is not over thirty-five or forty feet wide, the side walls will furnish all the drainage you need. This question of cement floors is a very important one, and if it is not done right, it is all wrong.

Mr. Arnold—Do we understand you that you think you can build a cement floor for the cow to lie on with ordinary bedding without any plank?

Mr. Cook—Yes, sir.

Mr. Arnold—I don't believe it.

Mr. Cook—I don't care. I can do it. Put on your plank though, if you want to.

Mr. Arnold—You go into dairymen's stables, you will find they don't have enough under the whole herd to put under one cow on a cement floor.

Mr. Cook—Of course the cow will lie on the plank floor without bedding a good deal better than she will on a cement floor, but I do say that using a reasonable amount of bedding, the cow will lie all right. With plank you have the same condition of wearing surface and you have the chances of the accumulation of the unwholesome matter.

A Member—The trouble is the liquids get down under the boards and we can't keep them dry.

A Member—Do you have the patent stall for your cows to stand in?

Mr. Cook—No, we are poor.

Prof. Henry—They are not so far advanced in New York as we are here in regard to cow stables.

Question—Do you have the floor level that the cow stands on?

Mr. Cook—No, sir, they are not level, back eighteen inches from the stanchion to the gutter there is a slant of an inch and an eighth. The cow is standing on a level platform, yet you have just enough slant to carry off all liquids, and that platform will just be as dry as a bone all the time.

The Chairman—I was up in a barn in La Crosse County, built by Mr. Charles Linse. He put in a cement floor and he has boards made of inch and a half stuff put together with rods running right directly through the plant to hold them in that position, and they fit in each and every stall. He has them washed off on this side when he uses this side, and if they get foul he takes them off and washes and turns them over. Anyone who uses a board floor has got to do something of that kind, or they can take them out and use the cement floor.

Mr. Arnold—Do these tubes ever reverse their action?

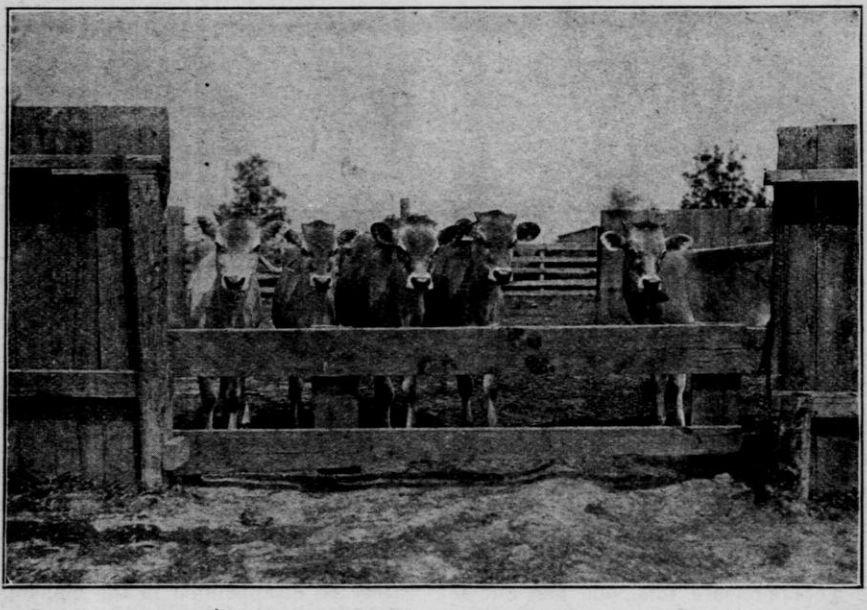
Mr. Cook—No, sir, they are not built like this. I have some tubes that are always bottom side up.

The Chairman—We can find out about this system by writing to Prof. King, of Madison. Mr. Cook says he had to come to Wisconsin to learn it, and that only goes to prove that the farther West you go, the smarter the men are. We have a gentleman here who comes from still farther West, and he will talk to you on Forage Crops this afternoon.

THE DAIRY MACHINE.

MRS. ADDA F. HOWIE, Elm Grove, Wis.

Mr. Chairman, Gentlemen and Ladies:—You can imagine that I feel a little diffident in getting up before all these noted dairymen in order to make even a suggestion as to the methods they should follow. We all know that most of the talk heard at these Institutes is of the dairy cow. We do not often hear very much about the little creature that is to make the dairy cow, and I believe it quite as essential to dairy interests to bring up the dairy calf to a standard of working perfection as it is to bring up the little ones in our own families. Every breeder who takes a pride in his calling knows how important is the business of raising the dairy calf. It is only the indolent and half-hearted dairyman who will be quite satisfied to go out and buy that calf or that cow after it has been raised. From the moment of its birth we gradually become familiar with its characteristics. Then when it steps into the line of producers we are able to take advantage of its best efforts just as we know what to expect from the girl who has been our companion from childhood, and we are rarely disappointed. Therefore, I would suggest that every dairyman make it a part of his business to save the best dairy calves, raise them under his personal supervision and thus make the whole individual his own.



JERSEY CALVES RAISED BY MRS. HOWIE. HER "DAIRY MACHINES."

Now, I am going to put aside sentiment and try to look on this important dairy factor as a machine. I have heard a number of people say in a cold-blooded way that a cow is nothing but a machine to convert food into milk and cream. Did you ever know a successful dairyman who had that feeling? He may advocate it, but deep

down in his heart, if he has met with success, if he has raised his cows from calfhood, he knows that it is something more than an inanimate piece of machinery with which he has to deal, and in commendable anxiety for the welfare of his cattle and the honor of his profession will not be content until every known method for the permanent improvement of his herd has been given thoughtful consideration.

Careful Handling Necessary.

While it would be far more agreeable to think and speak of the bovine race as living, breathing creatures, endowed with a sympathetic network of sensitive nerves and a brain capacity capable of developing rare intelligence, out of deference to the prejudice of unimaginative money-grubbers, who persistently scorn the idea that wholesome sentiment may happily affiliate with practical business operations, we will endeavor to place a representative of the dairy breed on the same basis as a useful, though inanimate device, with a mechanism of so delicate and complicated a nature that any inventor must readily recognize the imperative necessity of placing a competent and trustworthy engineer in charge. And yet only too frequently do we find this valuable and responsive piece of machinery in the hands of one so utterly unfitted to properly appreciate the worth or manage the most clumsy and indestructible samples of this old and reliable invention that there is little cause for wonder when the carefully-wrought specimens, polished and perfected through generations of skillful handling and breeding, are condemned by disappointed owners, as frail and unprofitable.

To appreciate this, one has but to take into consideration the probable outcome of a finely-constructed Corliss engine, placed in charge of an ignorant, untrained coal-heaver whose vague ideas of delicately adjusted bearings and cleanliness have sprung from the associations of crude and questionable surroundings, who, through indifference, would permit the valves and cogs to become clogged with the sticky sediment of a too liberally applied lubricant, simply because a well-filled oil can stood conveniently near, who acidly allows the boilers to be utterly ruined for the reason that it requires watchfulness and labor to replenish the evaporated water, or who would suffer through indolence and carelessness one of the mightiest works of man to become tarnished and rusted, besmirched with dirt and oil until it is so unsightly an object that the builder would cry out in wrath and amazement, should he behold the desecration of his labor of love and patience. Yet few will bear in mind the greater responsibility of a farmer who goes plodding along from day to day without seeking or caring to become more familiar with the workings of the mechanical contrivance that was intended by the Great Inventor to serve the twofold purpose of pleasure and profit. When one invests his money in a piece of farm machinery that is to be subjected to constant wear and strain, he is apt, if a prudent man, to carefully examine the material from which it is constructed. Undoubtedly he will take the wise precaution to insist that only the best grade of metal and the most durable quality of wood be used in its manufacture; and it is no more than right to expect the same painstaking discrimination in the selection of the embryo dairy machine. One must shrewdly forecast the responsibility to be placed upon it.

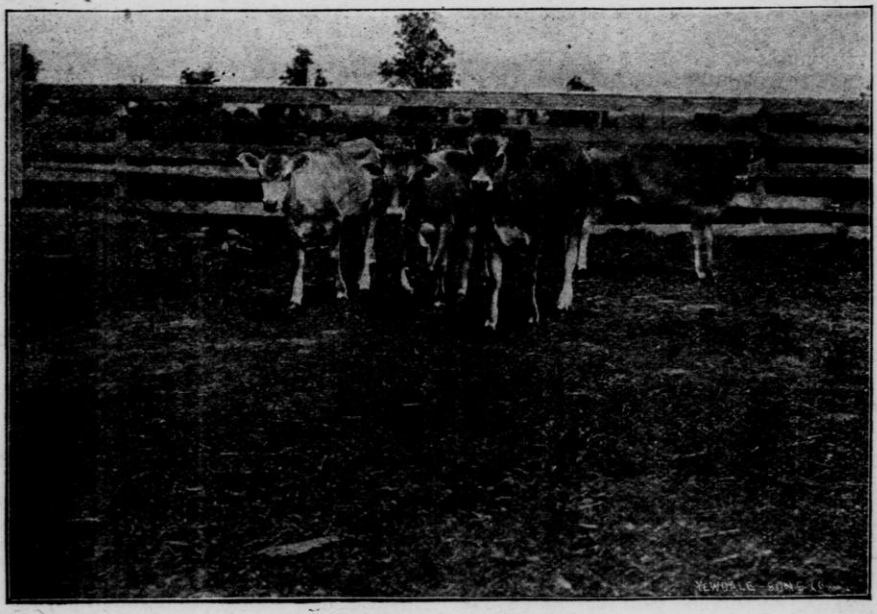
The Parent Stock.

The sire ought ever to be chosen with a view to prepotent vitality. The dam should have proven beyond question her stability and merit at the pail and churn, and, furthermore, if these good qualities have become solidly fixed through the transmission of many worthy ancestors on both sides, one will rarely be disappointed in the makeup of the bright-eyed, lively little creature newly added to his herd.

This bit of machinery does not come set up ready for use, and it will require weeks and months of patient, careful adjusting before she is ready to take her place as a reliable producer. Unfortunately no directions accompany her, and the would-be mechanic who relieves the mother of her charge must give heed to the laws of nature in dealing with her characteristics, if he would avoid friction and disaster.

Constitution.

In the first place the durability of rugged constitution is an imperative requisite for the long pull and strong pull that must be demanded of a profitable dairy worker; and badly ventilated, damp calf-pens are not calculated to promote vigorous health and thrift, for the framework of the dairy machine is as susceptible to the effects of moisture as one composed of iron or steel. There is little doubt that humid and filthy quarters are responsible for at least one-third of the ailments of calfhood.



MRS. HOWIE'S JERSEY PETS.

Over-feeding, too rich food and irregularity in feeding may safely be credited with another third, while one-half, if not three-fourths, of the remainder of these dependent creatures are debilitated by drinking from unclean pails, and the balance are victims of colds, thoughtless neglect and well-meant but unskilled doctoring, for a calf's stomach is always weakened in proportion to its body and requires rest rather than the over-taxing exertion of digesting various kinds of nostrums.

Early Care.

As a rule, at the age of three or four days the dairy calf should be separated from its mother, and in order to make the severing of maternal ties as humane as possible, the calf may be placed in a little pen partitioned off from one corner of the box-stall, so arranged that it cannot reach the udder of the cow, while the mother will in no way be prevented from fondling it to her heart's content. We have found that this change made directly after a morning meal and with no attempt to feed it until evening has proven the best means of weaning and teaching a young calf to drink. The cow may now be turned out for exercise and will undoubtedly return in a short time nervous and anxious, but so soon as she realizes that no harm will befall her little one and that it is in the hands of kindly-disposed friends, she will, without further ado, quietly take her place among the workers, and,

with intuitive confidence, willingly entrust her daughter to the care of the herdsman, just as a loving human mother would place her child under the sole tutelage of some accomplished and refined instructor. At this period the calf should be moved to a roomy, dry, clean and well-littered pen, free from draughts, and kept at as even a temperature as possible. For the latter reason it is not advisable to have the pens in winter located in a cow barn where the cattle are turned out during the greater part of the day, as the barn temperature, regulated to a large degree by animal heat, is subjected to too sudden and marked changes. It is advisable to keep spring and summer calves stabled until at least two months old, fall and winter calves are better for being kept indoors during the entire winter and early spring months, and no calf at any time should be compelled to occupy a pasture unprovided with abundant shade and shelter.

From the day of its birth a handful of bright, clean hay should be offered as a temptation to nibble; for calves, like humans, are seldom proof against temptation, and many a strong, active calf has, when a few hours hold, been found chewing the alluring bait.

Later Care.

At the end of the first week one-half of its milk allowance may be skimmed, and at the end of the second week, separator milk may be its only liquid nourishment. For the first two weeks it is prudent to feed, three times daily, from three pints to two quarts, and no more at one time. The milk should never be given cold or lukewarm. When feeding three times a day, six quarts a day are sufficient, but when the calf is put on two meals a day, seven quarts evenly divided may usually be assimilated with good results. Never feed in wooden pails or troughs, and be sure the tin or earthenware receptacle containing the food is perfectly clean and sweet. Calf pails should be as often and thoroughly cleansed and scalded as milk pails. In fact, one of the most particular dairymen of my acquaintance, in reply to my eagerly-put question as to his method of raising some exceptionally thrifty looking young stock, said, "I don't suppose you'll approve, but I just feed my calves from the milk pails after we've finished milking, then I'm always sure about the cleanly condition of the dish." No one who had ever taken a peep into his spotless and orderly dairy room could harbor a thought of untidiness or lack of system, and I was forced to admit that the condition of the calves justified the means. While it is unnecessary to ever increase the quantity of milk, as the calf grows older it may be done, and if at any time the calf should begin to scour, at once reduce the ration one-half. A raw egg or a tablespoonful of uncooked corn starch added to the remainder will almost invariably correct the evil; and as the calf improves, gradually increase to the full amount. At an early age, from two to three weeks, the calf may be taught and should be encouraged to eat a small quantity of bran, whole oats, or any food containing a large amount of protein. A tablespoonful of the jelly made from well-scalded old process oilmeal added once a day to the milk will insure slick coats and prove beneficial to digestion; but never on any account make the mistake of feeding a dairy animal fattening food. As the calf grows older, it will require more liquid, water may be added to the milk, and a frequent drink of fresh water, especially in the hot summer months, will be gratefully appreciated.

Roughage.

Endeavor to establish a habit of consuming large quantities of wholesome roughage, which should, when the animal is at the age of six or seven months old, supply abundant nourishment to develop both brawn and size; and while the discontinuance of the grain ration may serve to detract somewhat from her sleek and pleasing appearance, we believe that the stimulating effect of a strictly vegetable diet, as it were, on digestion and appetite will more than counterbalance the defects of a few brief months of ungainly proportions.

While exercise and pure air are admirable factors in the development of stock, still, young or old for that matter, should never be exposed for a lengthy time to intense cold or sleety storms.

A yearling may be promoted to the dignity of a regular stall, and will soon learn to know and take her place without prompting. If she has received the right kind of care and treatment, her sense of terror will lie dormant and a gentle command from the herdsman will bring her readily and fearlessly to his side. The early maturity breeds should be ready to join the ranks of producers at an age of from twenty-two to thirty months. For at least three months before calving, a heifer should receive special attention, a daily grooming and gentle handling of the udder in a great measure preparing and familiarizing her with the process of milking. During this critical period it would be well for her to receive a moderate ration of grain. If pasture is insufficient, a soiling crop should supplement it, or, if it be in winter, a generous amount of cut corn fodder, clover hay, or any other approved roughage, with the addition of a few roots such as carrots and mangles, will make a satisfactory and appetizing diet.

The First Milking.

And now, when this mighty complex bit of machinery stands complete, ready and willing to contribute her earnings to the dairyman's income, I would ask, before turning her over to the care of an unknown engineer, that she be given every advantage on this her trial run, not only in order to enable her to show her appreciation of thoughtful breeding and painstaking care, but because the regular habits formed during a heifer's first milking year will, to a large extent, mar or make the standard by which her future usefulness is to be measured. Insist that she be milked three times a day, whether she gives much or little, for at least three months. If possible prolong the milking period until four weeks within the time of dropping her second calf. Then, if with her third freshening, she fail to meet her owner's expectations, he has still the satisfaction of a duty well and faithfully performed, and be assured that every earnest effort in life will eventually meet with reward.

DISCUSSION.

Mr. Everett—Why did you persist in three milkings a day?

Mrs. Howie—Because I can raise the quantity of the product from two to four pounds a day; I can also raise the butter per cent. from a half to one per cent. during the period of three milkings a day. I have made careful tests on my farm, and found it to be so. You will invariably find that the quantity is increased even in an old cow. Now if you can establish that habit in the young heifer, she will do better as she grows older, as a producer, and we wish to develop her milking qualities.

Question—How long do you continue milking three times a day?

Mrs. Howie—Our cattle are breeding stock and I am very careful with them. Every cow on the farm is milked three times a day for the first five weeks. Usually after that the udder will contain the amount of milk she gives without inconvenience to the cow. If it does not, the milking is continued, and we have milked up to five months, but I think that almost too great a strain upon the breeding cow. I would prefer to have less milk. We don't try to get the very last drop from our cows, because we are anxious to have the calves strong and healthy, and as a rule they are.

Mr. Linse—How do you divide your milking time?

Mrs. Howie—We don't divide it into exact periods, only when we are making tests. The men are in the barn at 4 o'clock, and the freshest cows are the first ones milked. At 1 o'clock they are milked again, and the last time at night. Not infrequently we get a very large flow of milk, 47 to 48 pounds a day, and at times we have milked as late as 9 o'clock in the evening. Perhaps you think that is asking a good deal of the man, and perhaps it is, but I have noticed that in any other business people have their work attended to at the time required. An engineer who would only fill his boiler at stated intervals, regardless of requirements, wouldn't be apt to keep his position very long.

Mr. Linse—If my men milk at 5 o'clock in the morning, they want to milk again at 5 o'clock in the evening and quit about 6. If you milk three times a day at irregular periods, there is the same old danger between the night milking and the morning, of the cow not being relieved.

Mrs. Howie—We do not apportion it exactly, and the reason we do it at all is more to keep the cow's udder and system relieved from the strain of the additional flow of milk, than to get the last drop of milk, but it does result in raising the flow from two to four pounds, and in one case as high as six per day. The instant we stop milking three times a day we find the yield drops off two pounds, and within a week usually four pounds.

The Chairman—You say that you raised the per cent. of butter fat. Suppose your cows were giving four per cent. milk, milking twice a day. If you milk three times a day and raised the butter fat to 4½, would it continue for the rest of the season, or would it simply end when you dropped the extra milking?

Mrs. Howie—It would last for the time that I milked the extra milking. You see we have the three strippings and of course they are the richer part of the milk. In that way we do not allow the butter fat to go through the system of the cow, but take it all into the pail and consequently get every bit, that is, we think we do.

A Member—My boys are willing to work all day week days, but they like to have Sunday off, and so do I.

Mrs. Howie—I presume I am exceedingly fortunate; I have had some most excellent men, and they have had sense enough to be convinced that animals are dependent upon our care, and that a dairy requires the same attention Sundays as on any other day. At any rate, they have worked faithfully for me. We try to arrange it so that a man can have most of every third Sunday to himself, and if he wants a day once in a while, I make an effort that he shall have it. My chores are done on Sunday the same as every other day. I had one man who said he was too good a Christian to brush the cattle on Sunday, or to clean the barn, so he spent a great deal of his time singing and praying, and assuring the Lord that he was grateful for being on earth, but I have noticed that the man who was a real Christian and wanted to get right near to the Lord, would put his religion into his everyday life and business and he would make everything about him comfortable, just as I believe the Lord intended he should.

Mr. Hodgson—About how many of your calves become good cows? That is the first question I want answered. Second question: If the sanitary condition is given to the calves that you have described, what is the reason that once in a while your calves have the scours?

Mrs. Howie—Well, we will begin at the last question first, if you please. I had a case this last week in my own barn. Our straw bedding had given out. We all know that straw is a better absorbent than marsh hay. The boys put some marsh hay in a calf pen, and in a few hours that calf was scouring. We found that it was damp under this hay, the water had gone under the hay and had stayed there; it had neither absorbed nor evaporated. We simply dried out that pen, and I believe that damp, filthy calf pens are responsible for more than half the deaths in our young calves. Now, you asked me if every heifer raised the way I have described——

Mr. Hodgson—No, how many turn out good cows, say, out of eight or nine?

Mrs. Howie—I believe out of every nine that are well-bred and have received proper care, eight will be good. When I was a very little girl and used to complain now and then, I was told to look on the bright side of life, it was held up to me that we had so many more blessings than we had misfortunes, that it was impressed on me, and I became accustomed to looking at the good things and trying to forget the bad ones. Therefore, I want to tell you that at the present time I have a little heifer with her first calf that is giving 34 pounds of milk a day. Now, that one little heifer brought up after my ideal would make up for two or three that had disappointed me. I have had some disappointments. I don't know that it was their fault, perhaps I didn't do my whole duty by them, but they were not a credit to any herd; one, particularly, had a very defective udder. I sent those heifers to the stockyards, and I said, "Don't tell them from whose herd they came. I don't want them to represent my herd." I have been disappointed twice, and I may be a good many more

times, but still I look at the little ones with the big records, and feel satisfied, rather than at the ones that have not come up to my expectations.

Mrs. Lehmann—In our part of the country they are having a good deal of trouble with scouring among calves, and many lay it to allowing them to suck the cows.

Mrs. Howie—I have one cow that if I should leave her calf with her a day it would invariably be sick, because her milk appears too rich, or contains some element that will at once cause sickness to her calves. Her first calf I lost; the second calf I partitioned off at about two hours after it had taken its first drink; I put it in a little pen, and although the mother was permitted to go in that stall for four or five days, the calf was not allowed to drink from the mother. I have raised every one since and have been so successful that one of her calves brought me a fancy price as a two-year-old heifer. We have to use a great deal of judgment in these matters; when we find the same means won't do with one animal that was all right with another, we must change our methods.

A Member—I have been forced to take my calves from the cows right away.

Mrs. Howie—Under unfavorable conditions I think you should do that. Of course, I suppose you may all smile, but I have mixed a good deal of sentiment with my business, and I find that it pays. It seems to me that sentiment in this life is the better part of living.

A Member—If your cows are running in the pasture, do you get them up at noon to milk, and if you do, how do you handle that milk?

Mrs. Howie—Yes, we always milk in the barn. If we have enough milk both winter and summer, if we are milking as many as six or seven cows, we separate at once, but when we are only milking one or two, the amount is not sufficient; it wouldn't pay to wash the separator, because we wash it every time we run the milk through, so we plunge the milk into ice water, cool it down, and when we come to the night separation, we set the cans in a little warm water and bring it up to the proper temperature to run it through the separator and mix it with the other. We never have had any trouble in doing this.

The Chairman—A great many people for the first time this winter are using hand separators, and a great many calves are dying from being fed skim milk from hand separators, and I believe in many cases it is because they are fed too much.

Mrs. Howie—No doubt this is true, and there is another very important thing in calf feeding, and that is to have the milk warm. I have seen feeders start to feed calves with the best intention; they began with the milk at the proper temperature. They probably saw a cow out of place at the end of the barn, so they put down the milk can and drove her into the yard; then they would think of some duty in the pig pen, and when they came back an hour later that milk would be stone cold, and if fed to the calves would give them colic just as surely as it would any baby. We must use judgment; it is part of our business to do these things and do them right, do them in a systematic manner. The rule on my farm now is that if a man starts to feed the calves, he is to finish, no matter whether the barn is on fire or not; he is not to stop for anything else until they have had their food.

A Member—I find in feeding skim milk that too much is fed, as Mrs. Howie says, and we are apt to take the milk as it comes from the separator with a good deal of froth on top of the can. I believe we should turn that off, not use the top of the can at all.

Mrs. Howie—Yes, we are always very careful about that.

A Member—You don't warm that milk any more, do you?

Mrs. Howie—Yes, until the calf is three weeks old the milk is given at a higher temperature than it comes from the separator, as high as up to blood heat. That gives them three weeks' good start, and that is the time when they are the most easily thrown back. I do not set the milk on the stove to warm, because I am afraid of scorching it on the bottom, but I plunge the can into a kettle of hot water and warm it in that way. After three weeks you may give it directly from the separator, but at no time

unless it is summer, and the calf is at least six months old, give it cold milk.

Question—Would you feed a two-year-old heifer that has just freshened as heavy ration as you would a three-year-old, or later on, I mean directly after the first freshening?

Mrs. Howie—I would give her grain up to the time she freshened, that is, a small amount, not all she wanted, because I would like to have her eat a good deal of roughage; after that I would be careful. A small ration the third day after calving; my cattle get no grain until then. I try to avoid milk fever in the older cows, and in the younger ones I don't care to have the flow of milk come too quickly, I believe it will be better for the animal to have a more moderate time in bringing the milk to a full flow. Then I would feed just all the grain that animal could assimilate. I don't mean to dump it in the feed box and let her eat, but begin gradually, give her just a little more and feed her with grain right up to the second calving. If she was dry four weeks, I would reduce the quantity to about one-half the usual amount during that period. She won't require it if she is not being milked. In some cases I have not been able to dry them off at all, and I fed a full ration right up. You need not be afraid the young animal will have milk fever, but after the third calf, then I am very strict as to diet, but with the young heifer, give her all she can profitably consume, but not any more; don't let her form the habit of putting it onto her back.

Mr. Taylor—Mrs. Howie, you said you fed no grain for three days after freshening; what do you feed?

Mrs. Howie—I feed roughage, I give warm water, plenty of hay, let the cow stand in a box stall, and I don't even feed green food in the summer. I am very careful to give dry hay at first until after the milk flow is well started, then I begin and feed up. I don't know, perhaps I am wrong, but I have tried to take care of my cattle in the way that has been suggested by great physicians in caring for the human mother, and I believe in every case you will find that caution as to diet is the advice of our best doctors.

Mr. Taylor—Will they do as well the second year where they do not go dry?

Mrs. Howie—No, they will not, but do not be discouraged if they do not do as well the second year; you have given them a hard year's work. Give them six weeks' rest, before the third freshening, then they will come forward and do their work. It is rather unusual with me to have a heifer do quite so well after the second freshening as she did the first year. We must keep the digestive organs of the cow in perfect condition. A little dieting won't hurt, anyway. You work hard for a few months and eat heartily of heavy food and sit down in the house and do nothing, and that same food would soon put your stomach out of condition, so feed in accordance to the amount of work that your cows are doing.

Treatment for Milk Fever.

Mr. Cook—I want to give you the result of much study and experiment in Europe on the subject of milk fever. The results have been worked out in this country by Dr. Pearson, of Pennsylvania, on a most elaborate plan. He had no less than one hundred assistants scattered through the East working on this remedy, with the result that in no case did any of them report less than 60 per cent. of cures, and running up to 90 per cent. At St. Anthony Park, Minn., talking there with the foreman, I find they have had satisfactory results by the use of this preparation, so I feel warranted in giving you this remedy.

Milk fever has been proved not to be a fever, but to be due to a poisonous ptomaine developed in the udder. It did not do any good to turn the medicine into the stomach of the cow, in fact you are more apt to turn it into the lungs than into the stomach. If you have a veterinarian, I would of course always advise you to consult him the first thing, but if you cannot get one there quickly, you can use this remedy. Dissolve half an ounce of iodine of potassium in a pound of water, which is sixteen ounces. Get a syringe that will hold just four ounces. You can use more if you want to, you can use twenty ounces, udders will vary in their capacity to take this in. The arrangement I have is merely a small rubber tube, about eighteen inches long, with a milking tube on

SHORT HORN HEIFER "CICELY", PROPERTY OF AND BRED BY HER MAJESTY THE QUEEN; WINNER OF SHORT HORN FEMALE CHAMPIONSHIP AT THE ROYAL HIGHLAND SHOWS, 1899. IMPORTED BY W. D. FLATT, 1900, WINNER OF FIRST AND SWEEPSTAKES AT PAN-AMERICAN, 1901.

the end, and then with this rubber syringe that will hold just four ounces, we have just enough for each teat, and that four ounces is injected into each teat; it is absorbed, the poison ptomaine is killed and the cow gets well. It should be blood heat. Another thing you must remember, and that is to dip this milking tube into boiling water first, then into this iodine preparation before you use it. Use soft water, and it should be thoroughly boiled.

Mr. Convey—Isn't it necessary to draw off the milk first?

Mr. Cook—Yes, draw the milk out first. In suggesting this, I am giving you what has proved to be very satisfactory. In my own case I have not had a case which resulted badly since I knew of this remedy, and I know of many cases that have been cured in our own country.

THE SILO AND SILAGE UP-TO-DATE.

W. F. STILES, Lake Mills, Wis.

Mr. Chairman, Ladies and Gentlemen:—I know that you are all disappointed to know that Prof. King is not here to talk on this subject, but I am sure no one is more disappointed than myself.

Succulence for Stock.

I can safely say that from now on until the 15th of May all who have silos will be glad to say they have silage up to date. It is one of the best feeds that we can have in the winter to feed to all classes of stock. In his address on the dairy cow, Mr. Cook spoke of the necessity of supplying the dairy cow with a certain amount of succulence in the feed which she consumes. He has spoken of the ideal condition of the dairy cow in the summer, and said that in the winter we could have just as ideal a condition, perhaps better. In the summer we all know that the cow has a large amount of succulent feed. Of course grass is one of the best feeds the cow can have, because it contains a large amount of succulence, which makes it easily digestible. We know in the winter that if we do not grow roots nor have a silo, we have to go through a long period of feeding where we have very little succulence in the feed; hay, with all the various kinds of grain feed that we produce, is dry, and where the cow has to live upon these for five or six months, it is easy to see why she cannot do nearly as well as she can in the summer when she has a large amount of succulent feed. If we grow roots, we have supplemented the dry feed in a certain measure, but the growing of roots at the present time is too expensive. We can raise corn cheaper and this will furnish us a succulent feed if utilized through the silo. The corn crop is one of the best that we can raise. We know we often have dry weather in the summer, but it doesn't make very much difference to us how dry the season is, we can almost always get a corn crop, and if we utilize this crop through the silo, then we have a cheap, succulent feed for the cows and all classes of stock in the winter.

I am sorry Prof. King is not here to give you the best modes of constructing silos. He has visited them all over the country and is eminently fitted to take up and discuss the silo question. I think he has done more work on those lines than any other one man. I know how well all the farmers like to have him visit their silos. One time he was visiting the silos in my own section at a very busy time of the year, and one man said, "I am sorry I have so much work to do; I wish I could sit and visit with that man." He knew some mistakes he had made and he wished he could sit and talk with Prof. King and find out better ways of filling his silo, and constructing it so that the silage would keep.

Form and Material for Silo.

The silo is not a new thing with us in Wisconsin. We have been building them for twenty years, and the last

few years we are building more than ever before, as you can see all over the State. A map showing all the silos would show that they can be found in nearly all sections of the State; in my own section we have a silo on pretty nearly every farm. When we first began twenty years ago we made several mistakes in the construction of silos; we didn't know much about the keeping qualities of ensilage, and many cheap buildings were put up. Many men who advocated building silos said it didn't make much difference what kind of a silo was built, but so much ensilage was spoiled that we found out that cheap buildings were no good. Our own Experiment Station took up the subject, Prof. King took charge of the work, and made a careful investigation of the entire subject. Experience has taught that in square and rectangular shapes the pressure will spread the walls unless they are very strong, and in the corners there will be more or less spoiled ensilage. Prof. King found out that the building must be built with rigid walls, and the ensilage must be put in properly. As to shape, the cylindrical form is the best.

VIEW OF MODERN SILO.
22 ft. Diameter and 30 ft. Deep. The Lower 14 ft. Stone and the Upper 16 ft. Wood.

With regard to the best material out of which to build a silo, that will depend upon the relative cost of wood,

stone, brick and cement. The silos that have been built in my own locality are partly of stone and partly wood. In some localities they are built entirely of stone, in some places entirely of wood. I think in many places to build them partly of stone and partly of wood will be the best.

Location.

The place where the silo shall be located in regard to your other buildings will also depend upon local circumstances. You ought to have it convenient to where you are going to feed your cattle, and if you can build it so you can dig it down into the ground a certain depth, so much the better, because the deeper we get into the ground the less height we will have to elevate the cut feed in running through the feed cutter. There is one thing we ought to pay special attention to, and that is, to have the proportion right. Have it deep enough so we can feed off a certain amount every day, feeding off the entire surface, and then the feeding period can be extended seven, eight or nine months, and you will have enough in the silo to last that time. If your silo was very large in diameter and very shallow, you would have to feed so fast in order to have good ensilage all the time that you would soon have it all gone. A good shape for a dairy of twenty-five cows and fifteen head of young stock is about eighteen or twenty feet across and about thirty feet deep. I would not advise building a silo any less than twenty-five feet deep because the deeper we get the silo the more ensilage we can get in the same-sized building, as the pressure on the bottom will be so much greater. Where you are intending to build partly of stone and partly of wood, you can dig down four or six feet below the feeding floor and then build up the stone wall a couple of feet above the surface; in many cases the wall will be fourteen feet high. In building this stone wall, you can use the common hard heads, but be sure and make the wall sufficiently strong, because with a silo thirty feet deep the pressure will be very great upon the stone and there will be a tendency to spring the wall, then the air will enter and spoil your silage. I have known of stone walls two feet thick where the silo was thirty-eight feet in diameter and thirty-eight deep, and it became necessary to put a hoop around the stone wall.

A Stone Silo.

If you are going to build a silo write to Prof. King and get his bulletin on silo construction. He gives plans and specifications with the cost, and all sorts of information, which is very useful. If stone is sufficiently cheap with you, and you wish to build entirely with them, that will be all right. You will have to make doors from time to time, and they should not be more than three feet apart, preferably two feet square. Down at the bottom of the feeding floor there must be a door large enough to admit a man with a basket of silage, but do not think that you commence to feed the silage from the lower door. No, always feed from the top, so the doors are made at intervals of perhaps three feet apart, and we commence at the top to take out the ensilage.

Silo of Stone and Wood.

Now, where you wish to build the upper part of the silo with lumber, as many are built, the largest timbers necessary are 2 by 4s. After the wall is made, it is well cemented up on the inside with Portland cement to make it perfectly smooth and air-tight. If you do not cement it more or less air will pass through the wall. Mix one part of Portland cement to two of sharp sand and cement the inside of the wall good and smooth. Then we set our 2 by 4s on top of this wall. In some cases they put brick inside of the woodwork, and this would make a silo that would last almost indefinitely, but if you are going to do that, you must set these 2 by 4s far enough from the inside surface of the wall, so that when the last course of material is put on the inside of the 2 by 4s it will be flush with the inside of the wall, so there won't be a shoulder or jog back for the air to work into and spoil the silage.

Wooden Silo.

Where you use all lumber, you need to have just two courses of boards on the inside of these 2 by 4s; use com-

mon fencing sawed right through the middle, and make it half an inch thick. Then put on the first course of this fencing, and when you run them around and put it on the 2 by 4s, be sure that you break joints sufficiently so that these boards will act as a hoop, which prevents the building from springing. When you start your second tier of boards you want a board that is just three inches wide and then running on up with boards six inches wide. In that way you break joints. Between the two boards you have specially prepared paper to prevent the air from getting in and spoiling the silage.

Inside of Silo.

Some people tar up the inside of the boards; I don't know whether it really pays or not. It has not been tried long enough to prove whether it will be necessary or not. Some, in building, take boards four inches wide, grooved and matched, and put them on the inside of the silo, running up and down. This makes it perfectly smooth, and the silage settles better. On the outside the boards are matched the same as on the inside, only you must be specially careful to turn off the water so it will not run down in and rot the 2 by 4s. If boards are dried and then wet, they will rot sooner than if they are kept dry all the time or wet all the time. On the outside at the bottom there is a hole through the boards between each 2 by 4, and a corresponding series on the inside at the top, so that when the ensilage is removed these can be opened and allow the air to circulate through and keep the lumber dry. Of course, in winter these holes must be closed to prevent the silage from freezing. There is an air space between each one of the 2 by 4s. We don't want our silage to freeze any more than possible, although it does not hurt it a great deal, but it is harder to handle.

I think one reason why silos were not built as much a few years ago as they are now, was because it was pretty hard work to fill. We thought it was necessary to employ a good many extra men, and it made it pretty expensive, but with the corn binder we have it fixed now so that it needs no extra help. This last year I myself with one man filled our silo. It took us about three weeks, but the ensilage came out just as good as when we had a large force of men and filled it in three days. With our corn harvesters we make much easier work of it.

Cutting Silage.

In regard to varieties of corn to plant for the silo, that is an important question. A few years ago I visited about thirty silos in my own locality and examined the ensilage in them, and made inquiries as to the different varieties of corn. I found there was considerable difference. Corn that was cut very green, the ensilage came out very acid, and in one case I found it as sour as pickles. I found that corn was cut just as it was tasseling out. In other silos it had been cut just a little before it was ready to cut for husking, and that ensilage came out much sweeter. I think if we use varieties of corn that will mature in our own localities and cut it just when the ears are beginning to dent and the lower leaves begin to turn, we will find that the ensilage will come out much sweeter. Sour ensilage is not good for our cows.

DISCUSSION.

Mrs. Howie—What do you consider the best kind of corn for ensilage?

Mr. Stiles—The kind that will mature in my own locality. I use either the Yellow Dent or the White Dent. I have used White Cap Yellow Dent, and I like that because it bears a large proportion of leaves.

Mrs. Howie—Do you like Red Cap as a silage corn?

Mr. Stiles—Not as a rule. It is a good thing to have about 10 per cent. of the big varieties; this furnishes a heavyweight on top to press down and keep the rest.

Mrs. Lehmann—How do you like Flint corn?

Mr. Stiles—We have planted Flint corn to some extent, but it does not give us as large an amount of feed as the Dent corn, and with us it is more acid.

Mr. Convey—How far apart do you plant your corn in the row?

Mr. Stiles—I try to plant my corn so as not to have a lot of ears, but I don't want it without any ears at all. I think

it is best to have it about half and half, a little thicker than you would have it for husking corn, and then each stalk will develop an ear that won't be so very large, but there is the right amount of corn in there; but where we have it planted thin and the ears are large, I think the amount of corn in the feed would be too much, and the cattle may not be able to digest it all.

Mr. Thorp—In going over the State of Wisconsin this winter, I found that in the southern part of the State they value their cornstalks as absolutely nothing. Now, we are told by the experimenters at Madison that about one-third of the feeding value in our corn plant is in the stalk and leaf, and we find the silos are saving lots of waste of the corn fodder. I absolutely believe that in some parts of this State there are cornstalks enough in the fields to winter all the stock there is in the State of Wisconsin. Now, then, if one-third the value was in the stalks, there is certainly a time when the value of the plant is worth more than it is at any other time; there is a time when that corn plant is perfect, when there is just as much feeding value in it as there can possibly be there, and if there is such a time, I think that that is the time we ought to save the plant, the whole plant, I mean, not merely the corn, but the whole plant, and we who have silos do not know of any better way to save it than to put it in the silo. It is surprising to me that there are so any farmers in the State of Wisconsin that are going without silos and letting their corn fodder go to waste when they could keep so much more stock.

I want to say a word about the cost of building silos, because that question of the cost of stone or brick silos is often brought up in Farmers' Institutes. I built a silo of stone and brick, and I am going to build another of brick entirely, although I have a good many stone on the place, but I find in building a brick silo, that the mason in laying up a brick wall will lay up about three feet of the brick wall while he lays up one foot of the stone wall, and the tender is working with him one day where he would otherwise be working three. With wages at $2.50 or $3.00 a day, that cuts quite a figure in the expense of building a silo, and makes me think that sometimes, even if we have some rock on the place, we might better afford to build a brick silo. Another thing we find in putting up a brick silo, the amount of cement required on the inside of it is a great deal less than on the stone silo, because the wall can be laid up so much more nicely.

In regard to the strength of the silo. I think that the brick silo is stronger than the average stone silo, even with only an eight or nine inch wall. The brick in being laid up are lapped and they form a hoop in themselves, and having the two walls, we will say an inch apart for a dead air space, with headers placed across every two or three feet up and down every fifth brick in the course, will bind that all together. A thousand brick will weigh two tons, and the lime that is required to lay it up will weigh half a ton more. We know that the lateral pressure in a silo is greater near the bottom, so I do not think that we need be at all alarmed about building a brick silo on account of being afraid of its spreading. On a round silo the pressure is equal, alike all around, while in a square silo it is more in the center of the square, and I think with a round brick silo, if a man is afraid to build it up without using any bands, he could put two or three iron bands around it and it would be perfectly safe to put up two-inch walls with dead air space between.

Mr. Scott—When you are building a stone or a brick silo, it is well to have this wall well settled before the silo is filled. I know of a silo built in this county last fall, the lower part is stone; it was built too quickly and there was trouble.

Mr. Convey—We built a stone silo with a two-foot wall for the first eighteen feet; the last seven feet we built immediately. It is built in a square form with round corners.

Mr. Cook—I have a little model of a stave silo, which contains some features that I thought were very good. I will bring it to the meeting this afternoon.

Supt. McKerrow—We do not advocate the building of stave silos a great deal, as they are built here, but we will be glad to see that model.

Question—What do you think of the lathed and plastered silo?

Mr. Stiles—I have not visited any of those silos, although I know quite a number have been made, especially by Mr. Gurler, down in Illinois, who has built quite a number of them. They are a very much cheaper silo, but I think as a rule we will be wise to build a silo that we know will be permanent, because it is a thing we want to have a long time, and always have it good.

Recess to 1:30 p. m.

AFTERNOON SESSION.

The Institute met at 1:30 P. M. Conductor Chas. Thorp in the Chair.

IMPROVEMENT IN WISCONSIN DAIRY METHODS.

C. P. GOODRICH, Ft. Atkinson, Wis.

To fully realize to what extent dairy methods have been improved in Wisconsin it will be necessary to look back and see what methods were practiced in early days.

I have lived in Wisconsin fifty-four years and have had something to do with dairying nearly all the time.

In the old time the cows roamed at will over the prairies, woods and marshes, frequently getting miles from home. The tinkle and clang of cow bells could be heard on all sides. Sometimes the cows came home at night if some old matron of a cow, who wore the bell, had a calf at home which was allowed to nurse her so as to keep her maternal affections alive sufficiently to bring back the mother to her offspring at night with the rest of the herd following.

But frequently the cows failed to appear at night, and the boy, whose business it was to look after them, failed to find them and they had to be looked up the next morning. Such occurrences were not looked upon then as causing any very serious loss. I know, as a boy, I used to think I could stand it if the cows could.

Summer Dairying Practiced.

Cows gave milk quite well for a time while the grass, which was abundant, was fresh and succulent, but when the drouth of midsummer and fall caused the herbage to wither and turn brown, the flow of milk fell off or ceased entirely by the time winter set in, and for five or six months not one farmer in ten had any milk for family use.

Cows found shelter around the straw stack in winter, if the farmer had one, and they were fed marsh hay cut in September after it had some "substance to it" which was thrown on the ground or snow. Their water they got by drinking through a hole cut in the ice of a pond or by eating snow.

Occasionally a man built a shed for his cattle, but the old boss cow generally occupied it and kept the rest out. Cows kept in this way usually lived through the winter if the farmer fed the poorest ones a few "nubbins" of corn.

"Winter Cows."

"Winter dairying" was never practiced. Perhaps one farmer out of ten would have a "winter cow" fresh in the fall, which he, by extra feeding, could keep giving milk enough for family use during the winter.

We knew nothing of balanced rations. We knew that pasture grass was good for milk production and that marsh hay, straw and corn were not, but we did not know why. We had never known of the chemists' investigations in the line of feeding animals, and therefore could not understand the meaning of such terms as protein and carbohydrates.

But fifty years have wrought a wonderful change. Although some who keep cows still cling partially to these

old-time ways of keeping them, yet the dairymen who are the most successful in getting money, as well as pleasure out of the business, have most of their cows fresh in the fall; see to it that they have all the feed that they can make good use of every day; that they have succulent food the year round and a ration balanced to suit the needs of each individual cow. Their stables are comfortable and well ventilated and well lighted. Feeding, milking, watering and in fact all the operations about the stable are done with perfect regularity, and cows are always treated with utmost kindness and gentleness.

THE OLD-FASHIONED WAY.

The Old Way.

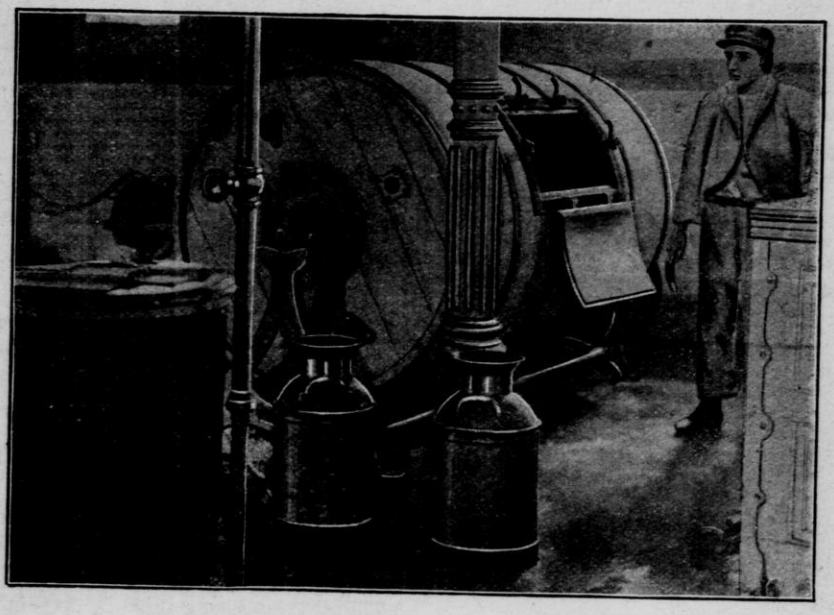
In 1847 my father bought a few heifers and cows with the intention of going into the dairy business in Jefferson County, Wis., where we lived. We built a small dairy house of logs. The cracks were "chinked" up with pieces of wood, and the spaces between the logs plastered up with lime mortar on the inside of the building, which was then whitewashed. The outside was plastered up between the logs with clay. Here my mother made butter. The milk was set on shelves in ten-quart pans and skimmed after it commenced to sour. The churning was done two or three times a week in a dash churn. I have good reason to remember that dash churn. With no thermometer the temperature was often so warm that the butter would not "gather" or so cold it would not come, but the cream would foam up and run over and—well, it was a dreadful time for a boy to spend a whole evening that way and I don't care to talk about it.

The butter was salted and worked in a butter bowl, then made into rolls and sold at the stores for what could be got, which was not much, taking pay in groceries, etc.

In the summer of 1851 my father determined to see if he could not do better with his dairy by holding the product till the next winter. He had twelve cows. Butter was made when the weather was not too hot, and packed in tubs which were made by a nearby cooper. When the weather became hot mother made the milk into cheese.

How We Made Cheese.

I never got fully initiated into the mysteries of making cheese on the farm. I well remember there was a boiler in which to heat milk but no thermometer to tell when it was warm enough. There was calves' rennet I know, for I took it from the calves myself, a cheese tub, a cheese ladder, a cheese knife and some other things I can't think of now. But I know there was a cheese hoop and a cheese press. O, yes, I well remember that first cheese press. A platform was fixed near the corner of the log house. On this was set the cheese to be pressed. Then the end of a large lever was placed under a log in the house and the cheese used as fulcrum as though we were trying to lift the house. On the long end of the lever was hung a box which we filled with stones enough to give the necessary pressure.



THE NEW WAY—MODERN CHURN AND BUTTER WORKER.

In Search of a Market.

When winter came I was sent off with the whole summer's make of butter and cheese to find a market. There were no railroads in the State. The load was not a very heavy one for a good pair of horses. It weighed less than 1500 pounds. I was advised to go to Fond du Lac, which was said to be a small lumbering town to the north of us, and it was supposed that men in the lumber camps would eat butter and cheese if they could get it, and that their employers would give something for it. After two days of hard driving—the distance being eighty miles—and by dint of often inquiring the road and keeping for the most part facing north, I arrived at Fond du Lac, where I, after a good deal of difficulty, sold the butter for 10 cents a pound and the cheese for 7 cents. This was the first cash that I ever had anything to do with getting in the dairy business. It amounted to less than $10 per cow for the year.

Since those days there has been great improvement in the manufacture of dairy products. In the setting of milk in dairies the ten-quart pans were first displaced by broad pans, each one holding one milking of the entire herd

of from twenty to fifty cows, under which cold water flowed. In some dairies some kind of deep cold setting was used. Within the last few years all these methods of setting milk have been displaced by the farm separator, by which a much more perfect creaming of the milk can be had than by any of the gravity methods.

Some New Methods.

The old dash churn has gone forever. In its trail there followed a flood of other imitations, each inventor trying to get something that would churn quickly. Some were contrived so as to force air through the cream and make it bubble and boil, and bring butter in five minutes. Others had paddles inside that were made to stir the cream with great rapidity by means of gearings.

The sellers of these rapid churning machines claimed that, besides bringing the butter quickly, the buttermilk was better for the boys to drink and for the housewife to make biscuits with. This last claim was true, but the butter was less. All the churns used now bring the butter by the concussion of the cream, and if the temperature of the cream is right, make very exhaustive churning, and a thermometer is indispensable. These churns have no inside fixtures and the cream falls as the churn is revolved. The rectangular square box, barrel and swing churns and some others work on this principle and are churns used in farm dairies. For working butter the butter bowl and ladle are no longer used, but some kind of a worker, usually the lever, though occasionally a combined churn and worker are used in dairies.

Advent of the Creamery.

The first creameries were run on the gathered cream plan. The cream was raised by deep cold setting. The first cans used for this purpose were the Fairlamb cans, which had a strip of glass near the top in the inside so as to be able to measure the depth of the cream. They were twelve inches in diameter at the top, with a hollow space three inches across, running up the middle from the bottom up to near the top. The cans were set in cold water and the cold water going up this hollow space was supposed to help cool the milk. One inch deep of cream or 113 cubic inches, was believed to be just cream enough for a pound of butter and was called a creamery inch.

Every patron was credited with the number of inches of cream he furnished and the money was divided accordingly. Afterward cans eight inches in diameter were used as being quicker to cool, and two inches in depth of cream was called a creamery inch or space.

It was soon discovered that this way did not do justice between patrons, as cream varied greatly in its per cent. of butter.

The Churn Test.

There must be some way of testing the cream, and a churn test was adopted and used to some extent. A small definitely measured amount of cream from each patron's was put into a pint can. A machine was used that would agitate and quickly churn into butter all these samples at once. These little pats of butter were weighed and the per cent. determined for each lot.

This was an improvement on the inch method, but a still better test, known as the oil, was soon invented. With this a small measured sample of cream was put into a glass tube. This was agitated until butter was produced. Then the butter was melted and reduced to oil, and then when the oil was all on top it could be measured with a scale.

The latest improvement for testing milk or cream is the Babcock test. This seems almost perfect.

The first whole milk creamery I ever saw was in 1875. It received the milk of 900 cows. It was all set in shotgun cans in long vats of cold water. The churning was done in five large dash churns run by waterpower. It took four or five hands to do the work.

I soon after this visited another whole milk creamery in which the milk was set in four large cheese vats fixed over for the purpose. Water flowed under the vats to cool the milk, but as it was in such a large body and twenty inches deep, it would get tainted in the middle unless it was stirred up after setting awhile. I judge that not more than half of the butter was obtained in this way, for it took forty pounds of milk to make one pound of butter.

These whole milk creameries had to be abandoned and none were a success until the centrifugal separator came into use.

Improvement Begins.

At first the milk was pooled by weight, but this was found to work unjustly; then the Babcock milk test was invented and used, which, when rightly used, gave to each patron money in exact proportion to the amount of butter fat he delivered.

In addition to the milk test we have the acid test, by which the butter-maker can trace the ripening of his cream. We also have a salt test, so that butter-making is now reduced by the use of these tests and a pure culture or other starter, very nearly to an exact science, or it would be if perfect cleanliness could be enforced on the farm and in the creameries.

These improvements have resulted in getting 240 pounds of butter as the yearly product per cow in Jefferson County, and perhaps some other counties, instead of less than 100 pounds as in the old times. They have reduced the cost of making creamery butter from six cents, the price charged in that first whole milk creamery I mentioned, to between two and three cents in most creameries now.

Cold Storage.

Besides the other improvements I have named, cold storage is now used for holding butter made in summer until the market is more satisfactory. In this way it can be held for months with scarcely any deterioration of quality, while with the old way it was stored in cellars which were often moldy and bad smelling, so that at the best butter became badly "off" in flavor in a few weeks.

Cheese used to be kept for weeks and sometimes months in curing rooms, where it was greased and rubbed and turned daily, making a great amount of labor. Now it can be taken soon after coming from the press to cold storage, where, without any further attention, it cures perfectly and keeps on improving in quality for many months.

In the old times getting dairy products to market was a serious affair, especially in the summer. No amount of care could prevent damage from exposure to heat. Now refrigerator cars run daily on all our main lines of railroads and steamships with refrigerators cross the ocean. By this means butter and cheese can be carried to the other side of the world in almost perfect condition.

Let us try to improve in the future as in the past. Let us not for a moment think that we are now doing the best that can be done.

We are going to increase the product per cow by having better cows and by feeding and caring for them better. The cost of production by these means is going to be reduced so that the human labor that enters into the problem can be better paid. The milk will soon all be separated on the farm and only the cream transported to the creamery.

The Good Work Goes On.

Improvements in dairying will still continue to be made in spite of the croaking of men who always oppose progress and predict failure in everything that is not old. They are the men who said it was impracticable to run a winter dairy. They sneered at the chemist who analyzed food, and they said it was nonsense to buy food to get protein, which was a myth anyway. They said creamery butter was not as good as dairy butter that was made in the kitchen near the frying meat and onions, and they sneeringly called it "whirligig butter." They opposed the silo and are still opposing it, and say it spoils the milk, and one of these men seriously asked me a few days ago if feeding silage didn't kill a good many cows by causing tuberculosis.

DISCUSSION.

The Chairman—I want to ask Mr. Goodrich what he meant by saying that the Babcock test is almost perfect.

Mr. Goodrich—When rightly used.

The Chairman—I wish you would explain that more fully, because there are a good many people who are opposed to the Babcock test, and I think it is simply because they don't understand its importance.

Mr. Goodrich—I believe that the Babcock test will tell nearer than it is

practical to tell in any other way the exact amount of butter fat that is in milk. The chemists have what they call the gravi-metric system of analysis, but from what I have learned I believe that they are just as liable to err as anyone who uses the Babcock test. Of course the test must be all right, and there is one thing that you must be particular about, you must have bottles that are correct. It has been discovered that there are some bottles that are not right, they are not calibrated, the scale is not right, and of course the test doesn't come out right. A man by the name of Trowbridge has discovered a way to find out that the bottles are right, and my son, the creamery instructor, has been making some and sending them out for just about what it costs to make them. In the first place my son tested some thousands of bottles in creameries with mercury, which is the correct way of testing them, but it is some work. Occasionally he found bottles that were off, for instance, he had one bottle that is two per cent. too high; he has another that is one and six-tenths too small. You know that the neck of those bottles is supposed to hold two cubic centimeters. Now, you have a rod of copper wire or some babbitt metal to reach down in the neck, and that will displace exactly two cubic centimeters of water. So you take the bottle and hold it up level with the eye, so you can just see when it is exactly full up to the "0" mark. You drop this piece of wire down into it, and if the bottle is correct, the water will rise just exactly to the 10 mark. Of course that is very easy. Before doing this, however, take something like a roll of blotting paper and run down the neck of the bottle, so as to take out the little drops of water that may be sticking on it; then when you take this rod out of the bottle wipe it perfectly dry before you use it in another one, because we are working fine, and a drop, or the tenth part of a drop, will make a little bit of difference.

Question—Where can you get those bottle testers?

Mr. Goodrich—You can get them by sending to the creamery instructor down at Fort Atkinson. I want to say I don't think there was much value in my paper, except that I wanted to bring back to your minds how things were done a great while ago and to see how much we have really improved, how much we have gained in the knowledge of doing good and also of doing evil. We have learned how to cheat just as well as we have learned how to improve in manufacture. We didn't know anything about filled cheese in those old days, we didn't know how to make fraudulent butter in those days. It took an educated chemist to figure that out, and help us to cheat. Knowledge is power, you know, and that power can be used for evil as well as for good. There was one thing there was no cheating in. I was once a clerk in a store where we used to take in country butter. In warm weather some of it would be melted by the time we got it, and we turned it right out into a barrel; it would go chunk, chunk, chunk, you know how it sounded. Another person would fetch in a roll, and we would throw that in; then once a week a man came and worked it all over. Anybody could tell what that was, it smelled to Heaven, there was no cheat in that, but I have seen worked over butter lately and you can't tell the difference between this process butter, renovated butter, or rejuvenated butter, or whatever they call it, and the good butter, sometimes. I want to tell the good people of Oshkosh that not a thousand miles from here is a creamery that puts up some old butter as fresh butter. That man can't get within three cents a pound as much for it as he can for fresh butter, and I will tell you what he is doing. He mixes a little of that old butter with the fresh butter and the people of Oshkosh are buying it of him and paying full price, and he is making a whole lot of money out of it. It is the hardest thing in the world to prevent dishonesty.

Mr. Arnold—Isn't it all butter?

Mr. Goodrich—Yes, it is all butter.

Mr. Arnold—Where is the fraud?

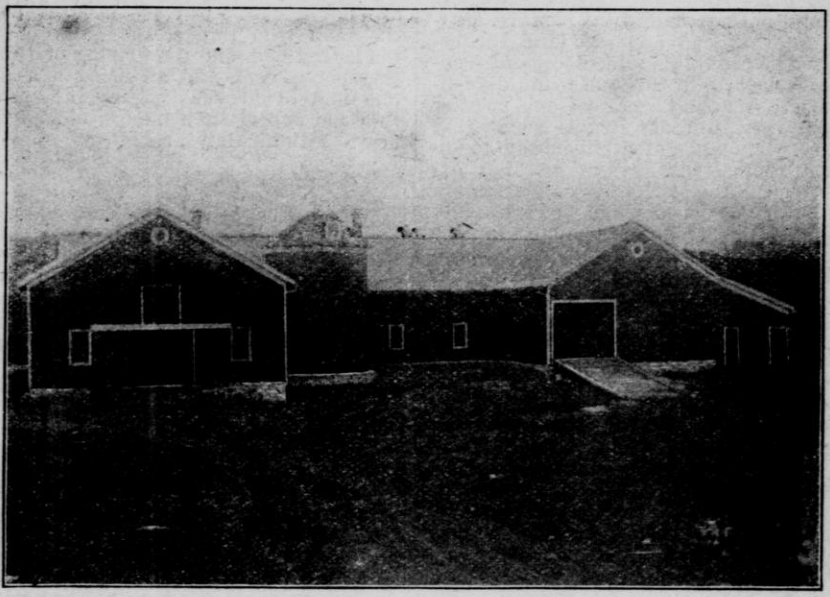
Mr. Goodrich—Part of it is worth three cents a pound more than the other. He is putting in the good butter to make it all pass for June butter, otherwise it wouldn't bring so much into three cents.

FEEDING THE DAIRY COW.

H. E. COOK, Denmark, N. Y.

Probably no branch of dairying has received as much attention at the hands of trained men as the feeding of the cow, yet I feel confident that no part of it is so little regarded, in proportion to the knowledge at hand. Why this condition of things exists I am unable to explain. The feeder seems to ignore the fact that maintenance costs equally whether the cow is producing to her capacity or not. overcome the loss due to improper feeding and care; that many otherwise profitable cows have been ruined by an insufficient amount of easily digestible food.

This word digestible is not well understood, or, if so, the principle is lost sight of in its application. We know well enough that milk for the young, and fresh grass for the more mature animal, give results in growth and



One of Mr Cook's Barns, Showing Silo.

In what particulars are we therefore weak in our application of well-known facts? It seems to me a lack of regularity and of full feeding every day, from birth to old age, and faulty combination of foods are in the main causes of low production per cow.

Breed and Feed.

I am a firm believer in cow education; that no amount of heredity can product rarely if ever equaled by any combination of foods whatever their analytical makeup. Then why do we raise or try to raise a calf on some patent food, its chief claim to value being in its name and extravagant claim of its manufacturer, and to feed the mature producing animal upon dry, hard, indigestible matter, and wonder why she fails of profitable production.

Can we provide June conditions?

Very nearly. So far as animal comfort goes, Yes. It is my judgment that cows kept in a sanitary barn, being let out for a few minutes on pleasant days,are more comfortable for six winter months than six summer months with heat and flies to contend with. Are we not able, therefore, to approximate closely to summer foods?

A Balanced Ration.

We understand that the succulent grass or its solids are well balanced and attribute its value to the relation of protein to carbohydrates, but its chief value is found in its digestibility. A well-balanced ration can be made with rye straw and cottonseed meal, but every practical feeder knows it would not supplant June pasture. After all said and done we find the essence of profitable and successful feeding locked up in this one word, digestibility. We find some of the coarser and very fibrous straws possessing barely enough potential energy to digest themselves. Have you not experienced the difficulty of burning a stick of wet wood when there was not combustible matter enough in the wood to dry itself, and without additional fuel the fire went out? So it is with much of our coarse cattle food, dried grasses through the late summer and early fall months, over-ripe hay and straw, cornstalks that are allowed to stand in the field until corn meal is actually needed to give the cow energy to masticate and eliminate from her system this wet wood, if you please. We meet the opposition to full feeding in that it soon wears out the cow. The feeder, however, goes thrice daily to his meals, and if he does not receive an abundance of well-prepared, easily-digsted food, he is so ill-tempered that his poor wife grows desperate. No, sir ! Do not fear that an abundance of good food will bring an animal to early decay as a producer.

Injudicious Feeding.

A one-sided ration usually found given in the corn States, and too much timothy hay in the Eastern States, are responsible for much cow dyspepsia, which as surely exists as it does in the human family. Another cause of this trouble is spasmodic feeding. Can a cow overeat, did you ask? Most certainly. If for any reason you do not get home to dinner do you not overeat at the next meal? As a rule you do. This poor cow does the same thing. There are two causes for this trouble, one of them a lack of regularity from day to day, passing by the hour established for several days. At the appointed time the animal becomes uneasy, and in my humble opinion is as fit a subject for nervous indigestion as a man. Have you never found yourself struggling with indigestion brought on by anxiety and worry, or by sudden sorrow? When a good dinner consumed with relish felt later as a ball of solid indigestible matter in your stomach?

Oh! but you say at once, that you are not a cow. But see here, is not the man who thinks, the dairy cow, the laying hen, and the driving or trotting horse, each and all using a similar kind of nervous energy, and are they not subject to a like physiological law? I think they are.

Regularity in Feeding.

While every cow stable should be provided with a thermometer, it is useless to have a clock. If you are a regular feeder the cows will tell you within a few minutes each day, when feeding time comes. I had an experience the past season, when a regular feeder displaced one not so regular, with the result that the same foods produced enough more milk to pay the feeder's labor. Several years ago I was led to an experiment by a good farmer friend of mine, to establish, if possible, the advantage of cutting hay and mixing the grain foods with it. The experiment from that standpoint was a failure, but a continuation along different lines with the same cows fully demonstrated the absolute necessity of uniform care and regularity of feeding, because after each change came a shrinkage of milk, even though it produced a gain later, after becoming accustomed to the change. I do not think the number of times a day, twice or three times, hay and grain mixed or separate, or one fed before or after the other, or the same applied to silage and grain, will have much to do with results, other things being equal.

Secondly, to a discussion of what I term spasmodic feeding usually fol-

lowing periods of high and low prices of dairy products. I must confess it requires a good deal of faith, often, to maintain full rations when prices reach the low ebb, but did you ever observe that extremely low prices are followed by extremely high prices? Low prices always stimulate consumption, opening up new avenues of trade. Which farmer is therefore most to be pitied, one with 1000 pounds of milk a day at fifty cents a hundred, or another without any when prices are $1.50 per hundred pounds. Neither gets a profit.

Mistakes We Make.

We buy feed for our creamery patrons, and it is no unusual thing for many of them, about September 1, after a heavy shrinkage has taken place through dry and insufficient pastures or green foods, to begin feeding bran, middlings, or gluten feed, and then querying why the cows do not respond at the pail, beginning to watch the weigh sheet even the next morning. Of course they will not respond. The milking machinery of a cow will not shrink and swell like a sponge. In fact, many times heavy feeding, after long periods of fasting, and the word seems fitting, may be a positive damage to the digestion of the cow.

In southern New York prices for milk are very high in the winter and usually low in the summer. I have repeatedly seen farmers in that section feeding only a bare maintenance ration in the hot summer months, and then in the winter feeding nearly double the grain food that the cow could assimilate. Result: indigestion and partial disorganization of the milk-making machinery. Such cows are usually sold to the butcher at the end of the second year after purchase. Unconsciously these farmers have come to believe that only so-called dual-purpose cows are the profitable ones, and with that system of feeding their reasoning is certainly right. Have you ever noticed that the most careful feeders, those who feed well-balanced, succulent rations and follow it year in and year out, are the men who look for and breed a special-purpose cow, simply because they know how to keep her as such. Bakewell, the great English breeder, reached fully this essential of animal development because six of the ten rules he laid down were confined to the food and care and four to the mating and selection.

From an observation of eight years among the farmers of the East I am forced to the conclusion that the great majority are more in need of the study and application of well-defined principles of feeding and care than they are of the purchase of expensive, highly-bred animals. In other words, many animals would prove valuable if they were in the hands of a skillful herdsman.

Oats and Peas.

From a practical standpoint let us therefore provide a green forage crop coming in rotation after pastures begin to fail, which is about July 1. The years are exceptions when they do not. I am not an advocate of a pure soiling system for every farmer. His environment, price of land, cost of labor, and his own desires will decide the question, but for a semi-soiling system I take no middle ground. Every cow keeper should adopt it, if he is desirous of greatest profit. For the very early foods winter rye and wheat are acceptable and alfalfa where it can be successfully grown, but for July and August feeding probably no crop is more generally adapted to the northern dairy belt than oats and peas. The small white Canada pea plowed in about four inches at the rate of one to one and one-half bushels per acre, the less amount on nitrogenous soils, enabling the oats to hold them up and prevent lodging, and one and one-half bushels oats sowed on a few days later and lightly covered. This operation repeated in ten days and again in a week or ten days will provide a succession of forage until the early maturing corn is ripe.

This oat and pea crop is not only valuable as a green food, but yields a splendid hay when cut green before the grain is mature, and if ripened the best farm grown grain to feed with silage and mixed hay. This early supplemental feeding has given the following results on our "Union Home" farms, where over 100 cows are milked. We are able to produce on an average 100 pounds of milk a day more for every thirty cows from July

1 to January 1, than when beginning the supplemental feeding August 15 to September 1. This 100 pounds milk during the past ten years has been worth about one dollar per 100 pounds for the period mentioned. This one dollar a day extra milk will nearly pay for the grain food fed to the thirty cows for the same time, and the only extra cost has been about six weeks of extra supplemental feeding.

Concentrates.

As to profitable feeding of concentrates, I must say it is only when coupled with a sufficient feeding of green succulent food, and when so fed a small amount seems satisfactory for maximum production, general health, and condition of the cows, while if the forage food is deficient no amount of concentrates can be profitably fed. This last statement I have proved over and again to my satisfaction and pecuniary loss.

I have spoken of what I consider most essential to profitable feeding. After complying with the foregoing we can easily begin the study of carefully compounding our rations from a scientific standpoint and the individuality of the animals. But to study the science of foods while the poor old cow looks in vain for enough grass in July and eats dry cornstalks in January, looks to me like a farce. We can never lay down an absolute ration of protein to carbohydrates until we have a similar type of cow, uniform temperature, and a uniform system of feeding and care. Probably as presently found in our dairy sections, rations varying from 1:5 to 1:7 represent the range. Under 1:5 we are likely to require more or less of the protein for heat; over 1:7 we are probably feeding either an overplus of starch or insufficient amount of protein, in either case representing a loss. Then again, the market price of foods is often a dominant factor. Protein foods are often so high that a ration a bit wider than normal may for a time be more satisfactory.

Feed at Calving Time.

Permit me to say a word in regard to feeding during the last three months of pregnancy, when the cow gives often but little and sometimes no milk. She is usually fed at this time upon starchy and fibrous foods as being the proper time to dispose of them. The soon-to-be mother often exhausts her own vitality in an effort to build up her young on foods deficient in bone, flesh and blood forming elements. Often she appears in so-called good condition when she is very deficient in muscular development and at time of parturition the ills of that trying period are on hand to annoy and frequently to destroy the usefulness of the cow.

The calf is dropped, a fat chump of a thing, with all hope of a fine dairy cow blighted, and we say it pays better to buy our stock than to raise it. Do not depart from the balanced ration during this period; keep up the oat or wheat feeds, preferably oats, on account of the alkaloid found in the oil of the grain, and a splendid nerve tonic. Of course she will not require as many pounds a day.

Do not fear garget or milk fever, or inflammation on account of this kind of feeding. These diseases do not come from a well-nurtured body, but on the other hand from indigestion and malnutrition, and garget is the result of catching cold. It is easier to prevent disease than to cure it, and a half or three-quarters pound of Epsom salts given with a half ounce of gentian a couple of times before parturition, will usually ward off any possibility of trouble when proper feeding has been followed.

Patent Foods.

The market is filled with so-called patent foods, a fraud, pure and simple. They are not foods, nor are many of them medicines. They seem to be a hybrid, a cross between a food and a medicine, and like the hybrid mule, always kicking up trouble. I term them a fraud because they cost from four to ten times their value. If your animal needs some kind of a tonic or restorative due to improper feeding, or out of condition for one cause or another, I can give you a condition powder as good as any of the foods you buy and much better than many of them, at a trifling cost as compared to prices asked for condimental foods :

100 lbs, linseed meal		$1.75
10 lbs. Epsom salts		.50
5 lbs. salt petre		.50
5 lbs. salt		.05
5 lbs. powdered charcoal		.75
2 lbs. Fenugreek		.40
2 lbs. allspice		.40
4 lbs. gentian		.80
133 lbs.	.03⅞ a lb.	$5.15

I do not think anyone practices the correct method of salting stock, viz., mixing it thoroughly with the food. I think this is the only ideal way. We do not practice it, however, because it seems quite impractical, but come as near to the system as possible by giving it on the grain at time of feeding. I am opposed to any method that requires the cow to take her salt separately from her food. The office of salt is to increase the action of the salivary glands and their action needs stimulating during mastication. Do not fail to give her salt once each day.

As cow keepers, as soon as we come to realize that each cow has an individuality and that to be studied and its requirements met and satisfied, we shall then be fairly well started on the way to dairy success.

DISCUSSION.

Mr. Scott—In keeping up the summer flow of milk, when the pastures fail, would you depend entirely upon your forage crops such as peas and oats, or would you give some grain in connection with it?

Mr. Cook—We feed grain the year around. There seems to be a little time when the pasture grasses are fresh that we do not get our pay back directly, but what started us feeding in this way was that we used to keep a dog. We sold him well and invested the returns in wheat bran, and it seemed to work so much better than the dog did that we have kept right on ever since, feeding them a little right through the summer. I find that cows that are fed a little muscle-forming food during the time that we have furnished it, have more strength and a greater power of producing milk than the cows that do not receive it. Sometimes the month of June is only two weeks long in dry years, and sometimes it lengthens out to six weeks or two months with fine grass; I find it is much better to keep the cows right up to their work than to try to catch up later, after they have dropped off a little. We feed our cows about a ton apiece a year, not quite, and we give it to them every day. Of course, later in their milking period they get less than when they are fresh, but it is surprising how seven or eight tons of grain carefully used will fortify the strength and enable a lot of cows to do business. I eat every day, when I can't eat I stop work, and I think it is so with the cow, she wants feeding all the time.

Mr. Culbertson—Do you sow one piece of peas and oats in the spring and feed on it all summer?

Mr. Cook—Oh, no, you know better than that.

Question—When do your cows come in?

Mr. Cook—From September along through to April.

Question—And you feed grain to cows through the summer that are not giving very much milk?

Mr. Cook—Well, the fact is they milk about the year around, that is the long and short of it; this continuous feeding makes the cow a persistent milker, and lengthens out the milking period very much. If I had things just as I wanted them, I would have a cow freshen once a year and go dry six weeks, but those cows that drop their calves in the fall, and the ones that are determined not to dry up, because they strike the pasture in the summer, and if they are given even a small quantity it seems to bring them up, they are determined to milk all the time.

Question—Would you milk a cow five or six years continuously?

Mr. Cook—No, I will tell you about that. You sometimes get cows that are so persistent in milking that if you ask them to drop a calf every year, in a little while you will have trouble. Now, where we have cows like that, we aim not to have them freshen every year regularly, but about once in fifteen months, and in that way they will get dry once in awhile, and it seems to obviate the trouble.

Mr. Hodgson—Where you are feeding your cows about eight quarts of feed besides rough food will it make any difference if you make a change?

Mr. Cook—I am satisfied that when you make a change there will be a shrinkage in the milk every time. Many times after these experiments are carried on, they will come right back again later, after they become accustomed to the change. The dairy cow is a creature that needs uniform care. The question of palatability must enter into the ration, though. I don't think it makes so much difference whether you feed at a given time in the morning or wait a couple of hours and feed later, and the same at night, provided only that the cow has the same treatment every day. Now, about watering. It is the nature of all animals to drink water after they eat, particularly with the dairy cow, and I think she ought to have it then. I think the horse ought to have it both sides. I think it is the biggest humbug in the world to think that a horse must not drink water when he comes into the barn; no matter how hot he is he needs a couple of quarts, but after he eats he wants some water, because his food must be soaked up, so the stomach can handle it; the stomach cannot act on dry food.

Mrs. Howie—Do you feed your grain dry?

Mr. Cook—Yes, I do.

The Chairman—How many times a day do you water?

Mr. Cook—We water twice.

The Chairman—Do you feed as much grain in the summer as in the winter?

Mr. Cook—We do not.

Question--When gluten meal is worth $18.00 a ton, what is the feeding value of oats per bushel?

Mr. Cook—From the protein standpoint alone, gluten feed would contain about twice as much protein as oats. That has been claimed, but I don't think there is that difference, still a ton of gluten would be worth more to produce milk than a ton of oats. The gluten is deficient in ash, that is its weak point. We don't usually think about the ash contents in food, because most of them have enough, but there are some of the by-products which are deficient.

Mr. Goodrich—A mixture of bran and gluten would be all right.

Mr. Cook—Yes. I can tell you of the two concentrated feeds that have given us the best results fed with coarse foods, that is, except for a little while in the summer. The corn plant either fed from the field or in the form of silage has been two parts, wheat middlings and one part of gluten feed. It seems to make an ideal combination of grain.

Mr. Convey—It is customary in this part of the country to balance up a wide ration with ground oats. What do you think of that?

Mr. Cook—It would be pretty hard work, because the oats themselves are only just about balanced; it would be hard work to bring down a wide ration with oats. Two or three pounds of those highly concentrated foods that we get on the market will bring down this wide ration very rapidly.

Mr. Convey—As a rule we find that people neglect to feed their cows when the grass is soft and slushy and the quality of the product is poor and the cows shrink in flesh. What do you think of that system?

Mr. Cook—I think the cow should have some dry feeds during the first period of grazing. By the way, I think if the cow feeders here will just think back, they will remember that usually they have received their highest flow of milk while they were still feeding from the barn. Isn't that true? Then when you took off the hay and grain, you said to yourself, now, the cows are put upon grass and we will get more milk, but you didn't just the same.

Mr. Convey—We didn't get the quality either.

Mr. Cook—Now, you have let down the bars until after pasture, you will see a difference in the quality of the product too, in the body of the grain, the high melting temperature.

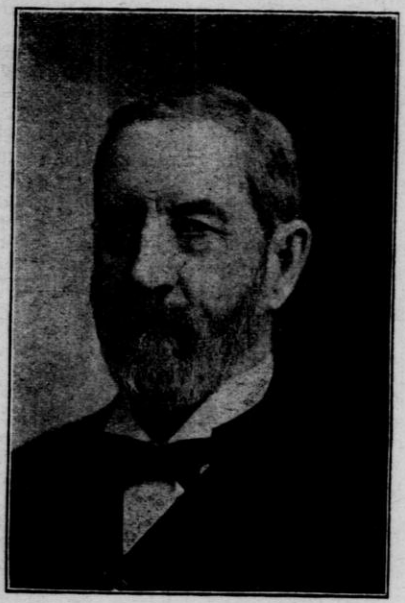
Mr. Sweet—Some of our dairymen are practicing the breaking up of their old bluegrass pastures, and substituting clover, timothy, etc. What do you think about whether it is better to keep the old bluegrass pasture for the cows and then supplement that with soiling? I will say that the bluegrass pasture which we have here produces very much more feed than the pastures East, as I remember.

Mr. Cook—It is my judgment, if you have a good bluegrass sod, and you want pasture, you had better keep the plow just as far from it as you can. I

never have seen very good results from plowing up good pasture sod just to seed it down again to get another pasture. Of course, if it is full of weeds and doesn't grow the amount of food you want, that is another thing; it is a good thing then, to plow it up and reseed it, but then it won't amount to much unless you spend a lot of time manuring it and handling it.

FORAGE CROPS.

HENRY WALLACE, Editor of Wallace's Farmer, Des Moines, Iowa.



MR. WALLACE.

Silent, but none the less potent changes are now taking place which will, in the future, materially affect Western agriculture. Farm lands are advancing by leaps and bounds, not so much because of increased productiveness or enhanced prices of farm products, but of low and ever falling rates of interest, due to our enormous exports of the products of our mines, farms and factories. As the results of this advance of from 20 to 50 per cent., the agricultural population is on wheels as never before, looking for low-priced lands from which, using the present methods of farming, they can make a comfortable living and in a few years reap the advance, or the unearned increment, which after all represents a large per cent. of the accumulated wealth of Western farmers. Illinois farmers move to Iowa; Iowa farmers to Missouri, Oklahoma, the Dakotas, Minnesota, northern Wisconsin, and the Provinces of Canada.

Those of us who remain on these high-priced acres will be compelled to grow harvests increased in proportion to the advanced price of land. To do this we must not only do better farming, in all lines, than we have ever done before, but must introduce new crops and up-to-date methods of handling them. Corn, wheat, oats, rye, barley, timothy, the clovers, and blue grass will no longer by themselves serve our purpose, however much we may improve our methods of cultivating them. The maintenance and increase of the fertility of our lands—of the capacity of the farm and factory—demands live stock, and success with live stock is closely connected with the supply of forage.

Forage—What Is It?

While in the strict sense of the word forage is food for live stock which they gather for themselves, on which they make forays, or foraging excursions, yet from the time of Dryden it has been used to denote any kind of food for live stock. Modern agricultural usage, which, however, has not been sanctioned by lexicographers, who are always from twenty to forty years behind, uses the word to designate any kind of roughness or roughage (two other words of which the dictionaries know nothing), whether the cattle for-

age on it for themselves, or whether it is fed to them green or cured. This usage of the word would include hay of any kind and silage. It is not necessary to speak of these to Wisconsin farmers. It should scarcely be necessary to speak to them of corn hay or fodder corn.

If I were talking to farmers of central Illinois, or in southern or northwestern Iowa, in Missouri, Kansas or Nebraska, I would ask them how they can afford to waste one and a half tons of stover per acre from a fifty-bushel corn crop, when the total cost of cutting and shredding, less the cost of the husking on the stalk, is about $3.50 per acre, or about $2.30 per ton for forage equal in feeding value to timothy hay which can be sold off the farm at from $6 to $10 per ton, varying with the locality. It is fair to presume that Henry, Hoard, McKerrow, Goodrich, and less conspicuous, but probably no less able leaders of Wisconsin agriculture, have so fully educated you in this line that no field of unharvested cornstalks proclaims to all comers and goers that its owner is not an up-to-date farmer.

Keep Our Land at Work.

But if we are to get more returns from our high-priced lands, we must do more than cut up corn and fill silos. We must keep our acres at work all summer long and must introduce crops and combinations of crops that will take constant toll from the nitrogen and carbon of the atmosphere and utilize to the fullest extent the moisture and stored fertility of the soil, as well as cover its nakedness and thus arrest the loss of nitrates during the growing season. By the introduction of sorghum, rape, soy beans, Canada peas, cow peas, and hairy vetch into our rotation we can, in many cases, double the yield of forage and, thereby, double the stock-carrying capacity of the farm.

Sorghum as Forage Crop.

The most valuable of all these new forage crops is sorghum. It may be sown on land that for any reason cannot be planted to other crops before the first of July, and it will produce from four to seven tons of cured sorghum forage per acre. Or, it may be sown on a field of rye sown in the previous fall, pastured in the fall and again in the spring until within one hundred days of frost, then plowed and sowed to sorghum with the same result. Or, by using a variety already adapted to the climate, or to be acclimated in the future, it may follow a crop of winter wheat or rye or early oats. Whether you have sufficiently early varieties as yet, I do not know. If not, you can have and will have them in due time. This at least can be done: sorghum can be drilled with corn for silage after these early harvested crops, and the crop gathered into the silo just before frost; or, it may be sown on well-prepared land in May and used as a soiling crop for cows in fly time when the winged tormentors, the heat, and short pasture compel the cows, in self-defense, to diminish their yield of milk.

Here let me drop a word of caution. When sorghum is grown for winter forage, it must not be cured as clover and timothy are cured. You must not try to cure it thus, but on the other hand, try not to cure it in that way. In this latitude sow about sixty-five pounds of germinable seed to the acre broadcast, on well-prepared soil, and do nothing more under any circumstances until the time of the first frost, or until there is a prospect of cooler weather. Frost does the sorghum no good, but the cooler weather following the first frost is essential to its proper curing. Then mow and pile up immediately in large shocks, without dew or rain, and let it alone. Handled in this way, it will maintain its succulence all winter.

Another warning: You must feed it out before the warm spring days come. If not, it will sour and become unpalatable, if not injurious to stock. West of the Missouri it is better to drill with a grain drill, closing three holes and leaving the next three open, then bind and shock. I don't think that plan would work here. It will not except in very dry years in the central part of Iowa, and it is not safe to risk it there. The consequence is molding and souring about the bands. If it is sown so thickly that the stalks will vary from the thickness of a lead pencil to that of your middle finger, there will be sufficient circulation of

air in a shock of four or five hundred pounds' weight to prevent molding.

Rape—How to Grow It.

Next in importance among the new forage crops is rape. I do not need to describe rape to Wisconsin farmers. It should always be sown in feed lots that have been tramped out, or places around the buildings which usually grow up to weeds, and used as a hog pasture. I think it will give more feeding value than the same acreage of corn, and at less expense, and furnish this feeding value in succulent form in the summer when it is most needed. Or, it may be sown in oats, or other spring grains, at, or some time after sowing (depending upon the fertility of the land), and furnish an admirable sheep pasture, or pasture for horses and stock cattle during the dry summer and fall. It may be sown in the cornfield at the last plowing, and while if the crop be heavy and the season dry it will not yield much, it will, by keeping down the weeds, should germination be secured, pay the cost of seed and will, with a light crop of corn or a wet season, furnish great late fall pasture. A cornfield sown to rape is an ideal place for fattening lambs during the fall.

Two objections are now framing themselves in your minds. First sorghum is a highly carbonaceous food and hence unfitted for dairy cows; second, rape fed to dairy cows will taint the milk. To the first I answer, it is no more carbonaceous than silage and the roughness, or concentrates, that will balance silage will balance sorghum. I need not speak of concentrates. You are thoroughly posted on these. Nor need I tell you that clover hay, or alfalfa, in sections where it will grow successfully, are the cheapest possible balances for these carbonaceous foods.

The Soy Bean.

I do not know how far hairy vetch may be used to balance these wide rations. I do believe that in the course of a few years at most, soy beans can be so acclimated even to Wisconsin conditions that they may be grown and used, either in the form of roughness or concentrates, to balance sorghum or silage. I do not see why the earlier varieties of soy beans might not be sown in separate fields in rows twenty-eight to thirty-two inches apart and four inches apart in the row, cultivated like corn, mowed when in the dough stage, or a little before, and run through the silage cutter with the corn and thus furnish in the corn and soy bean silage a ration that will meet the requirements of the dairy cow. Nor should it be difficult, by allowing the seeds to become nearly ripe, to harvest them as a grain crop and thus procure a concentrate equal pound for pound in flesh formers to oilmeal, having, however, an excess of fat until some Wisconsin Yankee learns how to press out the fat and sell it in the market for pure olive oil, or a "sure cure for consumption," and thus give us in the residue a home-grown substitute for oilmeal cheaper than can be bought in the market. Without doubt the larger varieties of soy beans are too late maturing for this latitude. They have, however, like corn and all other good things, good men and women included, the capacity of adapting themselves to climatic conditions. Each year we hear of them being grown successfully farther and farther north.

Cow Peas.

I doubt whether the cow pea will ever be of much value in Wisconsin as a forage crop. Possibly in time it, too, will adapt itself to northern conditions.

I am often asked, given land of like fertility, given the same culture, and the same season, what is the difference between the food value of an acre of sorghum and an acre of corn, total crop. I heard this question put at an institute in Illinois to J. G. Imboden, whom you will all recognize as one of the most successful feeders in that State. He replied that he was testing it at that time and that in his judgment, when fed to fattening cattle, an acre of sorghum was equal in feeding value to two like acres of corn. I thought this a high estimate and would have preferred, theoretically, placing it at one and a half times; but I find this statement confirmed by other feeders who have had similar experience. I am quite sure that for supplementing short pastures in the hot summer, for fattening steers, for carrying

dry cows through the winter, for work horses, as a partial ration for breeding ewes (clover being the balance), and for fattening sheep, an acre of sorghum will furnish more food value than an acre of corn; and at not much more than half the cost and labor.

Value of Sorghum.

It can be used in so many ways that I regard it as the most valuable of our new forage plants. It can even be grown for molasses, for seed, and still leave a residue, which, put in the silo, will have very considerable feeding value. I have seen excellent silage made from corn and sorghum half and half, which was highly satisfactory to the dairy cow and her owner. I have not said anything about Canada peas for the reason that they are well adapted to this latitude and I have good reasons to suppose that you know more about them than I do.

I believe that by judicious use of these new forage crops in connection with our present sources of forage and feed, it is possible to nearly double the food supply on Wisconsin acres. Nor is this mere theory. One of the valued correspondents of Wallace's Farmer, Mr. David Brown, of Hooper, Dodge County, Nebraska, by using the plants above mentioned and in the way suggested, is able to keep a cow, which with him means 1000 pounds of animal, whether of horse, cow, sheep, or hog, on an acre and a half of land during the year; and he believes that in a few years he will be able to keep a cow, growing all the feed on his own farm, for every acre. If this can be done in dry Nebraska, why cannot the Wisconsin farmer do the same or even better?

These are matters that we will have to think about seriously as long as land keeps advancing in price. The farmers of the Western States, by adopting improved methods, have shown that they can get as large dividends from land worth $40 to $50 an acre as they did when land was worth $15. Is it not much wiser to improve our methods and reap products from our land proportionate to its increasing value, rather than flee from a climate and soil with which we are acquainted and seek new gardens of Eden in strange lands where the garnered farm experience of a lifetime is of little value?

DISCUSSION.

Mr. Wallace—As I said in my talk, land is getting high, not because of increased products or prices, but because of the low interest on money which is likely to continue, hence it is important that we grow more upon our lands and that we raise good forage crops. I dwelt particularly on sorghum, because I believe it is a most valuable forage crop. In thinking it over I have thought that sorghum might be available to you people in two ways: first, sown in May, early Amber, ripe in August, to be used to piece out your dry pastures, hauling it out in the fields as a soiling crop. Second, as a supply of winter forage sown not earlier than the 10th of June. It is also important as making a variety. My conclusions have been based most largely on the experience of dairymen around Des Moines, and on that of readers of Wallace's Farmer who have been induced to try it through what I have said in the paper, who grow from ten to fifteen acres of sorghum a year, sowing it there about the 20th of June or the 1st of July. I think on the 10th of June here, because you have a shorter season. They sow sixty-five pounds of germinable seed, which will probably equal say, a hundred pounds of the seed you buy; they sow it on well-prepared land broadcast, harrow it in after first killing the weeds, let it stand until the first frost, then mow it down, and immediately put it up in cocks of four or five hundred pounds each. They let it lie there until winter, then they bring it in, or just feed it right out of the cock. They put it in small stacks, not over eight feet wide and eight feet high, and they find it makes nice, sweet, succulent food, no matter how much it freezes, until the first warm days come in the spring, then it will sour, so they have to feed it out before the first of March. Now, in Illinois, Mr. Imboden is growing it for fattening steers in the same way. He tells the Institute people that one acre of sorghum has twice the feeding value of an acre of corn on the same kind of land. I think that is high, but it is safe to say it is one and a half.

Mr. Convey—I think Mr. Wallace stated in his paper that it could be produced at half the cost of corn.

Mr. Wallace—I haven't got down to

exact figures on that, but you know what it costs to plow the ground and to harrow it. I am not able to say what seed is selling for this spring; probably it will cost you a dollar an acre for your seed. The seed weighs thirty-five pounds to the bushel, but they sell for about a dollar, anybody can raise seed cheap. You know how much it costs to mow. The main cost is in piling it up. It is pretty hard work. You want it ripe. Your men at the Experiment Station will tell you that corn puts four-fifths of the dry matter into the stalk between tasseling time and denting time, about the time it is fit to cut. I take it that sorghum is the same way; it spends the first part of the year getting ready, and does it in a very modest way, so you want to let it go until it is about ripe.

The Chairman—I have a brother out in Iowa and I think probably he has heard Mr. Wallace talk about sorghum, so he sowed some, about a bushel and a half to an acre. I was out there in August, and it stood up all right, but there was a slight breeze one night, and the next morning that lay just as flat as though you had been over it with a roller. What are you going to do with it when it gets in that condition?

Mr. Wallace—There was not a sorghum field near Des Moines that was not as flat after that storm as if a roller had been over it, but it will all come up again, don't worry about that. Like the psalmist David, after being cast down, it rises up again. In this rising up it leaves a crook down at the bottom and that makes it harder to cut. There is one kind of sorghum that will stand up, that is the Colger; I did not mention it, because I did not believe it was early enough for this latitude.

Mr. Bradley—What is the liability to mold in those cocks?

Mr. Wallace—None if you have it the right thickness.

Mr. Bradley—How long do you allow it to wilt?

Mr. Wallace—Not one minute. A gentleman came to me and asked me about cocking. I said, "You cock it right away after cutting." He started in, but did not have hands enough to keep up with the mower, and he tells me he can notice a difference in the quality for every day that that stood there without being cocked up. Put it up green, but not with the rain on it; like all other soft green things, boys and girls included, it must be left long enough for nature to do her work.

Mr. Culbertson—I have heard that it is detrimental to stock in some conditions.

Mr. Wallace—That is one of the unsolved problems. Some of our Des Moines fellows allowed their cows to get into the sorghum pasture, and the results were bad. Out in Nebraska and Kansas, I have known of a young cow being put in a field of sorghum that would be dead inside of fifteen minutes after; that was second growth sorghum after it starts up after the first cutting. Nobody pretends to know anything about it. I asked Peters, who is way up in all the new things, and he says, "That is a thing that I don't know anything about, and nobody else does." So you see there must be caution used. In handling this stock you use a dull fork, in taking it out in the winter time don't monkey with a sharp fork.

Mr. Arnold—I notice you conclude that the climate of Iowa is earlier than Wisconsin and you speak about the 10th of June.

Mr. Wallace—That is too early out there.

Mr. Arnold—I apprehend it is too early here.

Mr. Wallace—Yes, I had forgotten, your soil is much warmer and quicker than ours. You don't want it ripe until the first of October.

Question—Why couldn't you cut the sorghum with a binder?

Mr. Wallace—In Nebraska they do, and in very dry seasons in Iowa we can do it, but if there comes a wet spell in the fall, your sorghum will be apt to sour if bound. Now, the easiest way of putting it in is to take a common drill and plug up three holes, leaving three open, then you must cultivate your sorghum once with the harrow and keep out all the weeds; then you can take your binder and take three rows, that is wide enough, and bind it up in small sheaves, shock it up tight, and let it stand until you feed it out; in central Iowa that won't do, it would spoil and mold.

Mr. Thorp—There is one thing about

this early sowing. Do we understand you that that is simply for the soiling crop that you have been telling us about?

Mr. Wallace—Yes, sir.

Mr. Thorp—Suppose we have something left after we get the soiling crop, how would you cure that?

Mr. Wallace—I wouldn't try to cure it. I would put in stock enough to keep it down through July. It can be fed to fattening steers, stock cattle, horses, hogs, sheep, as one day feed only, the other being clover. You cannot feed it to your dairy cows unless you balance it, just as you do silage. There is more in sorghum than the chemist will make you believe. The cow has a better opinion of it than the chemist. You will always find the farmers who feed it speak more highly of it than the Experiment Stations. There is nothing left of it, the cow will chew it up clean, it is like a little girl eating candy.

Question—At what stage would you call it ripe enough to cut?

Mr. Wallace—Just at the stage that you cut corn. That is, with the seeds as ripe as you would want to have the grains of corn when you were putting it up for fodder.

Mr. Convey—Mr. Wallace spoke about its use for silage. Now, if it is good for silage, why would not the early crop do for that?

Mr. Wallace—Yes, I hadn't thought about that.

Mr. Convey—Wouldn't it be likely to be the same character of silage as that made from sweet corn, would not the sugar develop a higher degree of acidity in the silo?

Mr. Wallace—I cannot speak of that from experience. Buff Jersey sent me a lot of silage the other day, of which he spoke in the highest terms. There is a man out in Nebraska named David Brown, of Hooper, who, by using sorghum, cow peas and oats and late corn and sorghum drilled together on his oats ground, the sorghum put on after his rye, and rape in his grain, is able, in that dry country, to keep rather more than a thousand pounds of meat per acre. I believe he did that for three or four years and when he gets his methods fully developed, he will keep a cow to the acre. Gentlemen when you can do that, you can just laugh at anybody and everybody, and you can get six per cent. interest on your hundred-dollar-an-acre land.

Mr. Bradley—Years ago when we raised this sorghum to make syrup, that stubble bothered us. How about sowing the next season?

Mr. Wallace—You go over the State of Nebraska next year with a native, and he will point out a particular field of wheat or oats, and say, "That was sorghum land last year." The question was asked me, "Is sorghum hard on the land?" and I answered that I don't think it is. I believe the defect comes out of the bad condition of the soil. I know a man down in Illinois who grew sorghum for ten years for molasses, and he said he had no trouble at all. He said that the cause of the small crops following is the bad mechanical condition of the land growing out of the fact that it is a perfect mat of sorghum roots, and he takes and plows that just two inches and cuts off those big roots; then throw another furrow on top. My son-in-law, five miles north of Des Moines, adopted the same plan, and he says he can grow just as good crops after sorghum as before.

The Chairman—I have a friend down in Missouri, who is a very careful dairyman, and he sows sorghum every year; he does just exactly as Mr. Wallace says is the correct way to do. I don't quite believe the stories he used to tell about it, and I will tell you why. It is because his name is Goodrich, and I went down there and I found the same thing. More than that, I went down to the meeting of the Indiana Dairymen's Association, and a man read a paper on sorghum there, and he told just the same story, to cock it right up after it was cut, and it can be kept all winter. I don't think the farmers really believe it can be done, or they would all be raising sorghum, but it has been going on for ten years, just the same.

Mr. Linse—I don't see why we shouldn't believe Mr. Wallace. I used to raise sorghum for sugar and we kept the cane in a heap as late as Christmas, and it kept all right.

The Institute adjourned till 7:30 p. m.

EVENING SESSION.

The Institute met at 7:30 O'clock. Conductor L. E. Scott in the Chair.

PRACTICAL VALUE OF COOKING SCHOOLS.

MRS. HELEN ARMSTRONG, Chicago, Ill.

MRS. ARMSTRONG.

It hardly seems necessary to say anything to an audience like this about the practical value of the Cooking School, because most of you are familiar with what these schools are doing for this country, but many of us do not know how much we have to learn from other countries in this matter. In some other countries the Cooking Schools are extended into schools of housekeeping, and they not only teach the girls how to select and prepare the foods used in the family and to do it economically and in the most intelligent manner, but how to do everything connected with housekeeping in the largest sense of the term. They are taught to sew, to mend, to make their clothes and to do all those things which will be for the pleasure and comfort of a well-ordered home. We know that a woman who conducts her home intelligently from one end of the house to the other, has a great many cares; has many things upon her mind all the time. You know it is said that this is the only thing a woman can do that a man cannot, i. e., two things at a time, and the average woman has a good deal more than two things to see to at once.

Training for Our Girls.

It stands to reason that if a girl is well trained in the simpler things, in the rudiments of housekeeping, that she is going to make a much better helpmeet for some man, somewhere, sometime, for she must be better fitted to go through the battle of life, whether in her own home or somewhere else, if she has the training. What I want to lay special stress on this evening, is the *practical* value of the Cooking School.

The theory has always been held that girls should learn these things at home, that it is the business of the mother to train the girl in the home to look after the things which require her care in the home.

That is all right in theory, but we know it does not hold good in practice. The average woman has altogether too many things to do to train her girl in this way, and so the girl usually is not taught at home, or, if she is, it is in a rather unsystematic and irregular way. If we want our girls to play the piano, or to sing, or to study elocution, we don't attempt to teach them at home, we have those things taught by someone who is trained to do it.

An Age of Specialties.

In these days we are running to specialties, because we know that if one has been trained along a particular line, she becomes better fitted in that work than one who is untrained. If girls are taught by trained teachers, they will naturally learn much more. Girls can go to a Cooking School and learn, not only about the preparation of the foods themselves, but they are taught a great deal about system, order and method, which is the one thing that is most lacking in women in their homes in the present day. No man would attempt to run his business with as little system as the average woman uses in running her home. Of course, in one sense it cannot be otherwise, because the work is so diverse; we have not one or two lines to follow, but a dozen, or even more, but even then the work ought to be more systematic than it is; women ought to learn to so plan their work that they are not confined entirely by it, and thus they may have time for other things. Our girls ought to learn to do their work in such a systematic way that they can accomplish more in less time than their mothers would do, because they have not had this training.

Judicious Use of Money.

In schools that are properly conducted, the girls are taught to make money go as far as possible; they are taught to prepare a certain number of meals, for a family of a certain size and limited to a certain amount of money to do it with, and in that way they learn something of money values as applied to food products.

They tell us that in this country the largest proportion of the income in many cases is spent for food, and that in the middle classes the average family spends half its income for food. Just think what a tremendous proportion that is! We know, too, that the poorer classes of people as a rule spend even a larger proportion of the income for food, and as a rule they spend it less intelligently. That is one of the things we are trying to correct in the cooking school. I am speaking now about the cooking school in our public school system, and the work that is being done in a way through the Institutes. In some localities the cooking school has fallen into disrepute because a great many so-called cooking schools have been conducted where the instruction was laid along the lines of fancy dishes, very expensive ones, and ladies and young girls went to these schools and learned to make dishes which they never could make in their own homes.

Defective Training.

But in the schools to which I refer the work is done in a thoroughly practical way, and the girl is trained to do the most with the least possible outlay. In several places in this country they had the experience of running a cooking school for a year or two and then, unfortunately, have dropped it on the ground that the expense was not justified, although there was money enough for many less necessary things, and from this fact many argue that it has not been a success. It certainly takes money to run anything that is worth running, but the main trouble in these cases has been that there was not enough interest in the work. Now, that is because the system of teaching was defective or else they had incompetent teachers, because when children say they are not interested in the cooking school there is something wrong with the *teacher* every time. The work itself is so perfectly fascinating, it can be made so delightful to the child or the young person, that if it is not made so, there is something wrong with the way it is presented, and so in those schools where it has been abandoned it is almost universally true that the method of instruction has not been satisfactory and the work has not been practical.

Scientific and Practical.

We have made a great many mistakes in many places, in laying all of the stress of the work upon science. Of course, the work must have a scientific basis, we must do the work in a scientific manner as far as principles are concerned, but when it comes to talking proteid and carbohydrates to girls nine or ten years old it seems rather like overdoing the matter. As soon as you try to impress upon a child something that is absolutely beyond

his comprehension, you are talking in the air; you might better keep still. So in this work, by teaching science by itself we make a mistake. The work must be made practical on a scientific basis.

What we want to encourage in the cooking school is practical experiments in the home right along at the same time, but very small children cannot do that sort of thing; they waste materials, and become discouraged, because they cannot do it intelligently. A great mistake is made when the work is introduced in the primary grades. The work should be such as to interest them, and then as they become old enough to apply it intelligently at home, they can utilize it in their own families.

The Dignity of Labor.

Too much of our education has been simply the training of the eye and the mind; now, we are spending more time trying to train the hand. Too many girls go through school and college and never have time to learn these practical things; they are "learning to learn instead of learning to do things;" simply training the intellect without the hand as auxiliary. True labor comes from the combination of the hand and the brain, and in putting this kind of work before our girls along with our Institute work wherever it can be done, we are giving to labor its proper dignity, and trying to do away with the idea that it is nothing but drudgery. We realize it takes as much brain for a woman to be a good cook as it does to be an artist, or a composer, or writer, or anything worth while. So we feel that this work should be done in our schools, through our colleges in all kinds of public institutions, also wherever it can be introduced successfully along with the Institute work. In this way we should really accomplish something of a practical benefit, and our girls will grow up to be better housekeepers and better home-makers, that we will have better food upon our tables; there will be less intemperance in this country and a higher sense of the dignity of labor.

OUR BIRDS.

O. G. LIBBY, Instructor in History, University of Wisconsin.

It is a sign of healthy growth in the right direction when the study of birds is attracting such marked attention as it has in recent years. There are certain significant signs that our birds are coming to have some well-recognized rights in the scheme of existence of the present century. For example, it is growing to be more and more a matter of conscience for right-minded persons that birds as ornaments are out of place in good society. Again, by means of careful observation covering many species for a long period of time, we have found out that there are after all very few birds positively harmful to our economic interests, taken as a whole. We know now that while here and there a few species may do harm at some particular season, it is counterbalanced in the long run by their beneficial work elsewhere and at other seasons. So important has this seemed that our National Government is carrying on an elaborate study of the food habits of birds with a view to the protection of many an outlawed bird, such as the crow, the bluejay and several of the blackbirds.

But the activity in the new study does not end there. A whole bird literature has but recently made its appearance, some of it very poor, it is true, but a good deal of it really excellent. Bird manuals, bird charts, colored pictures of birds, and finally photographs of living birds, are appearing now year after year in an ever-increasing profusion. Besides this, bird classes in both the city and the country are being carried on with excellent success. I had recently sent me a little manual for the study of wild birds in city parks. It represents observations in Lincoln Park, Chicago, 1897-1900, and is the work of an en-

thusiastic teacher in one of the North Side High Schools. In Milwaukee the study of birds is pursued both by individuals and by organizations, and with marked success. In Madison there has been such work pursued since 1895, and it has grown to such the University professor. The enthusiasm in such work as this is infectious and catches readily by personal contact. Such outdoor laboratory methods at summer schools afford the rarest opportunity for real nature work.

But what is it all for? I hear some-

ROBIN'S NEST. PHOTOGRAPHED BY W. O. RICHTMANN, MADISON, WIS.

proportions that during the May mornings we sometimes have as many as eighty in attendance on our six o'clock classes. With a number of assistants or leaders, the work is carried on with genuine profit to everyone. All ages and classes are found in our sections, from the child in the fifth grade up to one say. Does it help the boy or girl to live better and work harder? Does it increase the per capita wealth of the taxpayer and make it easier for him to live? The answer to both of these questions is emphatically *yes*. It is a necessary element in any young person's education that along with math-

ematics and grammar and history he also gets some glimpse into the marvel and mystery of life in nature. It is a two-fold inspiration; children are observers as soon as they can use their eyes, and here is a world of living things, whose existence depends upon their fitness for present conditions and adaptability to future conditions. This interests all of us, especially the child, for these are the things not found out in mere books. On the other hand, the imagination is given excellent material to work upon, and the sympathies are powerfully quickened by the child's coming in contact with bird

YOUNG RED-WINGED BLACK BIRD. PHOTOGRAPHED BY GEO. KEMMERER, DELAVAN, WIS.

families and all the comedy and tragedy connected with real bird life.

But these bird classes are also of advantage to the taxpayer. We find them excellent means of bird protection not only from shotguns but the more deadly slingshot of the thoughtlessly cruel boy. When the birds are our personal friends we will not tolerate their killing by anyone. And in the long run the boys make the very best protectors of the birds, and there are few so hardened as not to feel the force of common opinion. Besides this it checks and in the end destroys the egg collecting which is so common and which yields so little of permanent value.

Bird Clubs.

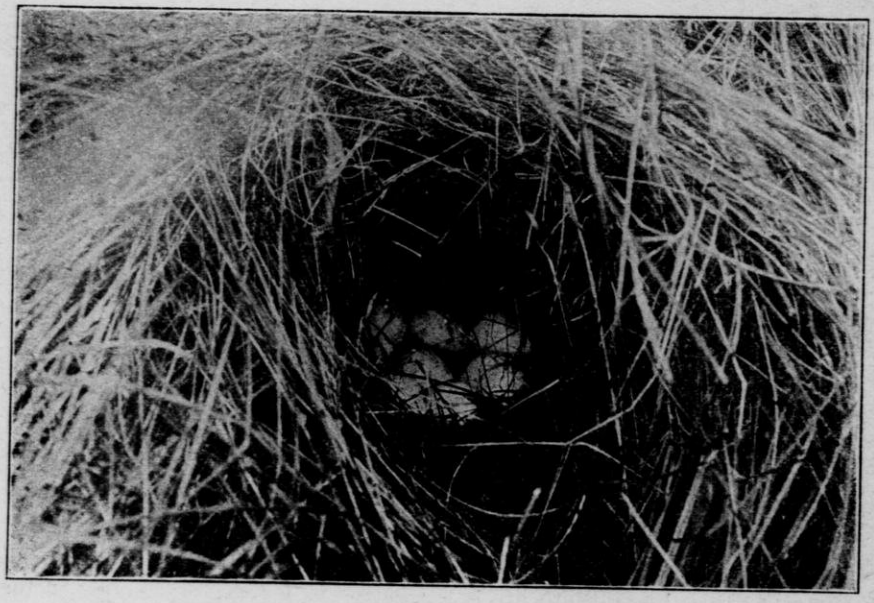
It would certainly be a capital investment for any cultivator of the soil to aid in every way such study, and especially in the formation of bird clubs. They all are in the direction of an increasing recognition of the services performed for us by the birds.

I think it would astonish such a patron of bird study to discover how surprisingly well informed most of the boys of his acquaintance are with the bird life of their locality. This will not be the only surprise in store for such a bird patron. If he is accustomed to substitute long, clean lines of barbwire fences for ragged, picturesque hedgerows and tree clumps, or if his theories make him inclined to clean out every brushy fence corner and to hew down every dead tree on his land as soon as it is discovered, he will come to have some doubt after a time as to his being quite fair to his bird neighbors whom he stands bound to protect. The members of his bird club will find good reason for his keeping this dead tree or that one a little longer to save a woodpecker family from being evicted entirely from house and home. Perhaps a little later he will be asked to save a fence corner thicket for another season

in order not to break up a thriving family of brown thrushes. His compromises will hardly be a sacrifice of utility, though they are perhaps of beauty.

Dead Trees as Bird Resorts.

A clump of dead trees is not a sightly object on a well-kept farm, but as a resort for a whole group of useful birds it may be the means of keeping many of these on or near the farm or orchard to its permanent well-being. A dead tree may contain the home of any of four woodpeckers, besides the chickadees and the smaller owls. The fly catchers like the kingbird, wood pewee and least fly catcher find here their favorite feeding grounds. Here will be found the mourning doves and cedar birds grouped sociably along the bare boughs, while the nuthatches and brown creepers scramble up and down the decaying stem, gleaning after the woodpeckers. A dead tree, if a large one, is for the bird world what a mountain peak is for us, a good point for observation; it is a landmark for miles around and is resorted to season after season by a surprisingly large number of birds. The State University has a considerable area of native wild wood, left as free and untouched as though in a wilderness. This wood both the resident and migratory birds appreciate, and the wooded shores of Lake Mendota adjoining the University grounds are always filled with a great variety of birds from early spring till late autumn. There are also scattered over the slopes of the University hills a large number of venerable oaks, many of them dead, whose age reaches back into the territorial days of Wisconsin. Such trees ought to be protected from the ax of the over-zealous landscape gardener, in whose mind dead trees are classified as mere firewood. If such magnificent and sightly relics of the olden times have no other friends in the University, they should certainly find them in the Department of Agriculture. The rage for the bran-new and the symmetrically arranged lines and groups



QUAIL'S NEST. PHOTOGRAPHED BY ETHEL RICKER, URBANA, ILLINOIS.

should never be tolerated on the University grounds if it means the sacrifice of these rugged veterans of a hundred storms whose sturdy trunks will yet outlast the term of the official who would sweep them entirely away. The recent drouth has stricken many a giant oak and elm, but they need not therefore be sacrificed at once. Let them stand, if not as beautiful objects, still as striking features of the landscape, relieving the monotony of the machine-made arrangement that too often takes the place of natural and pleasing irregularity.

It costs but little to maintain bird resorts, and landscape gardeners in their zeal for arrangement forget to adapt their grouping and thinning out to the needs of a considerable bird population. On a farm the problem is comparatively easy. A brambly fence corner, provided it does not become a breeding place for weeds, may soon come to be a well-populated tenement, with its inhabitants all doing valiant service for their landlord and paying twice over for all they eat and for the room they occupy. Even so simple a thing as a cherry tree, though the fruit is not edible for us, is a center of activity at the flowering time and doubly so for the time of the fruit. And a mountain ash with its red berries that remain on the tree all winter is a veritable banquet hall during this season of scanty rations. It is not alone for considerations of rainfall that deforesting is a catastrophe to be dreaded. The destruction of small groves and patches of woodland with the consequent drying up of the little streams otherwise protected, entails upon the bird population the loss of feeding grounds and ultimate local extinction. So any observer will tell you that different species once common are now rare or never seen. This may or may not affect the crops of the region, but this disappearance of birds is a significant fact worth careful consideration.

A line of evergreens upon the north side of a building site may serve quite another purpose than that of a windbreak. I recall very well one hard snowstorm I witnessed in about this latitude in the very middle of the May migration. Near the house was a grove of evergreens, and the morning after the storm the trees were a sight to gladden the eyes of a bird lover. Caught in mid-flight to their Northern homes, were kinglets, fly catchers, a good representation from the sparrow family and a whole swarm of brilliant warblers in full plumage. The entire group of birds together was in a very literal sense a cross section of the spring migration and a most interesting study. Evergreens such as these save many hundred bird lives each year and form the natural shelter stations on the long and perilous journeys north and south.

As intensive cultivation of the soil and scientific methods of farming come to be more common, we are apt to forget, I think, that we cannot keep house without the birds. Of all the native wild animals we found in our new lands, they alone are necessary to our civilization. We have exterminated the Indians, and driven the bears and wolves away, but the birds are slowly adapting themselves to the new environment, and if we only give them half an opportunity, they will perpetuate themselves on our lands to their own and to our benefit. Now that the birds have a legal status in our commonwealth, we have only to carry out our laws to give them all the protection they need.

The English Sparrow.

Among the dangers to our native birds none is fraught with greater menace for the future than the English sparrow pest. We can legislate out of existence the thoughtless killing of our birds for sport, and we are already crippling the murderous millinery trade in feathers and bodies, but against the English sparrow scourge there has not yet been devised a simple and effective remedy. The English sparrow is doing more damage to property than all the other birds in our latitude put together, and as an agent of destruction to our native birds they are unexcelled. No other birds will stay long where these sparrows are once located. It means persecution in detail by individual sparrows and by mobs of them till all self-respecting birds are compelled to leave the locality. The English sparrow is the only bird that carries on a systematic attack upon the homes of their neigh-

bors. They have been seen by many observers in different localities to visit the nests of their neighbors in the absence of the parent birds and to throw the young nestlings out upon the ground, in some cases dropping them ten or fifteen feet to the foot of the tree. They are with us the year round and unlike most of our native birds, their food is almost entirely grain. They are, then, no substitute for the insectivorous birds they expel, and they are a filthy nuisance about the barns and granaries as well as the dwellings where they congregate. They have the habits of the slum class of London or Chicago, with the intelligence of a street Arab and the pugnacity of a true Briton. They are a greater pest than rats and mice, and they are more difficult to combat. The most effective method of dealing with the sparrow is by poison. During the winter months if a platform be built above the reach of the poultry and the sparrows be fed there regularly in order to accustom them to the place, they may be easily poisoned. The recipe I quote from an article by E. B. Clark in The Outing of January, 1901: "Mix a drachm of strychnine with three quarts of boiling water. Let the mixture boil until the poison is thoroughly dissolved. Into the poisoned water pour a sufficient quantity of wheat to absorb the liquid. Put the mixture aside for forty-eight hours. The wheat will be found to have swollen greatly. Spread it over the bottom of a large pan and place it in an oven until thoroughly dry. It must not, however, be allowed to scorch in the least. English sparrows consider wheat prepared in this way a tidbit. It gives to them a swift and painless death." This method reaches a hundred of the sparrows to ten that can be reached during any other part of the year, and the farmers of the State ought to bestir themselves or the useful native birds will be exterminated or driven away by these sparrow pests. We must deal with the sparrows as we deal with rats and mice, and no false sentiment ought to be allowed to enter into the matter.

PARTRIDGE AND NEST. FROM SCIENTIFIC AMERICAN, 1900.

Bird Problems for the Farmer.

The subject under discussion may be thus summed up. The farmers of this country have two bird problems on their hands of the utmost practical importance to themselves. First, how to encourage the increase of our native birds by providing homes to replace the ones that cultivation and tree cutting have wholly or partially destroyed. The fruit grower more than the stock raiser needs to consider this problem and to act with careful forethought in regard to it. Second, the native birds must be protected from their deadly enemies, the thoughtless egg collector and the slungshot bird

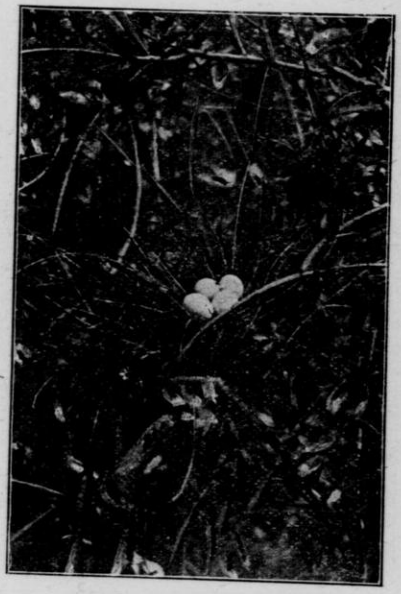
hunter; the callous milliner catering to the demands of her fashionable customers who are more cruel and thoughtless than the boys; and as already mentioned, the increasing hordes of English sparrows. For the last-named pest and enemy of our birds poison is recommended as the safest and surest remedy. For the others we fortunately have the law recently enacted, which punishes this inhumanity of the boys, and of the women who ought to know better.

ties to have the penalty applied and in case they are not accessible, any city or county attorney can bring in the complaint and have the case tried. It will need only a few enforcements of the law to give the lawless members of the community a wholesome respect for the statutory provisions protecting the birds.

Illegal Millinery Trade.

More difficulty will be experienced in putting an end to the unlawful sale of

SWAMP SPARROW'S NEST.



LITTLE GREEN HERON'S NEST.

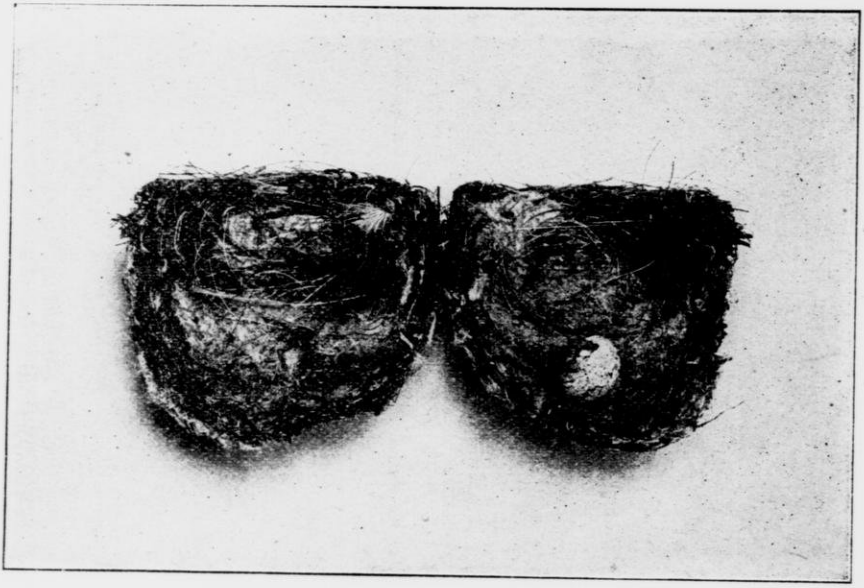
PHOTOGRAPHED BY GEO. KEMMERER, DELAVAN, WIS.

The egg-collecting craze, which is responsible for much destruction of nests and young, can be checked by a judicious application of the law which imposes a fine of five dollars for each egg or nest taken, or, at the discretion of the court, imprisonment for ten days. The same penalty applies also in case of the wanton killing of birds. As the party most interested in the preservation of our native birds, very few of whom are at any time harmful, the farmers of this State should see to it that the law is enforced. It is the duty of the game warden or his deputy

birds or parts of birds' skins or feathers by the milliners. The law can be enforced in cases of this kind against all those who have for sale *any portion of a wild bird that ever visits Wisconsin, whether as a resident or a migratory bird.* Such milliners should be warned they are violating the State law, and in most cases they would willingly comply with the statute when they are made aware of its provisions. The most serious attempt at avoiding the law on the part of the dealers in bird skins is the device of *made birds* by which feathers from a bird skin are

rearranged or dyed so as to be unrecognizable. The only safe way for one who does not believe in wearing birds is to scrupulously avoid all bird feathers as hat trimming. By this means and by seeing the law applied to the milliners who persist in defying the law, the wholesale slaughter of our native birds may be checked in time. The destruction of birds by the millinery trade has reached such appalling proportions that the national legislatures of both England and America are trying to enact effective laws against the murderous traffic. The struggle between fashion on the one side and every consideration of humanity and economy on the other is an exceedingly dubious one. The most curious feature of the whole matter is that if the women of either country should stand united against the traffic it would cease at once. If they allow it to go on to the complete and cruel extinction of a large number of our most useful and beautiful species, it will stand as a foul blot upon our boasted civilization. The full text of the law passed by the State of Wisconsin is given at the close, in order that all friends of humanity may aid in the good work of saving bird lives.

Utility aside, we need the birds for their beauty and for their song. Fields without bird songs, groves without nests, are anomalies in nature and should be felt to be so upon our farms. We have invaded the natural haunts of our birds with all the modern appliances of an advanced civilization. Let us see to it that we regard their rights to some slight degree and at least give them opportunity for new homes in



COWBIRD'S EGG WITH A NEW NEST BUILT ABOVE IT.

place of those we have deprived them of. The birds are, besides this, a most fascinating study of which one who is once fairly interested never tires. How the birds of this State war with the parasitic cowbird is a source of continual interest. In the accompanying cut is seen a cross section of a nest in which the cowbird's egg laid in the bottom of the nest of another bird. The egg has had built upon it a new nest in which the young were reared in safety and the cowbird's egg remained still unhatched.

The question of food of the birds is

by no means settled, and we are finding out new facts continually and changing almost all the old statements regarding what birds eat. As this question has great importance in connection with the economic value of birds to the farmers, the results of the investigation are of great value. Connected closely with this question is the one of migration. Why birds migrate has never been satisfactorily settled,

BARK OF WHITE OAKS WITH ACORNS PLACED IN INTERSTICES BY RED-HEADED WOODPECKERS, MADISON, WISCONSIN.

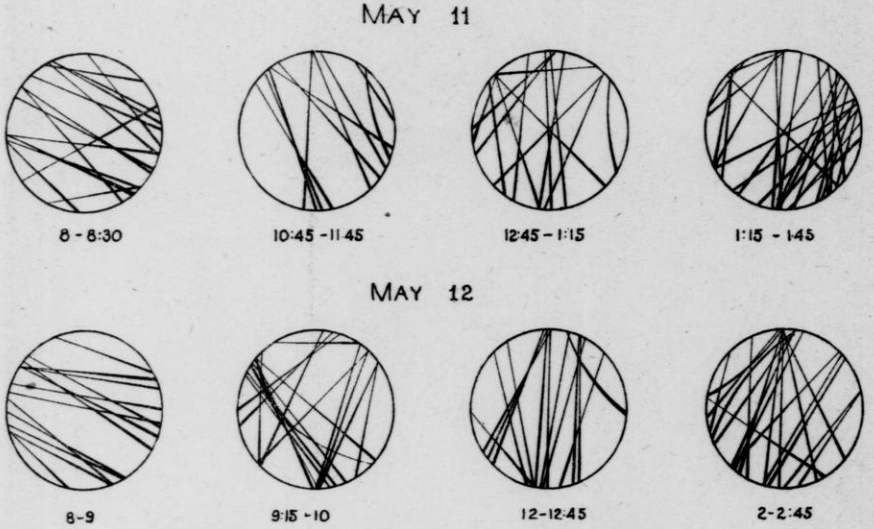
nor are the bird manuals correct in their statements as to what birds migrate South in winter. The red-headed woodpecker has always been called an early fall migrant and a late arrival in the spring. Yet in Madison this bird stays through the severest weather and stores acorns for his winter food by crowding them into the interstices of the bark of burr oaks or into holes in dead trees, or even the cracks in timbers or boards.

Nocturnal Migration.

The fact that birds migrate mostly at night has concealed the magnitude of this great movement from most observers. From observations at the Washburn Observatory at Madison a large number of birds were seen to pass across the surface of the moon, flying from half a mile to several miles above the earth. The number of such birds passing a line about six miles long at Madison is so large as to be almost inconceivable. It was estimated by Prof. Flint of the observatory that 160,000 passed in three

nights within range of the telescope. Yet this was only a small fraction of the time of migration and but a small portion of the entire width of our country.

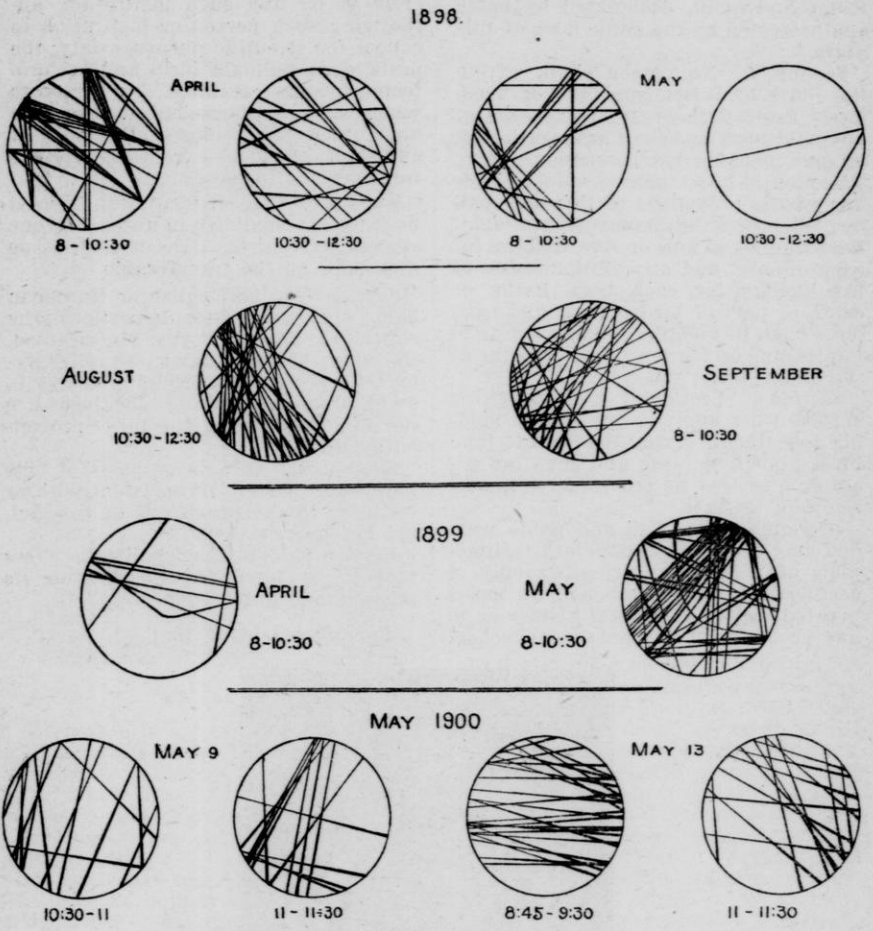
The accompanying cuts show how the flight of the birds is registered by observers. The circles represent the surface of the moon, and the lines drawn across the circle show the number and direction of the birds as seen within certain hours and at certain dates. The more heavily shaded portion of the lines indicates at what portion of the circumference the bird flew out of the field of vision; the upper portion of the chart is north, or toward the zenith.



TELESCOPIC OBSERVATIONS OF MOON AT BELOIT, WIS., IN 1900.

In the Madison observations the most significant thing is the difference between the direction of flight for May and April and for August and September. The full significance of these observations can only appear when more observers take part at widely separated points and the observations cover a much longer period of time. Observers of migrations need not have a telescope, and valuable observations are being made each year by noting the dates of the arrival and departure of several of the best-known species. In this way we can tell by what roads or highways the Wisconsin birds enter the State and reach every part of it.

A new and unexpected ally of the bird student has recently appeared in the camera. It is possible to take photographs of birds in all stages of development and to show every step in rearing of the young. The whole minutiae of bird life can thus be registered by careful use of the camera. This new method of hunting birds is fully as exciting as that in which killing or wounding was a necessary accompaniment and not a bird is harmed or a drop of blood shed. From negatives thus obtained lantern slides can be made indefinitely. The cost of such slides is about six dollars a dozen, and it is not a difficult matter for a careful amateur to make good slides. With a collection of such lantern slides, the children in any school can learn more than from a dozen books. The possibilities of this kind of nature study are very great and ought to encourage all bird lovers to begin such work wherever opportunity offers.



TELESCOPIC OBSERVATIONS OF MOON AT MADISON, WISCONSIN.

No. 179, A.] [Published April 12, 1901.

CHAPTER 156.

AN ACT for the better protection of insect-destroying wild birds, their nests and eggs.

The people of the State of Wisconsin represented in Senate and Assembly do enact as follows:

Section 1. No person shall within the State of Wisconsin, kill or catch or have in his or her possession, living or dead, any wild bird other than a game bird, nor shall purchase, offer or expose for sale any such wild bird after it has been killed or caught. No part of the plumage, skin or body of any bird protected by this section, shall be sold or had in possession for sale. For the purposes of this act the following only shall be considered game birds: The several species of wild geese, ducks, woodcock, snipe, plover,

grouse, prairie chickens, pheasant, partridge and quail, designated by name and protected by the game laws of this State.

Section 2. No person shall, within the State of Wisconsin, take or needlessly destroy the nest or the eggs of any wild bird, nor shall have such nest or eggs in his or her possession.

Section 3. Any person who violates any of the provisions of this act shall be guilty of a misdemeanor and shall be liable to a fine of five dollars for each offense, and an additional fine of five dollars for each bird, living or dead, or part of bird or nest and eggs possessed, in violation of this act or to imprisonment for ten days, or both, at the discretion of the court.

Section 4. Sections 1, 2 and 3 of this act shall not apply to any person holding a certificate giving the right to take birds and their nests and eggs for scientific purposes, as provided for in section 5 of this act.

Section 5. The fish and game warden may grant on satisfactory testimonials of well-known scientists only, a certificate to any member of an incorporated society of natural history or to any professor of any university, school or college, or any person properly accredited by any such institution, authorizing such person or institution to collect for scientific purposes only, the nests, eggs, animals, birds and fish protected by these statutes. No person to whom such certificate is issued or who acts under the same, shall dipose of any such specimens except in exchange for scientific purposes.

Section 6. The certificates authorized by this act shall be in force for one year only from the date of their issue and shall not be transferable.

Section 7. The English or European house sparrow (passer domesticus), the American crow (corvus americanus), the sharp-shinned hawk (accipiter velox), Cooper's hawk (accipiter cooperii), owls (ulula cimera) and blackbirds are not included among the birds protected by this act.

Section 8. All acts or parts of acts heretofore passed, inconsistent with or contrary to the provisions of this act, are hereby repealed.

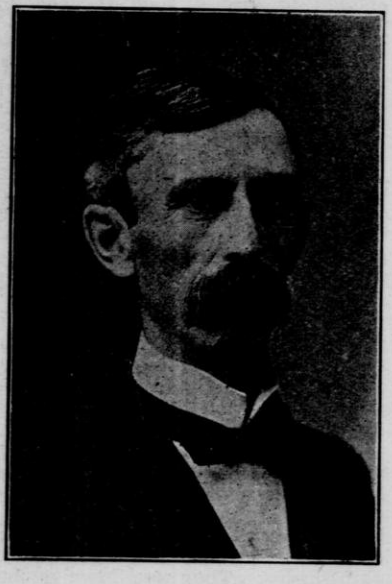
Section 9. This act shall take effect and be in force from and after its passage and publication.

Approved April 9, 1901.

YOUNG RED-WINGED BLACK BIRD LEAVING NEST. PHOTOGRAPHED BY GEO. KEMMERER, DELAVAN WIS.

EDUCATION.

HON. H. C. ADAMS, Dairy and Food Commissioner, Madison, Wis.



MR. ADAMS.

Wisconsin is a splendid State. It is a good State to be born in. It is a good State to live in. We have beautiful lakes, magnificent forests, rich mines, fertile prairies and cities that are great nerve centers of our commercial life.

No State has more varied resources. We have an industrious and conservative people. Scandinavian thrift, German economy and love of home, Irish cheerfulness and courage, Yankee ingenuity, enterprise and push, all combine to form the best citizenship in the world. Socialistic vagaries are not attractive to our people. Wisconsin is the most conservative Western State. No tide of political or industrial fanaticism has swept it from its moorings. It has ever respected law and enforced order.

Capital is safe here. Labor is safe here. Our resources have been wonderfully developed in twenty years. The Wisconsin farmer is not a Rip Van Winkle. Factories have been planted by the farms by thousands.

The State has provided schools where children can be educated at home. Farm products have more than doubled. Farm values have more than doubled. Manufactories have increased threefold.

Our Common Schools.

In 1885 the State provided for an annual levy of a one-mill tax for the common schools. It was an effort to make the property of the State bear its proper share of the expense of common school education.

Our State University has been built up, from an academy in fact, to a university. Education has been the mainspring of all this development. The education of individuals, the education of classes, the education of the people as a whole, have combined to make this State rich in material things and strong in good citizenship.

Education is a hackneyed subject. It has been talked about since men began to talk. For one hundred years it has been near the front of great public questions. Everybody talks about it. When I was a schoolboy and the great horror of my life was the task of writing an essay in a district school, three topics were considered staple and comparatively easy, "Hope," "Spring," and "Education." Education was regarded as the easiest of all.

To-day you can get quick and confident answers about any question regarding education from any man or woman except one who has made it a life study. Kitchen girls, and high-school girls, street car conductors, and railway presidents, farmers and ministers, politicians little and big, may doubt their own judgment in some things, but when it comes to education, their conceit of opinion is so colossal, that, like many other things out of all proportion, it is absolutely funny. A woman may doubt her ability to fry a steak, but she knows to a dead certainty how a boy ought to be

trained. She may seek for information about growing a house plant, but she is perfectly certain that she understands the most mysterious thing on earth—the mind of a girl.

Men who let their wives look after the education of their children will talk about rational education by the hour. One of them is doing that very thing now, but the defense in this case is good. A man should always, with as much grace as possible, permit his wife to do those things which she can do better than he can. There should be less talk and more thinking about education.

I taught a district school two terms which will probably warrant me in being dogmatic on this subject. Some old school teachers and many young ones have this fault: It is most glaring in some small-minded people whom a mysterious Providence and criminal school boards permit to disgrace school houses as teachers. A school should neither be an experiment station, a treadmill, nor an asylum for unfortunates.

We boast of our great educational system in Wisconsin. We have a right to. The system is reaching after babies and training old men. Its sweep is great enough. It is a long path from the kindergarten to the University.

District Schools.

The State has been wise and generous as a State, but the districts included within the system have not always been either wise or generous. The country district schools are not good enough. Everybody knows it. It is a conceded fact in every discussion of every educational body. It should be part of the work of the Farmers' Institute to make them better.

There is a multitude of farmers in this State who never think about the subject at all. The average farm audience will listen for hours with eager interest to discussions about a silo and get tired in fifteen minutes of a talk about schools.

They spend more time thinking about cows than children. There is money in cows. There is no particular profit in children. There is money saved in a silo. There is money spent in a schoolhouse. This does not apply to all farmers. Intelligence and culture are at home upon many farms in this State. But it applies to enough farmers to make many hundreds if not thousands, of our district schools weak and inefficient for their purpose. Two things make a school good, money enough to hire a good teacher, and parents who take a live interest in that teacher's work.

A farmer will give a dollar and a half for a scrubby calf and watch with the utmost anxiety and care its growth and development from calfhood to motherhood, who will not stick his head inside of a schoolhouse where the plastic minds of his own children are being shaped for all time—except when he goes to a caucus. There is some excuse for this, but not enough.

Farm life has its hardships, its privations, its strenuous toil. Many a man has begun life upon a farm heavily encumbered with debt, with slender resources, who has been engaged in so steady a fight to live and become independent, that the everlasting money question has been constantly forced to the front. In such a struggle he is about as apt to think about educational questions as a soldier is on the picket line.

But the great majority of Wisconsin farmers to-day are in comfortable circumstances. They can have no business more important than the training of their children. They owe it to their children that it shall be good training. They owe it to the State. The best teachers in this State should be in the district schools.

Farmers Themselves to Blame.

Ninety-five per cent. of the children who enter district schools never go to any other. And these schools that educate all of our farmers' children, except five in one hundred, the poorest in the State! They should be the best. They can be made the best. To bring this about the farmers themselves must wake up. State supervision is good. It has been growing better and more complete for fifty years.

County supervision is fairly good and is steadily improving. The supervision of farm communities over their own schools is not good. When farmers know the character of their schools and are willing to spend enough money to make them good their schools will become the pride of the State.

It is largely a question of money. Good teaching talent cannot be bought for a song. Men and women who can do things go for about their value in all the world's markets for work. Small pay and little service go hand in hand. Economy should be intelligent. Saving is sometimes losing.

A farmer with an important case cannot afford a cheap lawyer. A child is worth more than a lawsuit. The money spent in its proper education is the best investment in the world. It means money spent to lay well the foundations of right thinking and living. Its returns are common sense and good citizenship.

Farmers and Taxation.

It is sometimes in some places the popular thing to assure farmers that they are groaning under burdens of taxation—that their financial life blood is going out in taxes, that they are bearing the great bulk of the load of taxation, that the selfish greed of other classes has assessed upon agriculture the cost of maintaining the State. Sympathy is a nice thing. It is a weakness of human nature that one finds peculiar satisfaction in the assurance of being an object of injustice. But farmers are helped by neither the dubious flattery of being called beasts of burden or unfair criticism. They want to know things as they are and in the end will appreciate sincerity and plain statements of facts.

The farmers are not being ruined by taxation. They are not being seriously hurt by taxation.

I do not believe an instance can be given during the fifty-three years of the life of this state when taxes upon a farmer outside of what he may have paid in an incorporated village or city, have ever resulted in a business failure or serious impairment to a business success.

When this farm institute work was first started, Gov. Hoard, in a memorable sentence which has been the keynote of its life, said, "The heaviest tax which the Wisconsin farmer pays is the burden which he imposes upon himself by following thoughtless and unbusinesslike methods upon his farm."

The statement was true then. It is true now. The years since 1887 have brought new ambition and new intelligence to the farm. The tax has grown lighter. The farmer has more ideas and more dollars. When thought and labor go together mortgages disappear. Farms become homes and not simply places to stay.

Necessity of Good Teachers.

The district school taxes should be made enough to pay good teachers. They will never crush any farmer or seriously hurt any farmer. Not chickens or calves, honey or hogs, cabbage or corn, wool or wheat, any one or all, are the best fruitage of the farm. The boys and girls are the apples of gold in pictures of silver. They should be cherished. They should be well taught. Their teacher should have some other merit than willingness to work cheap. Cheap teachers make cheap children. The army of raw inexperienced boys and girls teaching in the district schools of Wisconsin should be driven out into the ocean of other occupations by the farm judgment of the State.

The future of the State is in the hands of the farm children of to-day. Industrial and commercial kings, great lawyers and the statesmen of this country, have nearly all been barefoot boys upon the farm.

The farm is a breeding place of greatness and of littleness. Its children breathe in honesty and constitutional vigor and ability to work. The isolation of the farmer makes narrowness and suspicion a steady menace.

Make the district school so good that common sense will be taught the children as well as grammar. Make them so good that green experimenters will not get a chance to blunder in the holy temple of the child's mind with half-baked educational fads.

Wipe off the map some of the weak district schools. Make it an honor instead of a bore or a job to be on a school board. Raise enough money in each district by direct taxation or increase the mill tax if you will to such a figure that competent teachers can be hired.

Do those things and the district schools of the State will be as good in their way as the higher schools are in their way.

Higher Education.

It is a frequent and dangerous cry in Wisconsin that the State robs the common schools to broaden high schools, multiply normal schools, and pile unnecessary riches upon the University. The argument is made that the State has no business with higher education, that the high schools may do perhaps, but the normal schools should stand alone, and the University should be handed over to private enterprise or private charity.

A real hatred of the University exists in unsuspected quarters. It is based on jealousy and envy and is often cloaked by pretended friendship. This hatred is not as dangerous, however, as the mistaken but sincere judgment of honest men, that the State cannot afford to pay for higher education.

A corporation fighting educational appropriations to keep down its own taxes is not to be feared as much as that great body of voters who would limit State aid to the common schools.

The farmers of Wisconsin have been generous to the normal schools and to the University. As a class they have believed in higher education. As a class they have believed that the State should promote it. And yet in many a farm audience a charge that normal school or University education is not practical, will be cheered to the echo.

Practical Education.

What is practical education? Is it simply husking corn, making shoes, running railroad trains, fashioning steel, selling calico, digging coal, cutting down forests, or building ships? Before every act of a human being there goes a theory. Before everything there is an idea. Before the steam engine was the thought which preceded it. Before the foundations of this government were laid was the theory of what those foundations should be.

There was never anything good in theory that was not good in practice. Practical education is an education which enables men to do well in either the realm of ideas or of things.

Practicality is not monopolized by ships, factories or farms. A lawyer may be as practical as a man who sets type. A college professor may be more practical than a man who shears sheep. "Ah! But," some friend of mine says, "that sounds well, but your colleges turn out boys who do not know how to get a living."

Of course they do. The human family shells out that kind of a product all around the globe. It is not unknown in those practical countries where there are no colleges and where clothes are scarce. A college cannot make a man. It can help him. "Schools give knowledge; God gives common sense." Ingersoll said, "Colleges are places where brickbats are polished and diamonds dulled." It was intended as a reproachful epigram. It was in fact a half truth and a tribute to the college at that. We can get along without the changeful beauty of diamonds, but human brickbats need the polish of knowledge to fit them properly into the great temple of life.

Recently in my home city I heard two after-dinner speeches, one by a University professor, and one by a professional man. The professional gentleman said a University education which did not enable a student to make money in the world was a failure. The professor said the horizon of educational purpose should be the satisfactions of knowledge. The value of money was over-estimated in one case and the value of knowledge in the other.

Our State University.

There is a golden mean between radical utilitarianism and a visionary scholasticism. The University is practical when it broadens the mind by exercise and fills it with the thought of the day and the wisdom of the ages. The University is no more practical when it puts a boy through a machine shop and teaches him to be a skilled mechanic.

The State builds, equips, and sustains a great University for its own good. It is a splendid and a wise selfishness. It is made the head of our educational system not simply for a capping stone, but to generate strong currents of intellectual life which shall give more vigor and more sense to the body politic in every community in the State.

Its work helps every school in the State. Its influence benefits every profession in the State. It helps every industry and every class. The farm-

ers owe it a debt. A University helps because it trains men and women in the beginning of life to think. It induces good mental habits. It puts the machine of the mind in good working order. It encourages knowing and discourages guessing. It breeds mental hospitality, the best quality of the mind.

There are drones in the University hive. They can be found upon the farm. No human abiding place is without them. But the motto of University life is labor, and it is well followed. It is urged that the University outside the department of agriculture does not graduate men who become farmers. It is true to a great extent; because it is true we have the department of agriculture.

It is a genuine thing. It is something more than a curriculum, a faculty, and some buildings. Twenty years ago it was a mill without a grist. Now it does business with four hundred young men. It is helping to solve the problem of how to keep the boys on the farm. Not every boy should stay on the farm. A natural lawyer should never hoe corn. A born artist has no business with an ax.

The boy with a taste for machinery can do better than spend a lifetime with harrows and harvesters. Dean Swift said or wrote: "No man ever made an ill figure who understood his own talent, or a good one who mistook them." Another philosopher said: "Be what nature intended you for and you will succeed; be anything else and you will surely fail." It is folly to chain a boy to a business he dislikes. A famous humorist is quoted as saying: "The only way to keep a boy on the farm is to drive a twenty-inch spike through him into a burr oak tree."

Keep the Boys on the Farm.

The drift of bright boys from farms to cities has been too general. It should be restricted, but not stopped. Stop feeding the professions, the machine shops, the counting houses, and the world of trade with the sturdy integrity of farmer boys and there would be a shortage of strong men to handle the nation's business and make its laws.

A great percentage of boys are not lucky enough to have been born with a bias for some particular occupation. They furnish good material for farm recruits. The agricultural college can make farmers out of them. It teaches the dignity of labor and the dignity and power of knowledge.

Where farming is a habit it is not attractive. Where it is a profession and science and art come in, it bristles with interest. The farmer boy likes the farm better when he knows what it all means. When soils become to him something more than dirt, when natural science comes in to explain the silo, when botany comes in to make a weed a curious study, when he finds that the complex problems of animal husbandry are worthy the labor of a lifetime, he wakes up to the fact that farming is a business where knowledge pays and that it is worth the attention and devotion of the finest sense and the strongest brain.

Our Agricultural College.

The farmers of this State should stand by the agricultural college to a man. It has stood by them. Its sole purpose is to aid men who till the soil. It is doing definite things. Its professors work as few farmers work.

It has made Wisconsin better known in other lands than any other or all other institutions of the State. The records of its work are eagerly read in every civilized nation. Secretary of Agriculture Wilson said to me in Washington, "You cannot help having a great agricultural college with men like Henry and Babcock, Russell and King to run it."

Measured by a money value alone, it has paid a larger percentage upon the investment than any gold mine that was ever opened. It has saved and made for our people through its teaching of economic agriculture more money than the entire University has cost the State in the half century of its life. It is a shameful fact that its most unfair critics are the men whom it would most benefit. You will find more prejudice against the agricultural college among farmers than among lawyers.

No doctor ever denounces medical colleges. No lawyer ever doubts the value of law schools. No minister of the gospel ever discourages school training in theology. It remains for

some farmers to misunderstand and condemn their own professional schools. They are in a minority. The great bulk of our farming population appreciates our agricultural college. It has no warmer friends than some of the pioneers who, without school training, know enough to know the value of that training. They know enough to know that in the keen competitions of modern life mental discipline and well-grounded knowledge count on the farm as everywhere. They know that the education of the schools is good because it saves time, money and embarrassment.

Hiram Smith was a grand type of a royal class. Without school training himself, he hated the jealousy of ignorance toward knowledge with undying hatred. Hiram Smith hall is his fitting monument. Without school training Mr. Smith became an educated man. But the experience of his life taught him that self-education is a slow and laborious process.

Stand by Your College.

When an appropriation bill for money needed by the agricultural college goes into the Legislature, the farmers all over the State should get busy. To a great extent they leave the work of passing such bills to Prof. Henry. It is a shame. Should Prof. Henry be compelled to beg needed money for the most fruitful instruction in the State?

Is anyone so misled as to think he likes it? He should state what the college needs and the farmers should see to it that he is not burdened with labor to get the money with which to benefit them. It is their appropriation bill, not his. His ambition to make his work worth something to Wisconsin farmers compels him to spend the legislative session making the people's representatives know the value of his college.

The farmers of this State can do anything in legislation which is reasonable. But they cannot pass laws in their sleep. The average legislator is a good man. He wants to do right. He wants to represent his people. How can he know what his people want unless he hears from them?

One corporation lobbyist in Madison will sometimes do more talking to the Legislature in a session than all the farmers in the State. Let the farm constituencies make their members and senators understand what they want, and Prof. Henry can stay where he prefers to stay, in his college, and the Legislature will do justice to him and his school and the farmers, who are benefited by both.

A Liberal Education.

In all this talk about education I do not wish to be understood as saying or thinking that the only foundation for success in life is the education of the schools. Schools do not monopolize education. They give it in a systematic and intelligent way. But there are other ways. Books educate some men, newspapers others, experience others.

The mental friction of business and politics results in a liberal education to a great host of men. Men make fortunes on farms and in trade who murder English in every sentence and who never heard of bacteria or of Apollo's silver bow. They get on in spite of their deficiencies, not because of them. Ignorance of Greek roots cannot break the force of courage. An iron will will win whether it carries a broken body or an unpolished mind.

Let no graduate rich in the lore of the Universities venture to disparage the men who win life's prizes without college helps. Intellectual snobbery is the most idiotic of all.

The increase and diffusion of wealth and vain imaginings of fond parents throws some children into college who should go to a reform school. The University student rare but sometimes in evidence who looks with contempt upon men who work with their hands, should stand with uncovered head in the presence of every hodcarrier who passes by.

Let all men be educated to this extent at least—that their minds shall be open to the truth, not only in enquiring youth, but in busy manhood and in old age, when judgments harden and prejudices crystallize.

A Bit of Sentiment.

A man can never be quite old who cultivates to the end a hunger for knowledge. The thinking machine is the most enduring of all. Train it.

Fill it with material for a lifetime. It will make happy lives afterward. Old age will be a golden sunset and not the shadowy presage of an endless night. There should be sentiment in farm life. There is a place for it. It is not life in its best sense without it. Not everything should have the dollar mark. There is something worth while in the castled clouds, in changing sunset hues, there is something in the dark greenness of the rustling cornfields, in the velvet mantle that covers dear old mother earth, in blooming orchards, in the winey air of spring mornings, in the purple beauty of a clover field, in the glories of a day in June, in the October wonders of forest coloring, and in that breath of heaven which comes at that twilight hour, which, as Ingersoll said, "falls like a benediction between the hours of toil and sleep."

In Conclusion.

The education of the farmer should broaden the mind, cultivate the senses and touch the heart. When we have more of this education, when Gov. Hoard's campaign to make the farmer demand the teaching of agriculture in the common schools shall stir in them a proper interest, when State Supt. Harvey shall have trained as he is now doing, teachers to supplement that demand, when secondary schools of agriculture shall have been established in the great agricultural counties, when the agricultural college shall have a thousand students, when agricultural papers shall go into every farm home, when rural deliveries shall carry daily papers into every farm home, when the Institutes have converted the last objector to modern methods, we shall have an ideal State.

The farmer will have won all the political power that he wants, and he will use it with due regard for the interests of labor and the rights of capital.

The Institute adjourned till 9 o'clock a. m. next day.

THIRD DAY.

The Institute met at 9:00 A. M. C. P. Goodrich in the Chair.
Prayer by Rev. S. H. Anderson.

CLOVER AND CORN.

F. H. SCRIBNER, Rosendale, Wis.

I think everyone in the room realizes the true value of clover, not only as a feed, but for its direct benefits to the soil, and anyone that practices intensified farming, realizes and appreciates its value more than any other class of people, and I think this subject was given me more to testify what it had done for me than to enumerate its merits.

The possibilities of the soil are more than most of us imagine and like the dairy cow, must be cared for and fed in order to get the most out of them. For the average farmer, I do not believe the best results in clover raising can be obtained, only by the liberal raising of live stock, in order that we may have a large amount of manure, and I notice that those who are following along in this line are the ones that have the least failures in clover catches.

Four Year Rotation.

The plan on our farm for the last twenty-five years has been a rotation of crops, and at present is a four-year rotation, two years in clover, one year in corn, one year in oats. The field we seed with clover was in to corn the year before and the ground plowed in the fall; the preparation we give the seed bed is as follows: Double-disc, lapping half way to keep the ground level, drag diagonally, then plank crosswise, then drag diagonally in the opposite direction from the first dragging then plank once more.

This puts the ground in a nice, smooth, level condition, so that we are able to get the seed in at a uniform depth. We use a drill with a grass seed attachment behind, sowing five pecks of oats per acre and fifteen pounds of grass seed, consisting of seven pounds of medium clover, three pounds of alsike, and five pounds timothy. After sowing, roll with a heavy roller and drag lightly. This may seem like a liberal seeding, but we get a fine quality of hay the first year, and a good heavy pasture the second. This also seems like a small amount of grain per acre, but clover we must have, and we would rather sacrifice a little grain to gain this point. The straw being thinner, allows the air and sun to come in, also grows more stiffly and is not so apt to lodge.

After the first crop has been secured for hay we then use it for pasture. This gives us two fields. One we use for a night pasture and the other for the day; in this way we have an abundance of pasture. At the present writing we have on our eighty-acre farm sixty-three head of cattle, and with this system are able to raise all the feed for them.

Our Corn Crop.

The corn crop is the mainstay in the feed line. A sufficient amount is put into the silo to last all the year round and the cows that are giving milk are fed twice a day the entire year. We find in this way it does not require so much pasture and besides have something on hand for an emergency which is most sure to come some time in the year, and we are satisfied we make more and better milk by feeding silage in connection with the pasture, and we prefer this kind of summer feeding to the raising of soiling crops, as it is much less labor and much quicker.

The balance of the crop is husked in the good old-fashioned way, early in the season while the stalks are in good condition, and stacked in long, narrow stacks near the barn. This is all run

through the feed cutter as we need it and everything is fed in the barn. As a rule the shredder and husker have been no improvement, because the corn has to be left out so as to get thoroughly dry, so it will be safe to pile up the corn and fodder, that the fodder is about worthless.

Reasons for Our Rotation.

We have several reasons for growing corn after clover. The clover sod is an ideal place to spread the manure, the stems of the clover prevent washing in a large measure and the roots penetrating the soil, makes it more porous, allows the liquids to enter in and prevents in a large degree the loss of the elements of fertility. Then there has been stored up in this soil through the growing of the clover that element of fertility which tends to make that immense growth of stalk and foliage that we like to see and that we need in the corn plant more than in any other grain crop. We never have too large a stand of corn provided it is the kind that will mature, then the corn absorbing and taking up a large proportion of this nitrogen, also a large amount of the elements of fertility from the manure, puts the soil in a condition better adapted to the oat crop which is next to follow. Another reason is we have less foul seeds in the clover soil and this is certainly worth considering in the cultivation, not that we mean we can get along with less cultivation, for we fully realize the necessity of often surface work for the preservation of the soil moisture. I think as a rule in the State of Wisconsin, it is not so much that we do not raise enough feed, but in taking care of what we do raise and having it in a condition to realize the most from it.

DISCUSSION.

Mr. Wallace—What kind of oats do you sow?

Mr. Scribner—We have sown White Shoenen for several years.

Mr. Wallace—What time do they ripen?

Mr. Scribner—I can't tell exactly, but as early as any oats we raise, and the straw is very stiff.

A Member—They should ripen about the same time as spring wheat, about the middle of July.

Question—Don't your clover winter kill?

Mr. Scribner—Once in a while it does. I think the greatest trouble with clover, especially in the fall, is in letting the stock run over it. We are very particular on new seeding not to allow our stock to run on it. We leave a large amount of stubble to hold the snow. I think we make a mistake in trying to get a little more pasture in this way. If we should have an extreme growth, I would turn the cattle on a little while, but not much. I would rather clip it down with the mower.

Mr. Culbertson—Do you seed with anything else but oats?

Mr. Scribner—No, that is the only grain crop we have.

Mr. Convey—Do you ever mow those oats for hay?

Mr. Scribner—Yes, and we find we have the best clover catch where we take the oats off for hay.

Mr. Wallace—How do you save the clover when you get it?

Mr. Scribner—Our plan is to cut in the afternoon what we think we can handle the next day, and the next morning go on with the tedder; if it is very heavy, shake it out and then pile it up right after dinner, and if the weather is right, let it lie there a couple of days. Make small, narrow heaps and let it cure in the heap; if the weather is safe a couple of days won't hurt anything, but you won't always dare to risk it, and perhaps we open it out the next day, air it out, and it is fit to go in.

Question—Do you use hay caps?

Mr. Scribner—No, I do not.

A Member—What troubles us is that we hardly ever know what those two days are going to be.

Mr. Scribner—You were pretty safe this year.

Mr. Wallace—If you put it up and just wilt it, a rain the first day or two won't hurt it.

Mr. Scribner—If properly heaped it makes a water shed of itself.

Mr. Wallace—If it was pretty well dried when you put it up and it got wet through, just let it stay where it is. If you ever undertake to shake it out, you will ruin it.

A Member—Did you have trouble with your timothy plant dying out in reseeding?

Mr. Scribner—No, not very often; we are more sure of the timothy than of the clover, as a rule.

Mr. Everett—Is there much object in sowing timothy for over two years' time?

Mr. Scribner—Yes, we use it for pasture the second year, and if the clover happens to kill out, we have something to fall back on the second year.

Mr. Goodrich—How many years has clover killed out in the winter seasons?

Mr. Scribner—I don't think to exceed three years in twenty-five.

Mr. Goodrich—And there has not been but one total failure in fifty-four years.

Mr. Arnold—In our part of the State we have little trouble about getting a catch of clover and keeping it through the winter, by reason of our sowing with winter grain. On this suggestion of Mr. Scribner I tried this last year. Some farmers have an idea that the richer the land the more grain you have to sow. That is all nonsense. I sowed a bushel of oats with half a bushel of wheat this year and I got more pounds of grain averaged by weight, than when I sowed two and a half bushels of oats, and being further apart there was a better catch. It is important that the plant have sunlight, which means vitality, to all kinds of life; darkness means death. How can you expect clover to grow if it is entirely shaded under a lot of oats?

Mr. Convey—Mr. Brinken, in the southern part of the State, has been experimenting in this seeding with oats, and I would like to hear from him.

Mr. Brinken—I sow part of it three bushels to the acre and part not so much. It is very seldom we are bothered with lodging. We got a good crop of clover and a big crop of oats. I cut the stubble as I can, so as to cut off the tops of the weeds and make the clover thicken out.

Mr. Scribner—We use seven pounds of medium, three pounds of alsike, and five pounds of timothy, making fifteen pounds altogether.

Mr. Wallace—I think I am able to tell what the farmers think on this subject. In central Illinois the best results are secured by sowing a bushel of oats and giving it an inch covering. In some parts of the State where they sow only a bushel of oats, the smartweed and other weeds come up and smother out both the oats and the clover, so they have to sow two bushels and a half there. When you get out to western Iowa, you have to have two inches covering, and you get to Nebraska and you had better give it more than that, so the question is one to be determined by the locality. I should say here that an inch is plenty. Last year I had a piece of land of seventy acres, forty of it bottom land, and gradually rising up to a sandy ridge. I was getting that all down to tame grass; the ridge part of it I sowed with wheat which matures the 10th of July, spring wheat; the next piece with common Blue Stem, which matures about the 15th; the next piece with Success barley and Early Champion oats and about an acre and a half on the bottom with Side oats. I had a perfect success with the Early Champion oats and with the Success barley; the next best was with the early wheat; the next with the Blue Stem, and none at all where I sowed late oats. To get a successful stand of clover, you must first have good seed. Never buy clover seed from a country merchant. You can't afford to buy anything but the best. If you have a nurse crop, get one that will cut off as quickly as possible, and I would advise you to try five bushels of Early Champion oats, which will ripen here about a week or ten days before the wheat. I would say about two bushels to the acre, one and a half anyway. You will get that out of the way ten days before your later oats, and it will give you on the average just as many bushels; it is a splendid nurse crop, but don't ever sow it on poor land. It will lie down on the richest land, but you will get clover seed every year after that. Oats require 500 pounds of water to 100 pounds of dry matter. The clover is just like a boy that has been in Chicago parting his hair in the middle, saying nice things to the ladies, and having no sun upon him, then you bring him out and put him in the harvest field and he will wilt right away. I have seen plenty of stands of oats and clover up to harvesting

time, and a week or two afterwards the clover has folded its tents like the Arabs and silently stolen away, because the hot sun being thrown on that tender plant kills it right out.

The Chairman—Will not clover seed do better with barley than with any other crop?

Mr. Scribner—It certainly does and the barley maturing so quickly, is soon off the ground.

Mr. Wallace—How do you regard Alsike clover for hay?

Mr. Scribner—I like it very much.

Mr. Goodrich—It depends on the ground.

Mr. Scribner—It grows very well with us.

Mr. Convey—I have raised Alsike clover in connection with medium clover for many years, and I think it does better than the Medium clover under favorable conditions.

Mr. Wallace—It will grow where you can't grow any other kind of clover.

Mr. Hill—I think Mr. Scribner will bear me out that we have as good success in getting a stand of clover as any farmer in our section, and we do it by keeping wheat in our rotation. We have a good wheat soil and wheat climate, and I think now the chinch bugs have left us that we can get as much out of a wheat crop as the oat crop. However that may be, we would want a clover crop, and we have been very successful in getting it in wheat. One thing more about putting hay in the cock. What are you going to do with that hay loader?

Mr. Wallace—Send him out to Iowa. Let me suggest to you, gentlemen, that you spend five dollars in getting early wheat, and you will save a week; you will get just as much wheat and a little better quality, and you will have a far better chance with your clover.

Mr. Judson—In the Fox River Valley there is a little midge or something, that kills our clover when it begins to blow. We used to raise good clover, but we cannot raise it now. I will say that I have traveled a good deal all through this country, and there seems to be no part of it where clover seems to do as well as it does around Rosendale.

Mr. Convey—They are good farmers down there.

Mr. Judson—Well, I think I have tried as hard as anybody to keep the clover up, and I have gotten about discouraged and decided that it doesn't pay me to sow clover any longer; what I would like to get is something to take the place of clover.

Mr. Wallace—You can't do it. It is the clover root worm that is troubling you, and what you want to do whenever you see the effect is to take and plow that under at once.

Mr. Judson—It doesn't seem to be in the root; it is a little, flat, small insect; it works in the seed.

The Chairman—That is the clover seed midge. Grow Mammoth clover.

Mr. Judson—I tried that and it bothers that worse than the other.

The Chairman—Then it has some new tricks. Down in our country it can't do it, and I will tell you why. The clover seed midge times itself to the two blossomings of the common red clover, but it lays its eggs in the little blossom and then it is all ready to hatch out and go through the next transformation by the time the clover gets ready to bloom again, then it is up and ready, but if you sow Mammoth clover, that comes three weeks later, and it will not be troubled with the midge. By the time that is ready for business the clover midge is out of business.

Mr. Judson—Do they affect Alsike too?

Mr. Goodrich—No, they don't. Can't you fix the Medium clover by cutting it off very early, or pasturing it off so that the blossom will come at the right time?

Mr. Wallace—I found a fellow out in Nebraska, at Aurora, that had been breeding bees for a long time. He says the bees will fertilize the common red clover and the Mammoth, and he has lengthened the tongues of his bees out about a quarter. Now, that is going to be a wonderful help to our clover business. Last spring a gentleman sent me a sample of clover and a sample of bees from Illinois, and I sent for others and sent for some more bees; then I sent some to Madison, some to Washington, and all over Iowa, to the different Universities. They thought I was a crank out there, crazy. I found out that your man down here didn't know anything about it, and he sent it to Washington to the Boss Bug-

ger of the country; from him I learned that it was a wood bee that breeds in timber that fertilized that clover. I am going to have a hive of bees this year. I have seen my Italian bees around the clover many times. One thing is sure, if you don't get Italian bees you won't have any fertilizing.

Question—Do you sow your clover seed ahead of the drill or after?

Mr. Scribner—Immediately after. We roll immediately and then harrow, about as shallow as we possibly can. I think we get the best results in covering clover about the depth of an inch or three-quarters of an inch.

Question—When is the proper time to cut clover?

Mr. Scribner—Before the blossoms are entirely out. Don't wait until it gets into that woody stage about the time the little blossom is brown. I think one of the secrets of getting a good clover catch with us, is because we can work our soil very quick in the spring. We are not afraid of our soil running together and becoming baked, and we can get on it as quickly as a team can stand it to travel. I notice all the grain we get in early is the best grain. By changing year after year and growing clover, we find a better condition of soil.

Question—What is your yield?

Mr. Scribner—We get about sixty-five bushels to the acre, that is, machine measure, that weighs out more, a lot more because it is very heavy oats.

Mr. Convey—What is the better way to plant corn, to hill it or drill it?

Mr. Scribner—I plant mine in hills, perhaps I have not got to the latest improved methods, but if I can't keep my corn clean I won't raise it at all. I don't want to do any hand work with it, so I plant in hills; it is pretty near in drills, it is three and a half feet one way and three the other way, and that makes it pretty close together. We can keep it clean by going through it one way with a single cultivator and the other way with a double cultivator.

Mr. Wallace—Have you ever figured what per cent. of barren stalks are in your ground?

Mr. Scribner—No, I never have.

Mr. Wallace—Would you be surprised if I should tell you that you get 25 per cent.?

Mr. Scribner—Yes, I should be surprised.

Mr. Wallace—You count them next year and you will probably find more.

Mr. Scribner—I doubt it very much.

The Chairman—Mr. Hill lives right there and he has counted them. He says it is not over five per cent. Remember this is Wisconsin.

Mr. Wallace—A professor of the Illinois college sent out letters to three boys in each of the counties of the State and asked them to go into the corn fields and count three feet square, the per cent. of barren stalks; they reported thirty-two in the State of Illinois.

The Chairman—How much seed did they put in the hill?

Mr. Wallace—About three stalks. There were 30 per cent. barren stalks that had no ears on.

Supt. McKerrow—I think that can be explained. That was in the State of Illinois, where they do not rotate their crops, but they grow corn after corn. In this State we rotate our crops and grow corn after clover.

Mr. Hill—Our average yield of corn in Wisconsin is way above Illinois.

Mr. Taylor—Would there be less barren stalks if you plant in drills?

Mr. Wallace—I don't believe barren stalks grow out of the fact of thick or thin planting. I believe that the cause of it is the fact that the corn has not evolved yet; corn used to grow above the ground and the stalk on the tassel, then it changed its mind and concluded to grow corn on the cob, and some of it hasn't got clear out of the notion of growing on the tassel, so we want to cut out those barren stalks, so they won't spoil the rest and get them to producing barren stalks. Some stalks may be weak, they haven't strength to produce an ear; some may be too crowded, but I do believe that the Illinois men are right when they say that the cause of barren stalks is insufficient evolution.

LAND RENTS.

HENRY WALLACE, Des Moines, Iowa.

Few if any who have not given the subject especial attention are at all aware of the rapidity with which the farm lands of the West, and especially those adapted to corn growing, are passing into the hands of landlords. The census of 1900 will in due time give us the full statistics, and they will surprise the general public as well as the political economist. A few weeks since I attended an Institute at Charleston, Illinois, which was mostly composed of landlords; and I was told, as an illustration of the extent of landlordism in that most fertile section, that on the plankroad leading north from that town there were in the first twelve miles but two farmers living on and cultivating their own farms. One farm on each side of the road in twelve miles! At Bloomington, Illinois, a few weeks later I was told that two-thirds of the land in McLain County was rented, and that two-thirds of the inhabitants of that beautiful city were retired farmers and their families. At Audubon, in one of the comparatively new counties of Iowa, I found an entire township in which there were but two men who cultivated their own farms. To a remarkable and increasing extent the same conditions prevail in the four counties I have visited in Institute work in the young State of Nebraska.

Why Some Farms Are Rented.

In Iowa and to some extent in Illinois and Nebraska, especially in the dairy sections, this landlordism is of the patriarchal, or paternal type. The owner of the land purchased it at a few dollars per acre and spent thirty years of his life in improving it and in milking cows, feeding hogs and cattle; and having laid up a handsome sum in the bank, thinks he has worked long enough and rents to son or son-in-law and moves to town "to enable his wife to go to church and to obtain better school privileges for his younger children." The result is a decline in school population, with hundreds of schools in each State with an attendance of ten or less pupils in each, and with hundreds of other schools idle during the winter. There were five idle schools in each of two Iowa counties I recently visited; and in one county, Floyd, a school with but two scholars and in another county, Audubon, a school conducted for a year with but one.

Where this paternal landlordism exists there is as yet but little complaint of the loss of land fertility, but where the landlord is a speculator and rents his land until he can sell it, or an investor and holds the land solely for rents, the complaint of the loss of fertility is as general and widespread as this sort of landlordism, whether it comes from Minnesota, Iowa, Nebraska, or Illinois.

Damaging Influence.

Co-extensive with this latter sort of landlordism there is a manifest lowering of both the standard of living, of intelligence, and of manhood in the tenant class, and for this reason the subject of land rents and the principles underlying it becomes a question of state-wide and nation-wide importance, involving, as it does, not merely the financial interests of the landlord and the tenant, but the enduring prosperity of agriculture and the position of the farming class in State and National affairs. I have, therefore, chosen the words "land rents" as a subject around which I could group a number of thoughts which I think the good of agriculture and of the nation requires to be uttered, and uttered now, and to which I solicit your undivided attention.

I shall not trouble you with theories about rent, what Ricardo, or John Stewart Mill, or Henry George said about it; but deal with the subject in a plain, common-sense way which always appeals to plain, common-sense people. By land rent I mean the price paid in cash, or grain, for a year or term of years, for the use of agricultural land. I say agricultural land, for the rent of farms differs in at least two important respects from any other kind or sort of rent. First, the amount of

land to be rented in any locality is limited. There is yet in the wide domain of this continent very much land to be possessed; but nearly all of it differs so greatly in climate, through latitude and longitude and rainfall, that the farmer to be successful must adopt entirely new methods and practically lose the experience which has furnished a large part of his capital heretofore. In these great corn and grass States of the Middle West the land has all been taken up, and no more can be added.

"Rack Rent."

On the other hand, there is no limit to the number of houses, stores and factories that can be built. Hence it is impossible that rents of this class can ever be permanently either too high or too low. A possible unlimited supply will always meet any possible demand. There will never, for any length of time, be two tenants for every store; but the time will soon come when there will be two tenants for every piece of land.

Land rents differ from all others in another very important respect: namely, that while the tenant of stores and factories will never put in more than he can take with him when he moves and will always take out what he puts in, the good farmer can never take with him what he has put into the land; and the bad farmer can and will always take out more than he has put in. Because of these radical differences between land rent and other rents there is a world-wide tendency on the part of landlords to exact rack rents, or a higher rent than the productive capacity of the land will justify.

An Illustration.

Let us, bearing these distinctions in mind, imagine a concrete case and see how rack-rent comes in in any long-settled country like this. I do not know what is the fair rent of land in this State, but for illustration will say $600 per quarter section. We can imagine an average farm leased to a good tenant for a term of years for that price. He has kept up the multitudinous repairs on the farm, has gathered stock about him, fed the principal part of the grain and forage of the farm, and hauled out the manure. The lease has expired and he would like to renew it for another term of years at a fair rate. A soil robber, with a family of husky boys, comes along, looks it over, goes to the landlord and offers $800 per year for the quarter. The landlord is delighted and concludes that prosperity has visited the land for sure; that the lines have "fallen to him in pleasant places," and that he has, indeed, "a goodly heritage;" but he don't like to part with the old tenant, whom we will call Jones. However, he tells Jones of the offer and regrets that his "duty to his family" and himself requires him to accept it. He says a whole lot of nice things about Mr. Jones, Mrs. Jones and the little Joneses, would rent to him cheaper than anyone else, and "being as it is you, I will renew the lease for $750." Mr. Jones talks it over with Mrs. Jones, and the Joneses in general, and finally concludes that he will lose in the breaking up of his plans and otherwise at least $200, perhaps $400, and concludes that he will pay the higher rent, work a little harder, and trust to good times and better luck. The word goes out that Smith, the landlord, has rented Jones his quarter for $750, and every landlord at once puts up the price and figures with great satisfaction that a quarter which will rent for $150 more than formerly is worth at least $2000 more in actual value.

But if Smith, the landlord, has had some pleasant sensations and counts himself richer, Jones, the tenant, has had sensations of a different character. He feels that Smith has taken advantage of his necessities, of the fact that he cannot move without serious loss. His attitude gradually becomes quite different. He now regards his lease as rack-rent and permission to get out of the land all he can. He suspects, in fact knows, that at the end of this lease a similar advantage will be taken, that the screws will be turned once more, and that his rent will be advanced as nearly as possible to the point that he will stand without quite driving him away. Smith, the landlord, has got it out of him, and Jones, the tenant, will get it out of the land if he possibly can. In your hearts, landlords, do you blame him? I certainly do not. If you have

granted him for a good price the right to the pound of flesh, why should he not take it though it takes the very life out of your land? Substantially, this is the history of rack-rents in every agricultural country in the world after that country has once been fully occupied.

Bad Results Follow.

What follows next? Impoverished land, impoverished tenants, impoverished landlords, a bitter feeling between landlords and tenants, a lower grade of tenants, until farming ceases to be respectable and the farm boy, disgusted with his father's calling and embittered against landlords as a class, flees for refuge to the city with all its allurements and temptations. The whole country puts on mourning in the shape of unpainted houses, dilapidated barns and fences, no live stock with the exception of the tired farm horse, the family cow and a few hogs; and it is regarded as an inhospitable country, fit only for "the man with the hoe."

History of Rents.

The beginning of the downfall of the kingdoms of Judea and Israel was the accumulation of large estates in violation of the Mosaic law, which made the land the inalienable property of the original family. The accumulation of large landed estates and the oppression of the peasants was one of the prime causes of the French Revolution. Ireland furnishes a striking example of rack-rents and the remedy. My ancestors in 1680 rented land at a mere nominal figure, making all the improvements, including roads. In the next 150 years rents rose to thirty shillings per acre, until the government was compelled to establish land courts which reduced the rent to twenty shillings. Then followed the Land Purchase Act, under which the landlord may sell the fee for twenty years' rent, the British Government paying him in the lump sum and giving the tenant forty-nine years to pay out. Now the proposition is to force all landlords to sell at seventeen years' rent on the same terms. In other words, the practice of rack-renting, growing out of the fact that the land was limited and the tenants limitless, and the further fact that the tenant could better afford at the time to pay the rack-rent than to move, has compelled the government to extinguish rack-renting by treating the land as a monopoly and fixing the price, both of the annual rent and the land itself. Similar legislation, though less drastic, may be found on the statute books of all old nations. Unless there is a better understanding than now prevails of the principles underlying land rent, it will in due time be necessary for this government to adopt similar measures if agriculture is to enjoy permanent and abiding prosperity.

How Rents are Determined.

What determines equitable and just rental values? Many things. Location with respect to market, transportation, temperature, rainfall, society, school and church privileges, all have their weight. These are all now mainly determined in the Mississippi Valley and will change but little in coming years. The two remaining factors are the available fertility of the land and the skill and integrity of the men who actually till it, and of these the last should be first. I can get more rent out of a second-class farm cultivated by a first-class tenant than out of a first-class farm cultivated by a second-class tenant. In farming, as in anything else, the man that has the best brain and the highest skill can afford to pay the highest rent for land or anything else.

Duty of Landlords.

If landlordism is to be permanently prosperous, landlords must adopt some method of renting lands that will maintain and increase the fertility of the soil and increase the skill and integrity of the tenant. I speak of landlordism as inevitable, for whether it be right or wrong, good policy or bad, in the next twenty-five years landlordism will increase and landlords will own the great bulk of the corn lands of the Mississippi Valley. The maintenance of the fertility of the soil involves some system of renting that will carefully protect the rights of the three parties to every just lease, the landlord, the tenant, and the land. A lease that does not recognize and protect the rights of all three parties is in

violation, not only of the equities between man and man, but the laws of Almighty God. Both the landlord and the renter die, but the land itself remains and represents the rights of unborn generations. The great Maker of the universe did not give this land exclusively to any one generation of men, much less to this generation who have had the privilege of pocketing the unearned increment, or the increase of land value through the settlement of the country, and then selling out or retiring to town, and patting their pocketbooks under the conviction that they have made money, and wondering why their sons or sons-in-law can't make money as fast as they did. Why, you miserable old duffer, you have not created values, but have pocketed unearned increment, while your tenant is "up against the real thing" in that he has to create values, to coin, from the sunshine, the raindrop, and the present available fertility of the soil, the actual stuff that feeds the world.

The Divine Method.

It is one of the peculiarities of the Divine government in this world that, when land is abused, it locks up fertility, keeping it in store for future generations of good farmers. It allows the man who tills the land from year to year to realize only a small per cent. of the potash, the phosphoric acid, and the nitrogen, the three great elements of fertility which the chemist can find in the soil. It is for this reason that it is not in the power of man to utterly, or nearly, exhaust any good soil of its actual fertility. The Lord lets him go about so far and then locks up the rest until the land spues out tenant and landlord, as the promised land spued out the Canaanites (for in this the ten spies told the truth), and as the prophet told the children of Israel later that the land itself should spue them out. Even so have the lands of Wisconsin, Illinois, and Iowa spued out the grain raiser and sent him across the Missouri; and they will eventually spue out that much greater sinner, the investing landlord, who extorts rack-rents and fails to provide either for the increased fertility of the land or the increased skill and integrity of the tenant.

About Leases.

It would carry me far from my present purpose to enter into details as to how leases should be drawn up that will maintain and increase the fertility of the land. It may perhaps be wise to suggest one or two points. It would involve a study of the methods which the Almighty himself has followed for thousands of years, ever since rock was converted into soil, and during which He has been growing in His large farming operations food for the fowls of the air and the beasts of the field. The Lord evidently does not consider the farm as a bank, but rather as a factory, of which the raw material is the rain, the sunshine, the electric currents, and the potash and phosphoric acids in the soil. The first three are all the gifts of God, given or withheld in such measure as suits Infinite Wisdom; the last given once for all in the composition of the rock elements of the soil.

The Lord has been using this factory for thousands of years to create food for the wild beasts and "creeping things and the fowls of the air," and He has turned it over to you to continue His operations and create food for the hungry nations. You have erected buildings for your family and your live stock, have fenced the farm off from other farms, have opened it up with the plow; and whether you propose to run the farm yourself or rent it to a tenant, you would do well to notice the suggestions which the Lord has given you in His practice as to how to run it to the best advantage. You will thus learn more about farming than all the professors, all the books, and all the agricultural papers and Institute lecturers in the world can tell you. At most, they can only point out the Divine method.

The Lord's Plan.

If you observe closely, you will notice that in addition to the actual mineral fertility of the rock, He keeps on hand constantly an amount of available fertility in the shape of potash and phosphoric acid which He has weathered out of the rocks by means of water, frost, heat, and the acids of plant roots. This is His stock in hand. He keeps also on hand, after the manner

of the thrifty housewife, who always has yeast in store, a large amount of partially decomposed vegetable matter, which we call humus. The uses of this are manifold; it is a storage basin for water, soaking it up like myriads of little sponges in a wet time and giving it out slowly to the plants in a dry time. It is a reservoir of nitrogen without which not a muscle or a drop of blood of man or beast can be formed. It is also a divisor to keep the rock particles, constituting by far the major part of the soil, apart and thus facilitate the growth and development of plant roots, and it also stores up heat for the use of plants. In His farming operations, the Lord always keeps a stock of humus on hand, manufacturing it out of dead grass on the prairies, falling leaves in the forest, and the decay of roots in both. The more of these elements in hand in due proportion, the greater the capacity of the farm factory and the greater its rental value.

If you are complaining of impoverished land, of land that washes in a wet time and bakes in a dry time, that will not grow clover as it used to do, know to a surety that you have departed from the right farming ways of the Lord of the Harvest. You will notice if you study the Divine methods that He has made large use of legumes in order to keep up the ever-wasting and vanishing supply of nitrogen. Further, under Western conditions this can be done only by adopting some kind of stock farming. You must have legumes to furnish the supply of nitrogen for your soil and to keep up the supply of humus, through which alone the inherent fertility of the land can be made available. This ought not to be a difficult matter with Wisconsin farmers. The fact that population moves westward on isothermal lines has made Wisconsin the heir to thrift, energy, and untiring industry; has filled it with a population that does not abandon dairying, as do the farmers of central Illinois, when they are about nine months old. It is this fact that explains the mighty contrast to the surprised traveler between Wisconsin, northern Illinois, northern Iowa, and southern Minnesota, and the far richer lands of central Illinois and southern Iowa. The first mentioned blooms like the "garden of the Lord, the land of Egypt as thou comest unto Zoar," and the last, especially in central Illinois, is fast taking on the outward appearance of what the Scotchman calls a "widdie's farm."

Give the Tenant a Chance.

But if these northern and apparently more prosperous sections are to maintain their prosperity, they must, and by every means in their power, increase the skill, integrity and standard of living of the tenants that cultivate these lands. Every decade with its improvements and sharper competition requires a higher measure of skill and a higher standard of integrity on the part of those who do the actual tilling of the soil, or participate in its management. How to get hold of the tenant, the hired man, how to impress upon their minds that a man without skill, no matter what his physical ability, must go to the wall and become a mere "hewer of wood and drawer of water," is one of the problems which now confronts every man who has the good of agriculture at heart.

Let me suggest in the first place that you must give the tenant a chance. You must not exact rack-rents, or all that his necessities may compel him to pay. You must not take advantage of the fact that a good tenant cannot take with him all that he has put in the land. If you do, you will learn by and by that long ages before it was inscribed in the Holy Writ it was written in the very constitution of this world, "Your sins will find you out;" "the way of the transgressor is hard;" "though hand joined with hand, the wicked shall not go unpunished." If your land mourns by buildings falling into decay, by scant crops, by clay spots appearing on the hillsides, know of a surety that the words of the ancient prophet are being fulfilled: "The land mourneth for the wickedness of them that dwell therein." Give the tenant a chance. Exact fair rents, not rack-rents.

Co-operation.

You must do more than this; you must work with him; not by putting your hand to the plow, but by helping him with that head-work without which mere hand work is the drudgery

of the slave. You can only increase his efficiency to pay higher and higher rents by persuading him to become a close observer and student of agriculture, and the best method of persuading him is by doing that yourself.

Again, there is a disposition on the part of many tenants to suspect that because they are tenants they are regarded by the landlord as "only a tenant;" that is, that the station in life of the tenant is below that of the landlord, a notion which, I suppose, like so many other false notions, should be labeled "imported," and imported from countries where such class distinctions actually exist. A suspicion of this kind should not be tolerated for a moment. The tenant may be, and often is, greatly inferior to the landlord in intelligence, integrity and executive ability; and again the very reverse may be, and often is, the case. Such a suspicion is not tolerated for a moment in the city where many of the larger enterprises are carried on in rented property and a large per cent. of the well-to-do live in rented houses. It is not wealth that makes the man. "Worth makes the man, and want of it, the fellow." The sooner both landlords and tenants realize that the man is neither socially the better or worse for being either landlord or tenant, the sooner one of the difficulties of making the farm pay higher and still higher rent will be removed.

Charge the tenant a fair rent for a short term, with the assurance that it will be extended from time to time at fair prices as long as the relation is satisfactory to both parties. Give the assurance, not by word but by act, that the tenant is not regarded as a mere "hewer of wood and drawer of water," a servant to do the landlord's bidding, and the way is open for his education in agricultural lines, without which no permanent advance in rents proportionate to the selling value is possible.

A Good Agricultural Paper.

How is this to be done? There is no better way for the landlord to increase the actual rental value of his farm than by persuading the tenant to subscribe for a first-class agricultural paper, the teachings of which are peculiarly adapted to the soil, climate and conditions of the country in which he farms. If the tenant will not subscribe, you had better make his lease a short one and in the meantime subscribe for him yourself, and spend a cent each week in sending him a postal card that will call his attention to articles worthy of his special attention. No breeder of live stock should be without the Breeder's Gazette. No dairy farmer should be without Hoard's Dairyman. No up-to-date farmer should be without two or three of the best up-to-date agricultural papers adapted to the wants of his section that can be found in the United States. If after trial he should decide that one of these is Wallace's Farmer, he might fairly be considered a wise man. You ought by all means to support your own paper, the Wisconsin Agriculturist.

Subscription to papers of this class is a recognition that in the opinion of the subscriber modern farming is not a mere matter of brute force, of hard knocks, of pure strength and awkwardness. It shows that the man has cut loose from the tradition of "father did so and so," and realizes that the really effective work of farming is a good mixture of brain work and hand work, the brain guiding the hand. An agricultural library will soon follow, with the reports of the Agricultural Experiment Station and the annual Institute report of his State and adjoining States.

The Results of Awakening.

It is not difficult to get the farmer who is thus awakened and has an appetite for agricultural knowledge, "know-how," to attend Institutes where he comes in personal touch with other farmers of like development; in touch, also, with the landlords whose eyes are open, and he begins to absorb the enthusiasm which characterizes all really first-class farmers, whether they live on the farm or have their investments in agricultural enterprises. He realizes the truth of the lamentation of the old prophet, "My people are destroyed for lack of knowledge." He is lifted out of the rut and begins to see something of the grandeur and glory, as well as the difficulties and disappointments, of that business which more directly than any other

deals with the great forces of Nature. He magnifies his office and regards himself as no longer a drudge, a "man with a hoe," but a co-worker with God Himself in feeding the hungry and clothing the naked nations. He does not regard himself as an Ishmaelite, his hand against every man, and every man's hand against him, but a man amongst men, with the respect and confidence of every other man who believes in good farming, clear thinking, and right living. He sees the great possibilities in farming, sees, if he is a tenant, that his real interests are identical with those of his landlord; that they are in fact, if not in name, partners, and are making the farm increasingly profitable to both.

He sees, whether he be tenant or owner, where it is possible to stop the terrific waste going on on farms every year through lack of knowledge of the capacities of the farm or of the mighty forces with which he is operating. He becomes, instead of a drudge, the manager of the farm factory and with his skill in management will give the owner of the factory a larger income or rent, whether he rents it for cash or works it on the shares; and his increased ability will justify him in paying a higher rent.

Brain and Brawn.

In this day and age of the world it is not the pure brain worker that commands the highest wages, much less the man who has nothing else but his strength to sell in the market; but it is the man who combines brain work with hand work, who understands men and things and has the capacity 'to bring things to pass." The world over, the more intelligent the worker, the higher average price he receives. The man who has the "know-how" does not compete with the machine; he guides it. The man who has not the "know-how," no matter what physical strength he may have, is the man foreordained by present conditions to scratch a poor man's head as long as he lives.

The more thoroughly I study this subject of rent, the relations of landlord and tenant, the necessity both of increasing the fertility of the soil and the ability of the man who tills it, the more overwhelming its importance becomes. It is not merely a matter of dollars and cents, not a mere question of economics; it is vitally related to the welfare of our country at large, a matter of patriotism as well as dollars. For as this civilization moves onward in the pathway of its manifest destiny, the proportion of farmers to the total population will certainly continue to decline. Cities, with their corrupt governments, will increase in population even more rapidly than in the past. The only thing that will preserve civil liberty in the city is the influx from the farms and the towns where the farm sentiment molds public life.

The Ideal Farmer.

The farm is the breeding place of men as well as of live stock, and if we send to the cities ill-bred boys and girls, with low intelligence, mere drudges, embittered by a sense of wrong, we but add to the pessimism and discontent which even now is the greatest menace both to the city and to the Republic. If, on the other hand, our farmers, whether landlords or tenants, cherish the exalted ideals of our forefathers, if the spirit of the country home, the country church, the rural school, is preserved and intensified, we not only pour life-giving streams into the great marts of trade, but we develop on the farm that exalted character which fits the farmer to act as umpire between the ever-warring forces of labor and capital; an umpire, who, combining in himself both the capitalist and the laborer, can, like the "daysman" that Job longed for, lay his hand upon both.

If this nation is to fulfill its glorious mission among the nations of the earth it must rear on its farms a race of broad-browed, clear-thinking men; the stay of the nation in time of peace, its strength in time of war; a race more invincible than Cromwell's Ironsides, mightier by far than Caesar's legions; a class of men who can hold the balance true when other classes lose their heads.

Much Depends Upon Rent.

We are near the parting of the ways. It is possible for these great States of the Middle West to be not only the granary of the nations, but by reason

of their thrift, intelligence and patriotism, and their ability to take broad views of all public questions, to be the arbiter of the destiny of this nation. And again, it is possible for these soils, teeming with the stored wealth of ages, to become so impoverished by bad farming that they will give a scant and grudging return to the unintelligent toil of men who will naturally be regarded by other classes as mere "hewers of wood and drawers of water," fair game for every adventurer and the prey of every plunderer. Whether the one or the other, whether these broad prairies shall flourish as the garden of the Lord, or whether in due time they will be abandoned by their owners and tenants, as other lands have been, depends largely on the equities of the customary rent.

THE HORSE.

SUPT. GEO. McKERROW, Madison, Wis.

Mr. Chairman and Gentlemen:—Some of my friends have said to me during the past six or seven years, when they have read the programs of the Wisconsin Institutes and have noted upon those programs the subject of "The Horse," "You are making a mistake, there is no money in horses," but we kept talking horse all the time. I am no prophet, nor the son of a prophet, but I felt sure of this, that the horse would again be valuable, be high in price, and we have already reached that point when it takes no prophet to see high prices very close to us, if not here.

High Prices at Hand.

The first week in last December I had the privilege of seeing three draft teams sold in the city of Chicago, at a thousand dollars a pair, the highest price ever made in that, the greatest horse market of the world, by three draft teams in a single week, so you see we have high prices already. I am here to say that I believe that within five years at the outside, we will see the highest prices for good horses that this country has ever seen. Now I presume I ought to give you some reasons for this belief.

As I travel over the State of Wisconsin and see the horses that come into the towns from the farm, and also see the horses upon the farms, and as I travel in other States and over in Canada, I find that the most of the horses that are doing the hard work in America are aged horses, and why? A few years ago when horses were very cheap, money was very hard to get and farmers who had horses for sale sold such horses as would sell, invariably the best horses that they had on their farms. These horses found their way Eastward to Chicago and other markets, but many of them were bought by exporters and have gone across the water. The farmers of Wisconsin and the other Northwestern States are now horse buyers; instead of shipping horses out of Wisconsin today we are shipping them in, and hundreds of horses will be sold in this State within the year that will close next June.

What the Market Demands.

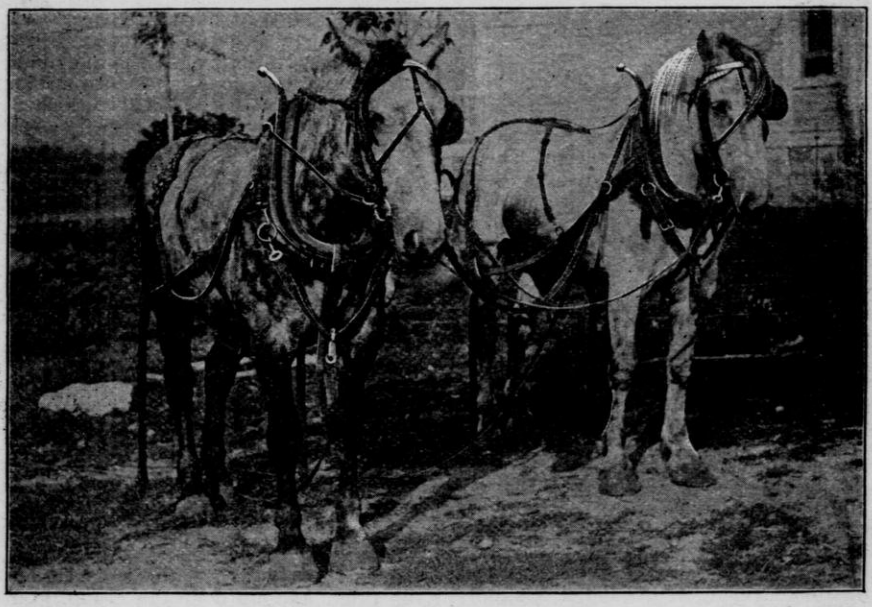
What shall we do to get some of the profits of the high horse market? Those of us who have good stock should endeavor to supply this market, and for a few minutes this morning we will look briefly to what this market demands.

In making awards to the teams that were shown here yesterday, I was placed in a dilemma. The award read "Prize for best farm team." I asked the gentleman who represented the committee out on the street how I should interpret that, and he said, "Just as you please." My idea of a good farm team and your idea of a good farm team might differ in weight, in conformation, in style, in finish. Therefore being placed upon my own responsibility, I had to follow out my idea of a farm team. I am not here

to-day to discuss the question of what you shall use upon your farm; you may like a 1200-pound horse or you may like a pair weighing thirteen or fourteen hundred pounds each, and some want them heavier than that. Some of you gentlemen in this audience may prefer a very fast horse, so that when you take your best girl riding you can go right along, while some of you prefer a very slow one. My best girl preferred a very fast one, and I took that as an indication that I was ahead in the race.

grown to the size I have mentioned, being from 1200 to 1500 pounds.

The market also pays well for coach horses standing 15½ to 16½ hands high, weighing 1200 to 1300, with a good smooth conformation and a good disposition. The market also demands a heavy road horse standing 15 to 16 hands high and weighing 1100 to 1300 pounds, that is able to take a good strong road wagon on fair roads, or even with a little mud, a three or four minute gait; if that gait is the right kind, and if he has the right kind of



First Prize Draft Team of Percheron Geldings, at Wisconsin State Fair, 1900 and 1901. Owned by Geo. McKerrow & Sons, Sussex, Wis.

The market to-day calls for heavy draft horses, weighing 1600 pounds and upwards. The market pays very well for what is known throughout our country as an expresser, weighing 1300 to 1500 pounds, with a good deal of style and finish, slightly drafty, but not quite as chunky as we would expect a horse to be that we would apply the term "draft" to. The market is also taking farm chunks of a little smaller grade at fair prices. These horses are of a drafty type, but not

conformation and development, he will sell well.

As to the trotter, we will not stop to discuss him. Of course the trotter or the pacer that gets down to a two-minute gait will sell, but on the average we farmers are not the fellows to handle that horse; at least many of my friends have found the profit on the wrong side of the ledger, when they have figured on this class of horses, and for that reason we will not talk about them at this time.

Essential Points.

We have here on one of our charts an illustration of a draft horse. We will not particularly discuss this draft horse, but I will state that all classes of horses should show several essential things in their make-up. Constitutional vigor is something that we must look for in all classes or types of horses. A proper conformation appropriate to the business that they are intended for is also another essential.

Soundness is very important. Action of the true mechanical kind must be found in all types of horses to make them valuable, and a good disposition is just as necessary and essential to get the best out of a horse as it is with a man.

The quality which rests upon all these points is something that brings money in the market and serves you best on your farm or on the road. We will briefly discuss these various points that I have named.

Constitutional Vigor.

First, in regard to the constitutional vigor of the horse, how can we determine it? Largely by the outside appearance. He must have a large heart girth, a good chest development. In the road types of horses we get that chest developemnt by depth of shoulder and chest rather than by width, while in the drafty types, we get it in the width of chest and width through the heart. We determine it by the size and brightness of the eye; to some extent, by the largeness of the nostrils, by the softness and silkiness of skin and hair, because you know that the outside covering of the horse is simply a continuation of the inside membrane or covering, and if we find the outside covering in a healthy condition we may conclude that the inside coverings are also in a healthy condition, that that horse is able to digest and assimilate his food to the best advantage, and that he is a good feeder and possessed of good constitutional vigor.

Conformation.

Now, as to the conformation of the horse. If he is a draft horse, beginning at his feet, and that is where we should begin with all classes of horses, he should have a high, strong heel, a perfectly-shaped foot for the particular class of horse that we are investigating. He should have properly sloped pasterns. A horse that is too straight in his pastern jars himself and gets all the concussion of the road. We find five horses too straight in the pasterns to one that is too sloping and springy; at least that is my experience and observation.

We want a clean, flat bone, as we term it, although the bones are not flat, but to the outside appearance they should appear flat, and we want a good quality of bone in all classes of horses, and the quality of bone, you may say, is very hard to determine. I have seen a horse's cannon bone sawed through that was so porous that I wondered how it did its work while the animal was living. How can we judge the quality of bone? By the outside covering, the skin and the hair. If this outside covering is soft, pliable and silky, free from thickness and scurviness, we may conclude that there is a good quality of bone beneath it, and in all cases where I have seen bones from under such covering sawed this has been true.

The good, flat knee, the muscular arm, the full muscular shoulder, the good hock, are all important points in the horse; the joint that has to stand the most strain, either at speed or at hard work, is the hock. It should be wide from point to point, from front to rear, but not so wide the other way. It should be clean, flat, flinty and free from all defects, and of course, free from all bony exuberances or soft puffs.

Then they should be well muscled on the thigh and up over the croup, and especially strong at the loin, which is another important point in your horse. Now, I like a horse comparatively short from the top of his shoulder to the top of his hip, but rather long on his top line from the point of the shoulder to the tail, but I want him short in the back, part of the length being made by some slope in the shoulder. Of course that slope varies according to the kind of horse. I want part of the length to be in a good long hip, but I must have the short back every time.

Then you want a well-finished horse, be it a draft horse or a road horse.

We want a neck well set up on the shoulders, as clean in the throttle as you can have it for the particular type of horse you are dealing with. If he is a thick, muscular draft horse, you must not expect to get him as clean as a thoroughbred or trotter, because his general conformation is different. He should be finished off with a fairly fine head and always wide between the eyes.

Soundness.

The soundness of a horse is something we must certainly consider. We must examine his pasterns and see that he is free from side bones and ring bones. We must examine the inside of the leg as a rule, to find that there is an absence of splints. There are certain classes of splints that are not so detrimental to the usefulness of the horse, but they are detrimental in the market. We must examine this hock very carefully. It must be clean and strong, and if there is any chance for any condition of the joint that indictates it may be easily strained, we want to avoid it. If these excrescences are already thrown out, certainly it is unsound.

To examine a horse for the condition of his wind, it is necessary quite often to put him under pretty rapid exertion for a short distance, at least; then, by watching his flanks and his nostrils, and by putting your ear quickly to his chest and his throttle, you can determine in regard to his wind. When you hear a wheezing sound in those lungs, or a whistling sound in his windpipe, you may make up your mind that there is something there that isn't just right.

Of course good eyes are essential, and I presume we all know enough to look at them.

Action.

Action is an essential, both in the draft horse and the road horse, but it means two different classes of action. The draft horse must have a good walking gait, and as part of his action, a true mechanical gait, so that as you stand in front of him and see him come toward you, his legs move in line so there is no waste action, or throwing out of the feet. As you stand beside him you want to see him flex the knees and hocks properly; he won't get them up like a coacher, but still he should have a certain amount of springy action in the knee and hock.

He should not have the sloping shoulder of the trotter, but he should have slope enough in his shoulder so that his neck will be pretty well set up on his shoulders, and so he can get his feet out far enough ahead that he may be a good walker. A perpendicular shoulder is a good draft shoulder, but a horse with a perfectly perpendicular shoulder, as a rule, will have his neck straight out from that shoulder, and his head will be carried a little down; he will never be a first-class walker, because he cannot get his feet far enough ahead with that kind of a shoulder. The draft horse should have a good, strong gait at the trot also.

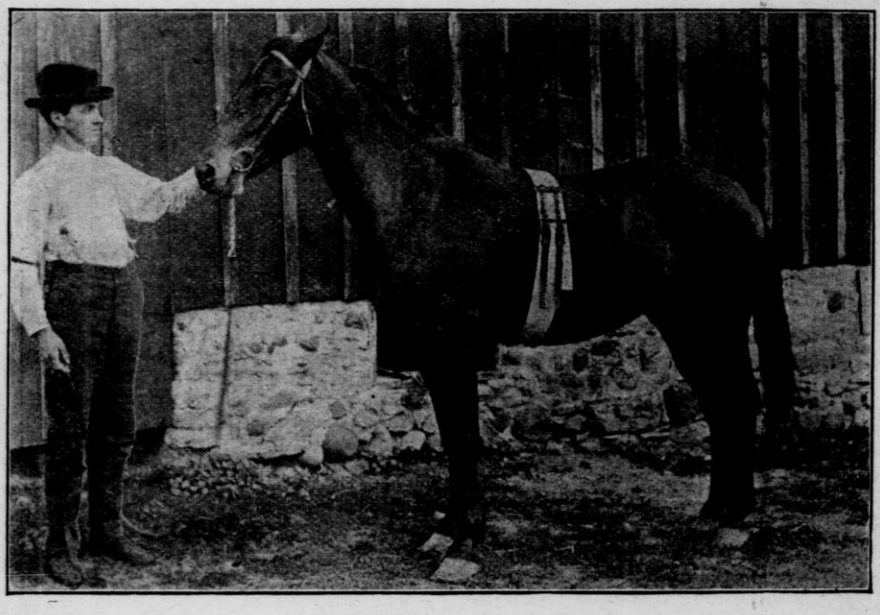
Of course when you get to the coach horse, then the better he flexes the hock and knee the more he has of it, providing he flexes them the right way the more valuable he is. He should have that same straight, mechanical gait as he goes from or toward you, as the road or draft horse not as fast as the one or with as strong propelling action as the other.

One thing we should have in both the coach and the draft horse, and that is, not to go too wide in the hocks; throwing their hocks out is objectionable. When put to heavy work that class of horses will spring those hocks out more and more, and never are as powerful horses as those that carry their hocks true in line.

Disposition.

The disposition of the horse is an important point, as I have already said. No matter how good a horse you may have, if it has a bad disposition so that it is uncontrollable, it is no good to you. The disposition of a horse is bred in him; he may have behind him long generations of heredity that has had meanness in it, and it will crop out, but a good deal of the disposition of the horse is a matter of development by the people who handle him and educate him, and in the education of a horse we should pay particular attention to a study of his disposition, just the same as the teacher in the schoolroom must use a great deal of tact and judgment in studying

the disposition of her pupil. You cannot educate all horses the same way and have them come out alike. But, as a rule, the disposition that we want in the horse, as we look at him, can be determined from outside appearance. When you see a large eye, well set out on the side of the head, as it were, with a great width between those eyes, and well-developed forehead, carried up smooth and full to the ears, when that eye plays nicely, not with a jerky motion, and not too slow and sluggish, and when the ears also play with a nice, lively motion back and forth as much as to say, "I am here to hear all I can, not for the purpose of being frightened at sounds, but simply to get acquainted with you," then you can say to yourself that this horse probably has a good disposition and can be educated. You can also judge by the action of the animal. The horse that goes off with a jerk, and has a jerky motion of the ear and eye, is a horse to be watched at all times.



PRIZE WINNING 3-YEAR OLD HACKNEY-MORGAN COLT, "DEWEY." OWNED BY GEO. MCKERROW & SONS, SUSSEX, WIS.

Quality.

Now, the quality of the horse, and that runs all through the animals make up, the quality of his bone, the general conformation, his muscle, his action, his gait, his style, and his disposition, all have something to do with it; if everything of that kind is right, and he is smooth and well finished, we can say that he is a horse of good quality.

How are we to get these horses? We have to get them through lines of heredity. If we have well-bred stock that has all these qualities, on the principle that like begets like, we will expect to produce a horse of the same kind.

We should be careful in handling these colts. Keep them on their feet, trim their feet occasionally so they stand true on them; they may toe out or in too much, and sometimes we can help that by dressing that portion of the foot that grows a little too fast. Many a fairly good

horse has been ruined in his colthood by simply neglect of his feet.

Then we must feed for this. There is many a colt born in the State of Wisconsin to be a 1600 or 1800 pound draft horse, that by improper feeding is kept down to about a 1400-pound chunk. There is many a good road colt or coach colt born that by neglect in feeding does not properly develop, and simply remains an ordinary, inferior farm horse.

Feeding.

Keep the colt growing from the time he is born until he is ready to go on the market. Even before birth his mother should be well cared for, for at least six months. She should not be in heavy flesh, but in fairly firm, muscular condition, and she should be furnished the class of foods that will build bone and muscle, such as clover hay, oats and bran. Some roots, or other succulent food, in reasonable quantities are good for her, and she should have a proper amount of exercise of the right kind, not rapid or heavy, but light work or exercise out in a permanent pasture field; exercise is very essential.

Then at the time of the birth of this colt the mother's box stall should be thoroughly cleaned and well disinfected with chloride of lime, or even slacked lime will answer the purpose, or some good disinfectant. At the birth we should have carbolized ointment on hand for use, or, as I prefer, iodoform and boracic acid to anoint the navel string of the colt, to prevent the entrance of disease germs that often later produce bad results in blood poisoning.

Raising the Colt.

A few hours later the education of the colt should begin. Put your arm around his neck and get him used to you before he gets too old. Teach him to like you; let him know that you are a friend, later give him a piece of apple or a little sugar, or a few oats; he won't want to do just what you want him to, but watch your chance to carefully outwit him, and when he does well treat him well. You can catch more flies with molasses than you can with vinegar. Treat him the way you do your wife when she don't want to do something you want her to do. You persuade her without her knowing it; persuade your colt in the same way. Teach him to eat, to drink a little skim milk, so that at weaning time you have very little trouble and he doesn't lose any flesh. I would say, wean the mother rather than the colt, leaving him in the stall he is used to and taking the mother out; then he knows where to come to for food and drink, and he doesn't feel as badly as if you take him away to a new place where everything is strange.

Through the first winter this colt must be kept growing. Such foods as I have already mentioned as proper for the brood mare, clover hay, oats and bran, with whatever succulent food you like to raise, and a little oilmeal put into his food once a day, will grow him well. This oilmeal will keep his hair slick and avoid worm troubles, lice, and everything of that kind. Your colt must be fed regularly, just like any other animal. There are a great many other things I would like to say, but this audience is waiting to hear some music, and we would like some time for discussion.

DISCUSSION.

Mr. Convey—Are there any diseases that are inherited by young stock?

Supt. McKerrow—Not many that I think of now.

Mr. Wallace—How about moon blindness, isn't that inherited?

Supt. McKerrow—Yes, I suppose in a sense it is, though I am not so sure about it. I am not a veterinarian, I only have some notions of my own as a farmer.

Mr. Semple—You spoke in regard to feeding the mother to grow bone; isn't there danger in feeding too much?

Supt. McKerrow—There may be danger of overfeeding, of course. I would not advise you to feed a ration that was over one to six, we will say, but as a rule the average farmer in Wisconsin does not feed too much bone-building material. He feeds too much corn. You must give the mare sufficient food to grow bone and muscle, or you have a weak colt.

Mr. Semple—When do you wean colts?

Supt. McKerrow—From two months and a half all the way up to eight;

about four months, as a rule. The cases where we have weaned earlier have been special cases, and after they were taking skim milk well.

Capt. Arnold—If you had a mare on your farm that had a lack of constitution, wouldn't you think it would pay better to use her and not breed her?

Supt. McKerrow—Yes, I would not want to reproduce any more of that kind; one would be bother enough. There are too many of that class already. That is one of the reasons I prophesy that horses are going to be high, because we have kept all the poor breeding mares, and sold the good ones.

Question—Are glanders brought in with Western horses?

Answer—Yes, I have good reasons to believe that they are, and greater care should be exercised in buying them.

The Institute adjourned until 1:30 p. m.

AFTERNOON SESSION.

The Institute met at 1:30 P. M. Supt. McKerrow in the Chair.

LATEST DEVELOPMENTS IN TUBERCULOSIS.

PROF. H. L. RUSSELL, Madison, Wis.

Mr. Chairman, Ladies and Gentlemen:—The question of bovine tuberculosis is one that is so new in this country that any consideration of it may well be made in a fundamental way.

What I have to say on the question of bovine tuberculosis will be with reference to how we can detect it, and how this disease is introduced into our herds and how it spreads.

In the first place, let us start out with this question: Is this a fad or not? We often hear that suggestion made in the agricultural papers and otherwise, and the question is frequently asked, Why all this fuss and furore about a disease that we knew nothing about a few years ago? Is it anything but a fad? Is it something which you scientific men have gathered up and are trying to make stock of, perhaps for your own benefit, or is there really something in this question which merits thoughtful, earnest consideration of the agricultural colleges and other people?

While it is true that tuberculosis has been known in the human family for centuries, it is not true that it has been recognized as a matter of economic importance among livestock interests for more than a relatively short period of time. It is probable that tuberculosis has existed in cattle and in domesticated animals to a very small extent for a great many centuries, but it is only within the last thirty or forty years that the question has become one of economic value and the importance of this question is increasing steadily year by year. I want to present a few statements in regard to this matter, showing the increase of bovine tuberculosis, as it is found in several of the European countries. The method of collecting statistics in this country is so much poorer than in European countries that in order to determine whether bovine tuberculosis is making any headway in the world at large, it becomes necessary for us to go to Europe and see what the statistics there show in regard to this point.

Tuberculosis Across the Water.

In Germany in the Duchy of Baden in 1880, there was 1.6 per cent. of tuberculous animals found at the slaughter houses. In 1887 they had increased to 3.6 per cent. In the City of Berlin, the capital of Germany, in 1883, there were 2.8 per cent., whereas in 1895 there were over 15 per cent. of all animals killed, which were found to be

affected. This is from actual examination of the carcasses of the animals killed for the purpose of meat, so that it gives us an accurate determination of the amount and growth of this disease in these countries. In Saxony, the increase from 1888 to 1897 was from 5 to 29 per cent. In Holland the increase from 1888 to 1896 was from 1.7 per cent. up to 8.2 per cent., so you see that at the present time the disease is making very steady and rapid inroads upon the stock interests in various countries of the world.

Whether it is doing that in this country or not is a question which is not so easy to decide, for we have not the statistics to show it. I shall try to confine myself to what I know to be positive facts, not theories, but things which have been ascertained and determined in tests as nearly correct and accurate as it is possible for human observation to make them. The facts with reference to the growth of the disease in this country have been gathered in a fragmentary manner, because our methods are not as thorough and accurate as are those which are practiced in European countries.

In my judgment this question is not a fad, while it is a question that is becoming more and more important, it is a question which is well worth our earnest consideration as stock owners and stock raisers.

There are two phases to this question of bovine tuberculosis. There is that, first, which relates to the public health, and the development of this disease in animal life is a serious menace to public health, to the lives of children particularly.

Then, again, we can consider this question from the standpoint of the successful animal industry.

Bovine Tuberculosis and Animal Industry.

I will not have time this afternoon to dilate upon both phases of this question, and inasmuch as we are talking to people who are interested in growing and raising stock, we will confine our attention very largely to this phase which relates to the influence of tuberculosis as affecting successful animal industry. It is an impossibility for one to succeed in raising animals unless they are raised in a healthy condition, and the question arises with reference to this disease, Are we running a danger in our Wisconsin herds, in our dairy herds particularly, or in our breeding herds, for with this class of herds the danger is very much greater than in the class of animals that are raised for beef, because where animals are fed for beef they are not kept for such a long period of time, and the opportunity for the contraction of disease is not as great as where the animals are raised for the dairy, or for breeding purposes.

The difficulty with this disease of tuberculosis is just exactly as it is in the human being, it is in the fact that in the earlier stages it is almost impossible for one to recognize the disease with any degree of certainty. Very frequently one contracts a cold that runs along, it becomes protracted, he suffers from a hacking cough, and pretty soon the doctor says it is running into consumption. That simply means that the organism producing this disease has found its way into the human system and has established itself in the lungs, but is not recognized as a specific disease until it gets to the second stage of the disease. It is exactly that same way with the disease among cattle. The disease is the same in man and in the cow, or any of the domesticated animals, or even any of the warm-blooded animals, for all wild animals when confined are liable to this disease. The losses, for instance, in menageries and in zoological gardens, among animals kept in captivity, are mainly from tuberculosis, showing that all warm-blooded animals are liable to contract this disease if the circumstances are favorable.

Diagnosis of the Disease by the Tuberculin Test.

As I said before, the difficulty with this disease lies in the fact that it is so difficult to recognize it in its earlier stages, and if we had to rely at the present time upon the recognition of it by the ordinary physical methods of examination,—those which the physician uses, generally, in the detection of the disease in the human being,—detection of the disease in stock would be absolutely out of the question in any large percentage of cases that are really affected. But very fortunately, in addition to these methods of physical

examination which are used by the veterinarian or the physician in either the animal or human body, we have a test which now has been practiced for a period of nearly ten years, which has been tried and tested under all sorts of conditions, and the uniform verdict of those who have had the most experience with this test, which is known as the tuberculin test, is that while it is not an infallible test, not something which will diagnose the disease absolutely correctly under any and all conditions, yet when properly operated it gives by far the best results that have ever yet been found, results which are so far superior to the ordinary physical methods which we were obliged to use until the introduction of this test, that this method has now come to be preferred to any other method of examination. It is possible for mistakes to be made by means of the tuberculin test, and undoubtedly they have been, but I will say right here that the majority of the mistakes are not attributable directly to the test, but in applying it in the wrong manner, applying it under conditions where it ought not to have been applied.

The test is extremely simple to apply and at the same time accurate, does not even affect the flow of milk under ordinary conditions, except in a very, very small degree. In case of the animals that respond to the tuberculin test, the flow is sometimes modified for one or two milkings, but no more than would frequently happen under ordinary conditions, such as changing milkers or some other condition that might occur in the management of the herd.

In this method we have a means of determining whether our stock is affected with this disease or not, and I wish to advise all of you who are interested in this subject, to apply it in your own herds, for it is only by such application that it becomes possible for us to determine whether our animals are affected in any stage of the disease whatever.

The question will be asked as to whether animals may not respond to the tuberculin test which may show no physical symptoms of the disease, and that is true, and that, by the way, is one of the greatest advantages, for it is absolutely impossible to recognize the disease in the earlier stages in any other way, while the tuberculin test can determine whether an animal is affected even in the very beginning stages, even if there is no larger amount of tuberculous tissue in the animal than would equal a pea in size, the tuberculin test will recognize that as accurately and thoroughly as if the animal were in the last stages of the disease. On this basis it becomes possible to separate our herds, putting in one class all those animals that are absolutely free from any taint of the disease, and in the other class all those animals which are tainted in any possible degree by the presence of the diseased organism.

Wisconsin Statistics as to Tuberculosis.

The tuberculin test has been used for a period of about eight or nine years. In Wisconsin it has only been used in a limited way. I have with me a number of bulletins which have just been issued, and more will be sent to all of you who are on the mailing list of the Experiment Station.

I refer to Bulletin No. 84 of the Wisconsin Experiment Station, which may be had upon application by anyone desiring the same. In that bulletin you will read of the results of the tuberculin test made under the auspices of the Experiment Station and also by the State Veterinarian, for the last five years. We have incorporated here the results of something like four or five thousand tests.

This fact is brought out in a striking manner, that the amount of tuberculosis is found to vary very greatly, depending as to whether those herds have been suspected of containing disease or not. In all of those herds that had been examined, where the owners had reason to think that there had been tuberculosis in the herd before, we have found almost without exception that the disease has been more or less widely distributed. Out of 323 animals tested by the Experiment Station, 115 have been found to react, and out of 588 tested by the State Veterinarian, 198 were found to react; in other words, almost one-third of all the animals in those herds, in which there was reason to believe that the disease was present from a physical examina-

tion of the animals, one-third of these animals responded to the tuberculin test. Out of a considerably larger number of animals that have been tested for shipping purposes into Illinois, 3,500 of these animals, only 76 reacted, showing only about 2 per cent. affected. I believe this represents a very much more correct average percentage of the disease in our State than do those figures which have been taken from herds in which there was reason to suspect the presence of the disease, for in most cases the herds which have been brought to our attention have been those in which the disease was suspected to be present. Whether our State is in a worse condition than others is a question that we cannot answer at the present time. In all probability we only have a small amount of the disease, but it is very unequally distributed, as you will see in studying these bulletins.

A question of very considerable practical importance is: How does this disease find its way into our herds? Let us answer with this proposition which I presume is known to most of you; that this disease is produced by a living organism which is capable of growth just exactly as a plant is capable of growth when placed under favorable conditions, when this organism finds its way into an animal from some pre-existing case of the disease. It does not and never can originate in and of itself. The conditions which surround the animal may modify to a very considerable extent the rate at which the disease may go on, but it cannot produce the disease in the beginning; it must come from some other case of tuberculosis, either directly or indirectly.

How Herds Become Infected.

A question of very great importance is: How do our herds become infected, and we have reason to believe that it is very largely through the purchase of animals which are infected in the beginning stages, but not sufficiently far enough advanced so that it may be detected by an ordinary physical examination. In our records we have the record of one herd in the State of Wisconsin that has been the means of distributing the disease to sixteen other herds in Northwestern States. If you will apply the tuberculin test to those animals which you introduce in your herds, it is possible for you to prevent the introduction of the disease.

This disease is spreading more and more rapidly at the present time, a great deal more so than formerly, for the reason that there is more interchange of cattle. With the development of the dairy industry and these pure-bred races of stock there has been more and more sale and purchase of animals, which have come from these sources. If such breeding stock is infected, or tainted with tuberculosis, it is a menace, not only to the owner himself, but to every man who buys stock from him.

I have taken these statistics which have been collected at the Experiment Station, and have divided the different herds into three classes; first, those herds that are used exclusively for breeding; second, those that we might call milk supply herds, where they supply towns and cities with milk directly, and finally, those herds that we might call dairy herds, that are used for the manufacture of butter in creameries. Sixteen breeding herds have been tested, sixteen milk supply herds have been tested, and thirty-seven dairy herds. Out of 365 breeding animals 11 per cent. had tuberculosis; out of 295 milk supply animals 18 per cent. had tuberculosis; and out of 713 dairy animals 20 per cent. had tuberculosis. So far as this data shows the breeding herds of our State are not yet tainted with the disease to the extent that the milk supply or the dairy herds are, and in all probability this condition is due in part at least to the fact that the breeding animals are kept in better hygienic and sanitary conditions, better care is taken of them than with the dairy herds or with the milk supply herds; for it is a notorious fact that most filthy conditions surround the milk supplies of many towns, particularly large cities, and under these conditions, if one single tuberculous animal is introduced into a herd of that class, the disease is bound to spread very much more rapidly than if introduced into a herd in which the sanitary conditions are very much better.

There are other ways in which the disease may be introduced into our midst, and one of them is through in-

fected skim milk in the creameries. This is found to be true, especially in those sections of the country where tuberculosis is present to a very considerable extent. In Denmark three years ago over 40 per cent. of their herds responded to the tuberculin test, and you can easily see that the milk of those animals, taken to the creameries and then taken back to the farms in the form of skim milk, would carry with it the tuberculous organisms contained in that milk, so that not only one animal to another. There is the ground plan of a barn which housed about twenty or twenty-five animals, and one of those animals had the beginning stages of tuberculosis when she was brought into the herd. She was kept in that herd for two or three years before she began to be physically diseased, and then when it became evident the animal was affected with tuberculosis, the tuberculin test was applied to the whole herd with the result that every animal in the part

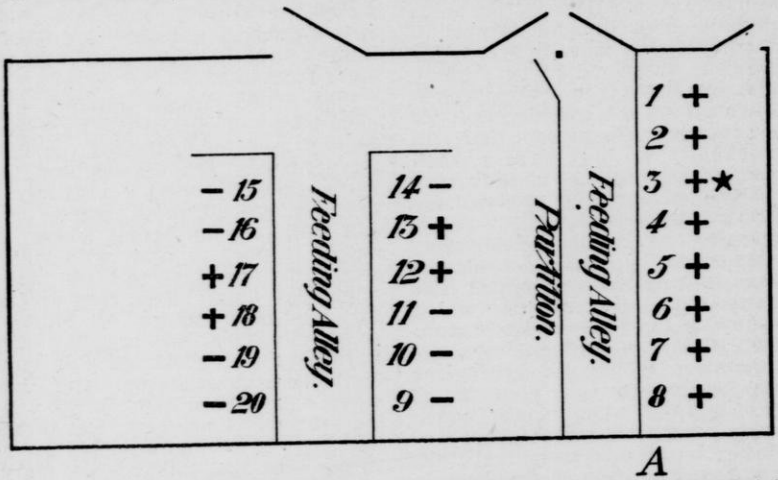


Fig. 2.—Showing distribution of tuberculosis in a herd and its relation to originally affected animal (marked *). + = tuberculosis; — = healthy animals.

calves, but swine, were becoming more and more affected in that country. This matter got to be so bad in Denmark that two years ago the legislature of that country passed very stringent laws, which now compel the heating of every drop of milk taken back from the creamery so as to insure the destruction of the tubercle organism if it happens to be present.

Manner of Spread in the Herd.

So much for the manner of introduction of the disease into our herds. Now, a few words in regard to the spread of the disease. How does a diseased organism find its way from the original infected animal to those about it? In this bulletin you will find a diagram which will give you, I trust, an object lesson showing the manner in which this disease is spread from of the barn in which this originally infected animal stood, had acquired the disease, whereas in the other part of the barn, which was separated by an ordinary board partition, only four animals out of twelve had acquired the disease. When we bear in mind that they were watered from a common watering trough, that these animals all had contact one with another, it is not at all surprising that these four animals acquired the disease. In other words, it is a question of contact. The disease is propagated in your herd exactly in the same way that it is propagated in human beings. The reason we find tuberculosis running in human families is simply because carelessness is exercised in regard to the disposition of the expectorations from the tuberculous patient. Even where precautions are taken, if there is an op-

portunity for these germs to pass from an individual out into the air, where they may readily dry, they can easily be breathed into the lungs in the form of dried particles of dust, and so where you have a tuberculous person in the house, it becomes necessary to use great care in regard to the disposition of the sputa from that person.

This proposition is also true for animals. Some may say that cows do not expectorate, and while it is true that they do not in the way that human beings do, still there are emanations from the animal, saliva drools from the mouth, and the very act of coughing forces out fine particles of mucus from the lungs in exactly the same manner as from the human being. The danger of this material has been proved by putting a nose bag over the cow and examining the exhalations and it was found that it contained germs of this disease. If this disease was rapid in its growth, like hog cholera or anthrax, for instance, it would in a sense be easier to control, but the fact that this disease is so slow in its development makes it possible that there may be months of it before the animal will show any physical symptoms and then it becomes very, very difficult to control. The only way that it is possible to control it is to determine its presence by means of the tuberculin test, and then separate absolutely and entirely all animals that react to the test from all those that do not react. When you thus separate the "sheep from the goats," you will be surprised very frequently to find that some of the best-conditioned animals have responded to the test. You will find an illustration of this sort in this bulletin. See Figs. 3 and 4.

Treatment for Tuberculous Cattle.

The only way you can handle this disease is, first, to apply the tuberculin test, and then separate and isolate your animals. Then the question comes up, what shall we do with those animals which do react to the tuberculin test? There is a great deal of opposition to all discussion of this matter, for the reason that some people have conceived the notion that it becomes absolutely necessary to destroy immediately and entirely all animals that respond to the test regardless of their condition as to whether they have the disease in the early stages, or in the advanced stages.

Before I go into a discussion of this point, I want to present some data that have been determined to be actual facts, not theories, in regard to raising healthy calves from animals which respond to the tuberculin test. It has been found not only in our own experience, but in the experience of other investigators, that it is possible to take an animal that responds to the tuberculin test and use it for breeding purposes, and if the calf from that animal is taken from the dam immediately after birth, and is fed upon the milk of animals that do not respond to the test, or upon boiled milk, it is further possible to raise that calf in a perfectly healthy condition, in exactly the same way that a child may be raised when taken from a tuberculous mother and placed in some other family in which there are no symptoms of the disease. Generally such a child grows up and dies from some other disease than tuberculosis. In other words, such a thing as hereditary transmission of tuberculosis, under ordinary conditions, does not occur, either among human beings or animals, except in very rare cases. There are probably not over twenty cases on record in the world where human beings have been found at birth to be tuberculous, but I might say that ninety-nine and ninety-nine hundredths per cent. of all animals born from tuberculous cows, if separated immediately after birth, or within a day or so, and fed upon milk which is known not to contain the seeds of this disease, can be raised under perfectly healthy conditions. A knowledge of this fact gives us the means of coping with this disease.

In some States it has been the custom to slaughter all animals that responded to the tuberculin test, regardless of their conditions, and when a man's herd was slaughtered, and it was found perhaps that only one little gland in the animal was affected with the disease, naturally he rebelled against any State supervision which would result in the destruction of his property, and, while it is true that a great many animals have been slaugh-

tered, it is not true that those animals may not have gone on and if left to themselves might not have developed the disease in a severe form. We killed an animal two weeks ago in an extreme stage of the disease, an animal that had been known to have been tuberculous for five years, and every year that animal had dropped a calf which had been tested with tuberculin and found to be perfectly healthy. In no case have the calves from that animal ever acquired tuberculosis, although in some instances they have been kept for a period of two or three years. So you see where animals are valuable enough, it is possible for us to quarantine, separate those animals by themselves, and keep them for breeding purposes. It is necessary to treat the milk from animals, for the milk of such animals is at times the means of disseminating the disease.

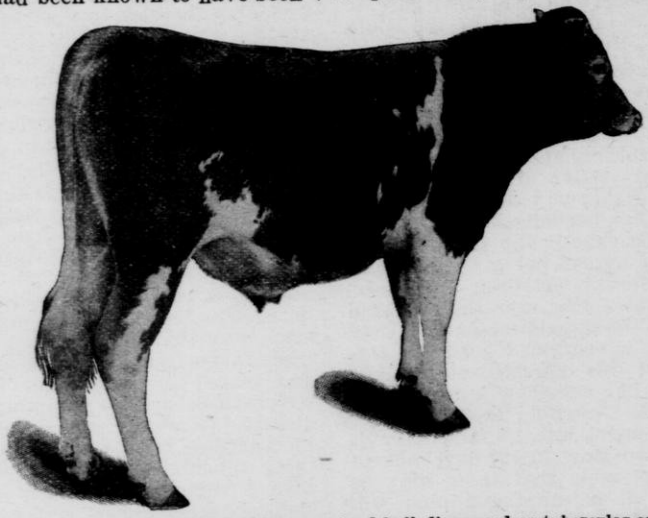


Fig 3.—An apparently healthy-looking pure-bred bull diagnosed as tubercular on the basis of the tuberculin test.

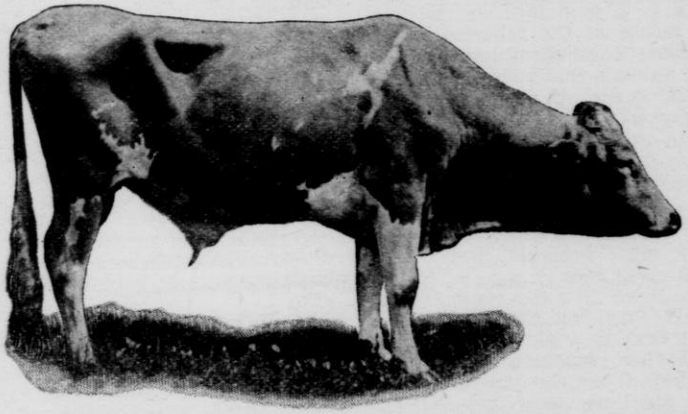


Fig. 4.—Same animal as in Fig. 3, eighteen months later, in the last stages of "quick consumption."

DISCUSSION.

A Member—Is it true that the milk of a tuberculous cow can disseminate the disease unless the tuberculosis is located in the udder?

Prof. Russell—Yes; where the disease is spread through the system without appearing particularly in the udder, the milk of the animal is generally affected, that is, where it is in the lungs, liver and spleen, without the udder itself being apparently affected. In comparatively few, indeed, a very small percentage of the animals that respond, does one find that the milk is affected, but as there is, of course, a possibility of those animals giving tuberculous milk at some subsequent time, if they are kept under conditions where the disease will go on and grow in their system, the milk should not be fed unless treated .

Prof. Henry—Suppose the animal is apparently in perfect health and fine flesh, is there any danger from the milk if there is no disease in the udder?

Prof. Russell—You can't tell in regard to that. My rule in regard to the milk of all reacting animals is to treat it as if it were tuberculous, then you are entirely on the safe side. That can be done simply by the application of heat. If the milk is heated in a closed vessel to a temperature of 140 degrees Fahrenheit, for a period of fifteen minutes, or in the ordinary open vessel to 160 or 175 degrees, for ten or fifteen minutes, if there are any tubercular germs in that milk they will be destroyed by that process, and it is possible by heating milk at 140 degrees to destroy the tubercle organisms without altering in any essential way the character of the milk. Even the creaming power of the milk is not interfered with upon the application of heat under these conditions.

Mr. Wallace—When these animals are taken to the slaughter house, what do you propose to do with them eventually?

Prof. Russell—Those animals are perfectly safe for ordinary purposes, to kill for beef. They are killed subject to inspection, of course.

Mr. Wallace—How would it be for the breeders of cattle in any given State to come to an agreement that they would test, not by State inspection, but by some good inspector, because State inspectors are willing to make private examinations and say nothing about it, at least they are in Iowa—that they would agree that they should be all actually inspected, that they would separate them, and that they would sell nothing except when subjected to the tuberculin test, what do you think of that way of getting at the subject in a practical way?

Prof. Russell—I think it would be perfectly feasible.

Mr. Wallace—And if four or five of the leading breeders in each State would do that, every one would have to.

Prof. Russell—The breeders of the State of Wisconsin never will use the tuberculin test, as a class, until the purchasers of animals want that test. When they go to a breeder and say, "I want a cow or a bull, but I want it tested," then the breeders will have to face this question. There are breeders in this State who don't want to consider this question at all, and I am glad to say there are other breeders that hail with delight any fair-minded discussion of this subject, for they know the condition of their own herds, they know their own herds are entirely free from disease and they of course recognize that if a general discussion of this subject is brought out, that it is to their advantage.

Mr. Wallace—At the Station have you ever undertaken to determine whether an animal in apparently perfect health, that is, having the disease in its incipient stage, will actually give tuberculous milk?

Prof. Russell—We killed an animal last week that was apparently in perfect health; it looked as well as any animal we ever had, and when that carcass was opened a condition of affairs was revealed that would shock people here, if they saw it. It is impossible for any man, even an experienced veterinarian, to tell what the condition of the inside of an animal is before slaughter. Under those conditions I say it is wise to treat the milk of all reacting animals as if it were diseased, recognizing the fact that it may not be in a majority of instances. It has been determined that in a very considerable number of cases the milk of such animals as you refer to did possess infectious principles.

Mr. Wallace—One more question. Is it not a great deal more reasonable to expect the breeders, with their supposed higher intelligence, to undertake this reform, than it is to go on until we develop a public opinion that will damage the industry in all lines? Isn't it the best thing to commence with the breeders and get them to wake up to this point?

Prof. Russell—I don't see where a fair, open discussion of this question is going to damage anyone. The tuberculosis question can be treated in a way that is fair and right, but there are agricultural papers which take a stand that I believe is quite unjustifiable. They cry down all discussion of this subject, and say that the tuberculin test is no good whatever. What that is done for I can't say.

Mr. Wallace—The position taken by many is that all animals ought to be killed. Now, that, of course, would ruin the breeding business, and that is the reason breeders object; that interferes so seriously with the breeding business that breeders bring all their force to bear upon editors to keep them talking on the other side.

Prof. Russell—The middle-of-the-road policy is perhaps a wise one to follow in this, as in politics or religion.

A Member—Is the tuberculin test infallible?

Prof. Russell—No, I don't say it is, but I do say that the mistakes which have been attributed to the tuberculin test are more frequently due to the fault of the manipulator than to the test itself. In my experience I have killed only two animals that responded to the tuberculin test in which I was unable to find the disease present upon post mortem examinations.

Mr. Wallace—Suppose a case down in Illinois, where a herd was tested, where the animals had been run around the yard and worked up and excited. Wouldn't that naturally cause a reaction?

Prof. Russell—It would cause a rise of temperature. I do not say that there are not men undertaking to make the test who do not know how to do it, although it does not require a great deal of skill or knowledge to know that when you drive animals around in a hurry and get them heated up, that you will nullify the action of the test. That is one of the greatest difficulties in the use of the test, that the normal temperature of the cow is subject to fluctuations of one or two degrees, or even more, so that it is necessary to take a number of temperatures before the test is made in order to establish the normal from which to work. But, of course, no trouble of that character should be charged against the use of the tuberculin test. It is because it is operated by somebody who either does not know his business or perhaps does it to discredit the test.

Supt. McKerrow—Have they found anywhere that they have gotten a safeguard on people who don't know their business?

Prof. Russell—No; in many cases one's judgment must be taken into consideration, but this test is a great deal more accurate than any method that is based upon the physical examination that has hitherto been used.

Supt. McKerrow—Right along that line I have been informed that the State of Pennsylvania has the nearest to a system that seems to be a satisfactory solution of the method of handling this question.

Prof. Russell—It follows practically the line which I have given. They give an option to the man after the test has been made, and the test is only made upon his asking for it. There they find the people are anxious to determine the actual condition of their herds. When the test is made, the owner either quarantines those reacting animals (and they are allowed to utilize the product under certain conditions) or else slaughters them. The owner can take either horn of the dilemma. You must bear in mind that this question is one which will cost you either money or time. If you have tuberculosis in your herds, it is a bad condition of affairs the best you can do, and the question is, how are you going to get out of it with the least possible loss, either in money or time. If you have only one or two animals the quickest thing is to destroy them, disinfect your barn and see that you do not introduce any more animals which have the disease. On the other hand, if you have thirty or forty, the other plan is open to you.

Supt. McKerrow—Every once in a

while a farmer asks me how he can tell the condition of his animals in this respect without going to the expense of having a veterinarian to test them.

Prof. Russell—The only way that you can tell with any degree of accuracy is to employ the tuberculin test. I would not advise the farmer who has not had experience to attempt to do it himself. The students in the Agricultural College are doing this, and sometimes neighbors help each other rather than to hire a veterinarian.

Supt. McKerrow—There is no way by which you can stand and look at an animal and tell whether it is tuberculous or not?

Prof. Russell—None that I know of.

Supt. McKerrow—What is this test? Explain it a little, please.

Prof. Russell—The test is simply taking the temperature several times before the introduction of this tuberculin and then taking the temperature several times afterwards. In the case of an animal that is affected with tuberculosis, even in the very beginning stages, the temperature will begin to go up about six or eight hours after, and will continue to rise until it is two, three, four, five, and sometimes as high as six degrees above normal temperature. You see it is simply a question of correctness in reading the thermometer, which registers the temperature of the animal before and after the introduction of the tuberculin.

A Member—How is it applied to the animal?

Prof. Russell—By means of a hypodermic syringe, exactly the same as a hypodermic injection of morphine into the human. It is introduced generally in the neighborhood of the shoulder, but it can be any part of the body.

Mr. Scott—Have any experiments been carried on in any State to determine the effect of sound and thorough ventilation in our stables as tending to prevent the contraction and development of the disease?

Prof. Russell—Yes, the State of Pennsylvania has carried on extensive experiments on that line. They have a complete barn, an old-fashioned Dutch barn with a hay loft above, just about high enough for a man to stand in, with little narrow windows, representing the average Pennsylvania barn. Right opposite that, they have built a hygienic barn, with lots of sunshine, put in good wooden stanchions on cement floors, and that barn is kept in the very best condition. Animals were taken which had responded to the tuberculin test and placed next to healthy animals, alternating first an affected, next a healthy cow. At intervals of every two weeks they were transferred from one barn to the other, so that each healthy animal in the two barns was brought in contact with the same tuberculous animal under practically the same conditions, and it was found that the animals which were housed in the well ventilated, well lighted barn, in no case contracted the disease—it was either none or only one case, whereas in the case of the old-fashioned, dark barn, illy ventilated, every animal that was healthy when it went in and was in contact with these tuberculous animals, acquired the disease.

Mr. Scott—How long were they there?

Prof. Russell—I think about a year.

Mr. Wallace—In the light of that fact, what sense is there in Legislatures passing laws allowing the Governor to quarantine the State against cattle coming within its borders as long as they have their own stables built rotten with filth?

Prof. Russell—You have got to educate public opinion; in all legislation you must have a basis of public opinion for it. We shall never have a condition of affairs which will warrant any kind of legislation unless we have people understanding the nature of this disease, how it is produced and disseminated. Now where States do try to weed out this thing, it is imperative that they should do something to prevent some other State from using them as a dumping ground.

Mr. Wallace—Do I look very consumptive, Professor?

Prof. Russell—I have not applied the tuberculin test to you yet.

Mr. Wallace—But from outward examination you would not think I was very consumptive. I came from one of the most tuberculous families that ever existed. I have lost four brothers and three sisters, my mother, and perhaps twenty cousins from consumption.

Prof. Russell—That simply is an example of the proposition that heredity does not transfer the disease. It is simply contact with the organism that produces the disease, not any hereditary taint.

Mr. Scott—Were you raised on sterilized milk?

Mr. Wallace—When I was raised we didn't know anything about sterilization, I was away from home; I left home before the disease started in the family.

Mr. Sweet—A question arises in the minds of many farmers which I wish you would answer. Are you satisfied that the introduction of the lymph into an otherwise healthy animal has no effect upon the animal?

Prof. Russell—Yes, I am. I have used the tuberculin in perfectly healthy animals for years without the slightest symptom of any trouble whatever. It is the universal experience of all those States that have paid any attention to the question that the introduction of tuberculin into healthy animals does not affect their health in any way, nor the milk producing faculty.

Mr. Sweet—Do they ever use this test on human subjects?

Prof. Russell—Yes, it is used in tuberculosis sanitariums.

Mr. Sweet—Have you any data to show whether this disease is more prevalent in high or low altitudes?

Prof. Russell—It is peculiarly a disease of the temperate zone. One reason why that is so is that people in the tropics live out of doors more, where the liability of contracting the disease is much less. It is those people who live in confined quarters, in illy ventilated rooms, who have much more tuberculosis than the farmer or the man who lives out of doors.

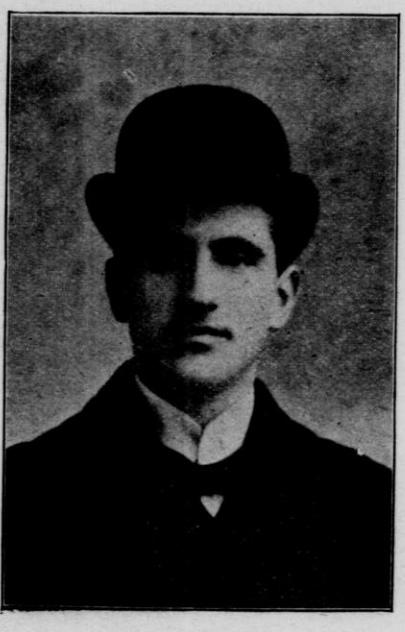
Question—Is the temperature of healthy animals the same as that of human beings?

Prof. Russell—No, the temperature is higher, two or three degrees, than that of human beings; it runs from 101 to 102.

The Chairman—Our next subject will be that of Growing Beef, and will be given to us by Stanley R. Pierce, of Creston, Ill. This young man raised beef that sold for $1.50 a pound at the Chicago Fat Stock Show last fall. A good many years ago I met a boy at some of the Western fairs. I sized him up and I said to myself that this young man had an object in life, and that object was to grow the best cattle that could be grown. When Mr. Pierce won that prize through his wonderful steer "Advance," last fall, at Chicago, I was a little proud that I had seen so far ahead. It was hard work to get Mr. Pierce here, and he is very anxious to get back to his "doddies," so I will not take time talking about him. I know you are all anxious to hear how "Advance" was raised.

GROWING BEEF.

STANLEY R. PIERCE, Creston, Ill.



MR. PIERCE.

Feeding cattle for show, particularly the Fat Stock Shows, must in all cases begin with the calf. One should notice the beauty and perfect form of the baby calf at three or four weeks old, when it has had plenty of mother's milk, and then imagine what a grand animal that would make if the form could be kept just the same until a yearling or a two-year-old. This can be done in many cases if careful attention is given to feeding the calf from this time on.

Feed and Care for Young Stock.

Ordinarily a calf begins to take a little feed at a month old. He should then have whole oats, nice bright hay or grass, if it is in grass season, plenty of outdoor exercise and sunshine. This mode of treatment should be followed with letting the calf suck the cow twice a day regularly until about four months old; then if he is strong and looks like a feeder, a little cornmeal and bran may be added to the oats and gradually increased until about one-third of each oats, bran and cornmeal, and the calf should be fed according to what he can stand; if he is a huge feeder he should be fed only enough to keep him satisfied, not overdone simply because he would eat it and perhaps throw his digestive organs out of whack and cause flesh to become flabby and the hide thick and hard. On the other hand, if he is a light feeder there will not be any danger of overdoing it if the feed is properly mixed. And I would say right here that as soon as grass is gone a few beets or roots of some kind should be added during the winter until green grass comes again. In all cases the feeder must be a judge of the animal he is feeding and must feed according to what he thinks the animal can stand and thrive.

Milk for Calf.

I think after the mother of the calf lets up in her milk it would be advisable in many cases to put the calf on a nurse cow and let him take milk until ten or eleven months old or even a little longer if he enjoys it, because milk is the stuff for a calf, and although he might do nearly as well on grain food it isn't so satisfying nor so beneficial all around.

After one gets started right and feeds right until the calf is a year old, I think he ought to be a judge for himself after that. Study the animal you are feeding, learn from his actions what his wants are and do accordingly; study the appetite and you will learn that if one kind of feed does not suit perhaps another will. Try it. We cannot tell anyone exactly how to feed cattle; they must be their own judge. Seemingly animals are not alike, even of the same breed, and in feeding them we must make it a study, and take time to notice how they digest their food and how they are laying the meat on their backs.

I do not think it is particularly necessary to use patent foods unless you wish to make a very rapid gain, and perhaps injure the animal; still a little stock food is a good health preserver and may prevent blackleg. I do not know; anyhow, we can grow and fatten as good cattle here in the corn States as anywhere, if the feed is properly mixed and fed. Do this right and Nature herself will do the rest.

How "Advance" was Raised.

As to how "Advance" was fed I will say this much, that he was fed about as I have given you herein for feeding any calves for show purposes. He was a naturally-raised calf, not pampered, but always had plenty of good, wholesome food, cornmeal, oats and bran forming his grain feed and grass in season, hay and corn fodder in the winter. He was always out of doors ten hours out of every twenty-four, which gave him so much constitution and hardiness. He was fed a little stock food, "Acme," the last four weeks of his fitting, but in all not more than three pounds. No sugar, molasses, drugs or cooked feed of any kind was given to him. Although I may never produce such a beautiful steer again as "Advance," someone else may, and we should all try.

Feeding cattle is a pleasure to me as well as a study, and I cannot help but admire the cunning yet intelligent and beautiful characteristics of the calf; to me no other animal is quite so deserving of kindness, and so innocent as a calf. There is still much chance for improvement in cattle, and if we give the breeding and feeding proper attention we can at least keep pace with the other industries of the world.

DISCUSSION.

Question—What do you mean by "patent foods?"

Mr. Pierce—Stock foods, something to increase the appetite and hurry him up. We feed a little of the Acme Stock Food each year to our calves, to prevent blackleg. We think it prevents it, whether it does or not I can't say; at any rate we feed it as a health preserver.

Question—Did you lose from blackleg before you commenced feeding that food?

Mr. Pierce—Not in my experience. Years ago my father lost a good many calves when the pastures were better than they are now. For the past few years our pastures have not been good enough to hurt anything, they have been dry. We do not feed a quarter of what the directions tell us to.

Question—What did your feed consist of for the last ninety days you fed "Advance," and how much per day?

Mr. Pierce—We grow beef; we don't fatten cattle. Now, "Advance" was fed just about the same towards the last as he was after he was four or five months old, cornmeal, oats and bran.

Question—But how much?

Mr. Pierce—According to what he would clean up.

Question—But that is not answering my question yet.

Mr. Pierce—Oh, I never weigh food for the cattle nor measure it.

Question—You know the difference between one quart and five.

Mr. Pierce—I used a pan that held about six quarts, and "Advance" got that about two-thirds full twice a day; that would be about four quarts twice a day, and in addition to that in the last three months he had a little chopped beets with his ground food.

Question—About how much?

Mr. Pierce—According to what I thought he could stand. If he got too relaxed I gave him less.

Supt. McKerrow—You judge of the amount by the condition of his bowels, but have you any estimate about it?

Mr. Pierce—Why, I should think he probably got ten pounds of beets a day when he was on dry feed. If he was getting grass, I would not dare give him that much.

Question—How long did he suck and how many cows, till he was three months old?

Mr. Pierce—I am afraid you want to make me blush a little. "Advance" had nothing but his mother's milk until he was five months old. He was then weaned from his mother and put onto a good, common shorthorn cow. He nursed on the shorthorn cow for two months, and then I put him onto a grade Angus cow; he had milk from her until he was about twelve months old.

MR. PIERCE AND "ADVANCE" WITH SILVER CUP WON AT CHICAGO IN DECEMBER, 1900. "ADVANCE" SOLD FOR $1.50 PER LB. LIVE WEIGHT, BRINGING OVER $2,100.

Question—What did you feed him besides what the cow gave him?

Mr. Pierce—About as I have given you—oats first until he was four or five months old, then I put him onto some bran and cornmeal. The oats were all whole; I never grind oats.

Supt. McKerrow—You said you fed later, oats, bran and cornmeal. Didn't you grind them then?

Mr. Pierce—No, not the oats, but I ground the other.

Mr. Wallace—Tell us what kind of a milker his mother was.

Mr. Pierce—She was a good milker. "Antelope 3rd" is one of the best cows I have.

Mr. Wallace—Do you think it is right, morally, to teach a calf that you are intending for a show animal to steal from other cows?

Mr. Pierce—Yes, I do.

Supt. McKerrow—You don't consider that stealing, do you?

Mr. Pierce—If you are going to have good cattle, you have to give them something to eat, and if milk will do it better than corn, give them milk.

Question—How old do you have your calves before you feed the stock food?

Mr. Pierce—I begin feeding my calves when they are about a month old, and just sprinkle in a little stock food from that time on, but you don't need to give to the little calf one-tenth part of what the directions say. We just feed a little stock food as a tonic, and only feed that in the dry parts of the season when the grass is dried up and there is danger of blackleg.

Supt. McKerrow—I see Capt. Arnold on the floor and I expect he is going to claim it was that Shorthorn milk that made that fine calf.

Mr. Pierce—It did do a lot of good.

Mr. Arnold—I understand you stayed right with your cattle.

Supt. McKerrow—Mr. Pierce sticks pretty close to his cattle, both before they are grown and afterwards. I have been in show rings with him, and I know just what he does.

Mr. Pierce—I did not leave that building until about eleven o'clock at night myself, and I hired men to stay there the rest of the night.

Question—What is your favorite breed of cattle?

Mr. Pierce—Well, I like all beef breeds of cattle, but I must say that I like the Angus a little the best.

Supt. McKerrow—"Advance" is Angus; of course he likes them the best.

Question—In order to raise a good animal, don't you have to do it individually, yourself?

Mr. Pierce—Well, I don't want to criticise the herdsmen at all, but my experience has been that herdsmen are all right until they get so they want to run the business themselves, and then I don't want to sell out. When I can have a young man that is willing to learn, to whom I can tell his duty, I can get along all right, but when I have a man that wants to buy me out entirely and I almost have to turn the business over to him to get along with him, then I have to let him go. But there are lots of good feeders and I have had some good men working with me.

Mr. Arnold—Do you know about how many quarts of milk a calf will suck?

Mr. Pierce—Milk is something I don't know much about, but I should think the mother of "Advance" would for about four months give about six quarts twice a day.

Mr. Convey—Do you approve of the plan of turning your calf on grass in the summer time in hot weather when the flies are bothering him.

Mr. Pierce—Why, grass is the place for them just as soon as there is grass to eat. Let the calves have it, but keep the feed up just the same. If you are going to grow beef, you must not stop feeding a minute.

Mr. Convey—A great many farmers now only turn out their calves for exercise and think they have better results.

Supt. McKerrow—But Mr. Pierce is not raising skim milk calves.

Mr. Goodrich—His cows don't give that kind of milk. Do you let the calves run with the cow?

Mr. Pierce—Until they are a week or two old only; after that they suck twice a day.

Mr. Arnold—I am glad that Mr. Pierce says that he raises a calf in the sunlight. I maintain that you cannot get a good animal of any kind unless it has plenty of sunlight. I believe many diseases originate in our close, dark stables. I believe dairymen especially cannot be too careful in

this regard. You cannot raise a fine beef animal without sunlight, how much more so in raising a delicate animal like a dairy animal.

Supt. McKerrow—After "Advance" left his mother, about at ten days, as you said, where did he spend his time when he was not with her but twice a day?

Mr. Pierce—He was kept in the barn part of the day, say from nine or ten o'clock in the morning until five or six in the afternoon, if it was very hot. But then he would be out all night in the fly season, for we let our cattle out nights. In the spring, fall and winter they are out daytimes, but we cannot make cattle in nice shape for the show ring if we leave them out to switch flies all day, particularly big and heavy cattle. Our stables are very fair stables, they are mostly sheds open to the south.

Question—How many years have you been in the business and how many cattle have you?

Mr. Pierce—Well, we have in the herd now one hundred and twenty head of pure bred Angus. I was born in a town, and at four years old my father moved onto a farm; since then I have been among cattle. I am twenty-seven years old.

Question—If you were growing rye, wouldn't you turn a calf into your rye pasture in the winter?

Mr. Pierce—No, the grass in the winter time would be frosted and that would be apt to cause dysentery in the cattle. I have never pastured much rye; I don't think much of it for pasture, anyhow.

Question—A calf is looking around for something green in the spring before the regular pastures are ready.

Mr. Pierce—I would not let my cattle out on grass until the latter part of April, until there is some substance in it. I am seventy miles west of Chicago.

Question—What particular preference have you for the Angus over Shorthorns?

Mr. Pierce—That is a pretty hard question to answer. My father was a breeder of Shorthorns for a good many years and he went into Angus cattle, merely from what he read of them. The fact of their originating in the northern part of Scotland, such a high latitude, made him think they would be hardier, and he thought also that they were a new class of cattle that would be better adapted for butchers' purposes.

Question—Will they fatten to a greater extent at the same age?

Mr. Pierce—Well, probably a greater weight as yearlings. I don't know that they weigh as much at two years old as Shorthorns.

Question—What are their milking qualities?

Mr. Pierce—We sold a grade Angus Shorthorn; she was bought for a nurse cow and was entered as a dairy cow, I think, at Detroit, and I believe she won the test.

Mr. Everett—If the mother of this steer had been a good milker, somewhat noted as a producer of milk or butter, do you believe that "Advance" would have been as good a steer from such a cow as from a strictly beef cow?

Mr. Pierce—No, indeed. When you try to work the two you make a mistake in each.

The Chairman—I presume that the Angus cattle have been tested along milk lines less than any other breed of cattle common in this country, unless it is the Herefords, and yet, at the Iowa Experiment Station, I saw an Angus cow that had made some three hundred pounds of butter or a little over, but they are not a milk breed, and we do not need to discuss that side of it.

Mr. Arnold—I would like to have you point out the strong points of a beef animal.

Mr. Pierce—I don' know where I can improve on the picture on the chart. I will say this much about the milking qualities of the Angus cattle. The first steer that I ever showed was "Rusty;" he was champion yearling at New York and a champion two-year-old at the Madison Garden show. He was raised only on his mother, so I think you can find plenty of cows among the beef breeds that will take good care of their calves, but the mother of "Advance" was not the best of our milkers. I think that made him all the better; his mother was not much on the dairy order; she was more of a beef cow.

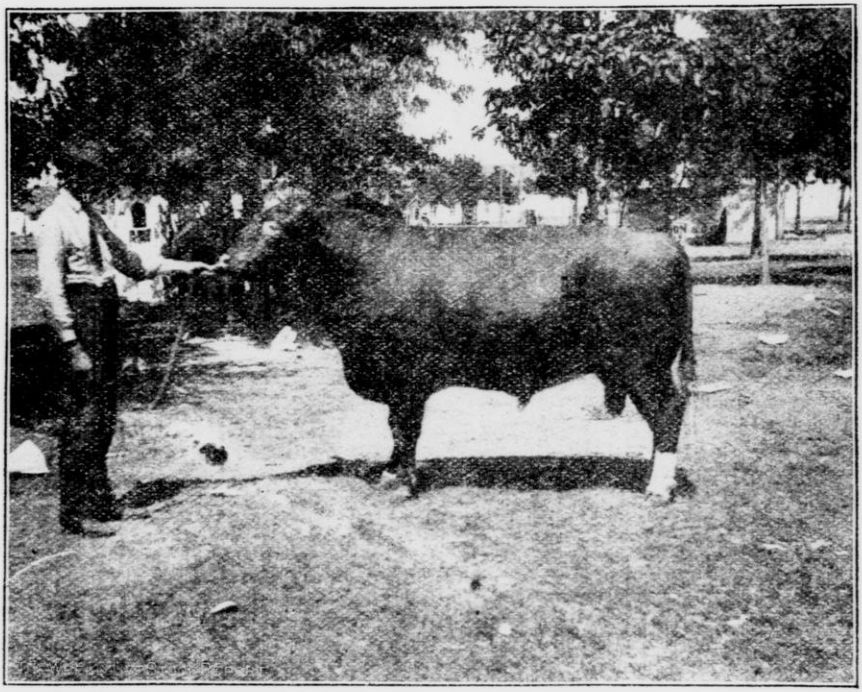
Question—Do you feed this grain raw or cooked, wet or dry?

Mr. Pierce—It is all fed dry and uncooked.

Mr. Thorp—I want to say a word about the beef steer business in Wisconsin. Mr. Pierce has said that he grows beef, he don't fatten cattle, and we heard a gentleman last winter from Illinois make that same statement. Now, what are we doing in Wisconsin? I have not found a man in the State of Wisconsin yet that is growing beef, but I have found quite a number that are fattening cattle, in fact I have been in that business myself for the last few years, and I find it is a very nice business to get into. But if I was situated differently I should prefer to grow beef rather than fatten cattle. I have been in the habit of going out and buying my cattle that I have had for beef, and I find I can buy almost any kind of an animal that I want, even up to a choice high-grade Shorthorn steer. Those are the kind that I like to buy, and those are the kind that we can get most of in the State of Wisconsin—no, I won't say that, we can get the most of the scrub cattle, but of the high grades, we can get the most of the Shorthorns because they have been bred in this State, I think, longer than the other breeds. When I go out to buy cattle I buy them of the stock man, and I pay him his price for the best he has. I use my own judgment in picking them out, but I have to pay as high as $4.10 a hundred to get those animals, and this is the point I want to make. Somebody has grown that animal up to that weight, say, 800 pounds, for an average for the yearlings that I buy. They have not kept them fleshy, they have grown frame. I take that animal home and put 400 pounds more onto him and sell this same 800 pounds that I have bought for $4.00 a hundred, for $5.00 or $5.50, and that is the way that men in Wisconsin that are buying cattle are making money out of fattening cattle, not making anything out of the fat that they are putting on, but making money out of this part of the frame that is already grown by the farmer. I, as the man between the farmer and the market in Chicago, am the man who makes the money. Now, why don't these farmers finish them up here and make them weigh 800 pounds worth $40 instead of $32? I think the

HIGHEST PRICED YEARLING ANGUS BULL (18 MOS. OLD) EVER SOLD IN AMERICA, $1,205.

man who will follow the suggestions of Mr. Pierce and keep them growing all the time can make more money than the man who goes out and buys the animals and then feeds them; he keeps the fertility on his farm at the same time. If we cannot grow grain enough, let us buy some grain and feed them on the farm and ship our cattle down to Chicago and sell them ourselves. I have looked at the Wisconsin pens in the Stock Yards, and I was ashamed of those cattle. I would buy a steer for six cents a pound that will kill at 70 per cent. beef, he would rather buy it than one that would only dress about 55 per cent. at five cents a pound. When you grow beef properly marbled it is in shape that it can be cut up and eaten, while the beef that you fatten when you buy a steer that is thin in flesh and put him in a feed lot and feed him sixty or a hundred days, is not properly marbled; the butchers cannot use that as they can a calf that is thoroughly



SHORTHORN BULL GOLDEN VICTOR 138972, WINNER OF FIRST PRIZE AND SWEEPSTAKES AT THE IOWA, MINNESOTA AND WISCONSIN STATE FAIRS OF 1901. OWNED BY GEO. HARDING & SON, WAUKESHA, WIS.

like to see the time when somebody would go out of the State of Wisconsin and win some of the prizes in the Fat Stock Show, and then we won't have to send to Illinois or some other State to get men to come up here and tell us how to feed such cattle as "Advance" was.

Mr. Pierce—I want to say one word more. The butcher has to pay for what is weighed to him, and if he can grown from the calf up and thoroughly marbled beef.

Question—Was "Advance" the most profitable type of butchers' beef?

Mr. Pierce—I think he was the best type of butchers' beef I ever saw, from the calf up. After being shipped to New York and after being kept there and handled for about five weeks on improper food, he dressed out a little less than 70 per cent., I think 69 and

a fraction, but, understand, he was yet just a trifle over two years old. Had he been fed to nearly three years old, I think he would have dressed over 70 per cent. "Good Times" dressed a small fraction more than "Advance;" he was riper, a year older, and they ought to dress a little more than the younger ones.

Question—As they get older don't they put on less meat for the food consumed?

Mr. Pierce—I don't know that I can explain that. I have fed lots of common cattle, but at the finishing period I don't think they would put on as many pounds. They don't eat so much towards the last.

A Member—Mr. Kerrick has always claimed that a steer always pays better for feeding the first twenty months than longer.

The Chairman—That is a rule that holds good in all classes of animals.

Mr. Thorp—We all know that the last pound that we put on an animal costs more than the first, of course, and the last one hundred costs more than the first one hundred, but the last fifty pounds, though it may cost more than we will ever get for the fifty pounds, makes the 1100 pounds that is already there worth another half a cent a pound, so we can afford to put on that last fifty pounds.

The Chairman—It is simply a question of feeding the animal into the highest price at the lowest cost, or getting him where the two margins come together, which depends on the individuality of your animals largely.

Mr. Arnold—I would like to ask Mr. Pierce what is the relative cost of a pound of beef, if he has fed that animal for beef from birth?

Mr. Pierce—I never kept track of anything of that kind.

The Chairman—Mr. Pierce don't run an Experiment Station.

Mr. Arnold—You can't make the farmers believe but what "Advance" cost you from fifty cents to a dollar a pound.

Mr. Pierce—It did not cost any more to raise him than common stock, except that he got a little more milk.

Mr. Arnold—Why did he sell for $1.50 a pound?

Mr. Pierce—I don't know; it was a great surprise to me.

Mr. Arnold—It was because of the superior finish that Mr. Pierce got on him.

RESOLUTIONS.

Submitted by the Committee on Resolutions and Adopted by the Institute.

Resolved: By the farmers assembled at the Seventeenth Closing Farmers' Institute, that we extend our thanks to the citizens of Oshkosh for their hearty welcome and generous hospitality, especially commending our host, Mr. W. H. Englebright, for his most excellent service and kind solicitude for the welfare of his guests.

2nd. Resolved: That we greatly appreciate the help we have had from Messrs. Cook, Wallace and Pierce, and Mrs. Armstrong, who come to us from other States, and regret that Mrs. Kedzie could not be with us.

3rd. Viewing with regret the tendency of the brightest and most promising of our country youths to drift from the farm upon the completion of their studies in our high schools, normal schools, and colleges,

Be it Resolved: That we favor the establishment and maintenance in our rural districts of schools that will furnish instruction sufficient to enable a farmer's boy or girl to become an intelligent farmer and useful citizen, believing that the trend of such training would be farmward instead of cityward.

To this end we favor State Supt. Harvey's plan of county training schools. We favor a township high school with a course of instruction so planned that the graduates and advanced pupils from our district schools may there complete their elementary studies and receive something of a training in agriculture and domestic economy, and at the same time enable them while receiving this advanced education, to board at home where they may be under parental restraint and guidance so much needed at the critical time of life.

We are in favor of the adoption of a uniform system of modern textbooks in the rural schools throughout the State.

Realizing the incentive of reward, we favor paying our rural teachers increased wages for services well and faithfully performed, and granting them a longer tenure of employment.

4th. Resolved: That we are inclined to Mr. H. E. Cook's belief, that sunlight, ventilation, and better sanitation in our stables will do more to stamp out that dread disease in our cattle, tuberculosis, than any legislation along the more commonly proposed lines can effect.

W. C. BRADLEY,
C. P. GOODRICH,
L. E. SCOTT,
Committee on Resolutions.

Closing Remarks.

Supt. McKerrow—Now, in closing this Institute, we must say that the weather here has been against us, and yet we are very well pleased, especially pleased to see so many of the representative farmers from different portions of Wisconsin who have traveled from twenty to two hundred miles on the railroad to attend this meeting. We are pleased also that we have had a fairly good local attendance, and we have to thank everybody who has taken an interest, especially those who contributed of their funds to secure this hall, to heat and light it, and the very fine list of premiums that have been offered for farm products. I think I can say for the exhibitors that they heartily thank the business men of Oshkosh for the prizes offered here.

Taking this meeting all in all, I think we can consider it very satisfactory, and after Mr. Hicks has read the list of prize awards, this meeting will be adjourned.

WOMEN'S DEPARTMENT.

COOKING SCHOOL.

Held at Oshkosh in Connection with the Closing Farmers' Institute, March 19, 20 and 21, 1901.

Conducted by MRS. HELEN ARMSTRONG, Chicago.
Assisted by DR. SARAH R. MUNRO, Milwaukee, Wis.
Stenographic Report by MISS FLORENCE Q. NORTON, Madison, Wis.

FIRST LESSON.

TUESDAY AFTERNOON, MARCH 19.

Mrs. Armstrong—I want first to say a word about the nature of this work and why it is done in connection with the Farmers' Institutes. You understand that we are not trying to give you a great deal in the way of actual cooking in these lessons. If you will look over the printed slips you will notice that the dishes are very simple ones and also very inexpensive. In a regular Cooking School you would expect to learn all kinds of cooking and everything which has to do with the preparation of foods and their selection. Where we have only two or three short afternoons for the work to be done we can cover but a little ground, and we aim to give the simplest dishes,—to give things we should have in our homes every day.

I think it is a very important point to have the dishes simple and inexpensive, for no matter how large a person's income may be, there is always a limit, and in each family there is a certain amount of money that must cover table expenses. The question is how to get the greatest amount of value for the money spent. In order to do that we must know something about foods and food values and their preparation, and what different foods will agree best with different members of the family. We must know something of the digestibility of foods, also. All these things require more or less thought in selecting and preparing food for the family. We know that our food influences our lives in a very large way. No matter how well educated a person may be, if he is not strong physically he cannot accomplish much, and physical life depends very largely upon the way we are fed. Women are now paying a great deal more attention to the subject of food for the family, because they have found the subject a very important one. We do not need such a variety of dishes, but the food should be well prepared and attractively served.

In our lesson this afternoon I am going on with the practical part of the work, and will prepare these dishes just as given in the formulas. I would like to ask one favor especially, and that is in regard to questions. I am here to talk, and fortunately I like to talk pretty well, but I do not want to do all the talking. I hope you will feel

free to ask any questions that may occur to you during the afternoon. I would rather have questions that I cannot answer than not have any questions at all. We will get a great deal more out of the afternoon's work by discussion.

Our program for this afternoon will consist of the following dishes:

Tomato Cream Toast.
Baked Sausages with Apples.
Luncheon Potatoes.
Popovers. Chocolate Pudding.

Remember that flour is to be sifted before measuring. The standard cup holds half a pint and all measurements are level.

Recipe. Melt three tablespoons of butter and blend with it four tablespoons of flour. Pour in gradually one and one-half cups of strained stewed tomatoes, and add a speck of soda. Season with salt and a little pepper; add three-fourths of a cup of hot cream and pour over toast. Serve promptly.

This is a very simple dish and very suitable for either lunch or supper. The tomato is prepared very much the same as for soup. At this season we have to use the canned tomatoes. I shall use mace and bay leaves, as they are very good seasonings for tomato. Cook the tomato with the mace and bay leaf and strain that, using the strained liquor in making this toast. The tomato has been scalded and the sauce thickened, and we will add a little of the soda. A speck of soda is rather an uncertain quantity. It is what you would take up on the end of a knife, or the size of a small pea. We use the soda with the tomato to prevent curdling. We cannot keep this mixture smooth very long after the two have been mixed. If you have your cream or milk hot and the sauce hot, you can serve them immediately. If they stand there is apt to be separation or curdling.

We use sauces for many different dishes, made either with water, milk or stock. To the melted butter in the saucepan we add the flour; when thoroughly blended we pour in the liquor. In making a large quantity it is better to have the milk heated. With a small quantity it seems hardly worth while, but it takes longer to blend the two when we pour in cold liquor. In making our gravies the more common method is to stir the flour and water to a paste and mix it thoroughly with the hot liquid, allowing it to boil. That is easier, but this way is enough better for the extra trouble it takes. We have a better flavor by mixing the hot butter with the flour and we can be more sure that the flour is thoroughly cooked, as it is cooking all the time that the sauce is being made. All of you have tasted raw flour in gravy. It is not only unpalatable, but very unwholesome, as flour is composed largely of starch, and starch cannot be digested until it has been thoroughly cooked.

In making the toast select partly-dried bread if possible. Baker's bread does very well for toast, because it is almost always lighter and dryer. So far as nourishment is concerned it is a very poor substitute, however. We find that when bread has been toasted it is much more easily digested than if eaten without toasting. This is because the starch is doubly cooked, as in zwiebach, for instance. Toast made for a sick person, in order to be easily digested, should be toasted dry all through.

We have a little foot-note at the bottom of the printed slips that have been passed around, giving the system of measurements, which are all level.

Pastry flour does not thicken quite so much as bread flour. Use the spring wheat flour and in using milk be sure that the butter does not brown before adding the flour to it. Be sure that the butter and flour are thoroughly blended before adding the liquid, and then pour that in gradually. A granite saucepan is much better than tin for sauces, as there is less danger of scorching, and it cooks less rapidly and more evenly. In adding the liquid, if the sauce becomes lumpy, take it from the fire and beat well before adding any more, and you can beat the lumps out. In doing this keep the mixture well scraped from the saucepan so that there will be no waste, and it will be perfectly smooth when taken out from the saucepan. We have this now about the consistency of ordinary tomato sauce, but we have not added the cream. This will bring it to the desired consistency. If you were preparing tomato sauce to use with meat, the sauce as we have it now would be the right consistency.

In making this sauce with milk or

cream we do not add any seasoning until the milk has been scalded, because sometimes the salt will cause the milk to curdle. Where we use lemon juice, as we often do, we are sure to have had the milk thoroughly scalded. In many sauces we use a beaten egg, especially in a sauce for fish or for cream codfish. If you let the sauce boil after the egg has been added, it hardens it immediately. It takes the least possible amount of heat to harden an egg. Albumen cooks at the lowest temperature of any food. We simply blend it with the sauce and heat it through.

You will find that it is very much better to dip each slice of toast in the sauce, than simply to pile the toast in the dish and pour the gravy over it. In that way you are not sure that each portion has been covered with the sauce.

In the matter of seasoning we always have to consider very largely the individual taste. In a family where there are small children it is not well to over-season the food. It is very easy for the individual to add salt and pepper to suit the taste.

Question—What amount of mace would you use in the tomato sauce?

Mrs. Armstrong—Just a little piece. Mace is a seasoning of which one can easily use too much. I used a piece the size of a finger nail. Five cents' worth of mace will last for a year or more.

Chocolate Bread Pudding.

Recipe. Soak one pint of stale crumbs in one quart of hot milk for half an hour. Melt two squares of Walter Baker's chocolate and add to this a little milk, two-thirds of a cup of sugar, a little salt, vanilla, and two slightly-beaten eggs. Mix all with bread and bake in a moderate oven three-fourths of an hour.

This is a very simple pudding, indeed, and one that is not only easily made, but the materials for it are always on hand. Most of us have chocolate or grated cocoanut in the house. Cocoa may be used in place of the chocolate, and it makes a less expensive dish. Cocoa will give the flavor without the richness. In cocoa we have the fat extracted from the chocolate. Chocolate is very nourishing. We often hear people say that they cannot use chocolate because it is too rich. I think that is very apt to be because the chocolate has been used with other rich food at a hearty meal. If you eat a hearty dinner and then add chocolate, you may feel the worse for it. Make the chocolate take the place of other foods. It is the combination of foods rather than the chocolate. While chocolate is harder to digest than cocoa, still it is so wholesome that it should be used very freely as a food and for a drink for children there is nothing more desirable than cocoa. We have in this not only a drink, but a food.

In this recipe we have the usual formula for bread pudding, with the addition of the chocolate, which gives it a richer flavor. We can vary this in other ways,—by using instead currant or raisins, or other dried fruits.

Soften the bread in the milk. You will have to use your judgment, as the cook books say, in the amount of bread to be used, or the proportion of bread and milk. If you have very dry bread it will absorb a great deal more milk than soft bread. So I have given you as a proportion a pint of dry bread to a quart of milk, using a larger proportion of bread if it is soft. I will pour the milk over the bread and set it aside for a time.

While I am waiting are there any questions?

Question—In making a dressing for fowl we are cautioned to use cold water. Is that so it will not be doughy?

Mrs. Armstrong—The cold liquid will soften the bread more evenly and thus give a better consistency. In making a dressing for fowl we make a mistake in using too much water. The dressing will be better if we make it quite dry. Do not make it very wet.

I will now go on with the pudding. I have here a half pound package of chocolate, which is marked off into eight squares. I will use two of these squares?

Question—How much cocoa would you use?

Mrs. Armstrong—I would use about half a cupful for this quantity. In making a cake, if you wish the chocolate flavor, sift cocoa with the flour, one-half or one-third of a cup. I have had excellent success in using cocoa

with cakes and puddings in place of chocolate, and it is easier to use on account of not having to grate it. A reliable brand like Walter Baker's is more ecomonical in the end.

I have here the bread which has been softened, and I will add to this a beaten egg, sugar, and the melted chocolate, a little salt, and the vanilla flavoring, although you need not use the vanilla flavor except in the sauce. This pudding may be baked in one dish or in two smaller ones. I shall use three small dishes in order to bake them more in less time and facilitate serving. It should bake slowly like custard. Mix the melted chocolate first with the soft bread, and then add the egg and sugar.

Question—How do you melt the chocolate?

Mrs. Armstrong—I set it in a bowl or cup into hot water or over the top of the teakettle.

CREAMY SAUCE FOR CHOCOLATE PUDDING.

Recipe. Cream half a cup of butter and beat into it one cup of sugar. Add one-fourth cup of milk gradually and flavor with vanilla. Heat over hot water and serve.

I have a half cup of butter in this bowl, which I have kept where it would soften some but not melt; just so that it will be easy to cream. Cream the butter thoroughly before adding the sugar, and add the sugar by degrees. For a hard sauce we prefer powdered sugar. With this either may be used and it may be heated over hot water. It is not to cook at all, but simply to be heated through. Where we have a very large proportion of sugar in proportion to the butter we sometimes add a little milk before adding all the sugar. The sauce may be made with a smaller quantity of butter than is given here. In this particular pudding we have no butter, so we use a larger amount for the sauce than we would in a rich pudding. By beating in the milk gradually we can keep a smooth consistency to the sauce. We are to have a hard sauce with our fruit roll Thursday afternoon, which will show the two kinds.

In heating this sauce you may set it directly into the hot water and stir it, or you may put it over the hot water. As soon as it is thoroughly heated it is to be served. Take pains to serve hot dishes on hot platters. I am often surprised in going into kitchens to find no good place for heating the dishes. Food depends so much upon the way it is served for its appetizing taste. We eat almost as much with our eyes as with our mouths. Our food will not do us the good it ought to if we do not relish it. Serve hot foods hot, and cold foods cold, having the dishes they are served in either hot or cold, as the case may be. If a sauce is to be cooked do not add the flavoring extract until after it is cooked, as so much of the flavor is lost in the cooking. The pudding should be put on the table in the dish in which it is cooked, the sauce being poured over it, or spread if a hard sauce is used, as it is served. This sauce can be used for almost any kind of a hot pudding.

Popovers.

Recipe. Beat two eggs lightly and mix with a pint of milk. Pour this gradually over a pint of flour sifted with a scant teaspoon of salt, and beat well. Fill hot greased cups or muffin irons and bake in a rather hot oven from thirty to forty minutes, according to size. Serve immediately.

In these popovers we have the simplest form of muffins. Even when eggs are high this is a cheap rule, because we do not have the expense of baking powder, shortening, or sugar, as we have in other kinds of muffins. The popovers are only crust when rightly made, but the crust is crisp and delicate, and the muffins should be served as soon as possible after they are ready because they will not remain light and crisp very long.

There are several things necessary for successful popovers. I do not know of a more popular muffin when properly made. First we must have a hot oven for the baking and fully half an hour to bake them. I use a muffin iron of small size. For larger irons it would take three-quarters of an hour to bake thoroughly. If you do not bake them long enough you have a soft muffin, which soon becomes tough; if thoroughly baked the crust is crisp and delicious. You can tell when they are done by lifting one from the iron,—

it should come out easily and feel very light. Have the oven thoroughly hot and heat the pans, using irons instead of tins. You can make them in tin gem pans, but they will not be nearly so light. In mixing the batter be sure to have the eggs thoroughly blended with the flour and milk.

I am sometimes asked if these muffins are good cold. If properly made you will have no cold ones, because they are so good they will all be eaten hot. It is necessary to make a generous supply, as people usually like them so well. In mixing, pour the liquid over the dry material, pouring gradually and keeping smooth. The batter is so thin that it must be comparatively free from lumps to be satisfactory. Any mixture which depends upon eggs for lightness must be very thoroughly blended. The actual work in putting together is very little indeed, the main things being to have a hot oven and plenty of time for baking. It is better to grease the irons after heating, as it does not take nearly so much grease as when cold. It is economy to use a brush in greasing, as a rag or paper soaks up the grease.

Question—Do you always use butter?

Mrs. Armstrong—No, it is not necessary; you can just as well use something else. Fat or oil containing no salt is really better.

Fill the irons as full as possible. For convenience I put the irons right down on the drop door when filling them.

Question—I would ask what form of a brush you use?

Mrs. Armstrong—I generally use a small paint brush which costs seven or eight cents. There are regular pastry brushes on the market, but any brush is inclined to shed the bristles after a short time, and it is just as well to get a cheap one and change it frequently. It is well to keep the brush in a covered cup, and it will keep sweet as long as the fat that it stands in is sweet. It is not necessary to clean the brush every time you use it. Scald it once a week with soda and suds. Soda is the housekeeper's best friend in the kitchen. It should be used for everything of this sort. After washing the brush rinse it thoroughly and dry. I have never had any trouble in keeping a brush sweet treating it in this way. The pastry brushes sell for thirty or forty cents apiece, and I have found that they do not last very much longer.

Question—Would you bake any other kind of food in the oven with the popovers?

Mrs. Armstrong—After the popovers were well started it would not make any difference. If there was any steam in the oven they would not be as crisp.

Sausages Baked with Apples.

Recipe. Butter a deep granite or earthen dish and place in it four apples cut in halves, with the skin side down. Place over the dish a wire toaster or rack and cover with sausages which have been well pricked. Cook from twenty minutes to half an hour, remove sausages to a hot platter and surround with the apples well drained.

I have given this particular dish for two reasons. Of course we do not approve of a very free use of pork, but there is no kind of meat that is a better friend to the farmer than pork. Many times it is possible to get it in the winter when we cannot get other kinds of fresh meat. Pork is harder to digest than other kinds of meat, but it furnishes a great deal of heat, and is therefore a very useful article of food in the wintertime.

The digestibility of an article depends in a very large sense on the individual who has to use it. One person can eat it where another cannot at all. Most persons who take a great deal of exercise and are in the fresh air can use pork satisfactorily. I would not give much pork to young children and I do not believe that people in school or offices should eat food of that kind. Underdone pork is very unwholesome for anybody, and in preparing it we must be sure that it is thoroughly cooked. In frying sausages, as a rule you find they are very greasy, and with large sausages, if you cook them long enough to cook through, the outside is apt to be overdone. In cooking on top of the stove the best way is to put them in your spider and partly cover them with boiling water, then put the cover on and let this water boil away. By the time the water is gone the sausages are almost cooked.

You can then finish them in the spider, browning them a little. This is an improvement on the frying, especially when you use large sausages.

Apples always make a satisfactory accompaniment to pork in any form. The apples are put in the pan and the sausages over them, or you may use a toaster, as I shall this afternoon. The fat from the sausages will drip upon the apples and baste and season them. They will taste very much as if fried in sausage fat. You can use sausages made in small cakes. If the apples need more cooking put them in first, about ten minutes. I am using greenings this afternoon. I shall put them in the oven a few minutes before adding the sausages.

Each sausage has been pricked in several places, so that the fat will have an opportunity to drain from them in the cooking and they will not burst in cooking. If you like the sausage flavor and find that the sausages themselves are too rich, I will tell you a way of preparing them which is very good. Use about half as much sausage meat as you would ordinarily for your family, and mix with it an equal quantity of bread softened in milk, and the milk drained from it. If you use stale bread soften it over night with cold milk, draining off the milk and squeezing it out. Mix with the sausage and a beaten egg, and make it into cakes. A great many people who do not care for sausage will eat it prepared in this way.

I will cook the sausages in the same heat I have for the popovers, cooking them in the pan below the popovers.

Question—Would you ordinarily bake something else at the same time with sausage; would not the odor make a difference?

Mrs. Armstrong—It depends a great deal upon the oven. We would not want one dish of a delicate flavor, such as custard, in the same oven with something that has a very strong odor. Milk, of course, takes up odors quickly, and more readily than almost anything else. It depends, too, very largely upon the construction of the stove you are using, as to what you can bake at the same time.

Luncheon Potatoes.

Chop rather fine, enough cooked potatoes to make a quart. Melt three tablespoons of butter or drippings in a saucepan and mix with the potatoes. Then add two tablespoons of flour and a cupful of milk. Stir well, cover and cook slowly for ten minutes. Add a beaten egg or two chopped, hard-cooked eggs. Season well and serve.

We have here a very simple way of reheating potatoes, and we find it necessary in our homes so many times to have warmed-over potatoes. It has seemed to me that the only way the average family thinks of warming potatoes is frying them. Many families never think of any other way for breakfast, and it is the most indigestible of all ways, because they soak so much grease and the crust formed is a tax on the stomach. In this recipe we have the potatoes cooked and chopped or cut in slices and heated in butter, milk and flour, which is simpler than making a sauce. A good way is to make such a sauce as we made for the toast, except that we use only milk, flour and butter, and mix the potatoes with the sauce. If you would like them baked, put them in the hot oven for a little while.

The dish I have this afternoon is simpler than this. We mix the chopped potato with the butter in the frying pan and add the milk to that. If we used less milk or cooked it longer we would not need any flour. In many dishes calling for butter, meat fat may be used instead. The butter is always an expensive article and in many dishes we can just as well use the fats of meats with it or in place of it.

Mix the potato thoroughly with the butter before adding the flour; then mix the flour with this, and add the milk or cream. If you use cream do not use so much butter. This must cook long enough to thoroughly cook the flour and have the mixture well thickened. The hard-cooked eggs may be used or not, as you like. If you have a very hearty meal you would not need to use the egg with the potato. In boiling the eggs, if the water boils furiously, the eggs are indigestible. Cook them for a long time at a low temperature. The beaten egg may be added just before serving the potato and will give a more creamy consistency. This dish is very satisfactory for breakfast when served with bacon either broiled or crisped in the oven.

SECOND SESSION.

WEDNESDAY AFTERNOON,

March 20, 1901.

HYGIENE IN OUR HOMES.

SARAH R. MUNRO, M. D., Milwaukee, Wis.

SARAH R. MUNRO, M. D.

It gives me pleasure, ladies, to be able to speak to you here today, though perhaps some of you may wonder why a physician, and a woman physician at that, should come to a Farmers' Institute, even though it be to the women's branch of the Institute.

A friend of mine in Milwaukee asked me what wild goose chase I was going on up to Oshkosh. I am not hunting wild geese. I am trying to find a body of women whom I can interest in a plan which I have very much at heart, and which I myself do not know how to carry out, and let me tell you how I happen to be *here*.

Why I Am Here.

Last year at the time of the Biennial in Milwaukee I attended the sessions held in the interests of the farmers' wives, and was deeply interested in what was said about the meetings held in different parts of this State to talk about art, and literature, and cooking, and so on, and it set me thinking, only being a doctor, and a woman doctor at that, my thoughts went in a rather different direction, somewhat like this: Why could not a series of talks, not lectures, be arranged on subjects of practical interest to mothers of families? Why might not groups of women be brought together to discuss with a woman physician, a woman, because generally women will ask questions more freely and probe deeper into special subjects if they have a woman to talk with—to discuss with a woman physician such topics as "The care of children in infancy," "The care of the infectious diseases of children," "The nursing of sick children," "The care of women during confinement," and later," "Family hygiene in general," and so on. But not being in the way of such things I did not know how to go about it. At last it occurred to me to write to Supt. McKerrow and propose the matter to him in connection with the Farmers' Institutes. He wrote that there was not enough money appropriated for anything of that sort, the cooking school was all that he could compass, but if he could manage it he would put in something at the Oshkosh "Round-up." So in February I wrote to him again. I did not want it forgotten, and he gave me a half hour today, which I took gladly, hop-

ing I might interest you enough to lead you to ask for something more next year.

A Plea for Mothers.

Now, some of you may ask why women should wish to have any such talks as these. Because, as I understand it, these Institutes are established to bring together once a year, farmers and farmers' families, to give them the benefit of the experience of others who are always studying and experimenting in the improvement of soils, the cultivation of vegetables and fruits, the raising of animals, to tell them of new methods, to help simplify their work, and to give to these busy people the satisfaction of telling what they have done, and why they have done it, and perhaps give them also, after their year's work is done, an opportunity of knowing each other personally.

But I think the women of these Institutes, who learn to make butter and cheese and other things without which good cooking is impossible, and good cooking of good food lies at the bottom of good hygiene and good health —the women of these Institutes need and are entitled to something more to help them in the raising of their little human animals, whose housing and feeding and clothing are sometimes not as much looked to as they should be. In the hurry and stress of daily living and working, the things that may be pushed aside are postponed, not that they are less important, but that the others are more insistent.

Our Homes—What They Should Be.

There is a side of this farming business which needs to be kept to the front just as much as the cows and the pigs, ensilage and big vegetables. The home is the unit of the nation. Whatever the home is, whatever the physical condition of those whom we send out from it, that will the nation be. In olden times when nations desired a race of strong, athletic men and women, they suffered only those children to live who, at birth, were apparently strong, healthy and well-developed. Like begets like, and our homes must be centers of intelligent care of the young, that whatever abnormal tendencies are born in them, or are contracted in early life, may be recognized in their incipiency and met by proper treatment. And to this end, all home hygiene leads. Food, ventilation, dress, exercise, hours of study, sewerage, care of the dooryard, all these are parts in a symmetrical whole, and eternal vigilance is as much the price of liberty in matters of health as in politics.

It is a fact that the boys and girls of the country, whether that term stands for farms or villages or small towns, are constantly pressing into the city. The ranks of the workers are recruited from the great army of those who till the soil, and whatever we can do to help the mothers of these boys and girls, in giving them good health, in making them strong, and in surrounding their early years with influences that shall count in adult life, that is the duty and privilege of those who themselves have all those helps for the taking. For mothers who live in cities there are lectures, classes, talks, and clubs, arranged by those who have had experience in matters that pertain to family life. I would like to see mothers in more remote districts have, as nearly as may be, help along the same lines. For instance, in many communities it must be necessary for women to render to each other, on occasion, help that is far from skilled, and were it not that Dame Nature intends all her processes to be healthful, and has a way of bringing mothers and their children safe through perilous places, we should hear more than we do of children left motherless, and mothers left invalid and disabled by the very conditions which bring them the highest joy in life.

Again, much might be done to avoid the blindness and deafness which are the portions of too many children, could mothers be taught how to care for, not only the newly-born, but the growing child subject to the various infective diseases that assail its early years. Everywhere do mothers and guardians of children need to learn that these infective diseases are not to be lightly considered—that it is not "just as well for children to have them and be over with it," but that on the contrary they are, in every way possible, to be protected from them, not only for the sake of their own health, but in order that each family shall do

its part of the great hygienic work of the nation in stamping out the diseases which are propagated by the carelessness and indifference which come from lack of knowledge. Often we hear of mothers who deliberately expose their children to chicken-pox or measles. They say that it is nothing, but there is hardly one of the contagious diseases of childhood which has so marked a tendency as measles to leave morbid conditions behind. Whooping cough, which is looked upon with the same indifference by those not taught to know its seriousness, is said to be third in the list of fatalities caused by all diseases, yet I have known mothers to put well children in bed with children sick of these diseases, that they might take the disease. Children with whooping cough are permitted to ride in public conveyances, to visit each other, in some places to attend school, and mothers never think of the wrong they are doing other children, or the sorrow they may be bringing into other homes. Mothers need to learn these things, and I believe would willingly learn, had they the chance, how to protect, not only other families, but other members of their own families, by proper quarantine precautions.

Typhoid Fever.

Perhaps I cannot do better to make this half hour practical as well as suggestive, than to give you briefly the chief points in the limitation and prevention of three of the trials of a physician's practice. The prevention of typhoid fever is a phase of home hygiene especially interesting and valuable to the farmer. This and tuberculosis or consumption, are diseases which are propagated by farm products. Thanks to the Farmers' Institutes, the latter is now pretty well understood and guarded against, but the care and prevention of typhoid fever are perhaps not so well understood by the farmer's wife. In this case it is she who is the responsible one, since, usually, she cares for, or at least directs the nursing of the patient. In the vast majority of cases typhoid fever is contracted by drinking water contaminated by sewage. Many local epidemics are directly traceable to this cause. The great epidemic in Plymouth, Pa., in which 1200 cases out of a population of 8000 occurred, was traced to the pollution of the water supply by a single patient. It is but a little while ago, that we had nearly an epidemic of typhoid fever in Milwaukee, and as we are required to report all such cases at the Health Office, it was not long before the attention of the authorities was drawn to the matter. Investigation was at once begun, and it was found that nearly all of the families having the fever took milk from one milkman, and through him the milk was traced to a farm where there was typhoid fever. If this family had known that even the hands could carry infection from the sickroom to the milk, and that liquids of any kind from the sickroom, poured on the ground might infect the water supply, that special epidemic with its expense and loss of loved ones, might have been spared. Raw vegetables, dishes, milk pans, or cans washed in water containing typhoid germs, may prove sources of infection. Articles of food may be contaminated by the soiled fingers of those who prepare it, or those who wait upon the sick, and the germs may be carried to food or milk by house flies, from discharges that have been allowed to stand uncovered.

Care and Prevention.

It will be seen from this that the indications in typhoid fever are first, to prevent any case from proving a source of further infection, and second, to rectify any unsanitary arrangement of any kind which might lead to the pollution of the water supply. As a disinfectant for discharges of any kind solutions of chloride of lime (giving 25 per cent. to the gallon), or a 5 per cent. solution of carbolic acid may be used. About a half pint of the carbolic acid mixture should be put in the bed pan before it is used, and afterwards the same quantity added, thoroughly mixing the whole. Let this stand, covered, for a couple of hours, and it may then be put into the privy, or water closet, or mixed with earth and be buried far from any water supply; or, in the country the discharges may be mixed with sufficient sawdust and burned. The bedding and clothing should be removed as soon as

soiled, placed in a pail or tub kept in the sickroom for the purpose, covered with a 5 per cent. solution of carbolic acid, and removed to the laundry and boiled in the carbolic acid solution half an hour. Then they may be washed with soap and thoroughly rinsed.

Scarlet Fever.

In scarlet fever, remember first, that scarlatina is not a mild form of scarlet fever. It is scarlet fever, and scarlet fever is scarlatina. Scarlatina is only the scientific name for scarlet fever. And remember, next, that the most malignant case of scarlet fever may be contracted from a very mild one; and finally, that in few other diseases are preventive measures more effective. The most important of these measures is isolation of the patient for at least thirty days. Some physicians say forty days, but it should be longer even than that, if desquamation (shedding of the skin) or purulent discharges of any kind continue. Then, disinfection of everything that goes out of the sickroom, of all discharges, the bed and body clothing, in a 5 per cent. solution of carbolic acid. Also, there should be a perfect understanding with the child that all toys, books, pictures, everything used for amusement, are to be burned when he leaves the sickroom. The nurse should be required to keep her hair covered, and if the mother be the nurse, and she must go to the other part of the family, she must keep a calico wraper for use in the sickroom and disinfect herself thoroughly before leaving the room. When the shedding of the skin is completed, and the child is ready to leave the room, he should have a carbolized bath and be put into clothes that have not been in the sickroom. Everything in the room that can be, should be boiled, the woodwork and furniture washed with carbolized water, and the room itself should be disinfected by the Health Board.

I might say here of diphtheria that its prophylaxis and quarantine are much the same as those of scarlet fever, but unlike scarlet fever, mothers are not apt to think they can carry their children through it unaided by skilled medical advice.

Small Pox—Vaccination.

Smallpox is the third of these diseases, and I presume no one wants to hear anything about it. Yet no age is free from its ravages. It takes its victims from all sorts and conditions of men, women and children, but for this as for almost no other disease known to man is there a preventive, to which every child that is born is entitled, and which should be an everlasting heritage from generation to generation without the loss of one connecting link. I refer to vaccination. I want to speak of this because I know there is a prejudice against it in some minds, but in these days when the vaccine is so carefully prepared, and such extreme precautions against septic or poisonous matter are taken, it seems to me no one should refuse to do his part of the great task which lies before our Boards of Health, to stamp out a disease so filthy, and so disfiguring in its results. And this help can be given by making it impossible for anyone to receive or hand on the contagion of smallpox.

Vaccine Virus.

May I tell you briefly how the vaccine virus is prepared? In the first place, special care is taken to select only healthy animals. This is done by a skilled veterinarian, and the animal is subjected to the tuberculin test. When it is admitted to the hospital, it is thoroughly cleaned with an antiseptic solution, and is then kept in a room constructed of such material that it is possible to cleanse and disinfect it after the manner of cleansing and disinfecting the operating rooms of modern hospitals. The area to be inoculated is cleaned and sterilized and from the time inoculation is performed until the vesicle is completed and the virus ready to be gathered, the animal is kept in a room where absolute cleanliness is rigidly enforced. After the virus is gathered, the animal is killed, and a careful autopsy made, to be sure that the animal was healthy. The virus is then subjected to bacteriological tests to be sure of its purity, and then to physiological tests to ensure its activity. Then it is enclosed in tiny glass tubes, hermetically sealed, and if the physician who is to do the vaccinating is equally careful of the cleanliness of his fingers and scarifier, and sterilizes the area to be vaccinated, the chances of infection are so small that they are

hardly worth considering. But even yet, there is something for the mother to do. Contamination may take place at the unprotected site of vaccination, at the time when the vesicle begins to itch or to inflame, and if a finger nail that is not aseptic, or underlinen that is not strictly clean, is used for friction, the introduction of germs is easily accomplished, and a poisoned sore results. And in the matter of finger nails, have not many of us heard our grandmothers say, "Don't scratch that sore with your finger nails, for they will poison it?" They knew the fact, but the reason was left for a later generation to discover. Therefore the vaccinated area should be protected by a cover which affords sufficient depth for the full vesicle, and has a central opening large enough to escape all points of irritation. Shields come now for this purpose, with a bit of transparent material in the center, through which the progress of the vesicle may be watched.

Re-vaccination.

Vaccination confers immunity for a certain period, but at just what time revaccination should take place has not been exactly determined. For five years after the first vaccination, immunity seems to be complete. Then if there be a suspicion of smallpox, I should say within a hundred miles, revaccination should be done, and every seven or ten years, at most, thereafter.

I have been thus explicit about vaccination because the steady spread of smallpox through the State calls for resolute measures to check it. The cases have mostly been very light, and in a measure that has served to spread the disease. Many physicians have never seen a case of smallpox, and when they are confronted with a light case they are not able to diagnosticate it from chicken pox. Unfortunately a very severe or even malignant case may be taken from a light one.

Sanitation of the Home.

These are but a few of the many sides of home hygiene that might be urged upon your attention. The sanitation of the home includes laying of drains, disposal of sewage, care of privies and vaults, the arrangement of living and sleeping rooms, the papering of walls, and just here let me ask anyone who has papering to do this spring, not to allow a yard of new paper to go on her walls until every inch of the old is removed. Few articles of house furnishing hold more germs, or germs of greater variety, than does old wall paper, especially that from bedrooms. The old song about love is equally true of wall paper: "'Tis better to be off with the old, before getting on with the new."

Care of the Dooryard.

The care of the dooryard is also an important matter, especially in the country, where provision is not always made for the disposal of waste water from various sources. I read, a few days ago, in a book called "Country Clouds and Sunshine," an amusing but very true illustration of this point. I think it was describing a New England farm when it said: "The farmhouse with its outbuildings, is usually so placed as to form a rough semi-circle opening toward the south. This gives a certain protection from winter winds. As a result, the snow disappears from the dooryard a number of days before it does from the surrounding fields; and no sooner is the snow gone than an unpleasant odor becomes apparent in the back door neighborhood, and shows that the ghosts of the slops it had been found convenient to throw out there during the winter are beginning to assert themselves. Mrs. Farmer, thereupon, declares that the yard has got to be cleaned up, and after the cleaning the odors subside to a degree."

But though much remains to be said, my paper must come to an end. I have tried to interest you for yourselves and for each other in these things that lie at the foundation of all right living. There may be obstacles to overcome. I think it is Frances Power Cobbe who tells the story of two men who were traveling on foot in Ireland and lost their way. Meeting a countryman they asked, "How far to Derry?" "Four miles," was the answer, "but as there's two of ye, that's but two miles apiece for ye." So, if there be enough to take the matter in hand, the proportion of obstacles grows less to each one who undertakes it, and I am a firm believer in the theory that what a woman

wants enough to insist upon having, she is pretty sure to get.

DISCUSSION.

Question—Do you consider a light case of smallpox the end of it? Could a person have it again after having a light case

Dr. Munro—Smallpox is like the other infectious diseases. Usually one attack ends it, but when there comes an epidemic, sometimes it does not prevent a recurrence. These infectious diseases are sometimes very curious things. While I was in Philadelphia studying medicine, there was a very severe epidemic of smallpox. People had it a second, and as far as could be judged, a third time. I remember one old lady who lived in one of the gardens that used to be so common in Philadelphia years ago. Her place was shut in by a high stone wall, and she had not been outside of it for years, yet she had smallpox. Where that woman took it nobody could tell. But ordinarily I think we may consider one attack of smallpox, as we may an attack of scarlet fever as a protection against a second one. Yet I have known children, though rarely, to have scarlet fever a second time.

Question—If one is vaccinated and it does not take, is he absolutely safe and sure of not taking smallpox?

Dr. Munro—No, the system may be brought under the influence of the virus by repeated vaccination. I have myself vaccinated and revaccinated children with virus that I knew was good because it had worked well with other children, and I remember one child that I vaccinated six times before it would take.

Question—If it had not taken the sixth time would you have felt safe.

Dr. Munro—No. I think one should be vaccinated regularly when smallpox is about.

Question—Do you think that any child that accidentally gets cowpox is affected the same as though vaccinated?

Dr. Munro—Yes, I have known children accidentally vaccinated through carelessness and supposed at the time to have chicken pox. That was the way vaccination was originally discovered. It was observed that persons who had kine pox never had smallpox.

Vaccine virus as it is used now is very different from what it used to be. I brought some of the newer points, as I thought possiby you might be interested in seeing them, and at the close of the session I shall be very glad to show them to anyone interested. They are too delicate to pass around.

I do not wish to be understood as saying that these helps to mothers or guardians of children might carry them through these diseases without the care of a physician. Far from it. I only want to give help to those who have to go through these infectious diseases without a physician. It sometimes happens in the country that one is not able to get a physician and these little hints will help in such cases. But if a physician can be had, that physician is first, and last, and all the time, the authority for vaccination and nursing and everything that pertains to the sick child. Nor do I wish the impression to go out that carbolic acid is the only disinfectant that can be used. It is the simplest and the least dangerous. There are many others used at the present day that should be used only under skilled direction. Carbolic acid is a disinfectant in such common use in families and is generally so well understood that I thought it safe to advise that to the laity even in very strong solution.

Question—What disinfectant would you use in consumption?

Dr. Munro—The same thing, but in consumption, of course, the contagion comes mainly from the sputum or matters ejected from the lungs. This should be taken on cloth or paper and burned. It should never be ejected upon the ground. A strong solution of carbolic acid should be put in a paper cup, such as is now made for the purpose, and it can be put in the fire and burned. This cup should be kept covered.

Question—Can a child have scarlet fever a third time?

Dr. Munro—It might a second. I do not say it might not a third time, but such cases are very rare. It is like the rare cases of smallpox. Ordinarily in these diseases the first attack is preventive against another one.

In the matter of smallpox let me say just a word. For some it seems to be

a fashion not to believe in vaccination. Of course, vaccination serves as a protection only for a limited period. Revaccination should be as compulsory as vaccination. I believe it should all be compulsory.

Question—Do you think that the mildness of the type of smallpox we are having this winter has anything to do with vaccination in previous years?

Dr. Munro—It might have. Revaccination was made compulsory in the Prussian army in '34, and from that time the mortality from smallpox in Prussia was insignificant. In the years from 1826 to 1836 deaths from smallpox were in the proportion of thirty-six to every hundred thousand of the population. In '86-7 they were less than one in ten million.

In India the average annual mortality from smallpox at Madras from '71 to '84 was 1457. In '83 vaccination was made compulsory, and during the years from '85 to '90 the mortality was but thirty-five.

Question—Is it not a fact that smallpox is one of the least contagious of the contagious diseases? Dr. Russell, bacteriologist of the State University, had a list made out and it showed it to be.

Dr. Munro—That may be possible, but I think it is not generally so considered.

Question—Won't you please tell us how to furnish a sanitary bedroom for people of moderate means, who would like to have it neat and attractive, yet sanitary.

Dr. Munro—Let me think about it a moment.

Question—You would not put paper on the walls, would you, nor carpet the floor, and you would have iron beds instead of wooden beds?

Dr. Munro—Yes, all of these things.

Question—Will the lady tell us why iron beds?

Answer—They can be so much more easily cleaned.

Mrs. Armstrong—Do you not find that all physicians are handicapped in getting mothers and those who have the care of the sick to realize the necessity of cleanliness from a physician's standpoint?

Dr. Munro—Yes, from a scientific standpoint. Housekeepers know the value of soap and water, but physicians know that soap and water will not kill the germs that it is desirable to kill.

I find it very hard with some of my German patients to make them understand what I mean by *boiling* water. Boiling water to kill germs must be used at the moment that it boils,—must be absolutely boiling.

I have oftentimes found it hard, in cases of scarlet fever or measles or a disease of that kind, to establish a quarantine in the house. I have had to fight a great many battles with the mothers and my little patients to accomplish that. But I have never yet, I am quite proud to say, had two cases of scarlet fever in one family, except where the infection was in both cases taken from the same source.

Question—How will measles be carried?

Dr. Munro—In the breath usually, but also from the sputa and the discharges from nose or eyes.

THE CARE OF THE HOME.

MRS. HELEN ARMSTRONG, Chicago.

A well-kept house may be homelike, or it may not, but other things being equal, a home that is comfortable, attractive and well cared for has a great influence on the happiness and well-being of the family. When this result is obtained without apparent worry or overwork, and the wheels of the domestic machinery run easily, housekeeping has been mastered, instead of being master.

Many women become such slaves to their work and its regular routine that the entire family is in a constant state of discomfort, and the bugbear of everlasting scrubbing and cleaning drives away all ease and pleasure.

Work for All.

The first essential of a home is a cooperative spirit between the members of the family. A selfish spirit is easily fostered where all the responsibility falls upon one pair of shoulders. No matter how slight the task, each one should feel that he can be of some use in the home, and even young children may learn to be very helpful, and what is more important, thoughtful for the comfort of others. I think I can hear a protest from some mothers right here, either saying that children should have a good time while they are young, as cares come soon enough; or that it is easier to do a thing one's self than teach another to do it. I admit the point in both arguments, but would ask if it is not worth something for children to learn their power of usefulness and a certain sense of responsibility, be it ever so slight? This may be taught without in any sense curtailing youthful pleasure. An anticipated treat is more fully enjoyed after the set task has been cheerfully performed. So I would make a plea for the help of the children in the home, boys as well as girls. Every little helps, and an hour's rest for the mother, either for a new book or magazine or a little outing daily, is surely worth this labor to them, in her added strength, pleasure and possibilities of companionship.

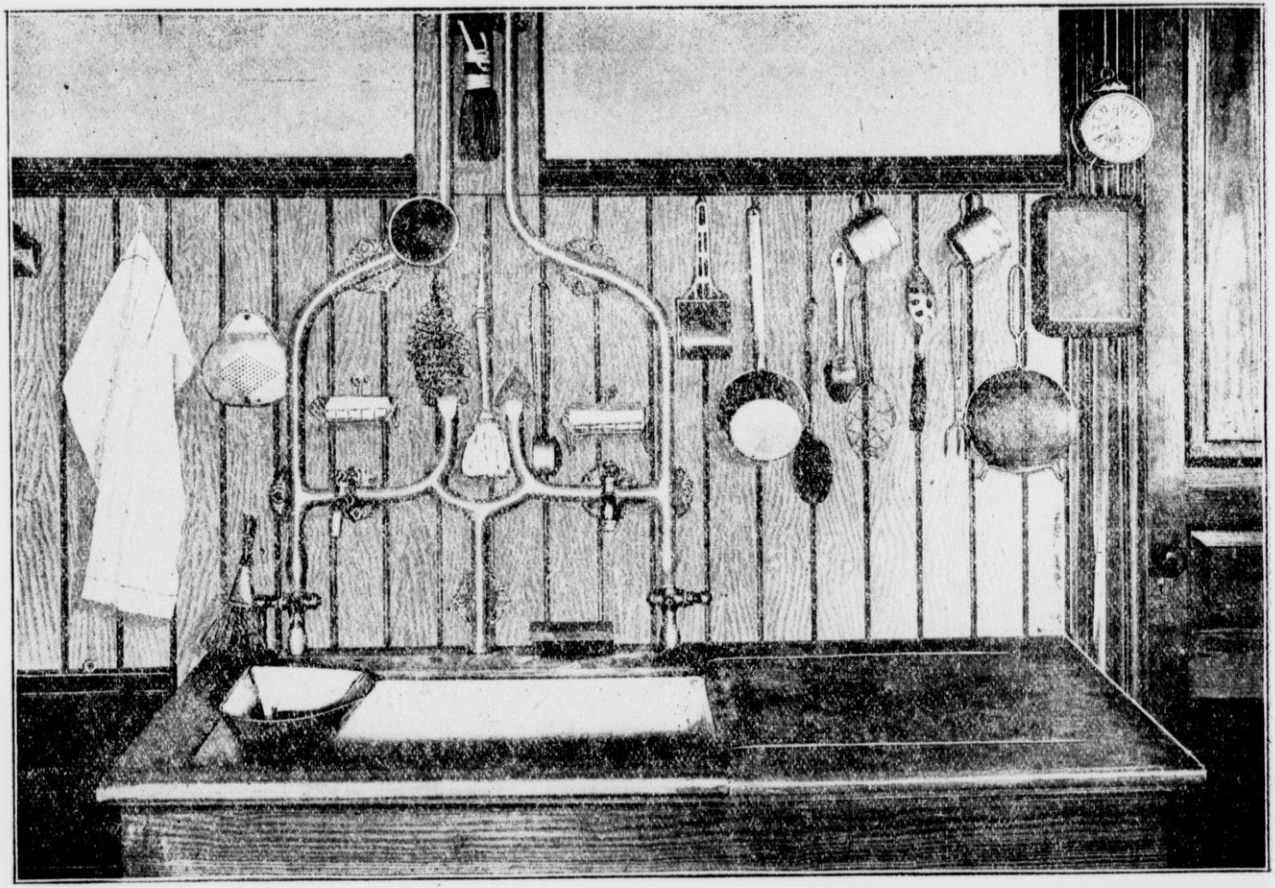
Building a Home.

So much for the theory in the care of a home; now let us consider the subject from a practical standpoint. In our modern papers and magazines we see many plausible articles on building good homes for small sums of money, and most of us have fancied just how delightful this might be, had we the means. The fact which the average family has to face is that here is the home which we must live in,—how can we make the best of the material at hand?

There are so many valuable treatises on home building that I will not spend time discussing plans which we may not follow. A person who contemplates making a home will consult proper authorities on the subject of site, drainage, exposure, building material and arrangement of the house. The importance of thick walls, plenty of sunlight, a dry, well-ventilated cellar, sufficient sleeping room, simply finished woodwork, the best plumbing and easy stairs, each and all can hardly be overestimated; but our time to-day must be confined to the practicable improvement of existing conditions.

The Cellar.

We will begin at the bottom and call attention to a few of the more important items regarding the cellar. A cement floor is to be desired if possible; the next best thing being a clay covering. A clean, dry space for a storeroom must also be considered, the sides to be shelved for canned fruits, etc., and ample bins on the floor for dry vegetables. Take great care that no particle of decayed matter lies in the cellar. Carelessness here may result in a siege of typhoid fever or diphtheria. Musty rags and damp refuse are equally dangerous. Whitewashed walls facilitate both cleanliness and a dry surface, while a box of chloride of lime may be frequently renewed there to good advantage. To insure pure, dry air in the cellar open windows there at night and close them in



SINK WITH CONVENIENT ARRANGEMENT OF UTENSILS, ETC., FOR DISHWASHING AND COOKING. SINK STRAINER AND BRUSH IN CORNER; SOAP, SAPOLIO, DISH-MOP, SOAP SHAKER AND IRON DISH CLOTH OVER SINK, WITH BRUSH RESERVED FOR CLEANING COFFEE POT ABOVE. VEGETABLE PRESS DIPPER, SPOONS, CUPS, STRAINER, CLOCK, SLATE, ETC., ON BRASS HOOKS AT RIGHT. A SMALL HAND TOWEL PLACED HERE IS MORE DESIRABLE THAN THE USUAL ROLLER.

the morning before the sun becomes warm. When possible, locate the storeroom near the stairway, and the latter should be well lighted, with broad, easy steps.

The Kitchen.

The kitchen next claims our attention. Either very large or very small kitchens are equally unsatisfactory. It is quite as hard to work in a large room requiring many steps as to manage in a crowded place. Plenty of light in a kitchen is a necessity, with a convenient arrangement of table, sink, pantry and range. Do not economize in buying the latter, as a good one will last a lifetime, insuring not only better results in cooking, but an even disposition in the cook,—a condition most devoutly to be desired!

The Kitchen Floor.

Have a floor surface that is easy to clean, if not of hard wood and well oiled, see that it is stained and varnished, or a linoleum covering, if expense does not prevent, is even better. A large sink makes dish-washing much easier and dish breaking less likely. Convenient hooks placed above the sink to hold soap shaker, mop, brush, cups, spoons, etc., will save many steps and a shelf for clock, lamp and cook books is desirable. If an old hanging book shelf be available it may be utilized here for spices, extracts, coffee and tea, a washable curtain keeping out the dust as well as concealing the contents. Every contrivance to save time and energy adds pleasure and a stimulus to the day's labor. Cover the kitchen table with oilcloth, as it is easy to clean and quite inexpensive. Tack a slate, with a pencil tied to it, near your work table, that various items may be jotted down as they come to mind. This will save much annoyance and delay in renewing household supplies otherwise overlooked.

Ventilation in Kitchen.

The ventilation of the kitchen is very easy if there is a transom over the kitchen door, or the windows can be lowered from the top. In the latter case screen them all over, instead of the single sash. Place the refrigerator as near the kitchen as possible and keep it scrupulously clean and dry. If an old-fashioned one, with zinc floor, you will find that clean paper spread on the bottom will simplify keeping it in good condition. It is easily renewed when anything becomes spilled and if you try the experiment you will continue to use it. Remember that the coldest part of the box is at the bottom, so keep butter and milk there, closely covered, as no other foods absorb odors so readily. Do not keep any foods in the top with the ice, as they are likely to give odors to the whole box, and the more often this part is open the greater the waste of ice. When putting in the ice supply bear in mind that it is poor economy to use a small piece each day; keep the space well filled and it will consume less ice in the end. If the drinking water in hot weather is not cold enough without ice, it is well to keep a half-gallon fruit jar filled and near the ice, instead of using ice in the water.

Kitchen Utensils.

In furnishing the kitchen buy utensils of good quality, even if their number at first must be limited. A good grade of granite will outwear several sets of tinware, and except for a few articles not used in actual cooking, the latter should be avoided. A generous supply of dish towels, both light and heavy, and holders to use about the stove, all enhance the comfort of the worker. A dish drainer may be readily constructed by anyone handy with tools. This will hold all plates and saucers and a plentiful supply of hot water for rinsing will give a brighter surface than if wiped, and save much time.

The Kitchen Sink.

See that the sink is frequenty flooded with boiling water containing washing soda, and pour no grease into it at any time. A sink strainer is another desirable convenience, and if not obtainable at the neighboring store a very good substitute may be made by punching holes in a discarded tin saucepan. Either of these will prevent the drain from being clogged with coffee grounds and other refuse, and insures dry garbage. The latter must never be thrown out near the house, and if it cannot be burned up, it would

better be put into a covered receptacle outside the door.

The most desirable finish for a kitchen wall is paint, which can be wiped off frequently. The steam of cooking will ruin wall paper, and calcimining soon becomes soiled and smoky. The paint costs more, but lasts enough longer to more than pay for the difference.

The Dining Room.

The dining room ought to be a most cheerful place. Here the family gather either two or three times a day for a pleasant half-hour, and the surroundings should be attractive. We cannot all have delicate china and fine silver (which is such a care), but we may have plenty of sunshine, a homelike room, an inviting table and wholesome food. A few plants may be grown here to good advantage. Even our low-priced china now comes in graceful shapes and pretty designs. Have nothing too fine for daily use. Why save all our best things for our neighbor's edification? Keep the dining-room only at a moderate temperature and air it well daily, regardless of weather. This may be done right after breakfast when the room is brushed. If you *will* have carpets on the floor, use a carpet-sweeper, as it saves one's strength and diminishes dust; but a stained or painted floor with a large rug is more sanitary and easier to keep clean. Please note that I say to keep clean, not *seem* clean. There is a vast difference between the two conditions.

The Hall.

If possible a hall should be something more than a dark passageway. It is the opening into your home, and a bit of color and cheerfulness here is a good indication of what is to follow.

The Living Room.

Let your living room be a living room, not a collection of stiff, uncomfortable furniture, worse than useless draperies and ornaments, that are neither a pleasure to the eye or a joy to the care-taker. I often wonder why it is that so many people seem to furnish their homes, especially the parlors, as a display for other people. Ask yourself, when doing your planning, if the room is to be for your family or for your neighbors. Let comfort come first, and of course such beauty as that may include. Give the sunlight free entrance, not fearing the pattern on your dust-harboring carpets. Have no draperies which cannot be washed and cherish fresh air as your dearest heritage. If you have good pictures, which are now within the means of very modest incomes, let their beauty be not overshadowed by conspicuous wall-paper. Whether in *style* or not, the plain cartridge paper is a most effective background for both pictures and ornaments. Avoid heavy upholstered furniture as hard to handle and a collector of dust and germs. Be as comfortable as you like with light cushions, which may be readily laundered, or often aired in the sunshine.

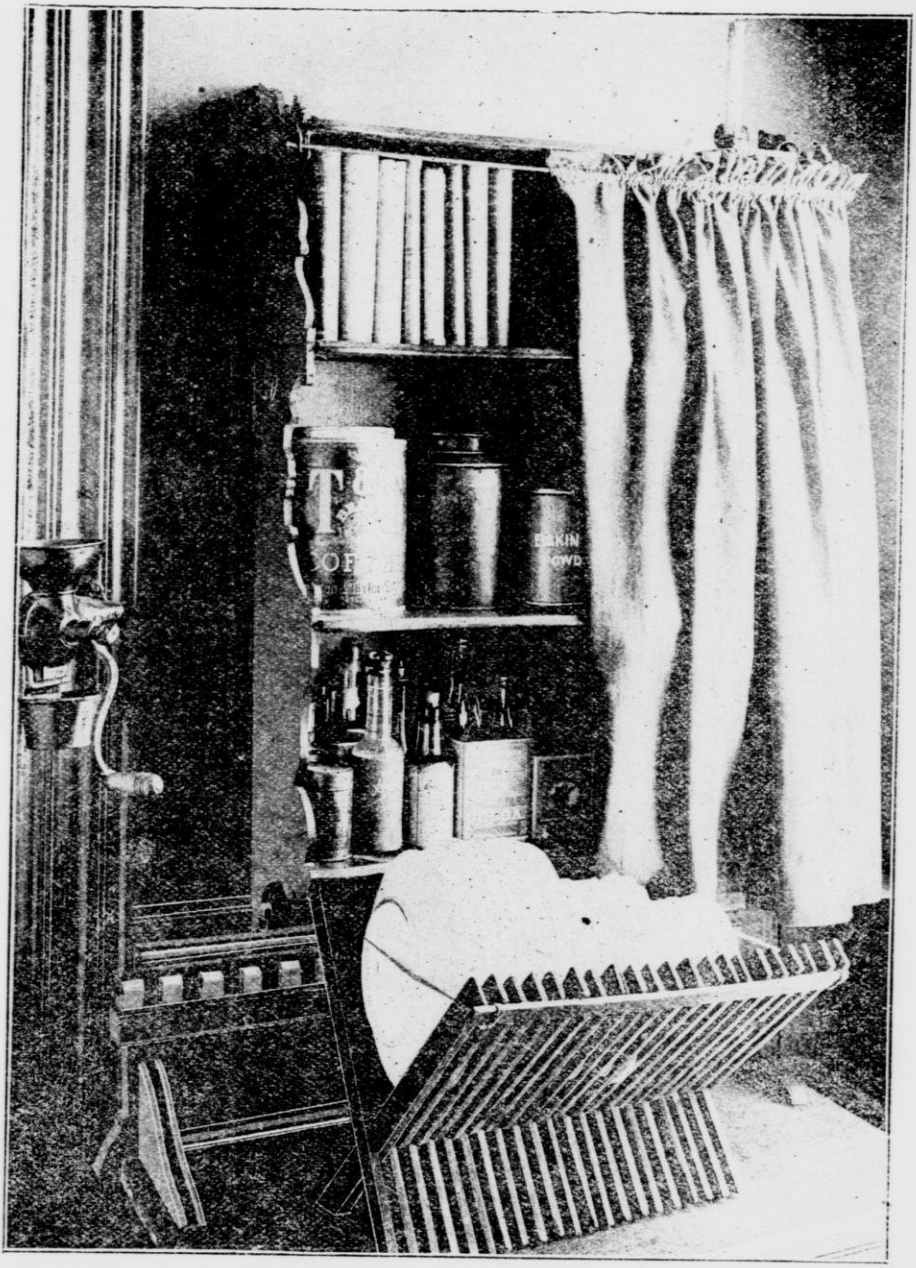
A good matting is the best floor covering possible, while a cheap matting is the poorest investment. Given a firm one, with a neat pattern and a few rugs, and your floor is both a pleasure and a comfort. The amount of wear this will give depends largely upon the care given it, wiping with a damp cloth frequently being the best treatment.

Bed Rooms.

In our bedrooms, painted or stained floors with rugs are an ideal arrangement. Matting may also be used if one cannot become accustomed to a bare floor. A sleeping room is not supposed to be a sitting room, and really needs no furniture but the bedroom set and perhaps a table. A cheerful wall paper can be used here, but remember that a striking design, if there should be sickness in the room, will be a constant annoyance to the invalid. Delicate colors and tracings of flowers are better than conventional designs in a sleeping room. If obliged to economize on your bedroom furniture save the money on the bedstead rather than on springs, mattress or bedding. A firm spring insures healthful rest and light, warm bedclothes are preferable to heavy comforters which tire instead of rest the sleeper.

Fresh Air for Bed Rooms.

Always be sure of fresh air in the bedroom both night and day and in all seasons. On rising in the morning, have the bed and room thoroughly



CORNER CUPBOARD IMPROVISED FROM BOOK SHELVES. COFFEE MILL ON THE LEFT, DISH DRAINER BELOW AS IT IS USED IN THE SINK. THE LATTER IS MADE OF CLEATS AND FOLDS TOGETHER WHEN NOT IN USE.

aired before putting the room in order. Do not encourage an ambition for an early-made bed. Turn the mattress frequently, have pillows as low as can be comfortably used, and sheets of ample size. Nothing is more conducive to a wakeful night than bedclothes too short to remain in place.

Closets.

Capacious closets are luxuries greatly to be desired. With plenty of space for both hooks and drawers, it is an easy matter to keep one's clothes in order. The coat-hangers which are now sold so cheaply are a great help in preserving the shape of garments. Do not neglect the thorough airing and brushing necessary to clothes worn in warm or dusty weather, before putting them away. The old proverb, "A stitch in time," etc., is here applicable.

A conveniently planned home, with simple furnishings and systematic management in the care of the same, means housekeeping reduced to its lowest terms. Much might still be said regarding the care of furniture and woodwork, the selection and preparation of foods, sweeping, dusting and cleaning. A whole chapter might be spent on the laundry alone, but time forbids. If you are thoroughly interested in these subjects and wish to know the best ways in our modern housekeeping, I would refer you to a book called "Home Economics," written by that pioneer in domestic science, Miss Maria Parloa. Many works have been written on these lines, but this is one of the most comprehensive and practical and should be in every home-maker's hands. A good magazine on household topics is a constant help and incentive. The American Kitchen Magazine fills the bill admirably, being written for the busy, practical housewife as well as for the student of domestic economy.

Do not Worry.

Do not be discouraged by the amount of work to be done. If women only did the work necessary at the time, much misery would be avoided, but the average woman worries about to-day and to-morrow while the morning has scarcely begun. "It is not work, but worry, that kills." We are still impressed with the old adage that "Man works from rise till set of sun, but woman's work is never done." No hard and fast rules can be formulated for the housekeeper. Each woman has her own individual family and conditions to consider. Do not sacrifice the family for the scrubbing brush and remember that a cheerful spirit will surmount many obstacles. Few of us live up to our ideals, but that is no argument against progress. Bear in mind Oliver Wendell Holmes' words, "The great thing in the word is not so much where we stand as in what direction we are moving."

DISCUSSION.

Question—Would you advise washing the dishes after every meal or would you pile them up and have a regular dish-washing time.

Mrs. Armstrong—In exceedingly hot weather that is the hardest part of the work when night time comes. We can stand it all day, but we would like to feel when we get up from the table that our work is done. The supper dishes are sometimes the last straw. It depends upon what we have to do the next day. I would not leave silver to stand over night. It has often seemed to me when I did leave dishes over night during hot weather, that it was harder to get up in the morning and see the dishes standing there waiting. Except for small families I do not think it a very good practice.

Just a few words about dish washing. So many people have an idea that dish washing is such disagreeable work. It is not the pleasantest work in the world. Every housekeeper should have washing soda at her sink and use that for the very greasy dishes, also thoroughly rinse and scrape the dishes before washing. It takes more time to get ready, but the washing is not half such hard work. With plenty of hot water, soap and a dish mop one can do a great deal without putting the hands in the water at all. I use a dish drainer, which saves much wiping. Well washed dishes are then rinsed with boiling water and drain dry and bright very quickly. Wash the cooking utensils first, getting the worst part done and out of the way.

Question—Do you wash the dish towels when you get through?

Mrs. Armstrong—I think the care of the dishcloth and dish towels is very important. There is a honeycomb material which is splendid for dishcloths; it comes for that purpose and costs four or five cents a yard. The dish towels and cloth should be very thoroughly washed after the dish washing is done if they need it, but if your dishes are washed clean before they are wiped you will not have unsightly dish towels. In wiping silver, it will be brighter if wiped right out of soapy water than if you rinse it first. I would have enough dish towels to change them frequently and put them into the regular washing each week for thorough boiling.

Question—How about using dish towels for holders?

Mrs. Armstrong—If you do not have anything in your kitchen to use for a holder, the towels will certainly be used, and you can't complain if they are spoiled in this way. The best thing is a square of denim with a brass ring in the corner, so that it may be hung within reach of stove. Make it at least half a yard square so that a hot dish may be easily held.

Question—Is there not time saved in cleaning the cooking utensils at once?

Mrs. Armstrong—That depends upon what you have to do before the meal. I put my cooking utensils into the sink and fill them with water immediately. Plenty of water is an important need in the kitchen.

Question—Please tell us just how you wash dishes.

Mrs. Armstrong—Taking it for granted the utensils are already washed, I would start by putting into the dishpan boiling water from the kettle, making a good suds with my soapshaker. The water is so hot I cannot put my fingers in it. I take the glasses one at a time and roll them through the water, wiping each one immediately. Glasses may be washed in one-tenth the time in that way. You will only break the glasses by pouring the water over them or setting them into the water bottom down. Tip each one up and roll it through. Old tablecloths cut and hemmed make fine glass towels. After the glasses are out of the way take the silver, or the cups and the pitchers. Of course with the silver we must have the water cool enough so we can put the hands into it. A dish mop which you can buy for ten cents will save your hands a great deal. If you have had milk in a glass rinse first with cold water. Silver wiped from the hot suds will not require so frequent cleaning. A few drops of ammonia once in a while is a good thing to use. Pile the plates up in the pan so that the water will cover them. The hotter the dishes are the less time it takes to dry them.

Question—Now tell us about the chamber work.

Mrs. Armstrong—I am glad you have asked the question about the care of the bedroom. It does not trouble my conscience if my beds remain open all the morning. You may think that a scandalous way to keep house. We make a great mistake when we have our beds made up as soon as we get through breakfast. The windows should be opened and the clothes thrown back as soon as we are up. I would always teach the children not to leave their rooms until that is done. In the care of the chamber outfit it is not enough to have the different articles rinsed with cold water. They should be thoroughly rinsed with hot water after they have been used.

Dr. Munro—In emptying chamber slops, never let them be emptied into the receptacle that stands in the room for slops from the bowl. Many people use, for instance, a small tin pail in the room to put the dirty water into. When they are ready to clean the bedroom they turn the slops from the chamber into that pail. Have a separate pail for this, and put into it some deodorizing preparation,—permanganate of potash, or Platt's chlorides.

I would like to say one thing more to the ladies before the meeting breaks up, because there are so many more here now than when I began. I would like them to remember that my address here this afternoon is not simply for the purpose of creating interest for the afternoon, but because I want to inspire, if possible, an interest in the subject to the end that something of this sort may be done in the regular Farmers' Institutes as they are to be held next winter in various places in the State. That is the thing I wanted to do last winter, but, as I say, I did not see my way clear, and Mr. McKerrow wrote

me that he had no money to do it with, so that in a way I might say that I invited myself up here. I thought it would be such a good thing if talks, not lectures, of this kind could be carried into the isolated communities and given there to mothers of families. I hoped I might interest somebody enough to take up the matter and try to carry it through next winter.

A rising vote of thanks was tendered to the speakers of the afternoon by the ladies present.

THIRD LESSON.

THURSDAY AFTERNOON,

March 22, 1901.

Mrs. Armstrong—In opening the lesson this afternoon I will repeat the bill of fare which you will find upon the printed slips that have been handed out, and which is also included on the Institute program:

Whole Wheat Bread.	Turkish Rice.
Corned Beef Hash.	Cheese Fondu.
Fruit Roll.	Hard Sauce.

TURKISH RICE.

Recipe.

Wash thoroughly three-fourths of a cup of rice and cook in a double boiler with a cup of water and a pint of strained tomato (or use tomato pulp with more water). Stir gently with a fork several times during the cooking; season and add two tablespoons of butter when rice is perfectly tender. Serve in a vegetable dish and sprinkle well with grated cheese, if desired.

It may be well to spend a few moments in talking of rice and other starchy foods. Rice, macaroni and spaghetti are all starchy foods and as a rule should be very thoroughly cooked in a large quantity of boiling water. For the dish which I am going to give you this afternoon we use tomato with the rice in place of water. The recipe says you may use the juice drained from a can of tomato or tomato pulp. It is sometimes more convenient to use the pulp. You could use the tomatoes as I did yesterday, straining off the juice and keeping it to use a day or two later for rice cooked in this way. Season it to suit the taste. This dish gives a very much better flavor than the rice simply cooked alone. Most starchy foods have very little flavor. There is a great deal of nourishment in them, but we usually find it necessary to put something with them which will have a decided flavor or character of its own. That is one reason why we almost always use cheese. You may prepare the rice the same as you prepare macaroni.

Just one word about the cooking of these pastes, as some things about them are not always understood. The same directions apply to the various forms, macaroni, spaghetti and vermicelli. All should be cooked in a large quantity of boiling water. Do not make the mistake of putting them to soak. The starch is soluble in cold water and you will lose a great deal of its value, so put these pastes in boiling water. Macaroni as a rule is apt to stick to the kettle and is very troublesome on account of scorching and sticking. If you use a large kettle and plenty of water, kept constantly boiling, you will have very little trouble in that way. Stir frequently during the cooking and scrape well from the bottom. When thoroughly cooked it should be very tender, then drain off the water and cover with cold water. Sometimes it is more convenient to let it stay in cold water for some time, and there is no objection to this after the cooking is done. When ready to use drain well, and proceed as if it were just cooked. For rice we may use milk to cook it in or water or stock or tomato, allowing plenty of time for cooking. It should not be cooked directly over the fire with milk because it would scorch, so in that case we use a double boiler or one

kettle set into another. It requires very little attention, is easily prepared and we may have a variety in the way of seasoning.

We are often told that Americans use too many starchy foods and that our diet is too one-sided. Very many times we do not realize what these starchy foods are and use an excess in one meal,—too many articles of a similar nature. There is no reason for having rice and potatoes at the same meal or macaroni with potatoes. We might very well omit the potatoes occasionally and use macaroni or rice or spaghetti in their place.

If you wish to make some dish with cold cooked rice, put the rice to soak in cold water and pour it off when you want to use the rice. To make muffins for breakfast the next morning, you will find it easier to use in this way.

Question—Is not macaroni a more valuable food than rice?

Mrs. Armstrong—Yes, because we have the gluten in that to a larger extent than in the rice. It takes a good deal of rice to get the proper amount of nourishment. An hour is none too long for cooking rice in a double boiler. Sometimes it takes longer than that. Rice is one of the things that is not injured by standing. Better get it ready too soon than to hurry the cooking. The only way to keep foods warm is to set them over hot water. If placed in the oven food becomes dry and unpalatable. After the rice is taken from the double boiler it should be put in a baking dish, sprinkled with grated cheese, and set back into the oven long enough to melt the cheese, when it is ready to serve.

WHOLE WHEAT BREAD.

Soften one cake of compressed yeast in one-fourth cup of water. Sift a scant quart of whole wheat flour into a bowl, with two teaspoons of salt and one-fourth cup of sugar, and make into a batter with a pint of warm milk and the yeast. Beat well and work in sifted flour until the bread can be handled lightly on the board. Place in greased bowl, cover well and raise in a warm place. Shape into two small loaves when light and bake in a moderate oven about forty-five minutes, brushing with soft butter just before placing them in the oven.

I will go on now with the mixing of the bread. I have here the compressed yeast and shall break this into small pieces and soften it in luke-warm water, never hot, then go on with the mixing of the flour, water and milk. I have put into the bowl a little of the sifted flour and the salt and sugar and the wetting, using part water and part milk, which is luke-warm. I will add the yeast, stirring in the flour thoroughly and constantly, and then will mold it on the board.

We have a good many things to consider in our bread-making, a good many materials to use, and it is very important that these should be good. First we have to consider the yeast. The yeast must be fresh and lively. The longer the yeast takes for the work, as a rule, the poorer it is. And for that reason wherever it is possible to get it we prefer to use compressed yeast, not only because it does the work in less time, but because it is a purer yeast than any other kind. In almost any community, even though very small, some dealer will supply the yeast if he knows how many customers will want it on a certain day.

Question—How long will it keep in the refrigerator?

Mrs. Armstrong—I have used yeast five days old with very good success where it was kept cold, but it is better if kept only a day or two. I once had to use yeast that had been frozen perfectly solid. If yeast is fresh when you first get it you can keep it in any place that you can keep milk, for several days.

Question—Will it work if it is frozen?

Mrs. Armstrong—Yes, but one would hardly advise freezing. Yeast is a plant that grows like any vegetable by the aid of warmth and moisture. Like a plant, it is very susceptible to changes of temperature. It is important in our bread-making to keep it as nearly as possible at a uniform temperature. Yeast does its best work at a temperature of from 70 to 80 degrees. You notice that in softening the yeast I broke it in small pieces and poured the luke-warm water over it. With the dry yeast or yeast cakes we have to allow more time for the softening and also much more time for the raising.

For the wetting we may use water

or milk or the two together. For whole wheat flour we like to use milk entirely, because we do not use any shortening. This wetting should be luke-warm and we always figure on allowing one-half pint for each small loaf, so that a quart of wetting would make four medium-sized loaves or three good-sized loaves. We prefer the small loaves because we can bake them more perfectly. If the milk is scalded and cooled you are less apt to have bread which is at all sour. In our bread-making we do not measure flour, we measure water. The flour varies so much that exact quantities could not be given.

After considering the wetting and the yeast we come to the flour. For making white bread we find spring-wheat flour far more satisfactory. We have more nutriment because there is a larger quantity of gluten in it. The larger amount of gluten in the flour the more nourishment we get. With the spring wheat the bread is easier to handle; it is not so sticky and does not require so much kneading. Be sure that the flour has been sifted first. Never use a particle until this has been done. In using whole wheat, if it is fine it may be used entirely, or you may make whole wheat with a sponge of white flour. When whole wheat flour is fine as this I have here, the sifting will not cause any waste as it does in graham flour. In graham flour we sift and reject the bran. Choose the flour that has the smallest proportion of bran. Whole wheat flour is more wholesome than graham and more easily digested. We have the nourishment without the waste, as in the graham.

Then we must consider what else we need in our bread. Of course we must have salt. We allow one level teaspoon of salt for each cupful of wetting. The question of sugar and shortening is one which people will have to determine for themselves. With the coarse flours I find that a small quantity of sugar is almost necessary on account of the flavor. In making white bread it is not necessary to use any sugar at all. The question of shortening has been discussed a good deal nowadays. Some tell us we should never use any. There is one important point in using shortening in bread. The yeast never does its best work when handicapped by shortening. Do not use the shortening until after the sponge has been raised. If the first raising is quick, the next one will be quick in proportion. The cells will multiply more rapidly through soft batters than through a stiff one. We do not put salt in the sponge either, but if we make our bread up stiff to start with, instead of with a sponge, we must use all the ingredients at first. It is a very satisfactory way, and many prefer it to the sponge process. The shortening may be added melted, allowing one level tablespoonful for each loaf. We can make a very nice light bread with a good crust and well flavored without shortening, but it dries out more rapidly. Our bread with shortening keeps moist longer. This is a consideration where bread is used in large quantities. If you are to use sugar in your bread the best time to add it is when the sponge is first put together. Beat thoroughly and make the consistency of soft muffin batter. Leave that in the bowl and cover closely until raised to twice its original size and well rounded over the top. The best thing to make bread in is a large earthen bowl. It is very much better than tin for two reasons. With tin it is not so easy to keep an even temperature, and in scraping we are apt to take off particles of the tin. After you have mixed your sponge so that not a particle of dry flour remains in the bowl, set it aside where no draft will strike it, covering closely with a cloth. A tin cover is hardly enough. In our rather uncertain climate we find it rather difficult to raise bread properly over night. In summer time it is apt to become too warm before morning and we have sour bread. There is really no reason why a careful housewife should ever have sour bread. Bread should be started in the early morning, for it is better to do this work in the daytime when you can watch its progress. In winter it is apt to be too cold. I have found it an excellent plan in a room which is quite cold to set the bowl in a pan of warm water and cover closely. This is better than a dry heat. We do not want it warm enough to make the bread warm to the hand.

The lightness of the sponge is deter-

mined by the bulk, which should be twice the original and well rounded over and full of bubbles. If it goes beyond that point it is apt to be sour. If the bread is ready in the morning before the busy housekeeper can leave other work, a little flour added (beaten in well) for the yeast to work upon will prevent its souring for a half or three-quarters of an hour longer. Then when it has reached this point stir well, add the melted shortening and salt, and work in the flour gradually, keeping as smooth as possible. When it has been worked sufficiently to handle take it out on the board and knead in the balance of the flour. I do the first part of this work with a knife. In teaching beginners to make bread I have found this an excellent thing to do. Most girls object to putting their hands into the sticky mass, and it can be easily handled with an ordinary table knife. With a very large mass it is much easier to divide it into two or three pieces, work each one and then all together. If you work in the flour in large quantities at a time you will find that the bread requires a great deal more kneading and will not be smooth.

Work the bread until it can be easily handled on the board without any extra flour. Let me tell you one thing about the kneading of bread. There is a great deal in knowing how to go at it. Some people make very hard work of it. It is not a question of great physical strength. It is more in knowing how to handle it. All the strength necessary will come from the elbow to the wrist. Push the bread from you and work toward the center, keeping the mass perfectly smooth. The bread now has no dry flour on it anywhere. With white bread it would be worked a little stiffer. I will put this back into the bowl, greasing it first so that the bread will come out perfectly clean.

Question—Do you use a special brand of whole wheat flour?

Mrs. Armstrong—I like the Franklin Mills flour better than any other, although I presume there are other good brands.

Question—Do you sift whole wheat flour?

Mrs. Armstrong—Oh, yes, all kinds should be sifted.

You understand, in bread-making it is not necessary to prepare a sponge, but we can always make bread in a shorter time where we have a sponge because the yeast will work faster through a soft mass. I have here a quantity started at twelve o'clock in exactly the same way I have been making this. I am going to make that into a loaf and biscuits so that it may be finished this afternoon. I am going to make the biscuits first because they take a little longer than the loaf to raise.

I want to call your attention to the quantity of yeast used in bread-making. We never try to have one cake of yeast make more than four loaves of bread,—bread made in the daytime. In making this bread here to-day you will see that I have used more yeast than the rule calls for. I do not advise you to use as much yeast as I have to-day. I do it to hasten the raising so that it may be a complete process in the time given for the lesson.

Question—In making biscuit don't you put any shortening in?

Mrs. Armstrong—Yes, if I had intended this wholly for biscuit I would have added shortening, but the raising would have been too slow for our purpose.

Question—Which do you use in preference, butter or lard?

Mrs. Armstrong—I would use butter for rolls. We always have a more moist bread where we use potatoes, and it always makes a well-flavored bread. Potato water is not the best thing to use in bread-making, although many people use it and have for years with satisfactory results. Remember that we do a great many things that are not the best things to do, and what I am trying to explain to you now is what is considered the *best* way.

Question—You would advise the use of potatoes, but not the water in which they are cooked. Why is that?

Mrs. Armstrong—Mrs. Lincoln explains it this way: "If you should taste the water in which the potatoes are cooked, you will realize from the peculiar greenish taste that it cannot be very wholesome." After being analyzed it has not been considered the best thing to use.

Some people say that everybody ought to eat whole wheat bread. That

seems a very extreme statement, for there is no one food suited to all people. Still we know that in the whole wheat we have a very wholesome food and the only question is whether all people can digest it equally well. I would suggest to housekeepers that instead of confining yourselves to white bread entirely, it would be well to have a variety and alternate the different kinds, giving the whole wheat a thorough trial. You will be pleased with its flavor and texture.

In using graham flour we do not make a stiff bread. We make what we call a stirred bread,—soft enough to be stirred with a heavy paddle or wooden spoon, and with this we use water instead of milk and no shortening; for the sweetening brown sugar is better than molasses because it is not so sticky. Use one part of white flour to two parts of graham, and do not allow this to raise too light. With a soft bread we allow a pint of wetting to a loaf. As it is so soft and raises quickly, it is apt to raise too light if not carefully watched, thus making the bread coarse and unpalatable. It should be firm and close-grained without being at all heavy.

I do not know of anything more unwholesome than underbaked bread, but I will say more of this when we come to the actual bread baking.

I am using no flour or shortening on my hands with the biscuit, and am working from the outside in, which insures a fine grain and a smooth crust. The balance of the dough I will put into a small loaf and while these are raising I will go on with the preparation of the other dishes. I shall brush over the loaf and rolls with soft butter just before putting into the oven, to give them a good crust, and I have put them into buttered pans.

I have here a Russia iron loaf pan. It pays in the end to buy the Russia iron, because they last so much longer and the bread bakes so much more evenly and mixtures do not stick to it. I do not like granite for baking at all, except for puddings or escalloped potatoes or something of that kind.

You have noticed sometimes that the loaf is thicker in the center than at the ends of the pan. You have made the loaves shorter than the pan, and it is highest in the middle. In shaping the loaf make it longer than the pan and the ends will fill out, making the loaf an even shape. In handling the loaves knead each one thoroughly. That is the secret of a close-grained, fine, even bread. As you take the bread from the bowl do not spend any time kneading, but cut off the loaves and knead each one at a time. Press it down into place thoroughly when you put it into the pan.

Another point which I neglected to speak of. Use no more extra flour in shaping the rolls and loaves than is absolutely necessary for handling.

It is very important to have a good crust to our bread. We want a light brown, crisp crust. I would make a plea for having bread baked with a good crust and baked in individual loaves instead of three or four loaves in a large pan. They are baked so much more evenly and thoroughly when single. There is nothing so good for children as plenty of good crust. Children will enjoy crust if it is good. The dentists tell us that children do not have enough use for their teeth,—too many soft foods,—a crisp crust with sweet butter will always be relished.

For the baking we want a fairly hot oven. It is hard to tell this; it must be learned by experience. The bread should brown lightly after having been in the oven ten minutes. The baking is then finished more slowly, allowing thirty-five or forty minutes for the loaf I have here,—a small-sized loaf. The average size loaf would take forty-five or fifty minutes. Test it to see if it is done by lifting the loaf from the pan and tapping on it lightly. If it has stopped "singing" it is thoroughly baked.

The loaves should be thoroughly cooled before being put away. Put them on something so that the air can circulate about them and underneath them. In the summertime throw a light cloth over the loaves so that they may be thoroughly protected from flies. It will take several hours for them to cool. The best thing to keep bread in is a tin box with a tight cover; the next best thing is an earthen jar. The tin will not absorb odors and the earthen jar will in time. The tin is more easily kept clean, is lighter and easier to handle. Whichever you

use should be scalded at least once a week and thoroughly dried. It is not necessary to use bread cloths. I have no objection to bread cloths if they are properly taken care of, but if bread is put away in the right condition it will not be necessary to use them. Put a clean paper in the bottom of the box before you put the bread in. When you put away a partly-cut loaf, lay it with the cut side down upon this paper.

I am always glad to see interest displayed in bread-making, as it is one of the principal articles of our diet. It is the only article of food which appears upon our table three times a day the year around, so it is important that we have good bread. There is no economy in using baker's bread. A barrel of flour at $4.00 would make you as much bread as you would have to pay $11.00 for at the baker's. This is leaving a large margin for materials and time and fuel. Your home bread if good home-made bread is enough better for the extra work, even though it costs just as much as baker's. In the first place the baker generally uses an inferior grade of flour. The bread is generally over-raised. They very often use harmful material, such as ammonia, to make it white. We demand a white bread, but it is never so good as a cream-colored bread. The best white flour has a creamy color. Most of our high-grade patent flours make excellent bread. Bread-making is an important subject and a most interesting one as well. Teach your girls to make good bread and to realize the value of the accomplishment.

When bread is raised sufficiently for baking brush it over the top with soft butter and moderate the heat of the oven after it has been in a short time. It is best to have the oven hotter for biscuit and rolls than the loaf.

Question—Would not those biscuit have gotten light as soon as the loaf if they had been put up on the stove?

Mrs. Armstrong—Yes, but I would rather not raise them where it is too warm. We always sacrifice quality in that way.

FRUIT ROLL.

Recipe.

Sift two cups of flour with four teaspoons of baking powder, a little salt and one tablespoon of sugar. Mix in one-third of a cup of butter, and add about three-fourths of a cup of milk, to make a soft dough. Roll out lightly and spread with a cup or more of apricots (or other dried fruit) which have been cleaned, softened and stewed. Roll up gently and place in baking pan with half a cup of juice drained from fruit, and baste with this during the cooking. Serve hot with sauce.

I have sifted the flour with the baking powder, salt and sugar. I have rubbed in the butter and I am going to add milk enough to make a soft dough as for baking powder biscuit, roll that out, and spread the fruit on it. This afternoon I am using canned fruit instead of dried fruit. Any kind of canned or preserved or dried fruit may be used in this way. I prefer the dried fruit, but I have not had time to prepare it beforehand.

Question—As a rule do you prefer baking to steaming?

Mrs. Armstrong—Yes, I do, but that is a matter of individual taste. I butter the pan before putting the roll into it, and use some of the fruit juice in basting it, which gives it a glazed crust over the top. It will take about a half hour for the baking.

Just a word about dried fruits. It seems to me that a great many people do not understand the possibilities of dried fruits and they do not know how to prepare them. They should first be thoroughly washed in luke-warm water and left to soak, twenty-four hours is none too long. If they are thoroughly washed in the first place, the water in which they are soaked can be used to cook them in and none of the flavor will be lost. Allow water enough to cover for the soaking. The next thing is slow cooking. The fruit should not be allowed to boil hard at any time. A granite or porcelain-lined saucepan is best. Let it cook very slowly until almost done before using any sugar. If you put it in in the first place it takes a great deal more and hardens the fruit. If you wish a thick syrup as we do with some kinds of fruit, take the fruit from the juice and cook the juice down. Dried fruits are very much cheaper than canned ones, and quite as satisfactory, if properly prepared.

HARD SAUCE FOR FRUIT ROLL.

Recipe.

Cream one-third of a cup of butter and add a generous cup of powdered sugar, then mix in carefully half a cup of the crushed fruit, as prepared for pudding. Keep in a cool place until serving time.

I do not know that anything need be said in explanation of this hard sauce. It is somewhat similar to that which we made yesterday for the chocolate pudding except that it is not to be heated.

CORNED BEEF HASH.

Recipe.

To one pint of chopped meat add a pint and a half of chopped cooked potatoes. Melt four tablespoons of butter in a frying pan and add two tablespoons of minced onion, if desired. Mix the hash thoroughly with the butter and season well, adding just enough water to moisten well (about half a cup). Cover closely and cook slowly for half an hour, or until a brown crust has formed on the bottom. Loosen carefully from the pan and turn out like an omelet, on a hot platter. Garnish with parsley.

We will now go on with the corned beef hash. The potatoes and beef have been chopped. The potatoes were cooked with the skins on, as there is less waste and they keep more firm. The corned beef was put through the chopper. I will add butter to this mixture and let it cook long enough to have a brown crust. It may be cooked in the oven, setting it upon the bottom. A long, slow cooking will give a better flavor and a better crust than a short, quick cooking.

Question—Was your meat cooked before being put through the chopper?

Mrs. Armstrong—Yes, it was.

I will say, if you are to have the hash for breakfast you can just as well have the meat and potato chopped and ready for frying (except the butter and water) the night before.

I am using the canned corn beef this afternoon, which answers very well. Any other kind of meat can be used, also.

In getting meat ready to chop, be sure and look it over carefully to remove all gristle.

In turning out the hash I use a flexible knife and run it around the sides and underneath to loosen it from the pan as much as possible. Have the platter warm and fold the hash over like an omelet. This makes a very simple, nourishing and attractive dish.

MISCELLANEOUS PAPERS.

GOATS FOR NORTHERN WISCONSIN.

HON. A. R. HALL, Knapp, Wis.

The land I have fenced in for flock of goats (shown in the accompanying illustrations) was a ten-acre lot of hardwood timber land from which the saw timber was cut five years ago, and most of the cordwood two years ago last winter. It was covered with a heavy growth of underbrush, sprouts, briars, and in places many coarse weeds could be found. Sprouts from the basswood, white and black ash, the different kinds of elm, oak, butternut, ironwood, and box elder were to be found on it, and the different kinds of brush that usually are found growing on hardwood timber lands.

Into this ten-acre lot I turned 299 goats, of which number there were 121 kids. In three weeks from the time they were turned in there was not a leaf nor anything green within their reach, and in addition to devouring everything green they ate the briars to the ground and took the bark from all the basswood, elm and ash sprouts, and the lot looked very much as though a fire had swept over it. Cuts Nos. 1 and 2 show the condition of the ten acres after the little fellows had been in possession three weeks.

They showed their preference by taking the bass, ash and elm sprouts first and leaving the butternut and ironwood till all else was gone. They are very fond of the prickly ash.

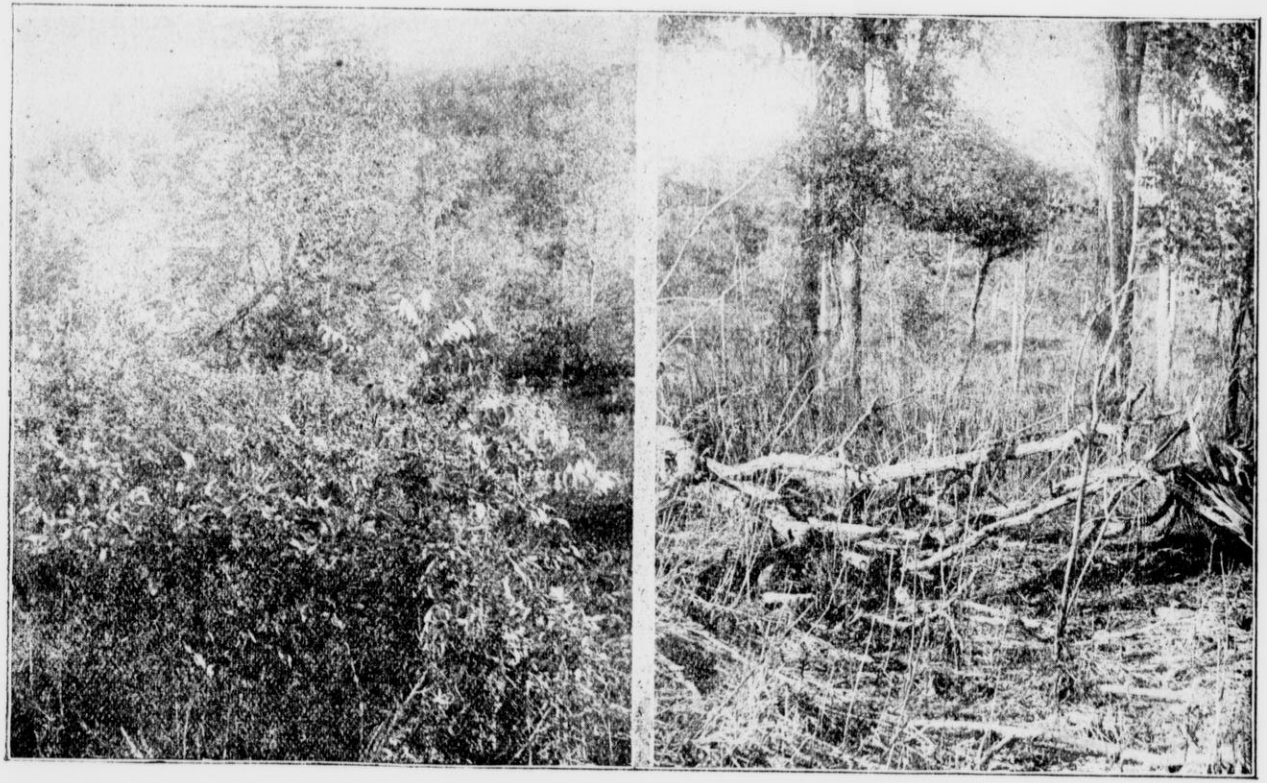
I presume more or less sprouts will put in an appearance on this piece another year. My plan is to still let them run on the same, adding to it about ten acres at a time as their needs may require. By so doing the young sprouts, if any, will receive prompt attention, they being preferred to the older growth.

From my experience I am satisfied that the brush lands of northern Wisconsin can be more cheaply cleared with goats than in any other way. With fair management the goats can be made to pay a good profit outside of any return they may create in clearing land.

OBSERVATIONS ON THE WORK OF THE GOAT IN BRUSH LANDS OF NORTHERN WISCONSIN.

PROF. W. L. CARLYLE, Madison, Wis.

In the latter part of September of the present year it was the privilege of the writer to visit the large farm of Hon. A. R. Hall, near the town of Knapp, in the western part of Dunn County, Wisconsin. The shrewd, far-seeing judgment and clear-cut business ideas that have made Mr. Hall the power he is in Wisconsin's Legislature have evidently been factors in his selection of this ideal location for a farm. The approach to it at present follows the course of a beautiful spring brook, which winds its way down a wide valley thickly grown with a variety of small timber, of which maple, elm, basswood, oak, ash, and butternut are the criterion of what the underlying soil must be. On reaching the farm we learn from Mr. Hall that it comprises a block of land some 1,200 acres in extent. Until a couple of years ago this land was in the condition known as "cut-over hardwood timber land." During the past two winters quite an area has been cleared of the smaller growth of timber which has been utilized and found a ready and remunerative mar-



No. 1.
CENTER OF TEN ACRE LOT THAT WAS CLEANED BY GOATS. BEFORE AND AFTER THEIR WORK.

No. 2.

ket as cordwood. This work has been done largely in a wide valley which extends well beyond the middle of the farm where the beautiful spring creek mentioned before finds its source in a number of the most beautiful springs it has ever been my privilege to see. One of them in particular at the close of this dry season, was especially worthy of note, as it was bubbling up with such a force of clear, cold water as formed a stream at once some three feet wide and a foot deep.

A well-built and commodious modern farmhouse has been constructed, which is supplied with water from a spring high up on the bluffs just at the rear. This water is also piped to the large, roomy flock barns now nearing completion. The farm buildings are beautifully located with the bluffs, upon which are many wide acres of most beautiful table land, immediately in their rear, and again just across the valley to the front some sixty rods distant the bluffs again rise into the same table land.

We must, however, come to the paramount object of our visit, the flock of Angora and Mexican goats and their work of reclaiming this brush land. Where the timber was removed in the green condition many of the stumps send up a perfect fringe of "suckers" or sprouts from the roots, which in a year or two reach a height of from six to ten feet. The underbrush and the briars, thistles and weeds that always find a congenial home in such places, get a wonderful impetus from the sun's rays and in the course of a year or two have given a condition of which cut No. .. is only a fair representation.

What a contrast, however, is presented when we come to the ten-acre lot, in which about 180 goats with about 120 kids, the equivalent of not more than 250 full-grown goats, have been thoroughly enjoying themselves for the past three weeks. The accompanying cuts show very plainly the condition of the land before and after the goats have been allowed to graze upon it. Not a leaf or a green twig could be seen on any briar, thistle, or sprout of brush wood even though they were ten feet high. We could not understand how it was possible for these small, lively little creatures not so large as a sheep, to so strip the leaves and in many cases the bark from underbrush ten feet high and about one and one-half inches through at the base. It was very readily demonstrated, however, by seeing one of the agile creatures scale a stump some thirty inches high, and by springing astride one of the sprouts growing from the roots, the weight of its body bringing the sprout, now quite a tree, to the ground, where Mr. Billie or Mrs. Nannie, as the case might be, was immediately surrounded by the family and friends, each intent on stripping everything eatable from the brush, while the star actor remained standing astride the sprout, preventing it from springing back to an upright position until it had been plucked and peeled clear of leaves, twigs and bark.

A much rougher or more undesirable spot, so far as brush was concerned, could not be imagined than many of the thicker places in this lot, and yet when the goats had finished with it we could not see how it would be possible for it to again regain its original condition. As Mr. Hall remarked, it resembled exactly a piece of land that had been run over by fire, except that there was a nice carpet of young grass springing up, which, however, did not seem to tempt the appetites of the goats so long as they could get leaves or brush.

Nor was this all. A number of red or "slippery elm" trees about six inches at the base had been left when the wood timber was removed. These had been absolutely stripped of every vestige of bark to a point about as high as we could reach, at which place there was a perfect broom-like fringe of bark that had been stripped from the tree but was so far beyond the reach of the goats that they could not secure it.

From what we saw of the work of this flock of goats, I am assured that there is a wonderful field of usefulness for the Angora goat on the cut-over hardwood lands of northern Wisconsin. The animals in this flock were plump and fat, and had every appearance of being well fed.

Much credit is due Mr. Hall for the original investigation and work he has

No. 3. Goats Browsing.

done on the goat industry in northern Wisconsin. His system of fencing off small areas and having the goats clear it completely before giving them more, is by far the most satisfactory method we have yet learned of for conducting this clearing process.

In conclusion, we must leave a word of caution to the beginner in the goat business. We are not assured as yet of the hardihood of these animals in exposed conditions during our rigorous winter weather. The kids also are much more weak and feeble at birth than lambs and must be kept housed for some weeks after birth before they can go to the fields with their dams. The flesh is not so valuable, perhaps, as mutton, since they do not have such broad, well-covered backs as sheep and consequently dress with a larger percentage of poor meat, not so well flavored as mutton. The market for the hair also is not as satisfactory at present as it might be. We may hope, however, to have some positive assurance one way or the other on these points very soon from Mr. Hall and others who are making a study of the business as applied to conditions in northern Wisconsin. The writer would advise the prospective purchaser of goats to go slowly, purchase a few, give them a fair trial, study their needs and peculiarities, and when assured of their value for the purpose intended go ahead.

THE FARMER'S SON OF THE TWENTIETH CENTURY.

ELLA EUGENIA WOODWARD.

Read at Farmers' Institute held at Orfordville, Jan. 24-25, 1901.

It is almost impossible, nowadays, to go to a gathering of any kind and not hear something about the Twentieth century, something about it as compared with the Nineteenth century, and we recall with pride the wonderful changes of this past period. But in all the evolution and growth of the last one hundred years, nothing has been more wonderful than the development of the farmer's boy. What will the next one hundred years do for him?

He will not be the boy whose education consists of the three R's—"readin', 'ritin' and 'rithmetic," with perhaps just a smattering of "gorgfy." Will this new century have a place for the boy who cannot figure up his own account when he buys and sells produce for the farm? The boy who stumbles in multiplying when he is trying to find out how much he ought to get for twenty bushels of potatoes at twenty-five cents a bushel; and when he is handed five dollars for them, wonders whether it is all his, or whether he ought to give the man back ten cents or a dollar? And neither will the Twentieth century farmer's boy be one who cannot read without stopping every now and again to spell out a word containing some four or six letters. It is said that our newspapers are one of the greatest factors in educating the masses. It is true, that one cannot know what is going on in his own nation or state, and hardly his own town—to say nothing of the world at large,—if he does not read the newspapers. But where can the newspapers come in, with such a lad? He cannot keep up with the times when he has no papers; and that which is worse, cannot read them with understanding if he did have them. And right in connection with this one can readily see that a knowledge of geography would be "quite handy" and of a great deal of use. In fact, intelligent reading is impossible without we have a certain information of geography—we cannot read an article without this knowledge is brought into play.

Will this century's farmer boy count writing as a non-essential? Can business be carried on without the use of

pen or pencil? And yet, in that glorious Nineteenth century of which we have boasted so often, how many a farmer's son had not enough education to enable him to write a common business letter! Has the new century a place for that boy? Will he be recognized as a competent agriculturist? The incoming century brings with it the best methods of reading, writing, arithmetic, geography and all the other common studies, not mentioning the higher branches. We are now taught the most legible style of penmanship that has yet been produced. In even common schools, the up-to-date teacher is giving lessons in vertical writing. It is now that we are taught to read with emphasis and expression and to understand the article after having read it. And it is thus with all other studies.

Nevertheless, we are now confronted with this question: Is the rural school education even as complete as we found it in the closing years of the Nineteenth—sufficient for the farmer's son of the Twentieth century? If we judge the progress we are going to make in the next one hundred years, by that made in the last one hundred years, certainly, the farmer's boy is going to find himself out of sight and entirely unfitted for the duties which he must perform, if he is only to have the education afforded by the rural schools.

How many a farmer's boy has been held down all his life through lack of education! And yet, over and over again, we see the same thing—go to school when there is nothing they can do on the farm. I grant you, there are cases when it is the lad's own fault, but in the majority it is not. "There are exceptions to all rules," nevertheless, by far the largest number of intelligent farmers of this new century see that their sons must have education and that it does not pay to keep them out of school at the very time when they are becoming interested and are learning fastest and best. If they do keep them out, what does it result in? A little better than no education at all. Why? Simply because the average American boy has enough pride to be ashamed to be in classes with pupils much younger than himself, therefore when he gets a little older he objects and will not go. And can we blame him for not wanting to be called "punkin-head?" And when the last day comes, and with it the closing day exercises and he must speak, he will have done his best with: "Strike the nail aright, boys; hit it on—hit it—strike the nails aright, boys; hit it on—hit it on—on the—on the *head*," and suddenly leaves the room in hasty disorder.

Why is this kind of work largely a thing of the past—gone with the past century? One can readily understand why, if he stops to think of the progress made in this line in the last fifty years. Those of you who are older, who can remember, do you not verify that which history teaches us who are younger, namely, that there is hardly any one thing that has made faster progress than education. And the farmer's boy has been the recipient of nearly all of the advantages thereof.

Now looking forward fifty years, we see a boy who does not have to run away from home to get an education—one who was not expected to get his schooling before he was 15 years old, and that by going two months or so in the winter—a boy into whose head has never entered the thought of running away from home or going to the city or sea or some strange country for change and romance and enjoyment—a young man who has had an education that will fit him for his life employment and make it a pleasure to him. And this boy is the farmer's boy of the Twentieth century. His parents have let him have the full privilege of the improved rural school which that time will bring. He has been taught to see all the liberty and change and romance and pure enjoyment there is in a prosperous, intelligent farmer's life. Then he will be sent away and his education will not wean him from the farm, nor take him from it, only so long as is necessary to acquire it.

Someone may inquire, "Will there be more money to send the boys away to school than now?" There has never been a period in the history of our country when there were as many well-to-do farmers as now, and we know no reason why we should not continue to prosper. But, leaving that out, let me answer by asking: "What

has been running at a higher tide in the closing years of the Nineteenth century—what is running higher now than ambition?" And the farmer's son has not been exempt—he, too, has been among the masses who have been swept along by it. But if this has been of no benefit to him, let us renounce it and, with Shakespeare, say, "Ambition should be made of sterner stuff." However, we can see the benefit derived from it. How many of us know young men who had not the means for an efficient education for farming, but did have the ambition—went to work with a will, acquired, first the means, then the education, and who shall say that, if they continue in the way they have begun, they will not make farmers of which the Twentieth century will be proud!

And that is not all that his education is going to do for the farmer's son of this new century. It gives him general knowledge, as well. He will not have to be dictated to about voting. He will not have to be told who the candidate for President is, and when he hears his name look bewildered and know no more than he did before. He will know who the candidate is, will know what party he stands for, know what that and the other party platforms are; and when some high-flown city politician steps up and says, "Here, never mind your party—here's a five—vote for us," he will answer, "No, I thank you; I vote for the one I think most competent, and need no pay for that." When a convention is called and on the platform are seen a dozen of the most prominent, the leading men, the majority will be farmers. When some bright young man is wanted to introduce a political speaker, the one chosen will, undoubtedly, be a farmer's son. When the chairman of the program committee wants a debate for the Farmers' Institute and, after naming over the young people of the town, finds that there are none that will or can debate the questions, it will not have to be given up. There will be plenty of farmers' sons who will not be afraid to tackle a debate, and, what is more, are more than competent of doing so. He will have all the education and refinement of the college man of the Nineteenth century, together with the hustle of the live business man and the vim and vigor of the sturdy farmer.

By the time the next fifty years have come and gone and we write it 1950, there will be seen a boy who, when he is away at college and is asked about his home, will not evade the question if possible. And, if it becomes necessary to answer, blush, stammer and say, "We—we—live on a—a—farm," then add in a reassuring manner, "But guess paw's goin' to move to town purty soon." No, indeed. His answer will come clearly and with pride, "My home is near Orfordville—my father is a farmer." As it has been in the past, the little, impertinent street urchins, anxious for sport and something to laugh at, upon seeing a farmer's boy drive into town, greet him with, "H-a-y-s-e-e-d;" or "Say, say," and when he looks, "Your wheel's turnin' round." If they try that on this century's farmer's son, they are very liable to get answered like some boys in a story a number of us know. They were yelling at this lad, "Say, say, have you got all the hay-seed out of your pocket; have you got all the hay-seed out of your pocket?" and the answer came in just as lusty a tone, "I guess not, by the way the calves are blatting after me." As it will be, the urchins will have as much respect for a farmer's son as for any other professional man's son.

Yes, farming has come to be a profession. It is no longer the life of the ignorant. The prevailing idea has been, anyone can farm, but people are coming to see that it takes quite a somebody to make farming a success. A lazy, slack, unintelligent person would make just as good lawyer as farmer. It is no longer the life of slavery that it was fifty years ago. At the present time, the best of our farmers and their families participate in the social functions and have time for the literary and enjoyable part of life, besides. The successful farmer of the Twentieth century will be the man who combines education and physical forces in doing his work and producing his wealth.

The farmer's son of this new era will not be the boy whose jaw will fall and knees tremble when a beautiful girl looks at him. And when this

young lady is asked about the employment of her escort, she can hold her pretty head very high when she says, "He is a farmer's son." When this farmer's son thinks of a home, he will not be looking for some girl, any girl, that can wash dishes and get something to put into them to make them dirty again and so on indefinitely. He will not call her "my woman." He will be looking for one who went from the farm to the seminary, only to return to be equal to any farmer in all the problems of a farmer's life. And not that alone, for, when called upon, this Twentieth century's farmer's wife can fill the place of lady as well. Giving 7 o'clock dinners, spreads, and entertaining the Shakespearean club will be as natural to her as getting a meal for threshers. She will be the lady who, when her husband is elected to the Senate, Assembly or House of Representatives, can fill her place as hostess in Madison or Washington, or wherever the place may be, quite as well as he can fill the office to which he has been elected.

To-day we find farming one of the most independent occupations. By the middle of the Twentieth century he will be the one out of many who is not obliged to smile at everyone and acquiesce to everything everyone says, saying, "Yes, yes, yes," when he thinks no, no, no. There is no occupation that affords such breadth and richness of opportunity as that of the successful farmer. Not the one who gives his pigs what he cannot sell and what the pigs will not eat, eats himself; but the one who puts the first and freshest fruits and eggs and butter and milk on his own table and has enough left of his prime produce to supply the cities and make the bondholder part with a part of his bonds. And at the same time his moral and intellectual opportunities are as broad as the earth.

God's first command to man was to dress the vineyard, and thus, dressing his vineyard, we leave the farmer's son of the Twentieth century.

CARE OF MILK FROM COW TO CREAMERY.

JAS. G. MOORE.

Read at Farmers' Institute held at Albion, March 6-7, 1900.

Mr. Chairman and Ladies and Gentlemen: A few years ago the Department of Agriculture sent out requests to men engaged in the handling of milk or its products asking them what branch of dairying, in their opinion, was in need of the greatest improvement. The consensus of opinion seems to have been that it was on the care of milk from the cow to the creamery.

On the care of milk, therefore, from the time it is drawn until it arrives at the creamery, depends much of the success or failure of the creamery, as no creamery that has not a supply of good, wholesome milk can expect to make that extra grade of butter that is necessary to supply the demands of the market and receive the highest price for its product, when it comes into competition with butter from creameries which are supplied with such milk. Farmers generally seem to have an idea that sweet milk is necessarily good milk, and in fact sweetness seems to be the only criterion for the butter-maker to go by in accepting or rejecting milk.

This season we expect to use Farrington's Acid Test in determining to some extent whether milk is fit to be used for making butter, and no milk should be used that has more than two-tenths of one per cent. acidity. Under ordinary conditions the milk from healthy cows is free from germ life, while in the udder, but in withdrawing the milk it invariably comes in contact with germs that are bound to affect it, and generally to its detriment.

A leading factor in the contamination of milk, the importance of which is rarely thought of, comes from the bacteria that gain access to the milk

by mixing the first few streams of milk or fore milk, as it is called, with the balance of the milking. Even when the milking is thoroughly done there remains in the milk ducts a few drops that afford sufficient food for the development of any germs that gain access through the openings in the teats. It would seem, to one unacquainted with bacteria and their action, that the openings would be too small for anything to get in, but it has been estimated by Dr. Russell and others that even when milking has been done with a reasonable degree of cleanliness and examined at once, that it contains from five to twenty thousand germs to the cubic centimeter, so you can readily see that the openings are plenty large enough.

A great deal of dirt gets into milk because the cows are not cleaned, and this applies not only to winter conditions, but also to summer ones, for when cows are pastured on marshes and allowed to wade through mud holes, they become covered with dirt, that is readily shaken off during the operation of milking and we can generally tell at the creamery those of our patrons who keep their cows on marsh pastures by the amount of settlings in the bottom of the cans.

The cleaning of cows is too often considered of small importance, and in many cases not thought of at all, but every cow should be curried or brushed daily and the udder and lower parts brushed or wiped with a cloth, preferably a damp one, just before milking. The air in the cow barn is frequently full of dust from the hay that is being thrown down from the mows, or the straw used as bedding, and milking should not be done for some time afterward, allowing time for the dust to settle.

Cleanliness should commence with the milker, as he can be as great a source of damage to the milk as anything else, and should not turn from cleaning the horses or other dirty, dusty work, without using a suit of some kind that is kept for the purpose and is washed often enough, so that when discarded will not stand alone from the drying of the milk on it and which when you get into it feels more like a suit of armor than anything else.

In milking, the pail should be held as close to the udder as possible for the further the milk has to fall and the more it is exposed to the air the more chance for dirt to get in.

The habit of wetting the hands in milking is unnecessary and a very dirty habit, for when the hands are wet, it is impossible to prevent the drops of liquid dirt from falling into the milk.

It should not be necessary to say that milk should be strained and that at once, but it is a fact, that milk is sent to the creamery not strained and even when strained is sometimes allowed to get full of hay, bedding, flies and other things too numerous to mention.

Straining the milk through the wire gauze strainers, commonly in use, is not an altogether satisfactory way of cleaning the milk, when dirty, for much of the dirt that falls into the milk is held in solution and is washed through and into the milk and is only caught by the separator. This is only another instance of the fact that an ounce of prevention is worth a pound of cure.

In this vicinity most of our farmers grow tobacco and few there are who have not gone to the expense of building a stripping house, where the crop can be properly cared for. These strip houses are used but a short time every year, but are considered necessary just the same. But a milk house, which would be in constant use and which would be such a help in properly caring for the milk, is not thought of, or when thought of the expense is considered too much and the advantage too little.

I have in mind one patron of our creamery who has a milk house, and who holds his milk two days even in summer, and while we don't advocate two day milk, yet we must say that his milk comes to the creamery in better shape than lots of milk that comes every day.

But not even a milk house will keep milk in good condition if the pails, cans and strainers are not kept clean. Cleaning the cans is an operation that is very badly done in a large number of cases and where washed in cold water or even lukewarm, as we know some are, they soon become covered,

especially in the seams, with a sticky yellow matter which becomes a veritable hotbed for the growth of bacteria. After emptying the cans of the skim milk they should be rinsed with lukewarm water and then washed thoroughly in hot water, using soap or some good cleaning powder and a brush in preference to a rag. Then a scalding in boiling water and turning them up to drain instead of wiping them with a cloth which too often does more damage than good. Milk cans should be covered, on their going to the factory in winter to keep their contents from freezing and in summer to keep the hot rays of the sun off of them. And the milk should always be cooled and aerated before sending it from the farm.

HOW SHALL WE INVEST OUR CAPITAL.

MRS. DELLA G. MERENESS.

Read at Farmers' Institute held at Walworth, Jan. 22-23, 1901.

When men or women have money to invest they do not usually do so without some thought as to what will be the most profitable investment they can make with the amount on hand. They look around about them and consider all opportunities from every standpoint, and endeavor to invest their capital not only in such a manner as to obtain the greatest per cent. of gain, but to do so with the least liability of loss of either principal or interest.

Now we, as farmers' wives, are very apt to say at once, that we have no money to invest, and if we have no capital to begin with, we are not in the least concerned as to what is the safest and most profitable investment for us to make. But I think you will all agree with me when I say that each one of us from the wife of the wealthiest farmer to the wife of the poorest, has a certain amount of capital to invest, and also that the amount is very equally divided among us.

It is a very old saying that time is money, and time is the capital of which I wish to speak to-day.

In what way can we farmers' wives use our time in order to secure from it the greatest good for ourselves and others?

Shall it be used exclusively for our own good or shall it be used somewhat for the good of those outside our immediate families? Shall we spend our whole time providing the necessary something to eat and something to wear, and in the keeping of our houses in order, or will we find it more profitable to invest a portion of it in recreation and improvement of our minds? Shall we tie ourselves closely at home, or shall we cultivate somewhat the acquaintance of our neighbors? As we look around about us can we find any way in which it will be especially profitable for us to invest our capital? There will probably be as many answers to these questions as there are persons answering them and I will endeavor to give a few thoughts on a few lines in connection with the subject.

I do not wish to give the impression that my own time is always invested in the way I would advocate, or that I live up to my ideal of what the life of a farmer's wife may be. Indeed I fall far short of doing as I would like to do and as I think we should do in making the most of our lives.

To begin with, there is a certain amount of necessary work which most of us are obliged to do, as most farmers, young farmers at least, cannot afford to keep help in the house all the time. And, indeed, if we can do so, it is much more pleasant for many of us to do our own work. Let us do this work in the easiest way possible to do it and do it well. As far as possible let us plan our work so that no extra steps need be taken. It is not always those who are quickest or strongest who accomplish the most, but those who manage well, saving

time and strength in performing the same labor for which others require much more of both.

One good rule for each of us is to have a place for everything and then be sure that everything is always put into its place as soon as we are through using it. Let the children have the same rule and learn to take care of things for themselves. A little, or even much time, is indeed well spent if we can teach our children this one thing, as it is a habit which, once acquired, is usually kept and will save a tired mother many steps and much worry. It is often easier for us to pick up after the little ones than to insist upon their doing it for themselves; but how much better in the end to take the necessary time and patiently insist that they do it and do it well.

I believe that our work should be neatly and well done, but by that I do not mean to say that we should use our time and strength to their utmost limit to have our homes in scrupulous order, and then be so worn and worried that we have neither time nor disposition to enjoy ourselves with our families. Let us, if necessary, confine ourselves to plain but well cooked food and simple living that we may have some time to spend with our families and make home a place where there is much of happiness and kindly feeling. Our families have a right to expect that the wife and mother have some time to spend for them aside from providing creature comforts.

A home, be it ever so nicely furnished and kept, in which the mother is unable to take any time for the amusement and instruction of her children, is not so truly a home as one which is plainer and in which the mother devotes a portion of her time to them. It is quite as essential for the welfare of all that the wife be a homekeeper as well as a housekeeper.

In doing our work it is well to have some regular routine and endeavor to have each part done in its own time. Never take two steps where you can make one serve the same purpose. Let our minds save our bodies. An old saying is: "That which you don't have in your head you must have in your heels."

Let us teach our children to do many little things for us and give them something for their own work to do each day. This should be some easy task which will not overtax them, but which they will know is their own to do and that they must do it as it should be done.

Many mothers say: "It is much easier to do it myself than to teach them to do it." This is often the case, but, dear mothers, is it not better for them as well as ourselves, that we spend the time required to teach them the common work which each of us must do at some time? Indeed, the little ones are often anxious to learn and are very proud to tell how much they can do to help mamma.

The work so taught is easily learned and nearly every child will sometime learn to thank the mother who has taken time to teach them the right way to do work which falls to the lot of most women. A little time so spent by the mother is often a great saving of time and worry to her children when they are away from her care and left with the whole responsibility and care of work for which they would be otherwise unfitted. Even though they may not need to do the work themselves, they can better manage a household with others to do the labor.

Such a woman as Queen Victoria did not consider the education of her daughters complete until they had a practical knowledge of housework and sewing.

I believe that every farmer's wife should spend some time in reading and recreation. How often do we hear women say: "I don't have a minute to read or do anything but my housework." In every home there is always much to be done, but in many cases we do not gain by putting all our time into hard work. If we will take a few minutes each day to read and rest we will be so much refreshed, both in mind and body, that we are enabled to accomplish fully as much work as though we worked steadily on without rest. Our whole time and strength should not be used in such a way that we can do nothing whatever for those outside our own family circle.

Both time and strength are given us by our Creator and we should devote a portion of each to his work. We

should not tire ourselves during the week so that we feel unable to attend the services of God on the Sabbath. We should so arrange our work that Sunday may be a day of worship and rest.

Our meals may be so prepared beforehand that very little labor is needed on Sunday to provide the necessary food. Those living some distance from the church often plead this as an excuse for staying away from God's service; but by preparation the day before, this difficulty can be overcome. Usually where there's a will there's a way. One family of my acquaintance furnish a fine example of this. They lived a number of years three or four miles from church, but were nearly always to be found in their places promptly at 10:30 a. m. for morning service. Their plan was to have cold meals, baked beans left in the oven, or other dishes quickly and easily prepared. Then when they arrived at home dinner could be served in a very short time.

Too many of us are inclined to neglect church and Sunday School for the sake of Sunday visiting. It does not seem like time rightly used to spend it in visiting and talking secular matters every Sabbath. It seems to me that is not what is meant by "Remember the Sabbath day to keep it holy." We should take time to visit our friends and neighbors, but should do it during the six days, reserving Sunday for rest and worship.

It is getting to be a very common thing among farmers' wives to think they cannot take time to call upon their neighbors even though they be very near. To be sure there is always work to be done and always will be as long as we have houses to keep and families to care for. But if we can find time in no other way, let us take a bit of sewing or mending along with us and visit while we work. I have seen some neighbors who followed this plan and by so doing, obtained much more time for visiting than they could have done had they completed the necessary work before leaving home.

Years ago our mothers and grandmothers did all the spinning, weaving and knitting for their families, and did all their sewing by hand, and even then had time to visit their neighbors. At the present time when we do none of these things, we surely should make our manner of living simple enough to be able to spend a small portion of our time cultivating the acquaintance of our friends and neighbors. A little time so spent often proves very beneficial, and it makes our lives less monotonous and gives us new ideas which are helpful to us in our everyday lives.

Whatever else we do, let us not spend our time in useless worry. It is not the work we have to do which wears us out so much as worry. Even though our neighbors may be able to keep their houses better or have things nicer than we, let us do the best we can and don't worry.

One writer has said: "The finest fields of the farm are those in the household—in the souls of the family, and the richest harvests are grown in these fields; and yet they are the fields most often neglected." Let us invest a goodly portion of our time in these fields, knowing that if we do so we may be able to receive great interest on our investment, not only in time but in eternity.

Surely there can be no better or more profitable investment for us to make of our time than in making happy homes on the farms in which we may bring up our boys and girls to a useful, Christian manhood and womanhood, whose influence will extend long after our presence is gone from among them.

BREEDING AND MANAGEMENT OF SHEEP.

LAWSON BRERETON.

Read at Farmers' Institute held at Lodi, in March, 1899.

None of our domestic animals need better food and care than sheep to give the most profitable results. To be successful with sheep as in any other business it is necessary that we pay strict attention to the smallest details of our business as well as to the more important ones. That it pays in handling sheep to use both thought and forethought in their management is proven to us in nearly every community by men who, giving uncommon care to their flocks, are being more successful than others.

It is impossible to lay down any iron-clad rules, which if followed would make as successful a shepherd of some men as of others, as all men do not have the same love for a sheep. If you are going into the sheep business you will find there are more things to be learned by experience than is possible for any person to tell you, but we do not have to learn it all from experience, however, for we have the results of other men's labors along those lines to refer to both in writing and coming in contact with them.

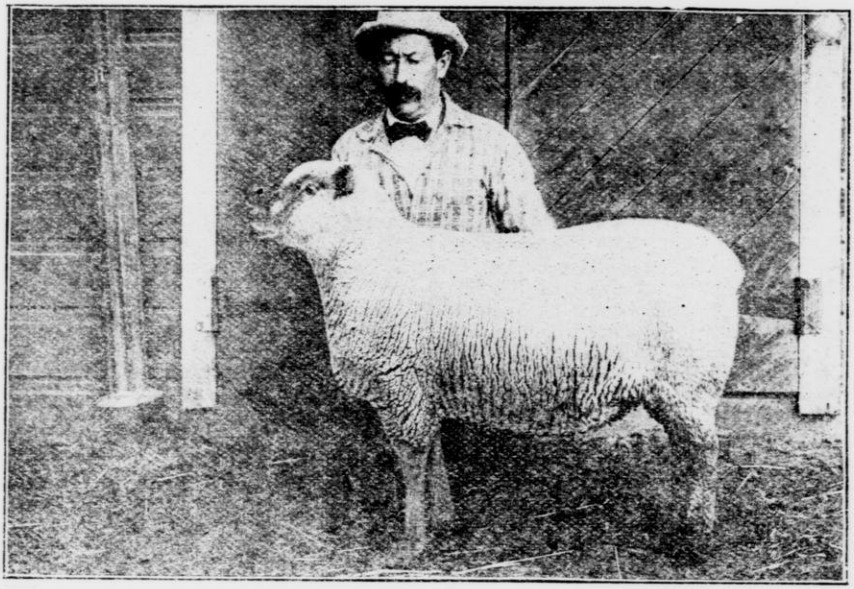
If any person was going to start with sheep I would advise him not to commence on a large scale, but to get a few, say from a dozen to twenty, and as his flock grows in numbers, he too, grows in the knowledge and experience of handling them. In that way he would avoid the disappointments and losses usually occurring to the large investor.

On the majority of farms small flocks are the most profitable. By that I do not mean always a few in number, for while a dozen would be a small flock for some men, in other cases a hundred would be just as small a flock for another man with different conditions and greater capabilities. One of the main causes of disastrous efforts in sheep husbandry has been a desire to do a larger business than our capabilities warranted.

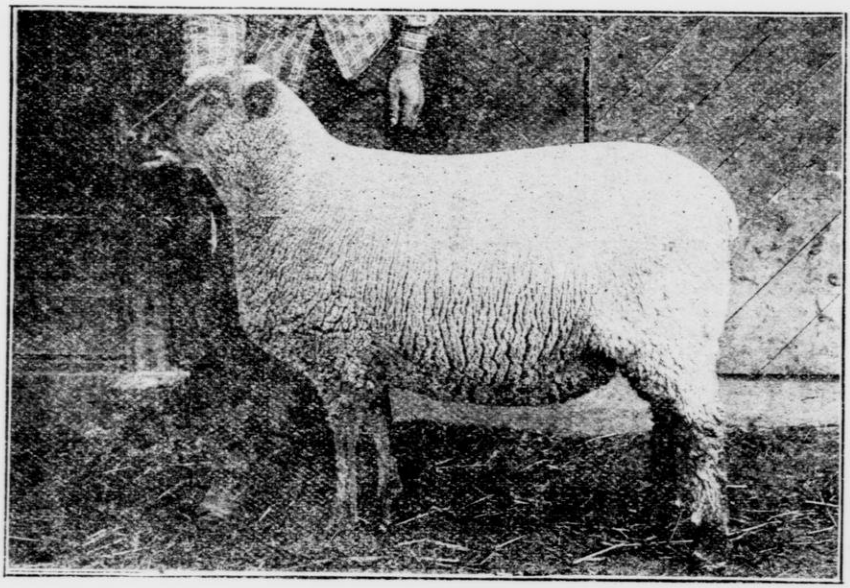
I think I am perfectly safe in making the assertion without fear of contradiction, that more money can be made in the sheep business, taking into consideration the capital, food and labor required, than in any other branch of our farmstock. That is if we have the right kind of stock and give them the proper care. I also think I am just as safe in saying that it is possible to lose more money with sheep than with any other farm stock.

I always consider it an important point to have my ewes as well as my ram in a gaining and thrifty condition at the time of breeding as by having them in a thrifty condition, especially if we keep up that thrift until lambing time, we certainly are more apt to have stronger and thriftier lambs, and I think by having them gaining we are apt to have a larger proportion of twins. We have a good illustration of that point in the case of a man who keeps but a few sheep, they are fat nearly the whole year and most of them raise twins. Some of you will undoubtedly take exceptions to the statement that it is as profitable to raise twins as one good, single lamb. You who have raised sheep have noticed that some of your twin lambs are just as good as your best single ones.

It is possible by judicious care in the selection of our ewes to have as good lambs in a large flock of twins as in a large flock of single lambs. In saving my ewe lambs for breeders, I should have a decided preference for those good twin ewes, as they are more apt to breed along those same lines. On most farms we have some cleared field to turn them into, if not then a light ration of shocked corn is very suitable. Rape and turnips are excellent for the purpose. Last season I sowed ten pounds of rape seed and two pounds of turnip seed on forty acres of oats. I mixed the seed with the grain at seeding time and consider I was well paid for my investment. All things



A Pure Bred Southdown Yearling Wether, Bred and Owned by Wisconsin Experiment Station.



Grade Southdown Yearling Wether. Owned by Wisconsin Experiment Station. The dam of this sheep was a common scrub ewe of very inferior appearance. The sire was a Southdown ram bred by the Experiment Station. This cut presents a capital illustration of what may be accomplished by the use of a first class sire, accompanied by liberal feed and good care of the offspring.

considered I was better pleased with the results obtained from the turnips than from the rape.

For winter feeding good clover hay is one of the best feeds we can use. A flock of sheep could be wintered on little else than clover, although not advisable, because it is too one-sided a ration and does not give sufficient variety. If you have plenty of clover hay for winter feeding and good blue grass pasture for summer, you will need little else in the way of feed to be successful with sheep. Good bright corn fodder I rank next to clover and could be used very advantageously in making up a ration. A light feed of shocked corn, especially if drilled or planted thick, could safely be used once a day with breeding ewes. Corn is one of the cheapest feeds we can raise, but we are apt to make it one of the most expensive by feeding breeding animals too exclusively on it. They should always have oat straw to pick over at will. This last season I saved one stack of oat bundles and am so well pleased with it that another season I shall save more. If sheep have straw before them at all times they will need to be fed but twice a day, and a very good ration consists of clover in the morning and corn fodder and shocked corn at night. If you have no clover hay then I should feed more corn fodder and would add oats besides.

It is very important to give as much of a variety as possible in the winter care. Some of us are very apt to consider it of not much importance to hear our institute workers tell us all about the different elements of food, the requirements of the animal, balanced rations, etc. It is not absolutely necessary that we know all about those things in order to be successful, but as soon as we make up our minds that a variety is necessary in order to get the most profitable thrift we are then really getting down to the foundations of the science of balanced rations.

A great many of our best feeders know nothing whatever about balanced rations, but they aim to give as large a variety of feeds as possible. If you are feeding corn I should gradually decrease it, adding oats instead with some bran when within a few weeks of lambing time. I should not feed bran all winter, but just a few weeks before and after lambing time until they are on grass. When the lambs are a few days old your ewes should be fed very liberally on oats and bran for grain and clover hay and corn fodder for roughage.

It is necessary to have good shelter for winter. It need not be expensive, but should be so arranged as to keep them dry, give all the sun and light possible and keep them out of drafts. By having protection from storms you will have a better quality of wool and healthier sheep. To keep our sheep healthy and in good thrift it is very essential that they have exercise. By that I do not mean that they should walk around the yard and to water, but they should have a large field to roam over at will. A good way to get them out is to feed something over the field such as corn stalks or straw. I would not let them out on very cold or stormy days. They should have water at all times, but if that is impossible, water them at least once a day. I do not know whether it has ever been demonstrated, but I think a thousand weight of sheep would use nearly as much water as a thousand-pound steer.

There is a very common impression that our breeding animals should not be in very good condition for the best results. It depends altogether on what they are fed on. If fed principally on corn they can be too fat. They can be in fine looking condition if fed on clover hay, corn fodder, oats and bran. I always like to have my breeding ewes in a good, round, plump condition at lambing time, as they will be in better shape for nursing lambs. They should be kept as quiet as possible at and nearing lambing time.

To get the most out of our feed it should be fed from racks and troughs. I prefer to do all my feeding, except in stormy weather, outdoors. Any person can make suitable racks for his own use. I should have separate racks for grain feeding. One of the most common ailments of sheep in the winter time is stretches caused from constipation. A sheep is the most constipated of all our domestic animals, but we can avoid it in a great measure by having salt and water before them

at all times and then if they get sick we will know it is not from lack of these.

The proverb, "As ye have sown so shall ye reap," is truer in no case than in the life of the shepherd during the lambing season. If he has laid the foundation for a crop of good, thrifty lambs, he is not apt to be disappointed. Some of our ewes will not own their lambs. I have been very successful by placing such ewes with their lambs in a pen just large enough to hold them. Two days' time is sufficient for most cases. Whenever any of my ewes lose their lambs I give them one out of a pair of twins. Whenever a ewe loses her lamb her profit is gone for that year, so we should aim to save all the lambs possible.

By all means we should dock and castrate our lambs when a few weeks old and then we can save them for any market with no inconvenience. A lamb creep should be made and feed placed before them as soon as they will eat. Ground oats and bran is very good at first and later on we can use whole oats and cracked corn. I like to use a self-feeder for lambs so arranged that they cannot get in with their feet and soil the feed. We should push our lambs along rapidly while young when the greatest gains can be made at the least expense, and so it is very essential that he be well fed from birth until sold to be the most profitable.

During the lambing season and again at shearing time we have a grand chance to sort our ewes. Any one that does not give good results in any way should be marked and later on disposed of. When we first turn out to grass the regular rations should be fed for a week or so, thus avoiding a too sudden change. Unless we take exceptionally good care of our sheep I should not have my lambs until late in March, as it costs more to feed them after lambing and the ewes are apt to get out of condition by nursing lambs so long before grass. An early lamb has the advantage over a late one in standing the ravages of the stomach worm. It is said that nearly all of our sheep have stomach worms, but they do not get troublesome unless very numerous. We can guard against them in a great measure by keeping our sheep healthy and improving all the time.

A splendid feed for lambs after weaning is clover aftermath and rape. If they get some grain besides there will be no danger of bloating. They will give better returns for grain fed at this time than any time later. We get our best results from our ewes between the ages of three and seven and it is not advisable to keep them longer unless especially valuable.

At shearing time we should endeavor to put our wool up in as neat and attractive a manner as possible, as the appearance has a great deal to do in selling it. Dipping is getting to be a very common practice with a great many. It should not be a question as to whether you have time to dip, but should be whether you can afford not to dip. A few weeks after shearing is a good time to dip, as it does not take nearly as much dip as later. When rightly managed, dipping is not a difficult job. In our neighborhood we have a company dipping tank. It cost us fourteen dollars and most of us dip twice a year. Our tank is ten feet long on top and four feet long at the bottom, ten inches wide at the bottom and twenty inches wide at the top, and four feet high with sloping ends.

In preparing to dip we set our tank about eighteen inches in the ground and back a wagon to one end of the tank. We place a water-tight box on the wagon with a hog rack on top, having the front end of the box a few inches higher than the back and extending a few inches over the end of the tank. We then arrange a narrow lane from the barn to the other end of the tank and make a bridge by placing some plank with one end on the tank and the other end on the ground. We drive our sheep in the lane and up the bridge and ease them into the tank, after which they walk up the other end into the wagon box. When we have a wagon load we leave them there a few minutes until drained and then place an old door over the tank immediately back of the wagon. The sheep will step on the door and then jump on the ground. One day last summer I dipped, with no assistance whatever, ninety-eight lambs and eighty-four sheep.

Tobacco dip is as good as any for immediate effect, but in order to do a thorough job it is necessary to dip twice about ten days apart. I prefer to use a prepared dip, as it is less trouble and is calculated to be lasting enough in its effect to do the work thoroughly with one dipping.

THE TENDENCY OF HIGHER EDUCATION TO BECOME UNIVERSAL.

PROF. H. F. KLING.

Read at Farmers' Institute held at Evansville, Feb. 21, 1899.

Never before in the history of the world have the common people been so highly and so universally educated as in these closing years of the nineteenth century. The rate of illiteracy is growing smaller every day and the standard of proficiency is steadily raised in all our schools.

Not only is the attendance larger, but the time spent in school is also much longer than ever before. The attendance in our high schools and colleges is increasing with marvelous rapidity and the magnitude of our educational system is well nigh beyond our power of comprehension. Our army of school children is so large that it can only be comprehended by comparisons. Let us suppose that the spirit of Washington could form our schools into a double column of boys and girls, facing to the south, the girls in the front rank and the boys in the rear rank, and let them stand shoulder to shoulder so as to form a double column of twos. Let the file closers stand at the statue of Liberty on the Atlantic and this double column will extend westward to Chicago, and Omaha, and Denver, and Salt Lake City, and even to the golden gate on the Pacific slope. This army would consist of fifteen millions of pupils and nearly half a million of teachers. If the school rooms were placed in a row against each other they would form a school house extending from New York to San Francisco. There would be thirty-one pupils and one teacher in every room thirty feet long. Again, if this army of fifteen millions of boys and girls should march by twos through Evansville at the rate of ten miles a day, this procession would march down Main street, not for a week or a month, but every day for a whole year. This training for the battle of life is becoming more general and more thorough each year. There are more than half a million of students in our higher institutions of learning. In Evansville there are 100 students in the High school and as many more in the Seminary. The time is coming when every person twenty years of age, will have at least a high school education or its equivalent.

Just imagine that every person in a community has spent four years in a high school, many of these have spent four years more in college and a considerable number, three years more in a professional school or in a university. Then universal education of a higher degree will have been realized. But how would such a change affect our civilization? What effect would it have upon the individual? These questions will certainly confront our young people when their school days are over and they are forced into the world to do for themselves.

It is too often true that those who attend school for any length of time, do not intend to do manual labor for a living and those who are willing to do manual labor do not think it necessary to spend much time in school. Too often our students hope to be president, senators, governors, lawyers, doctors, teachers, preachers, or the wives of such dignitaries. The intention seems to be to attend school so as to avoid manual labor. It is taken for granted that the necessary work will somehow be performed by some one else. But when higher education becomes universal the soil will still need

to be tilled, factories will still need to be operated and manual labor will be as indispensable as before. Occupations where mental labor alone is required will not be increased to any great extent. The professions and the fine arts are all very good, but food and clothing and shelter are homely necessities which will be in demand, no matter how highly cultivated our intellects may be. Some one may say that the Athenians at one time were so universally educated, that officials were chosen by lot, that art and architecture and poetry, and oratory, and philosophy all reached a very high state of perfection, and that the Athenians as a people were engaged in mental and not in manual pursuits. But we must bear in mind that the manual labor was performed by slaves and that these were very numerous. Moreover, Athens was the center of a confederacy in which the inhabitants of the dependent states were never on an equality with those of the ruling city. But our condition is different. We have no slaves, and we maintain that all men are created equal. We propose to be on an equality before the law, and the poor man's son is just as likely to have a good education as the rich man's son.

Heretofore all those who applied themselves diligently to books could easily find employment in the learned professions and engage in mental pursuits, while those who neglected their educational advantages could not hope to enter the professions and were naturally drawn into occupations of manual labor. But as the number of students is increasing very rapidly the occupations for mental labor become crowded, and the inducements are less encouraging. Here are two forces that must be adjusted. It is evident that an education will not always be a means of escape from manual labor.

If this movement toward higher education continues, a radical change must come with it. The training of our schools must be so conducted that the student when he goes forth to find employment will stand prepared to use his hands as well as his brains. There has been too much separation of hand and head labor. The best results can only be secured when the skill and dexterity of a well developed body are under the control of a well trained mind. We need educated carpenters, and farmers, and day laborers quite as much as more lawyers or doctors or teachers.

The time is not far distant when those who neglect educational advantages in youth will find little encouragement in the conditions which confront them. They will merely be slaves of circumstances. They can expect nothing but hard work and small pay, and still they are largely responsible for this state of affairs. Schools were provided for them and they were urged to equip themselves for the battle of life. But when they prefer the pleasures of youth to the exclusion of preparation for the future they must suffer the consequences in later years, which their own conduct has brought upon them.

We are assuming that it is possible for higher education to become well nigh universal and there are good reasons for believing that such a state of society may be realized. We are also assuming that such a condition would carry with it important consequences. In Russia, Spain, and Turkey, more than 70 per cent. of the inhabitants are illiterate and the educated few can easily find employment in exclusively mental pursuits. In the United States the per cent. of illiteracy is 13; in the northern states it is 7; in England 6; and in Germany it is less than one-tenth of one per cent., or only one in a thousand. We are rapidly approaching the German standard of education and we must adjust ourselves to it. We must teach that labor is dignified and honorable. The boy who has studied Algebra or Latin must still stand ready to follow the plough or feed calves. The girl who has read Wilhelm Tell and studied chemistry must still be taught to bake bread and mend clothes. Here we find that a little learning is a dangerous thing. Too often a little schooling unfits young people for the ordinary duties of life. They have an idea that an education will enable them to make a living without doing any hard work. That it would be a disgrace for a boy who had graduated from a high school to work on a farm or in a shop, and that it would be undignified for such a girl to do housework. The boy must

read law or study medicine or keep books. The girl must be a music teacher or a typewriter or an elocutionist or an actress. Then if these deluded people fail to find employment of this light character they blame the schools and gradually degenerate into high-toned tramps, where their school training enables them to become more mischievous and more worthless than they otherwise would have been.

Many young people make a failure of life because they believe that education leads to indolence. They do not realize that real mental labor is just as fatiguing as manual labor. The one fatigues the muscles, the other the nerves. Nervous fatigue is much more depleting to the system than muscular fatigue. The human body can accomplish the most when both the muscles and the nerves are brought into activity. Lincoln with all his wisdom could have returned to manual labor at any time. Gladstone, the most learned Englishman of modern times, chopped wood regularly, and McKinley endured the hardships of army life for four years.

But after all the greatest change must come from those who believe that a farmer or a mechanic does not need an education, or at least he has no use for the higher branches. What good will geometry or Latin or chemistry or history do him? He intends to be a farmer or a mechanic. If he can read and write and cipher he knows everything that will ever be required of him. He attends the country school in winter and if he manifests a disposition to make money he will take a three months' course at a commercial college. His diploma will serve as a passport to all future commercial transactions. The girl does not need even that much. She is good-looking and will surely have a chance to be married before she is eighteen and that disposes of her most effectually.

A farmer or a mechanic can make just as good use of a higher education as a lawyer. And a young man who intends to be a farmer or a mechanic is just as much in need of a good education as a young man who intends to be a preacher. Many a man has been considered well qualified for the ministry if he had good lungs and a loud voice. The difference between such a preacher and one who comes from a college and a theological seminary is no greater than the difference between the uneducated farmer and the one who is thoroughly educated. The old-fashioned preacher is out of date now, and there is little demand for him. This indicates that there has been progress in the ministry. Now there is just as much difference between an old-fashioned farmer and an educated farmer as there is between the old and the new preacher. Nowhere is a liberal education more useful than on a farm. An intelligent farmer needs a knowledge of several languages, of English literature and history and mathematics and science. He must be able to speak and write the English language easily and fluently. He needs to know botany and chemistry and physics and geology and zoology. He has occasion to use this knowledge every day, and life will mean more to him. The hard work will be made lighter by the enjoyment which his surroundings afford him, and his education will enable him to reduce the hard work very materially. Every intelligent farmer knows that the labor on a farm can be greatly reduced by a little head work. A large amount of hard labor can be saved by exercising forethought and judgment in arranging a house, a barn, a yard, and fields. The man who is able to think and plan has a great advantage over the one who can merely work. Farmers often amuse themselves over statements of this sort by telling what ridiculous blunders some supposed scholar made in applying such theories. These stories are always very interesting, but they do not prove that an education is useless on a farm. They simply show that some poor fellow was ignorant when he was supposed to be educated, or that he made a bad application of his knowledge which may have been quite impractical. The demand for higher education applies not only to the farmer but to every occupation where manual labor is required.

The farmers and the mechanics of the future will need to be better educated than those of the past have been for various reasons. The brightest young people heretofore have left

the farm and the shop to seek employment elsewhere, but a reaction is setting in. The farm and the shop offer better inducements to-day than almost any other calling, and the same ability is rewarded better and more surely on a farm than anywhere else. Educated farmers and mechanics are becoming so numerous that the uneducated cannot compete with them. And the same change which has taken place with the exhorter, and the pettifogger, and the quack doctor and the old schoolmaster and the scribbling country editor will take place with them. The procession is moving along and they must fall into line or else be left behind.

The new conditions toward which we are tending make higher education a necessity. Young people have no choice in the matter. They can only meet the demands of the hour by preparing themselves for it. This new state requires thinking laborers, and laboring thinkers. Too often the laborer does little thinking and the man who thinks does not have sufficient exercise to enjoy good health. Exclusive manual labor stupefies and exclusive mental labor deteroriates the individual. Mental occupation with some exercise insures better health and manual pursuits with mental requirements will accomplish better results and afford greater enjoyment. The masses of the people will be placed upon a higher plane of activity. There will be more time for self improvement and social enjoyment. It will do more to produce social equality than anything else that could be devised. There is a brotherhood and fellowship among educated people that is genuine and lasting. The difference between the masses and the leaders will not be as great as it used to be, but this is not because there are no great men. It is because the masses have been placed upon a higher plane.

The olden times may be compared to a forest in which there were a few giant oaks towering far above the surrounding trees. This made the large trees very conspicuous, but if all the trees in the forest are large, the few giant oaks become less conspicuous. Under the new system of universal education there will be greater equality. It will be more difficult for the leaders to maintain their eminence, but what the leaders lose the masses gain. It will be the greatest good to the greatest number. The opportunities which present themselves to the young people to-day are without parallel in all history. A land of promise and plenty lies before them and all they need to do is to equip themselves for the contest in which they must participate.

But Universal Education of a higher type is what the age requires and when it is once secured many perplexing problems will adjust themselves of their own accord. The social problems which are new and menacing in many respects will conform to natural laws, devised by an educated people more readily than to all the artificial panaceas and cure-alls which political demagogues may propose from time to time.

In conclusion, then, let us strive to conform to the demands of the age in which we live. Let us do our full share to usher in universal education of the higher type. Let us demonstrate that a student can still do manual labor and that the man who does manual labor needs a good education none the less. Farmers and mechanics need a good education just as well as professional men, and the boys and girls who go to the High school and to college will find a field of usefulness on farms and in shops just as well as in offices.

SWAMP LAND CULTURE.

CHAS. ROBINSON.

Read at Farmers' Institute held at Camp Douglas, Jan. 13-14, 1898.

Mr. Chairman, Ladies and Gentlemen—I have been led to prepare the following paper from the fact that there appears to be a great deal of ignorance in regard to the same, what it will produce. From twelve years' experience in almost exclusive cultivation of several kinds of swamp land, I simply propose to give the methods which seem to be the most successful with us. I have heard it said that "all swamp land is good for is to grow grass (and wild grass at that)." Now, I want to say right here, there are several kinds of swamp land, in fact, as many kinds and as much difference in them as there is in upland.

First, for the successful cultivation of such land, good tools are necessary. I would name four that it seems almost impossible to do without: First, a breaking plow with a long mould board not less than three feet long with a slip shave; such a plow will turn the furrow completely over, leave the ground smooth, and be of easier draft than any other kind. Second, a good disc harrow, kept sharp; nothing will take its place. Third, a lever harrow or one with the teeth slanting back. Fourth, but not least, a good steel scraper for two men, a team and scraper, will make more and better ditch in one day than three men in a week with shovels.

Drainage: Make your ditches wide with sloping sides so they can be crossed with any kind of machinery, and, if possible, make them parallel, even if it is a little more work; you can plow, and harvest your crops better if you do, it is often possible to carry water by a low piece of ground on a higher level, and so obtain a much greater fall and less water to drain off. In times of flood it will often make the difference between a good crop or none at all.

I would not drain a "peat" marsh more than one foot below the surface, unless I wanted to burn it down some, for the soil is so loose and light it will dry out like a sponge, and the grass "won't thrive," to say the least. If it can be flowed once or twice a year in cool weather, so much the better, but the ditches should be ample to carry the surface water off quickly or grass oats or any crop will be scalded.

Returning to the different kinds of swamp: first there is that with from two to eight feet or more of peat, not muck. Then somewhere the peat and muck is only from two to six inches deep over a clay or sand sub-soil, and last, that where there is no peat at all but a black soil composed of clay, sand and humus.

The peat soil is undoubtedly better adapted to grass than any other crop. In clearing this land, I should always burn off as much of the top as possible without interfering with drainage, because the top is tough, sour and full of roots, making it very hard to subdue. Then I would plow not over three inches deep for two reasons; first, if left, the ashes will be mostly blown away; second, the land is hardly ever left smooth enough to ride over with comfort or mow with safety unless plowed and worked smooth. Then I should seed to grass without any nurse crop, either early in the fall or spring (spring preferred). If sown to grain, the straw is apt to be the largest part of the crop. Buckwheat will leave it in first-class condition for any other crop. Don't plant corn millet or potatoes on peat—they won't grow.

The second and third kinds are the ones on which most of my farming has been done. In breaking this land after it is burned over, I should plow deeper than in the first—from four to six inches or deep enough to put some of the sand or clay on top, not too much the first time. The sand or clay will have a tendency to make the soil firmer and hold moisture better, also

prevent too rapid a growth of straw. This land, properly tilled, will produce almost any crop if it is well drained. And let me say right here that it is time thrown away to cultivate swamp land if it is not well ditched, better let the wild grass grow. With us, corn, oats, barley, rye, timothy, clover of all kinds, potatoes, beets, onions and millet have done well. I will give a few figures, showing what my swamp land has done in the past three years:

1895.

Potatoes, 4 acres .....800 bushels
2½ acres corn, damaged by hail ..... 150 baskets
Oats, 16 acres, damaged by hail .....600 bushels
Timothy and A Clover, 15 acres .....45 tons
Timothy for seed, 5 acres..50 bushels
Timothy, old seeding, 12 acres..20 tons

1896.

20 acres oats .....
400 sacks, weight 2½ bushels
2½ acres barley .....45 sacks
Corn, 4 acres, following potatoes .....600 baskets
Corn, 2 acres, on sod ....200 baskets
10 acres timothy seed.....62 bushels, 15 ton hay
15 acres timothy hay .....30 ton hay

1897.

5 acres oats .....240 bushels
3 acres barley ..... 60 bushels
14 acres rye .....140 bushels
6½ acres corn .....650 baskets
4 acres alsike clover..... 9 bushels
5 acres timothy and A. clover, ...14 bushels
15 acres hay .....25 tons
½ acre potatoes .....100 bushels

THOUGHTS ABOUT THE EDUCATION OF OUR FARMERS' CHILDREN AND OUR COMMON SCHOOLS.

JACOB SCHWARZENBACH, JR.

Read at Farmers' Institute held at Iola, Dec. 13, 1898.

Mr. Chairman, Ladies and Gentlemen —Perhaps a good many of you are a little disappointed about the title of my paper; you probably would rather hear something about a certain branch of farming and think that such a subject doesn't belong here; but I beg your pardon, my friends, as I believe that the Farmers' Institute is open to discussion on any subject concerning us farmers and our families, and while there is so much said about everything we produce on our farms, I thought it well worth while to spend a few moments in considering somewhat the education of our girls and boys, which, as we all know, are the most precious property we rear in our homes. The future belongs to our children, and upon them depends to a great extent the welfare of our country.

Now, when in our everyday life, we come in contact with different persons and listen here and there to the conversation, we find that a feeling of more or less dissatisfaction against the better situated classes of people is prevalent among the farming and laboring people. We very often hear it remarked that it is no trick for this or that man to get along nicely and be successful in his enterprises, no matter whether it is farming or any other business, because he has plenty of means, you know, and money makes money, so most people calculate. But, my friends, when we watch such men a little closer and pay a little attention to the way they manage their affairs, we most generally find that besides money it takes intelligence and schooling to be successful. You may give a fool any amount of money and the very best chances to multiply it, and you will see how soon he is rid of his property. We will now see how these so-called moneyed people who are mainly engaged in some business venture and live mostly in cities and villages, educate their children, and then we will go out in the country and see how much schooling the average farmer boys and girls get.

In this village and city, people can point with pride to their schools, they

are anxious to get good teachers and make out a good long school year, all the way from eight to ten months, leaving the vacations between the terms not very long, and the best thing of all is, when the schools begin they are anxious to have their children attend regularly; they know by their own experience that anybody who wants to make headway in this world must know something, and in order to know it, they want their children to learn, they don't believe in the old saying that ignorance is bliss; in short, they give their children all the chances to lay up a treasure of knowledge which is so necessary for anyone nowadays.

Now, how is it out in the country among farmers, do we give our children the same chances in regard to education as the city people do? To this question I must answer no, not so well. But I hear a few farmers remark that it is easy enough for village and city people to keep school most all the year around, they have plenty of money and their children have nothing to do, anyhow, so they might just as well go to school. W have too much work to spare our children so much for school, and furthermore, we don't think that they will be anything great when they are grown up, anyhow; we, ourselves, did not go to school very much and have to get along and think that our children will fight their way through this world all right.

Such is the feeling among some of our farmers, luckily not by the majority. True enough, some of those people who complain the loudest sometimes of getting beaten by the smart, intelligent and well educated city people, seem to be very careless about the schooling of their children. Do you believe that such young farmers with the most meager learning are well enough prepared to take up the struggles of life? Is it a wonder that the well educated city people try to pull the wool over the eyes of such farmers sometimes? A good many school districts keep just school enough to catch the state school money; some districts are not so very careful about getting their teachers, cheapness is the main object in view; in some districts the school meetings are attended very poorly and some of the voters do attend mainly for the purpose of seeing that the amount of money to be raised is cut as short as possible. They are most awfully afraid of a school-tax.

Now, my friends, what we should do in the country among farmers is this, and it is our duty towards our children to do it. We should take considerable interest in our schools, keep as many months during the year as we possibly can afford to, divide the terms in such a manner that all the scholars in the district will have some benefit and induce the school boards to be careful in the selection of our teachers. This is a very important matter; it is not the standing of the teacher in the different branches alone that should be taken into consideration, but his or her character as well. We must remember that during schooltime our children are exposed to the influence of the teacher most of the time.

In regard to wages we don't want to do like Spain, let the school teachers starve and the bull fighters get rich, although we don't want to throw any money away, but when we have a good, faithful teacher we should be willing to pay a good salary, as we cannot use the same scale for this kind of work as we do for cutting cord wood. When we pay good wages so a teacher can make a living out of it, we get better and more experienced teachers. Teaching school at present is taken up in most instances as a temporary job until something better comes along.

We generally know quite a while before the terms begin, and we should try our very best to have everything ready for our children so they can start in the first day, and it should be our aim to have them attend every day from the beginning to end unless prevented by sickness; this staying home now and then breaks up the classwork a good deal; it handicaps those who attend and the ones staying away can hardly follow.

Just think how sad we should feel if, through our neglect, our girls and boys grow up in ignorance and some day complain that there was a chance for them to attend school and learn something, but we did not give them that chance and now it is too late.

For some children it is often hard work to keep up. Those should be encouraged by their parents, the family should pay some attention to the workings in the schoolroom and help the teacher in the same direction. I think that parents should never express an unfavorable opinion about the teacher in the presence of their children, such a criticism will surely cripple the work of a teacher.

The tendency of some teachers is to hurry their work with their scholars to gain notoriety; such work takes very well with people who don't know any better; in fact, some parents feel somewhat flattered when their children go through their books so quick. The truth of it most generally is, such scholars go through a good deal of book surface, but learn very little; their minds get overloaded with a good deal of the stuff they don't understand and they finally lose interest for their work. It is far better for the districts to keep one month more school during the year and have the teachers explain the lessons to the scholars thoroughly so they can understand them. It is not the number of lessons the scholars go through which makes them wise, but what they remember and understand thoroughly.

Teachers should make it a rule that their scholars are polite among themselves and also towards the people they meet on the roads when they go to or come from school, as education not only means learning book lessons, but good manners and nice behavior as well.

Now at last a few words in regard to our common schools. What are they? Well, as a public institution, they are a blessing for our country of unlimited value, and for the different school districts they are just exactly what we make them. I don't believe that the masses of the people at large have a better friend than their district schools and the sooner we recognize that fact the better it is for us. We all certainly have just reason to be proud of our state educational institutions, but we farmers don't derive so much direct benefit from any of those institutions as we do from our district school. It is the district school which furnishes the elementary educational instructions equally to the poor as well as to the rich; here is where our best educated men and women began their learning and laid the foundation for their success afterward. History tells us that here is also the place where some of our most honored and best men received their first instructions.

It seems strange to me every time when I hear people denounce our schools as being good for but very little. Some people seem to think that it don't matter much whether their children attend the district schools steady or not, they had rather send them to some academy or college when they are old enough, and here is just where they make their mistake, because they see right away in all such schools where such scholars belong and they most generally get there, thereby spending time and money and deriving but very little benefit; even in the line of education it is a wrong idea to varnish a job before the primary coats are applied. Therefore, I say, take an active interest in your district schools, improve them as much as possible and have your children attend them regular, and if one or the other wants to enter either an academy or any other higher school they have a foundation to build on and get some benefit from such higher school.

Well then, let us unite in our efforts and see that our district schools in reality are educational institutions for our children and a credit to our districts.

FARM HELP.

D. W. CATE.

Read at Institute at Koro, held Feb. 23-24, 1899.

In these remarkable times in which we are living, deep mysteries have been unraveled, undreamed of discoveries have been made and ingenius inventions have been sought out which have well nigh revolutionized our whole system of living and working, but in spite of all this marvelous development of mechanical genius, it is still found that on the farm the man behind the plow, like the "man behind the gun" on shipboard, is an indispensable factor, and the more efficient he is, the better will be the results.

Admiral Sampson, with his splendid fleet, could never have destroyed the Spanish navy without the men who fed the fires and worked the ships and trained the guns; no more can the modern farmer with his complete equipment of labor-saving machinery, successfully run his farm without his complement of men to operate the machines. Help we still need; help we must have or our expensive machinery will lie idle in the sheds, and our fertile fields will grow up with weeds and brambles.

When modern farm machinery began to come into use it was confidently predicted that the majority of farm hands would be thrown out of employment entirely, or be forced to work at starvation wages. That such has not been the result, every farmer here can testify.

In farming, as in politics, we Americans are disposed to be expansionists. With our steam gangs and sulky plows, drills and seeders, horse planters, mowing machines and horse rakes, grain binders and corn harvesters, we think that we cannot afford to be content with the old-time "Little farm well tilled;" we must spread out. We become ambitious and want to run big farms because we can. Then we find that the use of machinery has so greatly increased the acreage of our cultivated tracts that more help is needed instead of less.

During nearly thirty years' experience in farming, I can recall no season in which it was more difficult to secure good help than in the one just past. Local causes added to the stringency in some places, it is true, but from near and far came the troubled wail echoing back through nineteen hundred years, "The harvest truly is plenteous, but the laborers are few."

Why this great scarcity of farm help? Have the men forsaken the country? If so, why? Is farm work more irksome or disagreeable than other employments? Are the days too long; or, is it a question of wages?

I am aware that there is a tendency, and I fear a growing one, among certain classes of country people to look upon farm life as being altogether drudgery, and that to be called a hired man is little else than ignominy. I think this is a great mistake. What is a clerk in a mercantile house but a hired man or a hired girl? And why should the life of a bookkeeper who sits perched on an uncomfortable seat breathing the stifling air of a musty city office—I say why should any spirited young man prefer such a life, to the comparative freedom of the ever-changing out-of-door life on the farm? Why then do so many young men shun the farm, choosing rather the most debasing of employments in the city? Is it not possible that some of the blame may attach to us? What is our attitude toward our employes? Do we treat them simply as servants, paid slaves whose service we demand and beyond that have no care or interest in them? Or do we strive to uplift their thought and excite their ambition by making them feel that we look upon them not as menials but as co-workers with us?

Then as to the hours of work. While so many farmers will begin work at four in the morning and not stop until nine in the evening, is it any wonder that their men are mightily drawn

toward the city factories where eight, or at most ten hours constitute the day's work? The farmer himself, interested in pushing the work along, does not mind the long day, but the hired man, not having the direct interest in the business which the owner of necessity has, very naturally grows discontented under a system of labor which barely allows him time for sleep, but leaves no opportunity for recreation or sociability. To him the allurements of city life with its shorter workday, offering such abundant opportunities for recreation and social enjoyment, have a drawing force which is all but irresistible.

Now, I am not advocating an eight-hour, nor even a ten-hour day for the farm, for I do not consider it practicable or desirable to establish an inflexible rule governing the length of the working day on the farm, but I wish to ask if there may not be somewhere a limit beyond which the working day cannot be advantageously extended either for ourselves or our men?

But, doubtless, the wage question is the crucial one. The bustle and excitement, the shorter day and the opportunities for visiting and sight-seeing which the city affords on the one hand; and the pure invigorating air, the appetizing exercise and the pleasing variety of labor which the farm requires on the other, all these things drop out of sight and are ignored completely before the all-ruling question of money. The laborer, looking for employment, demands the price. The farmer answers if you are a good hand I will give you two hundred dollars per year. City employers answer we can pay you from one dollar to four dollars per day according to your skill and experience.

Sixty-five cents a day on the farm and three dollars a day in the mill!

Is it surprising that the farms are neglected and the mills and factories are filled beyond their needs?

You will notice that the farmer furnishes board, lodging and washing in addition to the price named with constant employment, while the manufacturer's offer includes neither, but the value of these perquisites are usually under-rated, if not wholly overlooked by the laborer.

There is also another cause that is doing much to deprive us of our farm hands. Since our Government has so generously offered free homes to all who will accept them, there has been a constant drift toward the West of our most enterprising and energetic young men.

This home-seeking movement is a healthy and perfectly legitimate one and it would ill befit us who have homes which we so dearly prize, to utter a word to discourage or lift a hand to hinder this outflow even when it adds so much to our perplexity.

But this mad rush to the cities that are already filled to the overflowing, where the great numbers of the unemployed are even now a cause of anxiety and a menace to the commonwealth; how can it be checked and the workers kept where there is not only work enough but bread enough for all?

I suppose the men will say, "Pay us higher wages and we will stay." This is a simple and very easy solution of the problem, provided that it is a practicable one. This brings us to the question, is farming, under present conditions, lucrative enough to justify a large increase of wages paid to the help?

It is contended by those who demand an increase, that the machinery on the farms increases the value of labor by multiplying the quantity of work which any given number of hands can accomplish, and consequently the farmer can afford to pay the fewer hands required a correspondingly higher price for their work. This reasoning looks plausible, but to test its correctness it will be necessary to refer to a few statistics and facts bearing on the subject.

Reasoning from the best information I could obtain, coupled with my own observation, I conclude that the scale of wages paid farm hands is as high, if not higher, at the present time, than the average of wages paid them during the last thirty years. During that period, beginning with 1871, the price of wheat (and wheat is the staple product which determines the value of farm produce generally) has gradually fallen from $1.25 per bushel in that year to about 51 cents in 1895; and the average value per acre fell from $14.56 to $6.99. That is, it required a little

more than two acres in 1895 to produce as much value as one acre did in 1871. It is true that there has been a rally in the price in the past year, but it is well known that was caused by partial failures in the crops of foreign countries and can in no wise be considered permanent.

The cause for this great fall in prices can be readily seen when we consider that the total production of wheat increased from 235,884,000 bushels in 1870 to 467,102,000 bushels in 1895, a gain of nearly 100 per cent., while the population of the country gained only 80.77 per cent. In short, we are producing far more foodstuffs than our population can possibly consume, and consequently, unless there be some unusual foreign demand, the great surplus will be an incubus on our markets that will tend to force prices continually downward.

Now, is there any reason to hope for permanent improvement in the near future. The completion of the Siberian railroad will open up to the markets of Europe vast tracts of wheat lands which have heretofore been inaccessible, and the wheat growers of South America, on account of cheap land and cheaper labor, can easily undersell our farmers in foreign markets. But to get back to the original question, "Can our farmers afford to pay higher wages?"

As I have already hinted, and the figures quoted have proved, the use of farm machinery has had the effect to vastly expand the area of cultivation and more than double the production, but has reduced the price to such a degree that the larger crop brings no more money to the producer than did the comparatively small one before. How then stands the case with the farmer?

Twice as much capital to be invested in land, twice as much tax to be paid; a lot of expensive machinery to be paid for and kept in repair, double the quantity of seed to be planted, an equal sum to be paid out in wages for help and no increase in income. Does this showing justify the contention for higher wages?

But there is a way in which the farm hand can raise his own wages. By organization and strikes? No, for it is exceedingly doubtful if that plan could be made to work. By giving more faithful and intelligent service and consequently more value to his employer. Such service is sure to be appreciated and rewarded. Superior skill and experience commands superior wages no less on the farm than in the shop. And it is conceded that the steady, faithful, economical farmhand has a much better prospect for independence than the city worker, though his salary be two or three times as large.

Most farmhands, if they will, can easily save a hundred or a hundred and fifty dollars a year. At that rate of saving, a few years would accumulate enough to make a good payment on the purchase price of a farm. After that, if he is careful and industrious, he has a home of his own where he can bring a wife and rear a family with no dread of evictions and no fear of being thrown out of employment.

And, in conclusion, let me add that I can discover no better way to hold our young men on the farms than to inspire in them a love for simple, pure home life, and encourage them to aspire to homes and farms of their own.

OUR COUNTRY HOME-MAKERS.

MRS. GRACE WILSON, Rush Lake, Wis.

Read at Koro Institute, held Feb. 23-24, 1899.

There are few words in the English language with a greater significance than that word, "Home."

Who can measure its meaning to the poor boy in the Philippines to-day! He was so very patriotic, he thought he wanted to serve his country, but he was only a boy, and he only wanted to go somewhere and see something, and now all he wants to serve is his mother, and all he cares to see is his home. He would be quite willing, now, to leave the patriotism to those better able to understand the heights and depths, and the fullness thereof, of that magical word.

But home is not so far away from us, it is here and we are here—in the country—and what do our country homes mean to us? How do they compare with those of the city? We none of us think for a moment that the house, constructed from a carefully laid plan of an expert architect, with its beautiful curves, its colonial porches and oriel windows, constitute a home. It is the home-life within that is so dear to our hearts and fills us with yearning when separation is inevitable. And I think our country homes mean even more to us than do those of the city. Why? Because we are in a much greater measure dependent upon them for what we are, and aim to be. The lecture, concert and church privileges are many times beyond our reach. We must be possessed of an indefinite amount of strength and energy, and brave muddy roads, rainy weather or snow drifts and Arctic temperature, if we profit much by these means of education. So we are thrown back upon ourselves for pleasure and profit.

In what, then, should our idea of home consist? It should be one in which the members dwell together in love and harmony, one with another. Where peace and comfort prevail. Its influence should be far-reaching. Those who go forth from that home are to be an honor to it and to themselves, and a source of betterment to the world. She who reigns in that home will be a Godly woman. She will not be content with giving her children the necessary food, clothing and education, but the greatest desire of her heart is that they will be good.

A man may have a highly cultured head and a very bad heart. The mother is the home-maker. And she must have patience, and intuition, and wisdom, and tact, and stick-to-itive-ness, and every other virtue imaginable to properly govern her children and make home a place of rest. When she thinks of self alone there are many attractions in the city life for her socially and intellectually; there are means of self-improvement that she cannot possibly have in the country, and it is a source of regret to her. But at the same time, as she has not so much outside of her home to attract and distract her thoughts, she can give more careful attention to the wants of her family, and if she finds her efforts are paying in the home-life, ought she not to be satisfied?

Oh, these mothers; who can measure their responsibility! In their zeal for the welfare of their family how forgetful they are of self! How soon they wear out! What can we do to lighten their burdens? There is just one thing to be done and she can do it herself. She can take a little time for absolute rest each day. It will do more for her than the fabled spring of perpetual youth. If she is so conscientious that she feels selfish in taking this time, that is a false idea, because she makes it up, with interest, to her own family, it reverts right back to them in her own freshness and attractiveness, and then, too, while she is about her household duties she can work to so much better advantage with rested body and mind, that, really, the same amount of work is done after all, and in a vastly more satisfactory manner, be-

cause done cheerfully. The old Romans well understood the value of their "siesta," the whole household took their daily nap. By-the-way, what ever would the writers of Roman tales do for a plot for their story were it not for the household nap, when the villian could rush in and kidnap the son and heir.

Sometimes, if the body is not weary, it is equally as restful to retire to some quiet corner and read for a time a book that one especially enjoys. But get some rest somehow in the daytime if it is your ambition to be an ideal home-maker.

It is wonderful how the disposition will be adjusted to all sorts of annoyances, the children can tear the house down, with impunity, and she will look smilingly on. She will wade into the chaos that the baby has created in the sitting room, and pick up, without flinching, seven chairs that are reposing on their backs, an egg-beater, a wheel, seventeen blocks, a bell, the contents of the work basket, ten nails, a hammer, a lemon, six books, two dolls, thirteen buttons and a tooth-brush! Indeed, she will be proof against all annoyances—save one—and that is the long wait at noontime for the lord and master to appear. When the nicely baked potatoes are shriveled up, the apple-dumplings steamed into leather, and the aroma of the coffee all gone up the ventilator, it may take more than a nap to make her smile. But under any sort of reasonable provocations she will be sweet as the day is long. Just prevail on her to try it and see what a lubricator of family machinery it is.

She needs all the help and encouragement she can possibly have in her God-given task of training her children. The greatest problem of her life is to find out how as many different dispositions as there are children are to be governed, so that the result will be satisfactory. If she can do this she will have proven herself to be "a soldier, fit to stand by Caesar and give direction."

Do not hesitate to make your homes beautiful as it is in your power to do, for beautiful things are in themselves a source of refinement and education; books, music and pictures are three household weapons of defense and will aid the mother wonderfully in making home attractive so that the boys will never think of wanting to get out nights in questionable company, because there are means of enjoyment at home.

We believe our children have every advantage of a physical and moral constitution in our country homes till, when the time comes that they, of necessity, leave home for our city schools and colleges, we can feel comparatively safe concerning them. There is never a whit of danger, as some argue these days, that our boys will have been so hedged in on the farm that when temptation comes they will immediately be ensnared, because they have not been warned and become posted in regard to the temptations that surround the youth of our cities. We could not have it that way if we would. But give me the country boy who has been reared in a country home and trained by a country mother until he arrives at an age of reason, an age when he can be counseled with, and I will risk his future rather than that of the boy who hears and sees all the evil of city life from his babyhood up, and before he arrives at an age of understanding has contracted evil habits that go with him possibly to the grave. All honor to our Country Home-Makers, long may they live!

Miscellaneous Reading for the Farmer.

HOW TO FEED AND CARE FOR DAIRY STOCK FOR GREATEST PROFIT.

An Address Delivered by C. P. GOODRICH, at the Ontario Dairymen's Association, 1900.

BRING UP THE CALF RIGHT.—If we are to get the greatest possible profit out of a dairy cow she must be brought up right. She must be fed right from the start. One must have a clear and definite idea of what one wants and work to that end from the beginning. What is wanted is a cow capable of consuming, digesting, and turning into milk larger quantities of good milk-producing food. We do not want the cow to turn her food into flesh and body fat, only just enough to keep up her strength and health.

MUST NOT FATTEN THE CALF.—To get such a cow the calf must not be fed on food that is too fattening. The calf should be fed its mother's whole milk for a week, then substitute skim milk for a part of her feed, gradually increasing the proportion of skim milk; in about two weeks, the milk may be well skimmed. When the change is made to skim milk it is best to add a little oil-meal gruel, or flax-seed jelly. A tablespoonful of oil meal a day is enough at first, but it may be gradually increased to two tablespoonfuls.

The oil-meal is prepared by dissolving it in hot water, and then mixing it with the milk. The flax-seed jelly is made by boiling the seed. This can be mixed with the milk. Not more than half as much flax-seed should be fed as oil-meal.

MILK FED WARM AND SWEET.—The milk should always, especially when the calf is young, be fed warm and sweet, and warmed to blood heat. It is better to feed three times a day when the calf is young. The quantity of milk to feed the calf will vary greatly. Judgment must be used, but be sure not to feed too much. Do not feed more because the milk is skimmed. It will do to feed 10 to 12, or even 15 pounds a day when young, and this can be increased somewhat as she grows older.

MUST BE INDUCED TO EAT COARSE FODDER.—The calf should be induced, as soon as possible, to eat hay and oats. Some nice early cut clover hay should be put before it. Oats may be put in its mouth, or on the end of its wet nose, when it will lap out its tongue and get some of the oats in its mouth.

I keep up this kind of feed until the calf is six or eight months old. This kind of feed will make it grow rapidly—build up its frame and muscles—but will not make a dairy-bred calf fat. If it has been induced to eat all the coarse fodder possible by having it of the best quality and of the most palatable kinds, furnished in variety, the calf will develop a large stomach and a great capacity for handling and digesting food.

FALL CALVES BEST.—I prefer calves dropped in the fall; for, after the milk and other winter feed is taken from them and they are put on good pasture, they will keep right on growing. The next winter they should be fed on a good muscle-forming ration, like clover hay with a little bran or a few oats, with corn fodder, and straw for a variety.

If a heifer calf—I care not how well bred in dairy lines she may be—is allowed to run with her mother and have an abundant supply of whole milk till she is six months old, she will be permanently injured for a dairy cow. If in addition to this, she should be fed fattening foods, like timothy hay and corn, and kept very fat up to the time of becoming a cow, and you then ask her to

give you a good lot of milk, she will, as Prof. I. P. Roberts says, say to you, "I cannot; you taught me to make tallow."

I lay great stress on this point of bringing up the heifer right, and keeping her from forming the beef habit. I have seen too many heifers, that ought to have turned out superior cows, make very ordinary ones from this cause. They would give a good mess of milk for a short time, then the flow would fall off, and, if good feeding was resorted to to keep it up, the beef habit would assert itself and meat would be made instead of milk.

WHEN SHOULD HAVE FIRST CALF.—The heifer should commence the first business of her life, that is giving milk, at about two years of age. After coming in she should be fed but little grain or concentrated food for a few days. Good hay, and a little bran at first, is enough. The grain feed can be gradually increased till in three or four weeks she is on full feed.

FEED TO FULL CAPACITY.—Now she should be fed to her full capacity. By that I mean all the food she can consume, digest, and turn into milk. It takes a certain amount of food to sustain life. This we call the food of support, which is from one-half to two-thirds of "full feed." The only part of food we get any return from is what is fed in excess of the food of support. If only the food of support is given the cow, she can only live, and give no milk without taking it from her carcass. This she cannot do except for a short time, so in feeding that way we simply throw away the feed we do give.

SHORT FEEDING MAKES DEAR BUTTER.—Let us suppose that the food of support of a certain cow would cost six cents a day; and suppose this cow would consume and make good use of ten cents' worth of the same kinds of food per day, and on this she would produce one pound of butter. We would have six cents food of support and four cents food of production, making ten cents as the food cost of a pound of butter.

Then suppose we attempt to economize by cutting down the feed to eight cents per day. We would have six cents of food of support, and two cents of food of production, which could produce only one-half pound of butter per day, making the food cost of a pound of butter two days' feed or 16 cents.

Suppose we should try still further to economize in feeding this cow and feed only seven cents' worth of feed a day. Then we would have six cents food of support, and one cent food of production, which could produce only one-fourth pound of butter; or it would take four days at seven cents a day or twenty-eight cents in feed to produce a pound of butter.

The poorer we feed the greater will be the cost of a quart of milk, or a pound of butter, or a pound of cheese.

DON'T FEED TOO MUCH GRAIN.—Although I advocate feeding to full capacity on the score of economy and profit in production, yet I do not advise feeding all the grain or concentrated food the cow will eat to the exclusion of some of the coarse fodder she ought to eat, especially when, as is usually the case, the same food elements cost less in the form of coarse fodder than in concentrates.

Besides this, a cow is equipped with a stomach and digestive organs made for handling coarse fodder, and we have brought up our heifer in such a way as to develop her capacity for handling it, therefore a large proportion of her daily ration must be coarse fodder, or she cannot be in good health.

SOME GRAIN NECESSARY.—On the other hand, a good dairy cow cannot eat enough of bulky fodder to do her best, and therefore must have some grain or concentrated food. But the question is: What proportion of her food should be concentrated?

My rule is that about one-third, and never more than one-half, of the entire weight of her daily food should be concentrated. This is only a general rule which needs to be modified to suit each individual cow.

I feed grain food somewhat in proportion to the quantity of milk or butter a cow can be made to produce. Those that can be made to produce the most

should get the most grain, and those that do not respond to the grain food well in milk, but go to laying on flesh, should have less.

WATCH THE COWS.—The feeder must watch his cows, and see what they do with their food; watch to see that they eat it up clean with a good appetite; watch to see that it is well digested; watch to see what is done with it; whether it goes to the milk pail or on to the cow's back.

No more food should be given to a cow than she will eat up at the time. Have none left over in the manger to be mussed over and breathed on. They will eat more, and do better, if they are fed in this way.

BALANCED RATIONS.—Cows should be fed a properly balanced ration. Experience has demonstrated that the proportion of digestible protein and carbohydrates should be about as one to five and a half or six. The chemist tells the amount of the different elements in the food, and tells us what in his opinion a cow ought to produce with it, but the cow must be consulted before the final verdict can be rendered. The food must be palatable to her or she will not eat it. It must be easily digested or she cannot use it. It must be healthful for her or it will make her sick.

ALL COWS SHOULD NOT BE FED ALIKE.—All cows do not want to be fed alike. Cows that are inclined to put on fat should be fed less of the carbo-hydrates such as is contained in corn, and more protein food, like gluten feed, oil-meal, buckwheat, middlings, etc., while those that are inclined to milk down too thin should be fed more corn or other carbonaceous food.

FEED A VARIETY.—The feeder should study to give cows as great a variety of food as possible. They love a variety as well as we do, and if allowed freedom to get a variety, will have it, and do much better than if confined to one or two kinds of feed, no matter how good those foods may be.

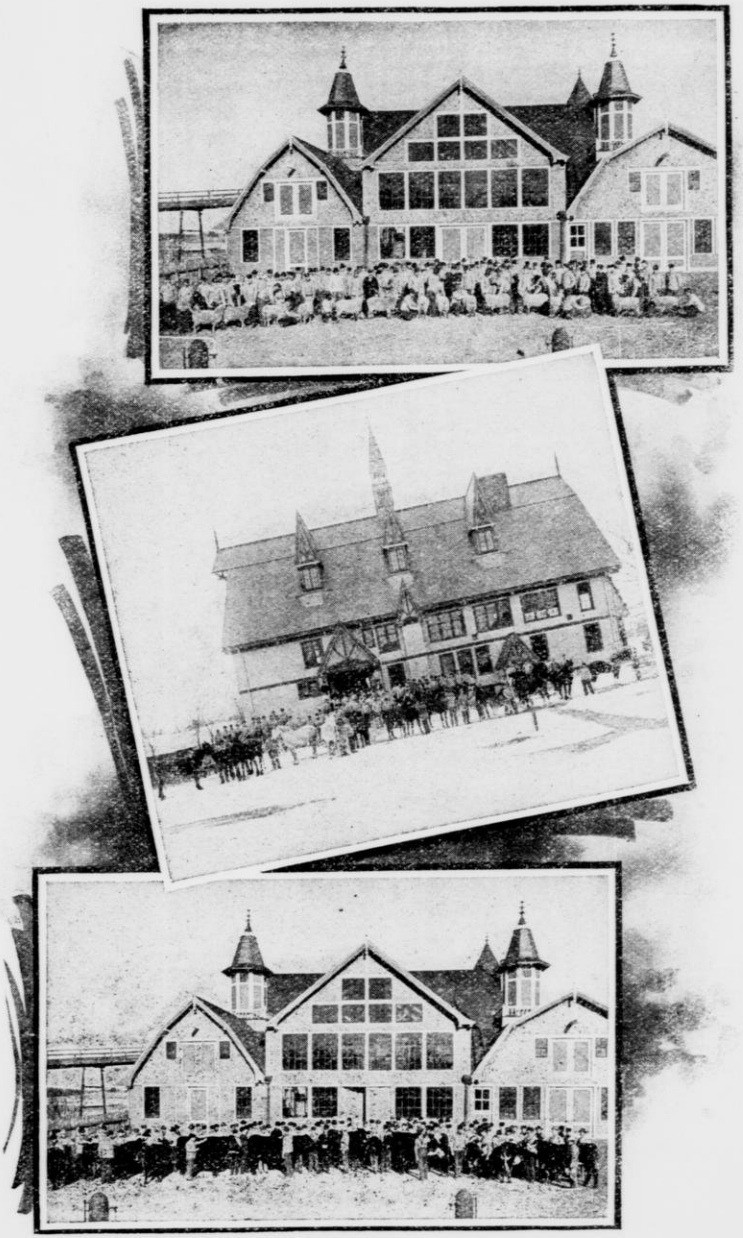
SUCCULENT FOOD.—Green succulent food is better for milk production than the same kind of food cut and dried, no matter how carefully cured. We should always provide some good soiling crop for time of summer drought, so that cows should never be without good succulent food in summer. In winter they do much better if fed succulent food. We cannot have grass, nor green corn fodder, but we can have the next thing to it, we can have silage. The cost of producing milk can be greatly reduced by means of the silo. It reduces the cost of feed and increases the flow of milk above what can be obtained by feeding all dry feed. The cheapest and best way to provide summer feed to help out dry pastures is by having a summer silo. Succulent food may also be provided for winter by raising roots, but they require more labor than silage does, to provide the same amount of food value.

REGULARITY IN FEEDING IS OF GREAT IMPORTANCE.—Cows should be fed as nearly as possible, at the same time each day, then they will not be worried waiting for their food.

HOW MANY TIMES A DAY TO FEED.—Many good dairymen advocate feeding but twice a day, while others insist that it is better to feed three times. I have always been in the habit of feeding three times a day, with coarse fodder, and twice a day with grain. Perhaps they would do just as well to leave out their noon feed of fodder, and give more night and morning, after they got used to it, but I am sure they would not at first, and I have never had the heart to disappoint them by not giving them their noon feed. I think this having feed three times, or only twice a day, is a matter of habit with cows, the same as it is with men.

CARE OF COWS.—The most important thing in the care of cows is to see that they are comfortable. They cannot do well unless they have comfort. Do not have them lie on a plank floor, or worse, on a bare cement floor. Give them a good, clean, evenly-made-up straw bed, then they can lie down in comfort, and will lie down and chew the cud most of the time, standing up only long enough to eat and be milked.

The temperature of the stable should be comfortable, never getting below



THE UNIVERSITY STOCK BUILDINGS. STUDENTS RECEIVING DRILL IN STOCK JUDGING.

freezing. At the same time, the ventilation should be such that the air should be pure and healthful.

WATER AND SALT FOR COWS.—Cows should have water at least twice a day, and that at a temperature that suits them, which is surely not ice-water, but 20 or 30 degrees above. They should have free access to salt, or it should be given them every day from one to two ounces per cow.

COWS SHOULD NOT BE EXPOSED TO COLD OR STORMS.—Cows should never be left out of doors when the weather is uncomfortable. They may be turned out in a yard well sheltered from the wind on pleasant, sunshiny winter days for two or three hours, but when the weather is very cold, or stormy, if they are not watered in the stable, which is the best way, they should be out only just long enough to drink from a tank a few feet away from the barn, and then immediately allowed to go back. It is cruel, as well as unprofitable to let cows stay out in the pasture during a cold October rain. One day's exposure to such weather will cause the owner serious loss by the shrinking of the milk.

If a cow is made to shrink in milk from such a cause she can never be brought back to the quantity she would have given if the shrinkage had not occurred.

EXCITEMENT.—Avoid getting cows excited. Driving cows with a dog is a very expensive business. A boy mounted on a horse does not always drive cows as gently as he should. Any excitement of any kind, whether it be from a dog or a boy chasing them; blows and rough treatment; loud and angry talk in the stable where they are, will cause the flow of milk to decrease, and it nearly always lessens the per cent. of butter fat in the milk they do give. I have known two cows to have a hard-fought battle in the yard where all the cows were, and not only the combatants, but nearly all the rest of the cows shrank considerably in milk in consequence of the excitement. Be gentle and kind to cows always; they will pay you for it in good milk.

MILKING.—The milking should be done in such a way as to please the cow by not causing her pain, and yet get the milk as quickly as possible. Get all the milk, but do not keep on stripping after you have got it.

Some persons will go on and tell you just how to do it—how to take hold of the teats, which to milk first, and so on. But I think no rule can be given that will apply to every cow. The milker must find out by practice just how to accomplish the desired object with each cow, and when he has found out the best way, milk her the same way every time.

It is best not to change milker, but have the same person milk the same cow every time. Milk in the same order every time. When you have been in the habit of beginning at one end of a row of cows and taking them by course right along through, you will notice that when you have about done with one cow, the milk will begin to drop from the next one to her. She is ready to be milked; she expects to be milked; she wants to be milked, and then is the time to milk her. But if, instead, you should go to the other end of the line and get around to her half an hour later, her milk will not "come down" as readily as it would if taken at the right time, there would not be as much of it, and, if tested, it will be found to be poorer in butter fat.

HOW LONG TO GO DRY.—As a rule, it is best to have cows go dry six to eight weeks, but there are some persistent milkers that it is difficult to dry up at the proper time. If a cow cannot be dried up at least three or four weeks before coming fresh it is better to continue milking right along. If you succeed in drying her only a week or two before coming in, the chances are that she will give very little milk when she does come in, and perhaps fail entirely in milk. But the cases are very rare indeed, where by the exercise of proper skill a cow cannot be well dried up four to six weeks before coming in.

HOW TO MANAGE WITH FIRST CALF.—To manage a heifer of a highly-organized dairy temperament, when she comes in with her first calf, in such a way as to make her as good a cow as she is capable of being, requires tact and skill of a high order.

After years of experience, and trying various ways, I have come to the conclusion that all things considered, the quicker the calf is taken from the heifer the better for all parties concerned. If the calf is allowed to suck several days the cow becomes much more attached to it, and will mourn more, and be more likely to withhold her milk than if they were separated at first.

To succeed the best, the milker must in some measure take the place of the calf in the affections of the cow. It requires extreme gentleness and kindness and much petting on the part of the milker to accomplish this. Some, men especially, are failures in this respect, and consequently can never be good milkers. Certain it is, no cow that has nervous energy enough to be worth anything for the dairy, will do her best in giving milk if she hates her milker, or stands in fear of him.

I am very glad, indeed, that I had this opportunity to come to Canada. When I first thought of coming I looked on the map and saw it was a foreign country, and I felt a little bit timid, never having been out of the United States before, and to come over here and face a lot of foreigners made me nervous; but now that I have been three days with you, and looked right in your faces, why you are just like our folks, perhaps a little more so, and perhaps that is what makes you good. I believe the business a man is engaged in has a great influence on his character, and a dairyman to be successful has got to be kind and gentle, and restrain his temper. He must not swear nor scold, nor make a great row. He must control himself and be kind, and I contend it makes him a better and a kinder man, and his family feels the better for it. He loves his cows so much that bye and bye he will begin to love his wife, and it makes him a better man. As I sat last night and heard you sing "God Save the Queen," you sang it to the same tune that we sing our song "America," and I believe that these great English-speaking races will in time carry the banner of civilization over this whole world, and that we will be all one people.

AGRICULTURE IN COMMON SCHOOLS.

GEO. T. FAIRCHILD, Late President Kansas State Agricultural College.

The culture of the soil is so materially connected with the maintenance of human life that it seems most natural that the facts and principles of agriculture should be the very basis of early education. Yet but few attempts have been made to introduce any systematic teaching in this direction. Even those few have been most striking for their lack of success in arousing or maintaining the interest and ingenuity necessary to develop mind in children and youth. Every text-book offered so far assumes the necessity of furnishing a certain fund of information as to the nature of soils, the nature of plants and animals, and a body of rules for handling all three, phrased in such general terms as to fit all sorts of people in all sorts of circumstances. The effort is to make a sort of trade manual, useful to the experienced farmer in explaining his experience and correcting his practice, but at the same time embodying fundamental scientific statements from the branches of knowledge directly bearing upon the handling of soils and crops. The most elementary work which has come under my notice has the form and method of a little cyclopedia of information about farming.

Many of these books are readable, and as summaries of excellent practice are good for one who already knows by experience the ins and outs of such work; but generally the mere smattering of scientific terms and statements might better be omitted for any light they throw upon the subject. Science cannot be assimilated from words; it must be touched by the senses, and absorbed in its elements. Phosphates and nitrates, carbo-hydrates and protein sound learned, but mean no more to one who borrows them from a book than

to the book itself, unless an intimate acquaintance has been formed with nature as she is working out these compounds. The name and the fact must both be in the mind to give the name a meaning and a use.

Now no such manual can, in the nature of the case, give the intimate observation needed. It cannot teach the botany with which it assumes familiarity. It cannot explain the laws of physics and physiology which it parades as part of agriculture. It cannot even make evident those principles of chemical affinity which give meaning to the names of soils and foods and processes. Of all burdensome science, the epitome of several sciences is worst because it lacks the very first essential of science—the seeing into things themselves.

But such efforts are also unsatisfactory as a means of education because they call for no ingenuity on the part of the learner. To learn and recite what costs nothing but memorizing gives no stimulant to thinking. If language and mathematics were taught simply by rules to be repeated, or propositions to be committed, little would be accomplished in the years spent in school. When geography becomes simply pages of words, it trains memory in tricks and contrivances, but gives no growth. Just so anybody of information not directly attached to the activity of a thinking mind gives no result; it is learned to be forgotten, or simply to be paraded as learning.

For many years it has seemed desirable that some plan be devised for extending to the children on the farms and in the rural villages the advantages of such familiarity with underlying truths within the reach of their senses as might give them the advantage of real knowledge and true ingenuity in using the forces of nature. A child learns easily to watch the processes of nature with a quickening wonder, if led by simple steps into her laboratory. Leaves, flowers, seeds, sprouting, growing, fruiting—all entice him into testing, and questioning nature's action. A study of the elements of soil is as natural as to play in dirt, if the true suggestive way is taken. Physiological processes and chemical action follow along in turn as underlying familiar facts, if the child can have his eyes and fingers kept at work. Books become his friends in helping to solve problems, not in setting him tasks by the page.

It is said, the teacher must have his ideals changed! Yes; and so must the parent. So also must the maker of text-books set himself to give problems for child and youth to solve. One question to be answered only by searching the potato field will teach more truth than ten answers ready made and clearly printed. The statement that potatoes are enlargements upon underground stems has little meaning till those stems are seen and compared with the enlarged roots of sweet potatoes. The facts brought out by suggestions and questions, with problems to be solved by exertion of the native ingenuity of children, teaches the self-help which makes growth, makes knowledge, makes ability.

Agriculture will never take the place it deserves in the schools till it forms such a basis of daily thought in school life as to quicken inquiry and stimulate interest in its wonderful field of information. Let the facts touch the children, and the applications will come to youth and manhood. Otherwise, we must wait for the need of application to awaken interest in facts, and so be too late to take time to find them.

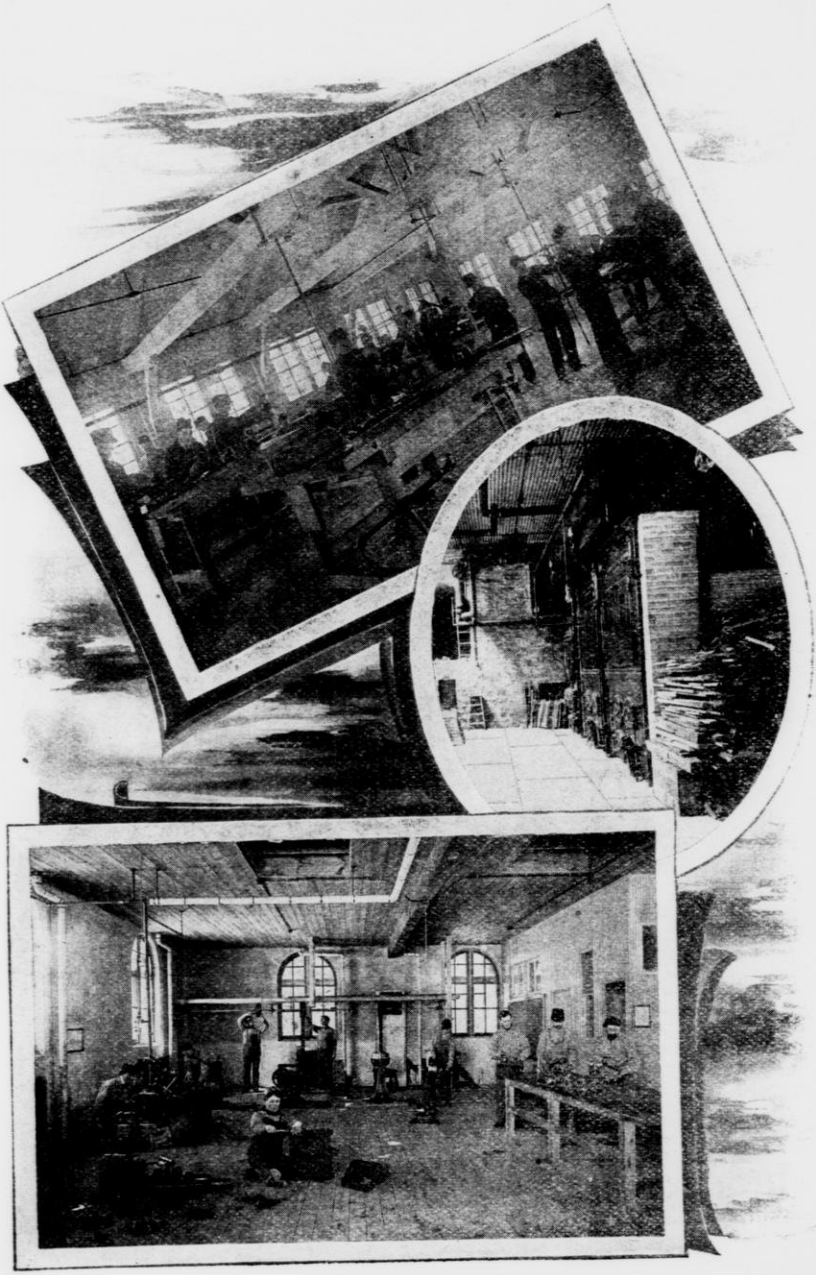
What teachers will begin the task aright? What authors will put their best before the coming generation?

VETERINARY LAWS OF WISCONSIN.

APPOINTMENT OF STATE VETERINARIAN; TERM, DUTIES.—Section 1492, W. S., 1898.—The governor shall, with the advice and consent of the senate, appoint a competent veterinary surgeon to the office of state veterinarian; such appointment shall be made for the term of two years and until the qualification of his successor. The person so appointed shall take an oath of office which shall be filed in the office of the secretary of state. It shall be the duty of such veterinarian to prevent the introduction or spread of contagious and infectious diseases among domestic animals in this state, to co-operate with the state board of health in controlling and suppressing such diseases as are common to men and animals or any diseased condition of animals likely to have a deleterious effect upon the general health of human beings, to make such scientific study, investigations and experiments as he shall deem necessary in relation to the prevention and cure of diseases among animals and extend information concerning the same.

DUTY OF LOCAL HEALTH BOARD; POWER OF VETERINARIAN.—Section 1492a, W. S., 1898.—The various town, village and city boards of health shall take cognizance of the existence of contagious and infectious disease among animals, report all cases thereof coming under their observation in their respective localities to the state veterinarian and co-operate with him to prevent their spread; any such board or the health officer thereof may order that any animal affected or suspected of being affected with any such disease or which has been exposed thereto, shall be quarantined, and the removal thereof from any premises where it may be ordered to be kept shall be forbidden. If any such board shall be unable to determine the nature of any disease prevailing among animals they may request the state veterinarian to investigate the same. Said veterinarian may quarantine premises upon which is a domestic animal afflicted with a contagious or infectious disease or that is suspected to be so afflicted or that has been exposed to such disease, and forbid the removal of any such animal or any animal susceptible to such disease therefrom by serving a written order upon the occupant or owner of such premises and by posting a copy of such order at the usual entrance thereto; and if any such disease shall become epidemic in any locality he shall immeditely notify the governor, who may thereupon issue a proclamation quarantining such locality and forbidding the removal therefrom of any animal of the kind so diseased or of any kind susceptible to such disease without the written permission of the state veterinarian. Any person who shall remove or allow the removal, without such permission, of any animal quarantined under the provisions of this section shall be punished as provided by law, be liable to all persons injured thereby for the damages sustained and forfeit all right to the indemnity which he might be entitled to under section 1492b.

KILLING AND APPRAISEMENT OF ANIMAL.—Section 1492b, W. S., 1898.—In case an infectious or contagious disease of a malignant or fatal nature, such as rinder-pest, foot-and-mouth disease, pleuro-pneumonia, anthrax and Texas fever among bovines, glanders among equines, anthrax in sheep, and other diseases of like nature or fatal tendency shall become or there is good reason to believe that either of them will become prevalent in the community in which any such disease exists the state veterinarian may, if in his judgment it shall be necessary, order any diseased animal or animals or any which have been exposed to an infectious or contagious disease to be slaughtered; but if he shall have any doubt concerning the nature of the disease which afflicts any animal or the advisability of slaughtering the same he may call in consultation one or two veterinary surgeons and confer with the state board of health, and for the purpose of ascertaining the nature of a disease may order the slaughter of any animal or animals suffering therewith. Whenever such slaughter shall be deemed by him to be necessary the state veterinarian shall give written notice to the owner, his agent or the person in whose possession such animal may be,



DAIRY MACHINERY.

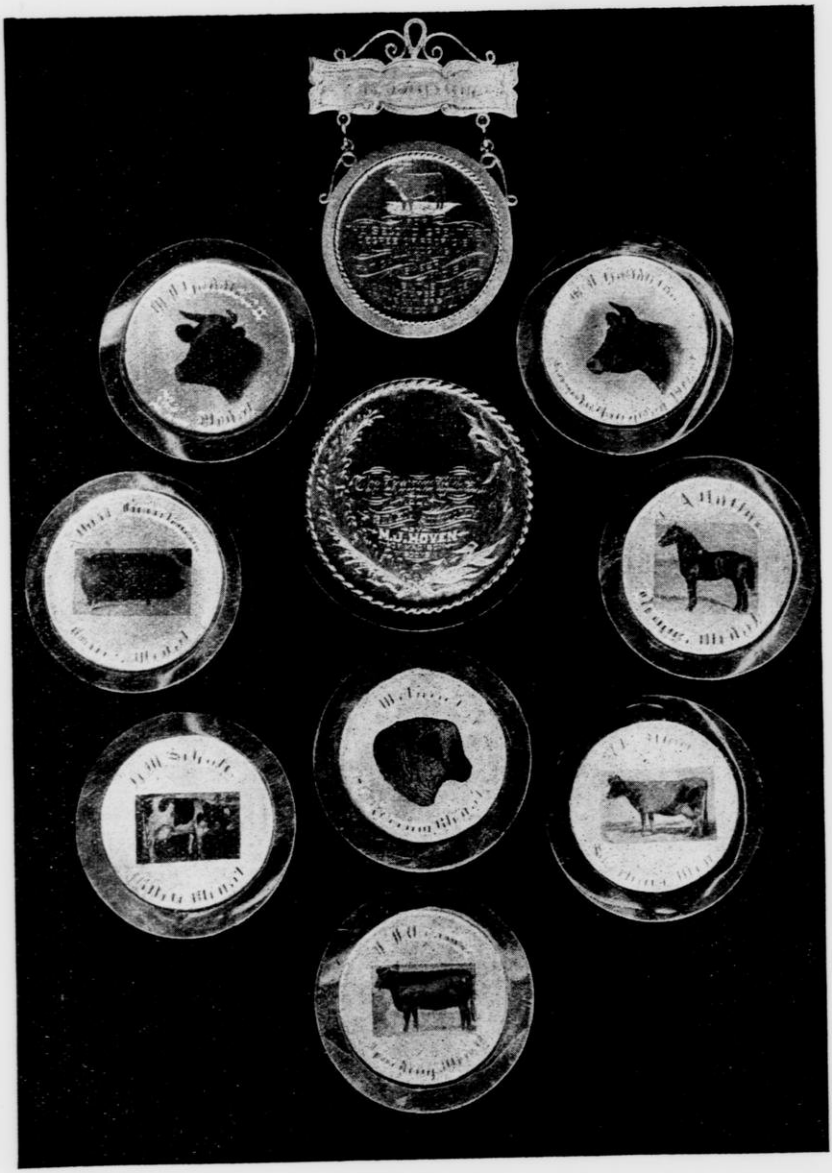
Dairy Students Cutting and Fitting Iron Pipe; taking apart Steam Engines, Pumps, etc., and View in Boiler Room.

and to a justice of the peace in the county in which the animal may be, of his purpose to order the slaughter thereof, and shall give a description of the animal or animals and state the owner's name if known. Said notice shall be entered upon the docket of such justice, who shall immediately thereafter summon such owner, agent or possessor and three disinterested citizens of the county, not residents of the immediate neighborhood in which such animal is owned or kept, to appraise the value thereof. Such appraisers shall, before entering upon the discharge of their duty, be sworn by such justice to make a true appraisement, without prejudice or favor, of the value of such animal, and shall certify in their return that they have seen the appraised animal destroyed. In making appraisement of a diseased animal the appraisers shall determine its value in the condition in which [it] is at that time; but the appraised value of a horse afflicted with glanders shall in no case exceed fifty dollars. The slaughter of animals which have been so appraised shall be made under the direction of the local health officer or the chairman of the board.

IMPORTATION OF ANIMALS; NOTICE OF DISEASE.—Section 1492c, W. S., 1898.—Whenever the state veterinarian shall have reason to believe that there is danger of the introduction into this state of any contagious or infectious disease prevailing among domestic animals in any locality without the state he shall immediately investigate the conditions there existing with reference to such danger, and if he concludes that such danger exists shall forthwith so report in writing to the governor and recommend the adoption of such measures as he may deem necessary; the governor may thereupon, by proclamation, designate the locality or localities from which danger is apprehended and prohibit the importation therefrom into this state of any animals of the kind diseased, except under such restrictions as the state veterinarian may make. It shall be the duty of every person who shall have reason to suspect that there is upon his premises, or upon premises over which he has control, whether as agent or otherwise, any domestic animal afflicted with a contagious or infectious disease to immediately report the fact to the local board of health or some member thereof, and such board or member shall forthwith make report thereof to the state veterinarian. That officer may enter upon any premises or go into any building or place where he has reason to suspect there may be diseased animals, and may call to his aid, whenever necessary, the sheriff or any constable of the county in which such animals may be, and all such officers when so called upon shall assist the state veterinarian in the enforcement of the provisions of this and the three preceding sections. All domestic animals in this state, whether here permanently or in transit, are within such sections and the two next following.

CLAIMS, HOW MADE; WHEN NOT ALLOWED.—Section 1492d, W. S., 1898.—All claims against the state arising from the slaughter of animals as above provided shall be made by filing with the secretary of state a copy of the state veterinarian's notice to the justice of the peace and the return of the appraisers to the justice, which notice and return shall be certified by him. The secretary of state shall examine these, and if satisfied that the amount awarded is just and that the owner of the animals slaughtered is entitled to indemnity, shall issue his warrant for two-thirds of the sum named in such return; but if he shall have reason to believe that the appraised value is greater than the real value of such animals he shall pay such owner such less sum as he shall deem just; provided, that the right to indemnity shall not exist nor shall payment be made in either of the following cases:

1. For animals owned by the United States, this state, or any county, city, town or village in this state.
2. For animals brought into this state contrary to the provisions of section 1491 or of the preceding section, or where the owner of the animal or the person claiming compensation has failed to comply with the provisions of section 1492b or of the preceding section.
3. When the owner or claimant, at the time of coming into possession of the animal, knew it to be afflicted with a contagious or infectious disease.



MEDALS AWARDED TO SHORT COURSE STUDENTS FOR COMPETITIVE WORK IN STOCK JUDGING, SPRING OF 1901.

Through the liberality of some of Wisconsin's citizens deeply interested in progressive farming, the College of Agriculture is able annually to offer prizes and medals valued at $500 to the students showing the greatest degree of proficiency in various lines of agricultural work.

4. When the animal slaughtered was diseased at the time of its arrival in this state.

5. When the owner shall have been guilty of negligence or has wilfully exposed such animal to the influence of a contagious or infectious disease.

ALLOWANCE TO VETERINARIAN; BULLETINS; PAY OF CONSULTING VETERINARIANS, APPRAISERS, ETC.—Section 1492e, W. S., 1898.—The state veterinarian shall be allowed for experimental purposes, with the consent and approval of the governor, a sum not to exceed five hundred dollars annually, which shall be audited upon the presentation of a verified account and an itemized statement and receipts approved by the governor. He shall from time to time issue such bulletins of information as he may deem advisable, which, with his report to the governor to be made in October of each even-numbered year, shall be printed, the bulletins in such number as may be necessary. He may deliver lectures on veterinary science in the agricultural department of the state university when to do so will not interfere with his other duties. The veterinary surgeons called in consultation by him shall be paid seven dollars for each day they are actually employed and be reimbursed their necessary expenses for such time; their accounts shall be audited upon itemized vouchers certified to by the state veterinarian and approved by the governor; but no person shall be considered a veterinary surgeon within the meaning of this and the five preceding sections who is not a regular graduate in good standing of some recognized veterinary college in the United States, Canada or Europe. The appraisers hereinbefore provided for shall receive two dollars for each day actually employed as such, which shall be paid out of the county treasury upon the certificate of the justice by whom they were summoned. The fees of the justice and other officers who may perform any duty hereunder shall be the same as are allowed by law in criminal proceedings in justices' courts and shall be paid by the county in which their services are performed.

THE PRACTICE OF VETERINARY MEDICINE AND SURGERY.

PRACTITIONERS; WHO MAY BE; RECORD OF.—Section 1492f, W. S., 1898, as amended by chapter 82, laws of 1899.—No person shall practice veterinary medicine and surgery or any branch thereof in this state for compensation or shall directly or indirectly ask or receive for his services as a practitioner thereof any fee or reward, nor shall be competent to testify as an expert witness in any court in matters pertaining to the diseases of animals unless he be registered as a veterinary physician and surgeon by the register of deeds of the county in which he resides. No person shall be so registered unless he is a graduate of a legally incorporated school or college of veterinary medicine and surgery, or shall hold a certificate of qualification as a veterinary physician and surgeon from a legally incorporated veterinary society, or shall have practiced veterinary medicine and surgery in this state for a period of not less than five years continuously before the twenty-eighth day of April, one thousand eight hundred and eighty-seven. The register of deeds of each county shall provide a book to be known as the veterinary medical registry in which he shall record the name of the registrant, of the institution which granted his diploma, or of the society which granted his certificate; or if the applicant for registration does not hold either, then he may be registered upon filing his affidavit stating that he has practiced veterinary medicine and surgery in this state for five years continuously prior to the date above given. Any person so registered and who shall pay to the register of deeds one dollar shall be entitled to continue the practice of veterinary medicine and surgery. Nothing in this section contained shall be construed to prohibit the rendition of services gratuitously in case of emergency or to prevent an authorized practitioner of an adjoining state from practicing in this state when his services are requested. Any person who shall violate the provisions of this section shall be punished by a fine of not less than ten dollars nor more than twenty-five dollars, or by imprisonment in the county jail not less than thirty nor more than ninety days or both.

No. 625, A.] [Published May 8, 1901.

CHAPTER 301.

AN ACT to authorize cities of the first class to employ a veterinary surgeon.

The people of the State of Wisconsin represented in senate and assembly do enact as follows:

EMPLOYMENT OF VETERINARY SURGEON AUTHORIZED.—Section 1.—Any city of the first class shall be authorized, and is hereby authorized, to employ a veterinary surgeon in its fire department who may be required to render service in respect to all horses used by the city.

CITY VETERINARIAN, HOW APPOINTED.—Section 2.—On or before the first Monday in June, 1901, the chief engineer of the fire department may nominate, and with the approval of the board of fire and police commissioners, he may appoint a qualified and suitable person to be veterinary surgeon of the fire department, who shall take the official oath required of officers of the city and shall hold his position at the pleasure of the chief. In case of a vacancy in the office at any time, it shall be filled by appointment in the same way.

SALARY OF, HOW FIXED.—Section 3.—The veterinary surgeon so appointed and his successors in office shall be subject to all the rules of the department which are applicable to such an officer and shall also be subject always to the special control and direction of the chief. The salary of the veterinary surgeon shall be fixed by the common council and shall be paid in monthly installments at the same time and in the same manner as other salaries in the fire department are paid.

DUTIES OF; TO MAKE REPORT.—Section 4.—The veterinary surgeon shall render such services and perform such duties as shall be required by the rules of the fire department, and also such as may be required by the chief at any time. Especially the veterinary surgeon will be required to make careful examination of horses offered for purchase by the city for use of the fire department when required by the chief or by any officer of the city or any board having authority to purchase such horses, and no horses shall be purchased for such use without a certificate by the veterinary surgeon that in his opinion, the horse is fit for the service intended and no bill or resolution for the payment for any horse purchased for such use shall be countersigned by the comptroller unless it is accompanied by such a certificate of the veterinary surgeon. It shall be the duty of the veterinary surgeon, at least once in each month, to visit the quarters of each company belonging to the fire department and to inspect carefully and thoroughly the stables and horses and the forage and feed provided and to make prompt report in writing to the chief of any deficiency found or anything needing correction or improvement either in the horses or the stables or the forage or feed provided. It shall be the duty of the veterinary surgeon to make a prompt written report to the chief immediately upon discovering that any horse in use in the department is not fit for further service therein and upon the approval by the chief of any such report, the horse or horses named therein may be sold or otherwise disposed of by the proper officer or officers of the city.

DUTIES OUTSIDE OF FIRE DEPARTMENT.—Section 5.—The veterinary surgeon of the fire department may also be required by the chief to inspect and make written report as to horses owned by the city or offered for purchase by the city for use elsewhere than in the fire department and also to render medical or other service in relation to horses owned or in use by the city elsewhere than in the fire department; and it is hereby made the duty of the chief of the fire department to communicate the opinion or certificate of such surgeon, as to any horses inspected by him, to the officer or board having charge of or authorized to purchase such horses, and no horse shall be purchased for the city

without the certificate of such surgeon, that in his opinion the horse is fit for the service intended. No compensation beyond the salary fixed by this act shall be allowed or paid to such surgeon for any services which he shall perform under this act.

Section 6.—This act shall take effect and be in force, from and after its passage and publication.

Approved May 6, 1901.

No. 644, A.] [Published May 22, 1901.

CHAPTER 440.

AN ACT for the establishment of a live stock sanitary board.

The people of the State of Wisconsin represented in senate and assembly do enact as follows:

BOARD, HOW CONSTITUTED; MEETINGS; ORGANIZATION.—Section 1.—There is hereby constituted a state live stock sanitary board which shall consist of three members of the state board of agriculture, to be chosen by that body from its membership, the bacteriologist of the state agricultural college, and the state veterinarian; the last two mentioned members to be ex-officio members of the board, and the state veterinarian to serve without additional compensation. The members selected from the state board of agriculture shall hold office for a term of three years, except that the member first chosen shall hold his position for one year, the second for two years, and the third for three years from the first day of June, 1901. They shall serve without salary, but shall be paid three dollars per day, and all members of the board shall be paid their actual expenses when in the discharge of their duties. Meetings of the board shall be limited to twelve in each year, and the service of no member on said board, for which a per diem is paid, shall exceed thirty days in any one year. The board may organize by the election of a president and secretary and shall hold its office in such room in the capitol as the governor may designate.

DUTY OF BOARD.—Section 2.—It shall be the duty of the state live stock sanitary board to protect the health of domestic animals of the state; to determine and employ the most efficient and practical means for the prevention, suppression, control, or eradication, of dangerous, contagious or infectious diseases among domestic animals; and for these purposes it is hereby authorized and empowered to establish, maintain, enforce and regulate such quarantine and other measures relating to the movement and care of animals and their products, the disinfection of suspected localities and articles and the disposition of animals, as it may deem necessary, and to adopt from time to time, all such regulations as may be necessary and proper for carrying out the purposes of this act. Provided, however, in the case of slowly contagious diseases, only suspected or diseased animals shall be quarantined, and in case of bovine tuberculosis or actinomycosis, the owner shall be granted the option of retaining the animals in quarantine, under such restrictions as the board may prescribe.

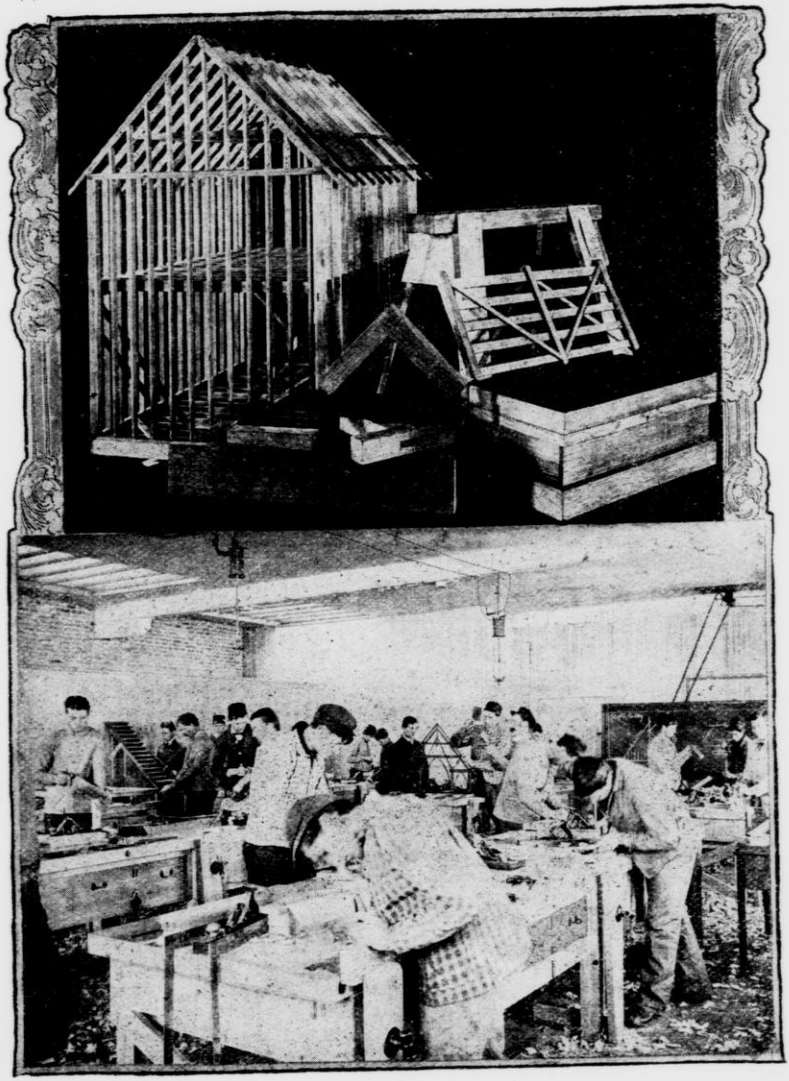
SLAUGHTER AND APPRAISEMENT OF ANIMALS.—Section 3.—Whenever the owner shall not exercise option and it shall be deemed necessary by the board to slaughter diseased animals, written notice shall be given to the owner, his agent or the person in charge of such animals, and to a justice of the peace in the county in which the animals may be, of the purpose to order the slaughter thereof, giving the number and description of the animals, and the name of the owner, if known. Such notice shall be entered on the docket of such justice, who shall immediately thereafter summon such owner, agent or possessor, and also three disinterested citizens of the county, not residents of the immediate neighborhood in which such animals are owned or kept, to appraise the value thereof. Such appraisers shall before entering upon the discharge of their duties, be sworn by such justice, to make a true appraisement without prejudice or favor, of the value of such animals, and they shall certify in their return, that they have seen the appraised animals slaughtered. In making appraise-

ment of diseased animals, the appraisers shall determine their value in the condition, in which they are found at the time of appraisement; but the appraised value of no single animal shall exceed fifty dollars. If such appraised animals are slaughtered, said slaughter shall be made under the direction of the local health officer, or the chairman of the town board. The owner of slaughtered animals shall receive no compensation for the same, until the live stock sanitary board is satisfied that the infected premises have been disinfected in such a manner as to prevent the further spread of disease.

IMPORTATIONS, POWERS OF BOARD TO PROHIBIT; SUSPECTED STOCK.—Section 4.—Whenever the state live stock sanitary board shall have reason to believe that there is danger of the introduction into this state of any contagious or infectious disease prevailing among domestic animals, in any district, outside this state, or its dissemination from one district in this state to another, it shall investigate the existing conditions, and if it conclude that danger exists to the live stock interests of this state therefrom, it may, with the advice and consent of the governor, prohibit the importation of animals of the kind diseased from the infected district, into this state, or the moving of them from one part of the state to another, except under such regulations as the board may establish. It shall be the duty of every person who shall have reason to suspect that there is upon his premises, or upon the premises occupied by him, or under his control, any domestic animal having a contagious or infectious disease, to immediately report the fact to the local board of health, or some member of the same, who shall immediately report such case to the state veterinarian, or the secretary of the board. The board or state veterinarian may require the owner of suspected stock to employ at his own expense, a qualified veterinary surgeon, to examine such stock, and determine whether, in his opinion, the disease exist. This board or any member thereof may enter upon any premises or go into any building or place, where he has reason to suspect there may be diseased animals, and examine the same and may call to his aid, if necessary, the sheriff or any constable of the county, in which such animals may be located, and all such officers when so called upon, shall assist such board or member thereof in the enforcement of the provisions of this act. Animals in transit in the state, are hereby declared to be under the provisions of this act.

CLAIMS, HOW PAID.—Section 5.—All claims against the state arising from the slaughter of animals as above provided, shall be made by filing with the secretary of state a copy of the state veterinarian's notice to the justice of the peace, and the return of the appraisers to the justice, which notice and return shall be certified by him. The secretary of state shall examine these, and if satisfied that the amount awarded is just and that the owner of the animals slaughtered, is entitled to indemnity, shall issue his warrant for two-thirds of the sum named in such return; but if he shall have reason to believe that the appraised value is greater than the real value of such animals, he shall pay such owner such less sum as he may deem just, provided, that the right to indemnity shall not exist, nor shall payment be made in either of the following cases: First. For animals owned by the United States, this state, or any county, city, town or village in this state. Second. For animals brought into this state, contrary to the provisions of this act, or where the owner of the animal or the person claiming compensation has failed to comply with the provisions of the same. Third. When the owner or claimant, at the time of the coming into possession of the animal, knew, or had good reason to believe it to be afflicted with a contagious or infectious disease. Fourth. When the animal slaughtered, was diseased at the time of its arrival in this state. Fifth. When the owner shall have been guilty of negligence, or has wilfully exposed such animal to the influence of a contagious or infectious disease.

ALLOWANCE FOR EXPERIMENTAL PURPOSES; REPORT OF BOARD; AUDITING OF ACCOUNTS.—Section 6.—The state live stock sanitary board shall be allowed for experimental purposes, with the consent and approval of the governor, a sum not to exceed five hundred dollars annually, which bills of expenditure shall be audited and approved by the governor. It shall from time to time issue



FARM CARPENTRY.

One of the many useful subjects taught in the Wisconsin College of Agriculture is Farm Carpentry. Students have an opportunity to learn the drafting of farm buildings and the construction of some of them in miniature form; the making of farm gates, tool chests, saw horses, miter boxes and practical work in joining and taking care of edged tools,

such bulletins of information as it may deem advisable, which with the report of the board to be made to the governor, in October of each year, shall be printed by the commissioners of public printing, the bulletins in such number as the governor may approve, and one thousand copies of the report of this board, five hundred of which shall be bound. The state veterinarian is hereby authorized to call to his assistance, as may be necessary in the performance of his work, duly qualified veterinary surgeons, who shall be paid for their services at the rate of seven dollars per day and their actual expenses for the time they are actually employed as assistants. Their accounts shall be audited upon itemized vouchers, certified to by the state veterinarian and approved by the governor, but no person shall be considered a veterinary surgon, within the meaning of this act who is not a regular graduate in good standing of some recognized veterinary college in the United States, Canada, or Europe. The appraisers herein provided for, shall receive two dollars for each day actually employed as such, which amount shall be paid out of the county treasury, upon the certificate of the justice by whom they were summoned. The justice of the peace and other officers who may perform any duty hereunder, shall have the same fees as are allowed by law in criminal proceedings in justice courts, and shall be paid by the county in which their services are performed.

STATIONERY AND POSTAGE.—Section 7.—The superintendent of public property is hereby instructed to furnish the state live stock sanitary board with the necessary stationery and postage stamps for its work.

CONFLICTING LAWS REPEALED.—Section 8.—All acts and parts of acts inconsistent with the provisions of this act, are hereby repealed.

Section 9.—This act shall take effect and be in force, from and after June 1st, 1901.

Approved May 15, 1901.

THE PREVENTION OF OAT SMUT.

E. S. GOFF and R. A. MOORE. Experiment Station, Madison.

It is often said that farmers pay more than their just share of taxes. However this may be, most farmers submit to some taxes that they might readily avoid. One of these is the smut tax on grain which usually amounts to from 3 to 20 per cent. of the value of the crop. Ordinary taxes are not a total loss. for they return in value nearly or quite as much as they cost. But this smut tax is a total loss. The smutted plants grow from good seed, and take good plant food from the soil, returning a crop of spores to infect the seed grown by the healthy plants, and thus to predispose the following crop to smut.

In this article we offer to the farmer an effectual, cheap and easily applied preventive of smut in oats, barley and wheat.*

THE AMOUNT OF DAMAGE FROM THE SMUTS.—Oat smut has been increasing at such a rapid rate in Wisconsin that it seems already to exist in all oat-growing centers of the state. To determine how widely the oat smut was prevalent and to what degree the oats were affected, investigations were made in the following counties during July and August this year: Dane, Grant, Crawford, La Crosse, Dunn, St. Croix, Wood, Marathon, Langlade, Marinette, Brown. Kewaunee, Manitowoc, Outagamie, Winnebago and Fond du Lac. In making the tests a barrel hoop was used and on approaching the field was thrown over the standing grain. All stalks encircled by the hoop were then counted and the percentage of smutted heads was determined. Several counts were made in each field and the determinations averaged.

Investigations were made in a number of fields in each county and by several careful counts in each field it was found that an average of 20 per cent. of the oats were destroyed by smut. A circular letter was sent to former Short Course students and farmers in general to take note of the smut in their oat

*There are two smuts of wheat, one of which is known as the "stinking" smut and the other as the "loose" smut. The first-named disease is prevented by the treatment prescribed in this bulletin.

fields and make the determinations in accordance with the above directions and report the result. Seventy-five reports have been received from farmers and students residing in various parts of the state to show that the oat-smut is everywhere prevalent in large quantities. The farmers are either not aware of the presence of smut in their oat fields or they think it is present in small quantities only and not worthy of serious attention. In many instances where determinations were being made, the farmer was invited to assist in making the counts and great was the astonishment when from 20 to 40 per cent. of smut was found in fields which he thought were absolutely free.

The smutted heads grow on weakly stalks and, as a rule, head lower than the fully-developed heads, making it hard to discover the affected heads by casual observation. It is largely from this fact that the smut has been able to invade the oat fields throughout the state unnoticed until the annual loss to the farmers of Wisconsin amounts to several hundred thousand dollars.

The Wisconsin oat crop of 1900 was estimated by the United States department of agriculture at 62,000,000 bushels, valued at $15,000,000. If the percentage of oats affected with smut was as great in 1900 as the determinations revealed this year, namely 20 per cent., the smut tax of 1900 in our state amounted to $3,000,000.

THE NATURE OF SMUTS.—The smuts of the small grains are due to fungus parasites, i. e., minute plants that grow and multiply inside of the grain plants, coming to maturity in the kernels. The soot-like dust forming the so-called smut is composed of the spores of these minute plants, and these spores propagate the disease as the seeds of weeds propagate weed plants. The spores cannot live through the winter in or upon the ground, hence a crop can only be infested with smut from live spores that adhere to the seed grains and are sown with them. It follows that if we treat the oats used for seed before sowing with some substance that kills the smut spores upon them, our crop will be free from smut.

Heads of oats affected with smut in different degrees. Reduced one-half.

PREVENTIVE METHODS.—Various methods have been used to prevent smut in the small grains, but the method now acknowledged to be best is that known as the "formaldehyde" treatment. This consists in submerging the seed in a 40 per cent. solution of formaldehyde gas, according to the directions given herewith.

Formaldehyde is a colorless, pungent gas obtainable from wood alcohol and readily soluble in water. Its property of destroying the spores of fungi was discovered by the German Scientist Loew, in 1888. In 1895 Prof. H. L. Bolley, then of Indiana but now of the North Dakota Experiment Station, began making experiments with a solution of formaldehyde for the prevention of grain smuts, and potato scab. His results were so satisfactory that the formaldehyde treatment has come to be regarded as the standard preventive for these diseases.

DOES IT PAY TO TREAT GRAIN TO PREVENT SMUT?—Suppose a farmer raises 25 acres of oats, and receives a yield, without treating the seed, of 40 bushels per acre. His crop would be 1,000 bushels. Suppose 20 per cent. of the heads in this crop were destroyed by smut. His crop would have been 1,250 bushels had he prevented the smut. In other words, he would have received 250 bushels of oats for treating the seed. If oats are worth 25 cents per bushel, the gain would have been $62.50. How much would it have cost to treat the seed? The account would stand about as follows:

DR.		CR.	
To one pound formaldehyde.....	.60	By 250 bush. oats at 25c.....	62.50
To 4 hours work at 15 cts.....	.60	Less cost of treating.....	1.20
Total	$1.20	Net profit.....	$61.30

HOW TO TREAT THE SEED.—The method of application is as follows: One pound of 40 per cent. formaldehyde is required for each 50 bushels of seed to be treated; 50 gallons of water are poured into a cask and one pound of the formaldehyde liquid added; a part of this solution is placed in another cask. Two bushels of oats are placed in a large gunny sack and submerged for twenty minutes. By having two casks, two lots can be submerged at the same time, enabling one to treat the seed more rapidly. At the expiration of twenty minutes the sack is pulled on the edge of the barrel and left to drain for a minute or two in order to save solution; the oats are then emptied on the threshing floor or on a canvas to dry.

The treatment of seed should be made a few days in advance of sowing to enable the seed to dry sufficiently to run readily through the seeder or the drill. If the oats are shoveled over two or three times a day it materially facilitates the drying. If a farmer wishes to treat two or three hundred bushels of seed grain he can use several barrels or casks and make sufficient solution at one time to put in the barrels. In this way a sack of oats can be in each cask, thereby enabling the operator to treat several bushels every twenty minutes.

The solution is not poisonous in moderate amounts; oats that have been treated and dried can be fed to stock. If more oats are treated than needed for seed, it is advisable to mix the treated oats with oats that have not been treated before feeding. The grain sacks or clothing coming in contact with the formaldehyde solution will not be injured. The solution will keep at any rate for a week or more, but it is advisable to cover up the cask when not used.

The treatment of seed oats seems to facilitate the sprouting. A difference of from two to four days in favor of the oats treated was noticeable this season.

From all field tests made no detrimental effect on the germination of seed was noticeable.

Thirty varieties of seed oats threshed from plots on the University Farm on which the oats last year were affected from two to twenty per cent., were treated with the oat smut preventive before sowing and not a single affected head could be found during the growing period.

Folmaldehyde is a gas readily soluble in water and is sold in liquid form, usually, in 40 per cent. solution, by most drug stores at about 50 cents per pound. A solution of the strength indicated is manufactured by different commercial houses under the name of formalin.

Corn smut cannot be prevented by treating the seed corn, as the disease is of a different nature from the other grain smuts.

FORMALDEHYDE FOR POTATO SCAB.—Formaldehyde may also be used to lessen damage from potato scab. Immerse the unsprouted and uncut seed potatoes for two hours in a solution made by adding one-half pound of 40 per cent. formaldehyde to 15 gallons of water. If the tubers are deeply scabbed, extend the time to three or four hours. After treatment, cut the tubers in the usual manner. They may be handled freely without danger. The same solution may be used five or six times in succession if the treatment is continued a little longer each time.

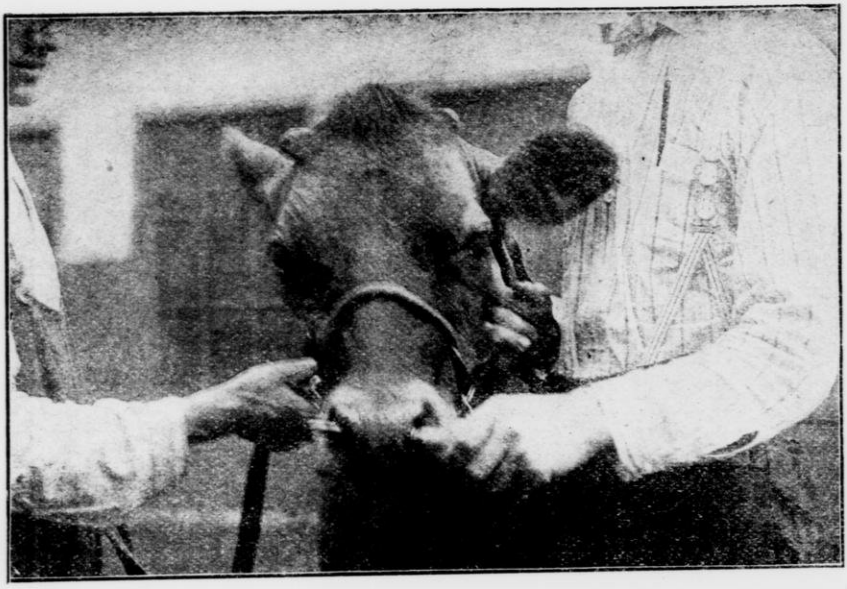
A DEVICE FOR PREVENTING HEIFERS AND COWS FROM SUCKING.

W. L. CARLYLE. Experiment Station, Madison.

There is probably no greater nuisance on a dairy farm than a cow or heifer addicted to the pernicious habit of sucking herself and other animals in the herd. It is not only the loss of the milk that is sustained, but it would seem that one such animal may induce others to contract the habit. The University dairy herd has had an almost unprecedented number of "suckers" among its members during the past three years. The fact of our having trouble in this respect has perhaps been "for the best," since in endeavoring to cope with it

RINGS TO BE USED AND THE TROCAR AND CANULA OR "BULL PUNCH" FOR MAKING THE INCISION IN THE NOSE.

we have finally been enabled to devise a means of breaking the habit in every instance. We first experimented with a number of the devices on the market, but none of them were entirely satisfactory. In considering ways and means of solving the problem the writer recalled the fact that on one or two occasions the insertion of a ring in a bull calf's nose had prevented him from sucking his dam. Ordinary bull rings were inserted in a number of the offending heifers' noses and in several instances answered the purpose. Some of the veterans at the practice were, however, stopped only for a time, for they soon contrived to elevate the ring out of the way when sucking. Observing this performance led to the thought that by adding one or more loose rings to the one already in the nose, the animal could in no way prevent these from dropping



Showing the Method of Inserting the Ring in the Nose by Means of the Canula.

A Photo of the Device when Attached to the Animal's Nose.

into the mouth when it attempted to suck. By adding another ring we have been successful in every instance in breaking up the habit. We may not be able to establish our claim of priority of discovery in this device, as it may have been made use of years ago, but so far as the writer is aware it has never before been given to the public. We submit the accompanying cuts made from photos that were taken to more clearly illustrate the device and also demonstrate the proper manner of inserting the bull ring and attaching the extra ring or rings. Brass bull rings can be purchased at almost any hardware store for 20 cents each, and the common iron harness rings cost but a few cents per dozen. The "Trocar and Canula" or "bull punch," made use of in inserting the

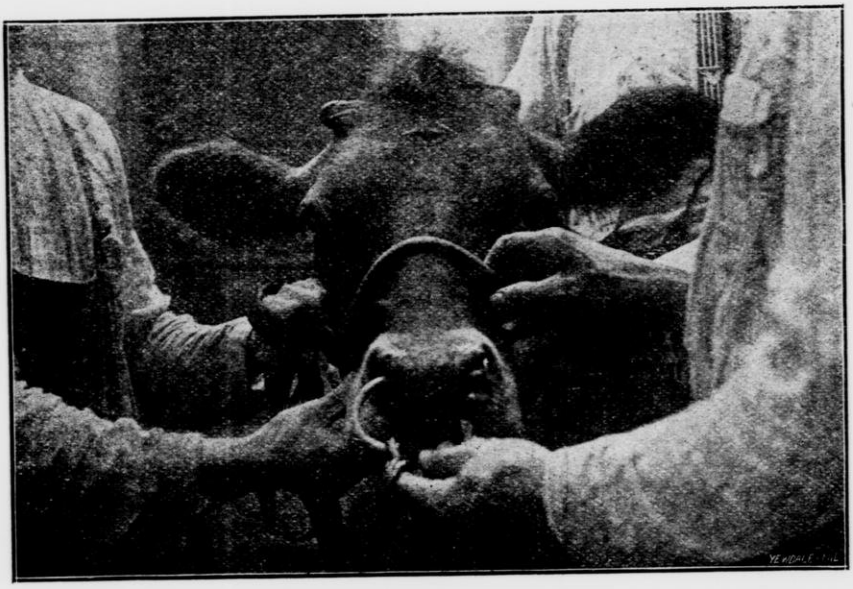


PHOTO OF THE TROCAR AND CANULA AS INSERTED THROUGH THE NOSE OF SUCKING HEIFER ON UNIVERSITY FARM.

rings and shown in the cuts, can be purchased for about 65 cents, and will be found useful in a number of emergencies on a stock farm, since it is very useful in tapping the stomach of cattle and sheep in acute cases of hoven or bloat, as well as for ringing bulls.

The device described above is submitted to the farmers and dairymen of Wisconsin with the hope that it may be found as useful to those possessed of "suckers," as it has been to the Experiment Station and with the assurance that when given a trial it will transform what may be a great nuisance in a dairy herd into a very valuable animal.

FARMERS' CLUBS.

GEO. McKERROW, Superintendent Farmers' Institutes.

In holding Farmers' Institutes in the different sections of Wisconsin we have found that in those localities where farmers' clubs have been maintained for some time there the most intelligent and best meetings are conducted and the thrift, intelligence and morality of the people are above the average. Therefore I take pleasure in recommending that such clubs be formed to work in harmony with the Farmers' Institutes, and any information that will help these clubs to organize or to do successful work after organization will be gladly given from this office and Bulletins will be supplied them for free distribution. To help such parties as may wish to organize we publish the following Constitution and By-Laws which have been compiled from those of some of the best working clubs in the state, and can be changed to suit other conditions that may exist where other clubs are being formed. I would suggest that all clubs formed send in the name of club and names and postoffice address of president and secretary, that we may keep a list and be able to forward the work as opportunity offers.

CONSTITUTION AND BY-LAWS OF THE AGRICULTURAL CLUB.

Together with Rules of Order and Order of Business.

CONSTITUTION.

PREAMBLE.

We, the undersigned, interested in Agriculture and Horticulture, and desirous to secure the benefits to be derived from organization, for the purpose of practical discussion and the promotion of the common interests of our pursuits, do subscribe the following Constitution:

ARTICLE 1—NAME.

This Association shall be styled and known as the ..... Agricultural Club.

ARTICLE 2—OBJECTS.

The objects of this Club are to advance the knowledge and promote the general interests of Agriculture and Horticulture in this community.

ARTICLE 3—OFFICERS.

The officers shall consist of a President, Vice-President, Recording Secretary, Corresponding Secretary, Treasurer and Librarian.

ARTICLE 4—DUTIES OF OFFICERS.

SECTION 1. It shall be the duty of the President to preside at all meetings of the Club; to enforce a due observance of the Constitution, By-Laws and rules of Order; to assign topics of discussion, at the suggestion of members. He shall neither make nor second any motion, but shall have the privilege of taking part in debate; and, while he has the floor, the meeting, for the time being, shall be in charge of the Vice-President; but the President shall have no vote unless the Club shall be equally divided.

SECTION 2. It shall be the duty of the Vice-President to preside at all times when the President is absent, and while he shall have temporarily vacated the chair.

SECTION 3. The Recording Secretary shall keep a record of the proceedings of the Club, also the name of each member, and shall, on the regular last meeting of each year, prepare and read the names of all members, and he shall have charge of the archives of the Club.

SECTION 4. The Corresponding Secretary shall conduct the correspondence of the Club and act as Recording Secretary in the absence of that officer. He shall render such assistance to the Recording Secretary as that officer may require in the performance of his duties.

SECTION 5. The Treasurer shall keep all money belonging to the Club, and disburse the same under the direction of the Club, according to its laws. He shall collect all fees and dues of members, and shall, at some time during the month of December of each year, notify such as are in arrears and request their dues. He shall keep a correct account of all moneys received and expended.

SECTION 6. The Librarian shall have charge of the library and its appurtenances, regulating the use of the same by the members, according to the rules and regulations prescribed. He shall make a written report of the condition of the library, at the annual meeting, and at such other times as the Club may direct. He shall, within one week, deliver to his successor in office the library and its appurtenances, and all books, papers and documents in his possession belonging to the Club.

ARTICLE 5—ELECTIONS.

All elections for officers shall be by ballot, and shall be held at the first regular meeting in January of each year; and their terms shall commence immediately after their election, to continue for one year, or until others are elected to fill their places. In the case of vacancy occurring in any office, the Club shall go immediately into an election to fill the same. A majority of all the votes cast shall be necessary to a choice.

ARTICLE 6—MEMBERSHIP.

SECTION 1. Any person interested in Agriculture or Horticulture, and of good moral standing, may become a member of this Club by signing this Constitution, agreeing to support all laws and regulations made in pursuance thereof, and paying fifty cents annually into the treasury.

SECTION 2. Honorary membership may be conferred in consideration of eminent character and services in honor of Agriculture or Horticulture, and shall be conferred without fee or dues. The recipient shall not be entitled to hold office, and may take part in all discussions and vote on all questions.

ARTICLE 7—AMENDMENTS.

No alteration, amendment or addition can be made to this Constitution, neither can a part of it be repealed, without a vote of two-thirds of the members present. Any proposed alteration, amendment, addition or repeal must be submitted in writing, filed with the Recording Secretary, and read at the two regular meetings next preceding that on which the vote is taken.

BY-LAWS.

ARTICLE 1.

This Club shall assemble weekly on ..... evenings from November 1 to April 1, and at such intervals thereafter as may be agreed upon by the Club, or appointed by the President. The time and place of meeting may be altered at any regular meeting of the Club by a vote of two-thirds of all of the members present.

ARTICLE 2.

SECTION 1. Seven members shall constitute a quorum for the transaction of business of the Club. A less number may meet, maintain a discussion on any topic, and adjourn to any given time.

SECTION 2. Persons present, not members of the Club, may be invited to take part in all discussions of agricultural topics; but they shall take no part in the business of the Club.

ARTICLE 3.

SECTION 1. If funds of the Club should at any time be exhausted, or inadequate to meet the demands contemplated by the Constitution, there shall be an equal assessment upon each member to make up the deficiency.

SECTION 2. No appropriation of money from the funds of the Club shall be lawful, except in furtherance of the objects contemplated by the Constitution, as stated in Article 2, or as especially provided by these By-Laws.

ARTICLE 4.

SECTION 1. There shall be a library established for the use of the Club in furtherance of the objects contemplated in Article 2, of the Constitution.

SECTION 2. The library shall be open to the free use of the members of the Club, who shall not be more than three months indebted to the treasury, subject to the prescribed rules and regulations.

SECTION 3. The library shall be maintained by the surplus fund, after defraying the expenses of the Club, and by the voluntary contributions and donations of the members, to be duly accredited to such contributor and donor.

SECTION 4. The library shall be in charge of the Librarian, as provided in Article 4, Section 6, of the Constitution. There shall be a standing library committee of three members appointed at each annual meeting, of whom the Librarian shall be one, and ex-officio chairman, who shall have charge of the purchase and collection of books, papers and pamphlets for the library, and perform such other duties as may be ordained.

SECTION 5. RULES—RULE 1. No member shall have from the library more than one book at a time.

RULE 2. No volume shall be retained longer than two weeks, under penalty of a fine of ten cents for the first week of detention and five cents for each week thereafter.

RULE 3. There shall be assessed for injuries as follows: First, for an injury beyond ordinary wear, an amount appropriate to the injury, ascertained by the Librarian. Second, for the loss of the volume, the cost of the book; and if one of a set, an amount sufficient to replace it or purchase a new set.

RULE 4. No person having incurred a fine shall be permitted to take books from the library until the fine is paid.

ARTICLE 5.

A vote of two-thirds of all the members present shall be required to pass any appropriation of money by the Club other than for its necessary contingent expenses.

ARTICLE 6.

SECTION 1. Any member who shall suffer his account with the treasurer to go unsettled for more than one year shall cease to be considered as belonging to the Club, and his name shall be stricken from the roll accordingly.

SECTION 2. Any member who shall be guilty of any gross violation of the rules of order, or of profane or indecent language or conduct at any of the meetings of the Club, shall be fined, reprimanded or expelled, as the Club may, by a two-thirds vote, decide.

SECTION 3. Any member who shall become guilty of any heinous offense or disgraceful practice, such as to render him unfit as an associate, shall, on conviction thereof, be expelled by the Club.

ARTICLE 7.

These By-Laws may be amended in the same manner as the Constitution.

STANDING RESOLUTIONS.

Resolved, That, after this date, the weekly meetings of this Club shall be held on ....., at ....., or at the residence of the members of the Club, at ..... o'clock.

Resolved, That there shall be an Executive Committee, consisting of the President, Recording Secretary and Treasurer, having power to transact the necessary business of the Club during the term when the meetings are not held.

RULES OF ORDER.

1. No question shall be stated unless moved by two members, nor open for discussion unless stated by the President.
2. When a member intends to speak on a question he shall rise in his place and respectfully address his remarks to the chair, confine his remarks to the question, and avoid personalities. Should more than one person rise at a time, the President shall determine who is entitled to the floor.
3. When a member is called to order by the President, or any other member, he shall at once take his seat, and every point of order shall be decided by the President without debate, subject to an appeal to the Club.
4. In case of an appeal from the decision of the chair the question shall be put to the Club, thus: "Shall the decision of the chair be sustained?" which shall be decided without debate.
5. No member shall interrupt another while he is speaking, except to call to order.
6. Any member may call for a division of the question, when the sense will admit of it.
7. When any three members call for the ayes and nays, they shall be taken and recorded on the minutes.
8. All resolutions shall, when required by the President or any member, be submitted in writing and signed by the member offering the same.
9. Cushing's Manual of Parliamentary Practice shall be adopted as authority in all matters pertaining to parliamentary order in the Club.
10. These rules may be amended in the same manner as the Constitution and By-Laws.

ORDER OF BUSINESS.

1. Calling the roll of officers and necessary filling of vacancies.
2. Reading of minutes of last meeting.
3. Reports of committees.
4. Unfinished business.
5. New business.
6. Reception of new members.
7. Has any member any question to ask for information in regard to his farm, stock, etc.?
8. Reading of communications and essays.
9. Discussion of regular topic.
10. Assignment of subject for next discussion.

METHOD OF FEEDING FAT STOCK THAT WON THE PRIZES AT THE ONTARIO PROVINCIAL FAT STOCK SHOW, 1899.

Taken from Ontario Live Stock Association Report.

CATTLE.

By D. McCrae, Guelph.

Breeding.—Seven of the eight Galloways shown were strong in Scottish Borderer (669) blood with a mixture of Harden (1151), the most famous Galloway bull of late years. Both the yearling heifers were sired by Canadian Borderer, 5945, the oldest bull and best known Galloway in Canada. He is by Scottish Borderer out of a cow by Harden. The winning cow or heifer three years or over, was Adela of Flamboro, 12783, by Canadian Borderer, a low down type of a cow very round in barrel with long quarters, fleshy hams and the shortest, broadest head in the show of any breed. Maid Minnie, 12959, the two year old second prize, is by College Boy, 10395, he by Galloway King (5489), by Harden out of a cow by Scottish Borderer. Maid Minnie is out of Maid Marian B, 9750, by Canadian Borderer. There were two Semiramis heifers shown, and they were descended from Scottish Borderer through Semiramis 19th bred at Tarbreoch. One was by College Boy and the other by Norfolk, 6764, descended from Crusader (2858), Champion and winner of silver cup at Edinborough in 1884, and he was the most famous son of Scottish Borderer. Of the calves one was by Czar, 12807, a son of College Boy, and the other Calla Lily, 14615, is the one in the lot of quite different breeding, by Norfolk, 6764, by Black Ronald, 3342, a Blackie of Balig and from a Culmain cow, on both sides of quite different breeding from the others. The aim has been to breed round, smooth animals, with short legs and beef well spread on the most valuable parts. Straight lines above and below have been secured and moderate quality of bone. Fineness of bone is desirable in a quick feeder, but is not fancied on our Northwest ranches, where strong, heavy bone is looked upon as very desirable for that country. The two calves shown were dropped in September, and all the eight animals shown were fall calves, except one dropped in march. For our condition in Western Ontario, fall calves have been found by experience to be most profitable. If early in the fall they have the advantage of fine weather and a life of grass for the cows or other fall feed always abundant; if later when the cows are housed they have comfortable pens with exercise and the best of care and attention. The calves are allowed to suckle twice a day, and in addition are fed a little chopped oats and bran, and as soon as they care to nibble at it, well cured clover hay. It is a great help to a growing calf to have early learned to take additional food. By the time the grass is good in the spring, some will be ready to wean, and others may require the dam's care a little longer. By this time the sexes have to be separated, and usually the bull calves are kept near the barn, to be fed the few mangles that may be left till May and June, and cut winter rye when it is tall enough to be fed in the house. If they have a good grass field near the barn, so much the better. Next come the oats, peas and vetches sown together and making good soiling for summer, and then the first green corn followed by the white turnips, if the rape be not available. The heifer calves have been sent to pasture in a wood lot during the summer, without any extra feed till the fall rape is ready. Have found rape an excellent food for young stock when carefully used. They should be well fed before going on the rape, and should have free access to a field of rough pasture at all times, as well as abundance of salt. They may be left out till the snow flies if they are sheltered during the cold autumn rains, and well watched after hard frosts, if the rape be

still rank. It saves feed, however, to house them earlier and give them cut corn and roots, soft turnips preferred for the fall feed—with all they will eat of good straw.

YEARLINGS.—The wintering of yearlings has to be carefully done. They need close attention and good care. At no time in the animal's life may they be more easily spoiled than when taken in for the first winter feeding. They need rather more nourishing feed than older animals. They may also be changing teeth during the winter, and that has to be watched and suitable provision made for well cut food. The food for the whole stock is cut and mixed. Corn cut moderately green, shocked, and housed when dry enough is used for part of the ration, while chaff or cut straw makes up the coarse food. This is fed twice a day at six in the morning and five at night. At noon a ration of roots is given, and these are sliced only for animals teething. With the coarse fodder is the corn at least fairly well matured. For the yearlings, instead of the straw, cut rye or clover hay is substituted twice a week, or oftener as may be required. As the winter advances the supply of dried corn becomes exhausted, and silage is substituted for that part of the ration, and with it is used a small feed of chopped oats two parts, bran or shorts two parts, and chopped peas one part. This is sprinkled upon the coarse fodder at the forenoon feed. As the winter advances and spring time comes nearer, the roots, which have been white or yellow turnips in the fall, and Swedes by about Christmas time, merge into mangels, which are best in the spring time. The roots usually last till there is good grazing, which will be from the 10th to the 15th of May. During the summer, if pasture is bare, care is taken to supplement with other feed, or such soiling crops as have already been mentioned in the feeding of the younger stock.

TWO YEAR OLDS.—The fall feeding of yearlings applies to those two year old, except that if these are to be furnished for beef in the fall, they are given the best of the pasture and a more liberal allowance of chopped feed. They are put into the stables earlier than the younger cattle, and fed more liberally of chopped grains and oil cake. The grains grown on the farm are first consumed as being the most economical, but if more be needed, oil cake is an excellent finishing food. In the mixed grain ration as feeding time advances the chopped oats may be increased as well as the chopped peas, and the bran reduced. So much has to be left to the careful feeder, who has to treat each animal according to its special needs, that unless a careful weighing is made of the food consumed the expense can only be estimated. Such a careful weighing of food consumed is too expensive for the ordinary farmer, and is usually left for the experimental station. Unless compiled with care any guess of value is only misleading and is not to be attempted. It has been found that where animals can be fed in loose boxes with plenty of room to move about they do better and make faster gains in weight than when tied up. During the period in which the animals are housed, they are out once every day for water, which is pumped by wind-mill into a tank in the yard. If plenty of roots are fed, it is found that feeding cattle will hardly touch water. Salt is provided, and may be fed with food as well as put within reach. A feeding steer will require from 3½ to 4½ ozs. of salt per day, while 1 oz. is sufficient for a horse of the same weight. The brush and curry comb are very useful, and while always short of straw for bedding purposes, the cattle are much the better for careful cleaning and good grooming, and it pays to have it done as frequently as time will permit.

SHEEP.

BY JOHN JACKSON, ABINGDON.

The sheep we exhibited were all pure bred Southdowns. Beginning with the three shearling wethers, dropped about the middle of March, 1898, these had no extra care before going out to grass where they ran with their dams without other food till the 1st of July. They were then weaned and put on oat

stubble, where 1½ lbs. of rape seed per acre had been sown with oats. About the 20th of August these were castrated, being the culls of the ram lambs. Castrating was done by cutting off end of scrotum and taking out testicles in the ordinary way, pouring in a twenty per cent. solution of carbolic acid, and kept in a rather dark box stall for ten days. It is important that the operation be done as quickly and with as little excitement and worry to the lambs as possible; better results would be obtained by castrating when two or three weeks old. These lambs were again put on the stubble. The rape made a fine growth through September. About the middle of October they were put inside, fed a mixed feed of oats, bran, and a little oil cake, commencing with ½ lb. and increasing to 1½ lbs. per day, with two or three pounds of mangles and what clover hay they would eat up clean. This was continued for six weeks, when they were shown as lambs at the Provincial Fat Stock Show, Brantford, 1898, where they were 1st and 2nd in class, and 1st for pen of three. They were then run through the winter with the ewe lambs on about ½ lb. of the mixed feed and 2 lbs. mangles with hay for about 150 days, and again turned on grass without grain. The one that was first in his class at London, Sweepstake in Southdown class, and Grand Sweepstake of the Show, was run in this way till the middle of October. Having no rape this year, owing to drouth, part of the time pasture was very poor indeed. The other two wethers, one of which was third in class and the other fifth in dressed carcass class, were put in with the show sheep on the 8th of July, getting an average of 1 lb. mixed grain feed per day, with green food, vetches, peas and oats and out in pasture at night till about the 8th of August, after which they were kept inside and clover hay substituted for the green food. These two were shown for about six weeks at the fall shows which brought them to the middle of October.

The wether lambs, born in April, that won first and second prizes in class, were castrated when young, and run on the pasture till and after being weaned, without grain feed up to the middle of October. The other one shown, first prize pen of three, was castrated in November. This is not recommended.

The six ewe lambs were dropped in March and April, fed in the ordinary way till turned on grass, about the first of May, got nothing more till weaned the 8th of July. Four of these were gradually fed the grain mixture till one pound per day was reached, with green food as above, then took the round of the fall shows, which brought them to the middle of October. The other two (twins), one of which won first prize in the class, ran on the grass and stubble till the middle of October. The lot was awarded first, second and third in class, with first and second for pens of three. After the middle of October up to time of show, some 56 days, the whole lot was kept inside on clover hay, three pounds of roots, and an average of one and a quarter pounds of the mixed grain feed per head a day.

To sum up the results, we find the grand Sweepstake wether was in prime condition, and from birth, in feeding and fitting for the two years shows had consumed about 200 lbs. of grain fed at a cost of one cent per pound, or $2. The other two wethers feeding and fitting for the two seasons, including the fall shows, had consumed about 300 lbs. of the grain feed each, or $3. These were quite too ripe and overdone, and when put on the block were entirely too fat to win, one dressing 66 per cent. of his live weight, and that without shrinking, being within one pound of the heaviest carcass in the show.

The first and second prize wether lambs were in prime condition for the Christmas market, and had consumed only 70 lbs. of grain feed each at a cost of 70 cents.

The four ewe lambs fitted for the fall shows had consumed 170 lbs. each of grain feed at a cost of $1.70 each. It will be seen that in knocking about for six weeks at the fall shows a large portion of this would be lost from a mutton standpoint. The other two lambs, which included the first prize winner, consumed only 70 lbs. at a cost of 70 cents each for the grain feed. This leads to the conclusion that six weeks is about the right length of time to feed lambs to put them in prime condition for the market. It must be borne in mind that

well bred lambs (not necessarily pure bred) of good quality feed at less cost per pound than rough ones of any breed; and that quality counts far more to the feeder than size, as well as being worth more per pound to the consumer.

It is difficult to arrive at the exact value of hay and pasture consumed, but in this case Southdowns being such small consumers, especially when on a good feed of grain, it would not figure very high. The result goes to show that the most profitable time to market sheep is before they are a year old. They will gain more in a given time up to that age than after. As an illustration and approximate estimate of the profits in feeding well-bred lambs, on the 23rd of October when we had got these six ewe lambs fairly started to feed, we weighed them and they ran from 87 to 108 lbs. each, or a total of 568 lbs. for the six. We weighed them again November 29th, when they went from 105 to 130 each, or a total of 705 lbs., an average gain of 23 lbs. in 37 days. This would add to their value nearly three times the cost of the grain feed consumed in that time. Another way of arriving at the profit: Take for example these six lambs, their average weight 117 lbs. at five cents, $5.85 each, and deduct from this the cost of grain and roots fed, which would be about $1 each; this would leave a good margin on the rough feed in favor of the producer.

BY JOHN CAMPBELL, WOODVILLE.

Six pure-bred Shropshires, and nine grades sired by registered Shropshire rams were entered. Starting with the shearling registered wether, Blue Bell, 112222, winner of second prize in class 16, section 2, and also second in Shropshire special competition, his breeder was Mr. James Bale, Woodville, Ont. The dam was Canadian bred, tracing several generations back to imported ancestry. His sire, bred at Fairview, was Tantalizer, 59972, a son of Royal Doncaster, 30989, winner of second prize at the Royal Show in England, and fourth at the World's Fair, Chicago.

The model, 133210, a wether lamb, bred at Fairview, winner of first premium in class 16, section 3, first in Shropshire Specials' competition, and first in pen of five lambs, winning the "Prince of Wales" prize, was sired by The Best Type, 88775, a son of Newton Lord, 30983. The latter won at World's Fair, Chicago, five first premiums, including the championship for being the best Shropshire ram of any age in the show. The Best Type at Toronto in 1897, won first place with one of England's most noted Royal Champions in the ring, viz.: Darlington.

The Model's dam, Campbell's 776, 99634, was bred by S. Nevett, England, and won first in pen of five at the Shropshire Show in 1897. My registered ewe lambs which won first in pen of three, class 16, section 5, were bred at Fairview. Their sire was Newton Lord, and the dams were Campbell's 664, 98582, sired by Fair Star (5177); Campbell's 666, 98584, by Fair Star, and Campbell's 582, 77180 by Settler 58985.

The two dams by Fair Star, one of England's most noted sires, were bred by Mrs. A. E. Mansell, Shifnal, England. The third dam was bred at Fairview. Her sire, Settler, was bred by Mr. Daniel Eardley, of Market Drayton, England. Settler sired Campbell's 540, 68735, winner as a lamb of the grand sweepstakes at Guelph Fat Stock Show in 1894. My fourth ewe lamb, sired by Newton Lord, had Campbell's 667, 98585 for dam. She was bred by Mr. A. E. Mansell. Her sire was Montford Dreamer, another of the noted stock rams which so largely helped to make Mr. Mansell's flock famous, in that he sired for him two rams which won the championship at the Royal, besides other winners of less renown. The latter mentioned ewe lamb, with my winning pen of three ewe lambs, and first prize wether lamb—The Model—formed the pen of five which won the "Prince of Wales" prize offered for the best five lambs of any breed. The awarding committee of four, who were unanimous in making the award, were breeders of Oxfords and Southdowns, one of Oxfords, another of Cotswolds and one of Leicesters. All were bred by neighbors who used well-bred Shropshire rams in their flocks. My first prize yearling wether in class 29, section 2, was sired by Fairview Sort 99, 519, a son of Newton Lord

and Campbell's 508, 56994, a first premium ewe at Madison Square Garden Show, New York City. The dam of wether was a good common Leicester grade ewe. Besides winning in his section this wether won first in Shropshire Specials Class.

The grade yearling ewe, winner of first place in class 29, section 1, was sired by Newton Lord. Her dam was a high grade Shropshire ewe, bred up from a common grade of some twelve years ago, by the continual use of high-class Shropshire sires. This winning ewe, later on was declared the best grade sheep in the show. The wether lamb, winner of second prize in class 29, section 4, and first in Shropshire specials, was also sired by Fairview Sort. His dam was a Shropshire grade, bred from a common grade ewe and by a Shropshire ram. The pen of three grade wether lambs, class 29, section 3, winners of second honors, were sired, two by Fairview Sort, and one by Harrison's 235, 61709. Their dams were ordinary grade ewes, except as stated in description of single lamb in class 29, section 4, which was one of the pen of three. My second premium ewe lamb in class 29, section 5, was sired by Fairview Sort, with dam a good common grade ewe of no particular breeding. I have given the breeding in detail in order to show conclusively how important the use of first-class sires is in the flock, and how they will transmit their good qualities, even when used on grade ewes of mixed blood and varied type.

How Fed.—During the first three weeks of the young lambs' existence, the growth and development were maintained by feeding the mothers liberally with milk-producing feed. Clover hay cut when in full blossom, with a sufficient supply of pulped turnips, bran and crushed oats, all mixed together a few hours before using, kept up a flow of milk such as is essential to the rapid growth of the lambkin. Later the use of the creep, and the regularly cleaned out trough, in which finely pulped turnips, with whole oats and bran spread over the turnips were placed fresh twice daily, caused a steady growth of plump form, which is much easier maintained than regained if once lost. I found a roomy, sunny yard for lambs to take exercise in very helpful in late winter and early spring weather. When turned on grass the roots fed were gradually lessened in quantity, and a little peas added to the oats and bran, to which they had access every night when the flock was yarded to save it from dogs. After weaning in July, aftermath and rape were ready for their use. Morning and evening they had a run on rape, with a few hours on the aftermath between. Tares were ready to cut for feeding inside at noon, about the middle of July. A small feed of the mixed grain and bran, to which about five per cent. of ground flax seed was added, was given night and morning. Not more than half a pound was allowed each lamb at first, and when the cool fall season set in a third feed of same quantity was given at noon, when rape and pasture depreciated in succulence, turnips were ready to use instead at the rate of some eight pounds to each sheep and lamb, divided in three feeds daily. A very small amount of milk, not more than a pint to each lamb daily, was fed during the two months preceding the show, but I cannot say that it resulted in any noticeable improvement, comparing them with the grade lambs which did not come into my possession until August, and had no milk after weaning at that date. The latter appeared to fatten more rapidly than the former when fed altogether in the same pen. Before I purchased the grade lambs they were pastured throughout the spring and summer on the roadside, and had no feeding except what they helped themselves to.

The yearlings in my exhibit were last year fed similarly to the lambs, as stated above, and were carried through the winter on unthreshed peas for the morning feed, about four pounds each of cut turnips at noon, a full feed of clover hay at 5 p. m., and four pounds of cut turnips to each at 7:30. In April, mangels in about half the quantity, replaced the turnips. The spring feeding was one pound of grain—same mixture as lambs had at 5 a. m., then to grass till 11 a. m., and when let into barn at that hour three pounds cut mangles and clover hay were placed before them. One pound of grain at 5 p. m., and out to grass till bed-time completed the day's attention.

When rape was ready for use they were turned on it morning and evening, fed grain as formerly and green tares given as a noon feed in barn. During harvest and fall they and the lambs were penned together, and had the same feeding as previously described. Fresh water was always within reach, and the salt boxes were kept well supplied. No condiments were used.

COST OF FEED CONSUMED.—Here I halt, as it is not possible for me to give even an approximate estimate of cost. That is not considered in fitting animals for the showing. While it is wise to count the cost as closely as possible in nearly every line of operations on the farm, in my humble opinion, the person who will pay much attention to the cost of feeding, or value of the constant labor required to successfully prepare show animals for such a contest as that of our Provincial Fat Stock Show, is one who will find it a very difficult matter ever to win in close competition.

BY JOHN RAWLINGS, RAVENSWOOD.

Breeding and feeding of the three ewe lambs that won 1st prize and five lambs that won second place for "Prince of Wales" prize at Provincial Fat Stock Show.

Our stock of registered Cotswolds was founded in 1896 when we purchased four imported ewes from Mr. James Snell, Clinton. On these ewes we used such sires as Grey Face, 7865 (bred by Charles Gillett, England, and imported by J. C. Ross, Jarvis, Ont.), Ross 7866 (also bred by Charles Gillett, and imported by J. C. Ross, a prize winner at Toronto and London, and also in the States), and Standon 4117, (bred by John Snell & Son, Edmonton, out of imported stock). In 1892, we added to our flock four shearling ewes from John Snell & Son's flock, out of imported ewes. After this we used Charity 4794, bred by J. G. Snell & Bro., an excellent stock sheep, and the sire of some of the best ewes we have. Royal Topin, 8974, Commander, 8375, and Blucher, 8376, were also used with success. Blucher, 8376, especially was an all round sheep, carrying the best fleece of wool we ever saw on a Cotswold sheep. In 1899, we purchased from Mr. S. Coxworth, Whitby, Ont., Brilliant, 4491, imported by Joseph Ward, Marsh Hill. He is the sire of a great many prize winners, and has left good points in our flock. Our present stock ram, Lord Walton, 8771, the sire of the lambs exhibited at London, was imported by J. G. Snell and bred by T. Gillett, England. He was never beaten in the show ring as a lamb, and is a wonderfully good getter. As regards feeding and care of our lambs, we always aim to have our ewes in good healthy condition when the lambing season arrives, by giving them plenty of out door exercise, with plenty of good nourishing food and pure water. As soon as the lambs arrive we build a creep in the sunniest part of the sheep barn, where the lambs soon learn to lie. As soon as they are old enough to eat, a trough is placed in the creep with oats, bran and a little oil cake; a second trough with pulped roots, and a crib with the very best clover hay, lucerne or alfalfa preferred. As soon as warm weather comes we supply them with good clean water, which they relish very much. When the sheep are turned on the pasture in the spring, we build a creep in the field and feed the lambs once a day with oats, bran and oil cake. We wean our lambs about the 1st of July, after which we feed grain twice a day. The ewe lambs we had at London were turned out in good clover meadow and rape about the 1st of August, and received no grain till the 10th of November, when they were placed in an acre plot of lucerne and rape mixed, and fed four quarts of bran, oats and oil cake mixed, equal parts of each, twice a day with all the lucerne hay they could eat.

BY R. H. HARDING, THORNDALE.

My Dorsets were not subject to pampering. The lambs are principally dropped in January, and while they are suckling their dams I supply the little fellows with a creep pen, where they can be fed a little grain and roots, without being interfered with by the older sheep. At the same time I feed the dams

liberally upon grain, pulped roots and clover hay, always allowing plenty of exercise, which I consider very essential in the growing of early lambs. As early in the spring as possible I let them have the run of a pasture field. I find this plan works well so far as the lambs are concerned, as it tends to increase the milk flow of the dams, but I find that the ewes lose flesh to quite an extent at this season, as the taste of fresh grass and the warm sun has a tendency towards sluggishness, turning them against eating hay. As soon as the weather is warm enough we shear the whole flock (unwashed). About a week after shearing, we dip the lambs to destroy ticks, as they have mostly left the shorn sheep and found shelter on the lambs by this time. I have used both Little's and Cooper's dips (at different times) with excellent results. As soon as the grass is good enough I wean the lambs, putting them on nice fresh pasture. I also feed a mixture of oats, bran and oil cake to those intended for exhibition, aiming to make them firm and plump, at the same time trying to avoid building up a carcase of tallow, by allowing plenty of exercise and making the grain ration principally oats. I aim to have a patch of early rape fit to turn the lambs into about the 1st of July, letting them run in the rape by night and in the pen by day. When the rape is fairly well eaten down, we usually have some second growth clover to turn the lambs into, but last season was an exception to the rule on account of the drouth. As the weather gets cool (if I want to increase the fat) I add a small quantity of peas to the grain ration.

So far as the cost of growing and fitting my stock is concerned, I cannot give anything like an exact account, as the number included in the feeding lot varies from time to time, but I will append the following estimate, allowing an acre to pasture six head and allowing another acre to grow their winter feed:

Rating the land as worth $3.00 per acre, rent, would equal $6.00 for the two acres, or $1.00 per head for the pasture. Hay and roots, allowing $1.50 per acre for labor, 50 cents per head, and allowing them one pound of grain per head daily for the first year, estimating the grain at 80 cents per hundred pounds, $2.92 per head for grain, or a total of $4.42 per head. To the average reader this will no doubt appear to be unprofitable feeding, and to such I would say that these are estimates on feeding and fitting Show Sheep, and I am satisfied many old exhibitors will say I am far within the mark, but we do not fit all our sheep for the shows.

Concerning the breeding of my exhibit of sheep, they are all home bred, and mostly from home bred sires and dams, but I have taken care to avoid inbreeding in selecting sires. However, I am working new blood into my flock by using two first-class imported sires, one of them a first-prize winner at the Royal, 1899. From these I expect good results. Concerning the block test, the yearling Dorset wether that I had dressed was proclaimed by several experts to be either the first or second best carcase in the Show. One of these experts was Mr. McKerrow, of Sussex, Wis.

By John Park & Son, Burgesville.

The sheep we exhibited at the Provincial Fat Stock Show were bred by ourselves and were got by imported rams and registered Canadian-bred ewes. They were dropped the last of March and first of April. The ewes with the best lambs were put by themselves and fed clover hay night and morning, with an additional feed of bran mash at night and in the morning a feed of grain, consisting of one part peas, two parts bran and two parts oats. At noon they were fed a liberal feed of cut turnips and also fed threshed pea straw. On fine days, ewes and lambs were given a run in yards. As soon as grass was ready to turn out on, the ewes were put on good clover and changed from one pasture lot to another every two weeks. This was all the care the ewes and lambs got until weaning time.

When lambs were weaned they were turned on three or four acres of rape, oats and barley, turned on this green feed about two hours in the morning and taken into the shed before noon, and fed a grain ration consisting of bran, oats

and a little oil cake. They were turned out for two hours in the evening, and turned on a pasture lot for the night. This method was continued for the summer. The cost to fit a sheep till a shearling is about five dollars. Sheep should have plenty of exercise. With this method you will have the right sheep for the flock.

By James Bowman, Guelph.

The shearlings, Suffolks, that took first and second in Dressed Carcase Competition were reasonably well wintered and run in good grass pasture all summer, with access to running water. About October 1st they got a little grain, about one and a half pints each day of oats and peas mixed. This was continued until about the 10th of November, when they were put in a pen and fed what pulped turnips and grain they would eat, with bran and oil-cake mixed, about a quarter of a pound of cake to each sheep per day. They were fed twice a day, and when they had cleaned up the grain and roots they got what they would eat. They also had access to salt and water. The Suffolk ewe lamb that got third prize was fed in the same way, except that she got rape for about three weeks.

SWINE.

By J. E. Brethour, Burford.

In making a report of the system of feeding and care given to the pen of hogs which won Sweepstake at the Provincial Winter Show at London in 1899, I would say first that I took special care in the selection of these pigs that they should have the required length and form necessary to produce carcases suitable for the English trade. The pigs having been selected carefully, they were treated in the following manner: They were allowed to suckle the sow until two months old, then weaned and fed upon wheat middlings and a small quantity of skim milk, given four times daily until three months old, adding a small quantity of barley and corn meal as they grew older and were able to stand stronger feed; but after three months old their feed was composed largely of green clover, and later in the season green corn and rape. For six weeks previous to the commencement of the finishing period they were allowed the run of a small field of artichokes, which they dug and ate at their own free will, being given a small quantity of whole corn, scattered broadcast. This system of feeding was inexpensive and promoted a good development of muscle and a healthy condition. The finishing period lasted about a month, when they were confined to the pen and fed upon a mixture of chopped wheat, oats and corn, which was fed to them in liberal quantities during the finishing period. One danger to guard against in the production of high-class bacon is to avoid over-feeding while the pigs are young and during the growing period. Such food should be given as will develop bone and muscle, and sufficient exercise should be allowed to induce good healthy digestion. One cause of soft pork is too high feeding when young, and sufficient attention not being given to the development of a healthy, vigorous condition of the pig. Soft pork is not so much a matter of what you feed as how it is fed, and the form or condition the pig is in to properly utilize the food given. It is useless to try and make a bacon hog from a pig that is inclined to be short and thick. This class of pig must be underfed to induce a growth of bone and muscle, and when finished it will have a hard, coarse quality of lean meat, with the fat soft and oily. A hog having good length and depth of side, when well fed from birth, will furnish a carcase full of lean, juicy meat with an even distribution of fat throughout the entire carcase. I would say in conclusion, that to produce an ideal "Wiltshire side" the form of the pig is of as great importance as the food given. Food is only wasted in trying to produce bacon hogs from short, thick pigs.

Final Report of the Fifty Cows in Model Dairy Six Months' Test, Placing Cows in Order of their Profit on Estimated Butter.

At Pan-American Exposition (from "Hoard's Dairyman").

NAME OF COW.	BREED.	Lbs. Milk.	Per cent. Fat.	Lbs. Estimated Butter.	Value of Butter at 25 cts. a lb.	Cost of Hay Fed.	Cost of Silage Fed.	Cost of Grain Fed.	Total Cost of Feed.	Profit on Butter at 25 cts. a lb.	Weight of Cow May 1st.	Gain in Weight.
1. Mary Marshall	Guernsey	5,611.0	5.36	354.26	$88.56	$6.63	$4.34	$18.19	$29.16	$59.40	987	64
2. Mayflower 2nd	Red Poll	6,161.5	4.45	323.15	80.79	5.70	4.73	18.26	28.69	52.10	1,134	66
3. Cassiopiea	Guernsey	6,270.1	4.26	315.01	78.75	6.66	4.14	17.60	28.40	50.35	1,019	24
4. Primrose Park's Prude	Jersey	4,639.4	5.64	308.24	77.06	5.41	5.09	16.31	26.81	50.25	992	54
5. Procris of Paxtang	Guernsey	5,992.6	4.43	313.10	78.27	6.60	4.47	18.71	28.78	49.49	869	1
6. Beauty of Norval	Holstein	8,140.7	3.42	328.01	82.00	6.63	5.88	20.14	32.65	49.35	1,017	64
7. Queen May	Jersey	5.343.1	4.74	298.54	74.63	5.56	5.08	16.53	27.17	47.46	974	42
8. Betsy 1st	Ayrshire	7,041.5	3.59	298.57	74.64	6.18	5.44	16.95	28.57	46.07	973	25
9. Pearl of Woodside	Ayrshire	6,730.8	3.74	296.07	74.02	6.18	5.44	16.94	28.56	45.46	912	80
10. Kirsty Wallace	Ayrshire	6,469.7	3.83	292.31	73.08	5.89	4.96	16.89	27.74	45.34	966	44
11. Gipsey	Jersey	5,790.3	4.4	300.21	75.05	5.54	5.09	19.64	30.27	44.78	1,004	loss 7
12. Mossy of H	Jersey	5,762.4	4.27	290.01	72.50	5.48	5.00	17.53	28.01	44.49	822	67
13. Hulda Wayne	Holstein	8,040.7	3.23	305.79	76.45	6.62	5.58	20.20	32.40	44.05	989	55
14. Susie	Red Poll	6,430.1	3.8	287.50	71.87	5.96	5.10	17.01	28.07	43.80	1,187	38
15. Miss Molly	Short-horn	6,894.1	3.71	301.47	75.37	7.23	4.96	20.17	32.36	43.01	1,075	134
16. Queen	Polled Jersey	4,010.0	5.63	265.98	66.49	6.27	3.80	13.53	23.60	42.89	648	101
17. Alice 2nd	Ayrshire	6,127.9	3.91	282.15	70.54	6.18	5.43	16.68	28.29	42.25	1,054	82
18. Vega	Guernsey	5,029.1	4.59	271.64	67.91	6.95	4.60	14.61	26.16	41.75	1,094	76
19. Belle T	Brown Swiss	5,789.6	4.09	278.45	69.61	7.76	3.32	16.30	28.38	41.23	1,039	loss 7
20. Tidy Abberkirk	Holstein	7,659.1	3.28	296.00	74.00	6.63	5.96	20.38	32.97	41.03	1,008	101
21. Denise Championne	French Canadian	5,404.2	4.03	256.63	64.16	5.08	4.79	13.65	23.52	40.64	750	64
22. Rouen	French Canadian	4,896.1	4.46	257.20	64.30	5.07	4.91	13.70	23.68	40.62	794	27
23. Eliza	Brown Swiss	6,407.9	3.8	286.89	71.72	6.36	5.29	19.47	31.12	40.60	1,273	2

24. Inka Mercedes	Holstein	8,028.3	3.05	288.34	72.08	6 63	5.60	20.22	32.45	39.63	915	72
25. Liena Flore	French Canadian	4,558.0	3.92	252.54	63.13	5.07	4.91	13.74	23.72	39.41	1,030	63
26. *Ora	Polled Jersey	4,804.8	4 40	249.36	62.34	6.28	4.03	12 86	23.17	39.17	1,013	loss 17
27. Pride's Favorite	Polled Jersey	4,569.1	4.60	247.71	61.93	7.02	3.57	13.38	22.97	38.96	665	71
28. Lady Florie	Ayrshire	6,626.3	3.40	265.51	66.38	5.86	5.13	16.69	27.68	38.70	1,105	loss 13
29. §Rexina	Jersey	5,451.9	3.98	256.01	64.00	5.50	5.19	14.79	25.48	38.52	933	33
30. Easter	Red Poll	6,058.7	3.70	263.96	65.99	5.81	5.05	17.83	27.83	38.16	834	99
31. ‡Belle of Warwick	Dutch Belted	5,313.2	4.15	259.80	64.95	5.60	3.93	17.40	26.93	38.02	935	83
32. Hope of Minn	Brown Swiss	6,117.0	3.61	259.85	64.96	8.10	2.52	16.98	27.60	37.36	1,015	54
33. Meg	Holstein	7,391.0	3.25	282.84	70.71	6.62	5.97	21.52	34.11	36.60	1,314	99
34. Queen Bess	Short-horn	6,547.9	3.57	275.21	68.80	7.21	5 30	19.98	32.49	36.31	1,105	192
35. Princess of Thule	Short-horn	5,885.7	3.82	264.79	66.20	7.20	5.31	19.98	32.49	33.71	1.261	132
36. Lucy B	Brown Swiss	6,356.2	3.45	258.13	64.53	7.80	5.12	18.09	31.01	33.52	1,193	84
37. Phyllis	Polled Jersey	4,430.0	4.38	228.12	57.03	6.31	3.75	13.77	23.83	33.20	799	59
38. Luna	French Canadian	5,048.5	3.79	225.03	56.26	5.20	4.89	13.43	23.52	32.74	760	102
39. Flora	Red Poll	4,628.4	4.29	233.55	58.39	5.70	4.77	15.79	26.28	32.11	1,068	102
40. Tryste	Red Poll	5,416.2	3.68	234.97	58.74	5.75	4.86	16.54	27.15	31.59	1,036	44
41. Rose 3rd	Short-horn	6,492.8	3.31	253.35	63.34	7.21	5.17	19.98	32.37	30.97	1,105	125
42. Nicola	Brown Swiss	6,220.8	3.25	238.12	59.53	7.80	5.13	16.25	29.18	30.35	1,208	65
43. Madora Fern	Guernsey	4,224 8	4.36	214.87	53.72	6.92	4.61	12.83	24.36	29.36	958	30
44. Daisy D	Short-horn	6,054.4	3.43	244.74	61.18	7.21	5.05	20.12	32.38	28.80	1,161	219
45. †Madeline	Dutch Belted	5,661.0	3.23	215.26	53.81	5.52	3.96	17.10	26.66	27.15	1,028	77
46. Holland Creamery	Dutch Belted	5,287.3	3.36	209.51	52.38	6.26	3.36	16.59	27.21	24.17	806	90
47. La Bouchette	French Canadian	3,849.6	3.67	166.38	41.59	5.05	4.79	8.81	18.65	22.94	647	32
48. ¶Justina	Polled Jersey	2,465.0	4.31	124.95	31.24	6.17	3.99	5.68	15.84	15.40	913	61
49. Merletta	Dutch Belted	4,715.4	3.2	170.03	42.51	7.27	4.47	16.71	27.45	15.06	948	114
50. Alberta	Dutch Belted	3,916.6	3.09	142.42	35.60	6.21	4.46	13.39	24.11	11.49	1,147	12

* Did not calve for two weeks after test began.

§ Did not calve till May 7th.

‡ Arrived 18 days late.

† Arrived 18 days late, so is short that much in record.

¶ Last calf October, 1900.

Typical Oxford Down Ram, one year old, Champion of the breed, at the Pan-American Exposition, Buffalo, September, 1901, owned by a Wisconsin exhibitor. This sheep was pronounced by several expert judges to be the best type of a perfect mutton ram on exhibition at that great show.

Digestible Food Ingredients in 100 lbs. of Feeding Stuffs.

Compiled from Hand-book of Experiment Station Work, 1893, and Other Sources.

FOOD STUFFS.	POUNDS.				Nutritive Ratio.
	Water.	Protein.	Carbo-hydrates.	Fat.	
Green Corn Fodder (av.)	79.3	1.45	11.78	0.38	1 to 8.7
Green Clover	70.8	2.9	14.1	0.70	1 to 5.4
Green Timothy	61.6	2.2	23.0	0.70	1 to 11.2
Corn Silage	79.1	0.82	10.89	0.68	1 to 15.1
Potatoes	78.9	1.27	15.57	0.10	1 to 12.4
Turnips	90.5	0.63	6.68	0.20	1 to 11.3
Carrots	88.6	0.68	8.82	0.37	1 to 14.2
Sugar Beets	86.5	1.1	9.3	0.1	1 to 8.7
Hay, Timothy in bloom	15.0	2.93	41.0	1.47	1 to 15.0
Hay, Red Clover	15.3	8.06	39.07	2.14	1 to 5.2
Corn Fodder, cured	42.2	2.17	31.98	1.07	1 to 15.8
Wheat Straw	9.6	0.80	38.04	0.46	1 to 48.8
Oat Straw	9.2	1.58	41.63	0.74	1 to 27.4
Corn	10.6	7.85	66.97	4.28	1 to 9.7
Oats	11.0	9.25	48.31	4.17	1 to 6.2
Wheat (Prof. Woll)	10.5	9.2	64.9	1.40	1 to 7.4
Barley	10.9	9.5	66.1	1.2	1 to 7.2
Rye	11.6	8.3	65.5	1.2	1 to 8.2
Buckwheat	12.6	7.7	49.2	1.8	1 to 7.0
Pea Meal	10.5	18.0	56.0	0.9	1 to 3.2
Wheat Bran	11.9	11.40	45.8	2.80	1 to 4.6
Wheat Middlings	11.8	12.2	47.2	2.9	1 to 4.4
Cottonseed Meal	8.2	36.67	18.77	12.50	1 to 1.3
Linseed Meal (old process)	9.2	28.3	32.8	7.1	1 to 1.7
Linseed Meal (new process)	10.1	27.06	32.52	2.74	1 to 1.4
Dry Grains (Brewers)	8.2	13.71	36.95	4.53	1 to 3.5
Malt Sprouts (dry)	10.2	16.2	35.5	5.3	1 to 2.3
Gluten Meal	9.6	24.99	49.80	4.79	1 to 2.4
Skimmed Milk	90.4	3.1	4.7	0.8	1 to 2.8
Whey	93.4	0.8	4.7	0.3	1 to 14.1
Dried Blood	8.5	58.1	.....	2.3	1 to 0.01

A balanced ration is considered to have a nutritive ratio of 1 to 6, to which you will notice oats come the nearest, followed by clover on the narrow side.

Dried blood is an extremely narrow ration, followed by cottonseed meal and oil meal, while wheat straw is an extremely wide ration, followed by oat straw and corn fodder.

WEIGHTS PER BUSHEL (COMMERCIAL).

	lbs.		lbs.
Wheat	60	Flax	56
Clovers	60	Buckwheat	50
Peas	60	Millet	50
Beans	60	Sorghum	50
Potatoes	60	Barley	48
Onions	57	Millet (Hungarian)	48
Corn (in the ear)	70	Timothy	45
Corn (shelled)	56	Oats	32
Rye	56	Orchard grass	14

SEED USED PER ACRE.

	Drilled.	Broadcast.		Drilled.	Broadcast.
Wheat	1½ bus.	2 bus.	Potatoes	10 bus.	.. bus.
Oats	2 "	2½ "	Clover (red)	.. "	12 lbs.
Barley	1¾ "	2¼ "	Clover (Alsike)	.. "	4 "
Rye	2 "	2½ "	Clover (white)	.. "	3 "
Peas	2 "	... "	Clover and timothy (8 clover, 2 timothy)	.. "	10 "
Buckwheat	... "	½ "	Timothy	.. "	5 "
Beans	1½ "	... "	Orchard grass	.. "	25 "
Oats and Peas (mixed for hay) Oats	1 "	... "	Rape	1½ lbs.	3 "
Oats and Peas (mixed for hay) Peas	2 "	... "	Turnips	¾ "	1 "
Flax	... "	½ to 1½ "	Carrots	2 "	.. "
Millet	... "	½ to 1 "	Beets	4 "	.. "
Corn	¼ "	... "			

VITALITY OF SEEDS IF PROPERLY KEPT.

Turnips	5 years	Wheat	2 years
Rape	5 "	Buckwheat	2 "
Pumpkin	5 "	Corn	2 "
Peas	3 "	Timothy	2 "
Beans	3 "	Rye	2 "
Clover	3 "	Flax	2 "
Oats	3 "	Millet	2 "
Barley	3 "	Orchard grass	2 "

YIELD OF A GOOD CROP OF FARM PRODUCTS PER ACRE.

Oats	60 bus.	Rye	25 bus.
Corn (shelled)	50 "	Hay	2 tons.
Barley	50 "	Potatoes	200 bus.
Wheat (winter)	30 "	Turnips	500 "
Wheat (spring)	25 "	Mangels	800 "
Beans	15 "	Sugar Beets	500 "

WISCONSIN STATE ORGANIZATIONS OF INTEREST TO FARMERS.

WISCONSIN STATE BOARD OF AGRICULTURE.

Geo. McKerrow, Sussex ..... President
John M. True, Madison ..... Secretary
George Wylie, Leeds ..... At Large
S. D. Hubbard, Mondovi ..... At Large
C. H. Everett, Racine ..... 1st District
Geo. Klein, Ft. Atkinson ..... 2d district
Geo. C. Cox, Mineral Point ..... 3d district
P. R. Hannifin, Milwaukee ..... 4th district
Geo. McKerrow, Sussex ..... 5th district
C. W. Harvey, Beaver Dam ..... 6th district
Charles Linse, La Crosse ..... 7th district
F. A. Heubner, Manitowoc ..... 8th district
David Wedgewood, Little Suamico ..... 9th district
C. G. Wilcox, De Pere ..... 10th district
John W. Thomas, Anson ..... 11th district

WISCONSIN DAIRYMEN'S ASSOCIATION.

C. P. Goodrich, Ft. Atkinson ..... President
G. W. Burchard, Ft. Atkinson ..... Secretary
H. K. Loomis, Sheboygan Falls ..... Treasurer

WISCONSIN HORTICULTURAL SOCIETY.

T. E. Loope, Eureka ..... President
F. C. Edwards, Ft. Atkinson ..... Vice-President
J. L. Herbst, Sparta ..... Secretary
L. G. Kellogg, Ripon ..... Treasurer
S. H. Marshall, Madison ..... Corresponding Secretary

STATE LIVE STOCK SANITARY BOARD.

Prof. H. L. Russell, Madison ..... State Bacteriologist
Dr. E. P. Roberts, Janesville ..... State Veterinarian
Geo. McKerrow, Madison ..... President
S. D. Hubbard, Mondovi .....
George Wylie, Leeds .....
John M. True, Madison ..... Secretary

WISCONSIN LIVESTOCK BREEDERS' ASSOCIATION.

Geo. McKerrow, Sussex ..... President
Frank W. Harding, Waukesha ..... Secretary
G. L. Hill, Rosendale ..... Treasurer
Executive Committee—J. Q. Emery, Albion; Prof. W. L. Carlyle, Madison; George Wylie, Leeds; Walter L. Houser, Mondovi.

WISCONSIN SHORT-HORN BREEDERS' ASSOCIATION.

Geo. Wylie, Leeds ..... President
J. B. Kiser, Oregon; F. W. Harding, Waukesha ..... Vice-Presidents
H. B. Drake, Beaver Dam ..... Secretary and Treasurer
Members of Executive Board—Chas. E. Apple, North Cape; D. H. Robertson, Lodi.

WISCONSIN SWINE BREEDERS' ASSOCIATION.

George Wylie, Leeds ..... President
H. B. West, Fayetteville ..... Secretary
H. J. Noblet, Bowers ..... Treasurer

WISCONSIN SHEEP BREEDERS' AND WOOL GROWERS' ASSOCIATION.

J. N. Crawford, Mukwonago.....
Andrew Kull, Lake Geneva.....President
H. J. Wilkinson, Whitewater.....Vice-President
C. R. Gibbs, Whitewater.....Secretary
W. H. Hardy, Genesee.....Corresponding Secretary
.....Treasurer

HOLSTEIN FRIESIAN BREEDERS' ASSOCIATION OF WISCONSIN.

J. Rust, North Greenfield.....
Fred E. Harriman, Appleton.....President
Fred Ziegler, Apple Creek.....Secretary
.....Treasurer

WISCONSIN CHEESEMAKERS' ASSOCIATION.

W. C. Dickson, Madison .....
John McCready, Madison.....President
S. E. Knickerbocker, Wyoming .....Vice-President
U. S. Baer, Madison.....Treasurer
Directors—Three years, J. K. Powell, New Lisbon; two years, Fritz Karlen, Monroe; one year, Thos. Johnston, Boaz.
.....Secretary

WISCONSIN JERSEY BREEDERS' ASSOCIATION.

Geo. E. Bryant, Madison.....
H. C. Taylor, Orfordville.....President
E. F. Riley, Madison.....Secretary
.....Treasurer

WISCONSIN BEE KEEPERS' ASSOCIATION.

F. Wilcox, Mauston.....
J. K. Hoffman, Monroe.....President
N. E. France, Platteville.....Vice-President
H. Lathrop, Browntown.....Secretary
.....Treasurer

STATE FORESTRY ASSOCIATION.

B. S. Hoxie, Evansville.....
C. A. Hutchins, Beloit.....President
L. S. Cheney, Madison.....Vice-President
Ernst Bruncken, Milwaukee.....Treasurer
Other Members of Executive Committee—H. C. Putnam, Eau Claire; J. M. Stout, Menomonie.
.....Secretary

WISCONSIN STATE VETERINARY ASSOCIATION.

C. Evans, Racine.....
J. F. Roub, Monroe.....President
W. C. Clark, Marinette.....Vice-President
S. S. Snyder, Cedarburg.....Secretary
Censors—H. P. Clute, Marinette; R. S. Heer, Platteville; B. L. Clarke, Monticello.
.....Treasurer

WISCONSIN ASSOCIATION OF TOWN INSURANCE COMPANIES.

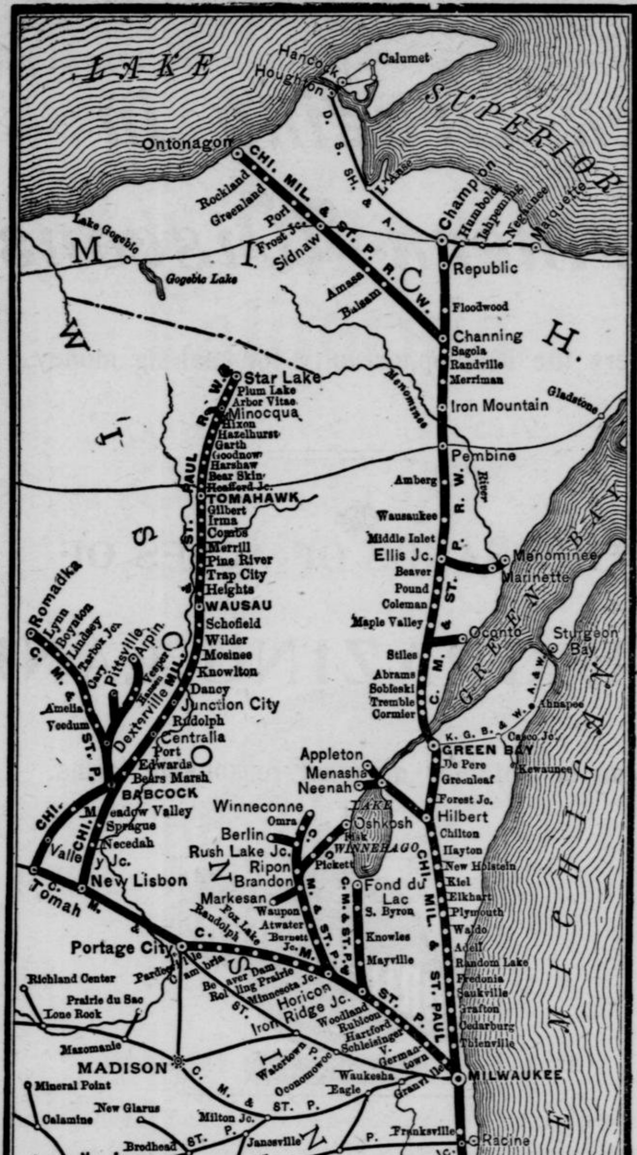
William McEwen, Milton.....
William Grevirus, New Holstein.....President
H. B. Drake, Beaver Dam.....Secretary
.....Treasurer

WISCONSIN STATE LEAGUE FOR GOOD ROADS.

Thos. M. Blackstock, Sheboygan.....
Otto Dorner, Milwaukee.....President
John Johnston, Milwaukee.....Secretary
Geo. McKerrow, Madison.....Treasurer
W. D. Hoard, Ft. Atkinson.....1st Vice-President
A. C. Morrison, Milwaukee.....2d Vice-President
.....3d Vice-President

INDEX TO ADVERTISERS.

How to Reach Good Lands in Wisconsin via the Chicago, Milwaukee & St. Paul Railway.



We Build Goods Especially for the Wisconsin Trade.

We want to supply our home market, consequently adapt our goods to the NEEDS OF THE WISCONSIN FARMER.

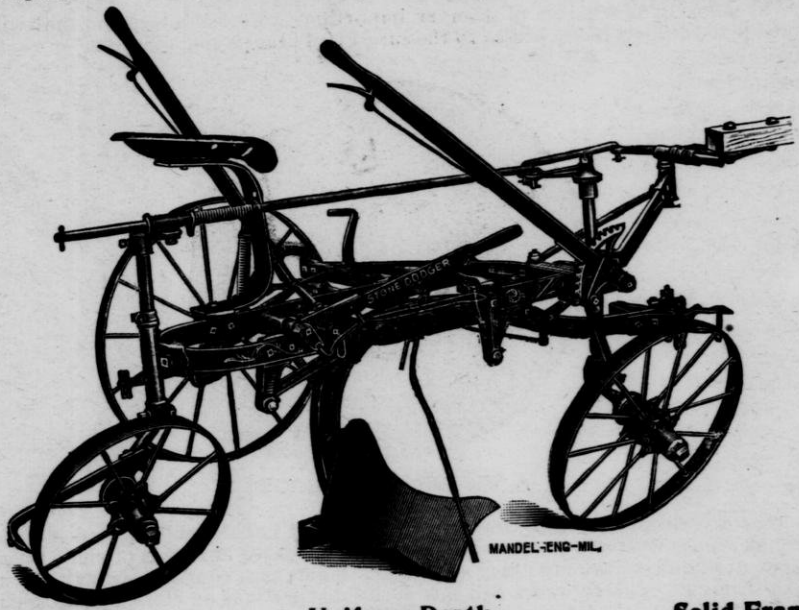
There is no room here for details, but the

GOODS ARE GOOD, WE GUARANTEE THEM FULLY.

Write Us and we will tell You about them.

Eclipse "Stone Dodger" Plows.

High Spring Lift. No Stopping for Stones, No Sore Shoulders on Horses. No Broken Points on Plow, Easily Handled.



Light Draft. **Uniform Depth.** **Solid Frame.**

We Make A Full Line of

AGRICULTURAL IMPLEMENTS,

also **Farm Wagons and Light Vehicles.**

Some things you should ask us about:

Stark's Force Drop Corn Planter; Universal Cultivator, with or without Tobacco Hoeing Attachment; Bemis' Tobacco Transplanter; Self-balance Cultivator; Western Riding Weeder, &c., &c.

We shall be glad to send you circulars, and write you fully about them all. Address,

FULLER & JOHNSON MFG. CO., Madison, Wis.

Homes for Ten Thousand People in Wisconsin.

In view of the present condition of affairs in this country it is the highest wisdom for those who have never had a farm or a home of their own, and who are dependent upon weekly wages, to make a determined effort in their own behalf and find some desirable locality where they can build a pleasant home for themselves and their children.

It has been many years since such special inducements as are now being offered served to attract the people of limited means to leave the city, where expenses multiply on every hand, and make a place for their declining years in the country. Life in town is a hard and never-ending struggle for the poor man. Wages are low, and, besides, every avenue of labor in the cities and manufacturing centers is already over-crowded. For this reason thousands can scarcely earn sufficient money to supply the actual wants of life and are, in consequence, glad to turn to agricultural pursuits.

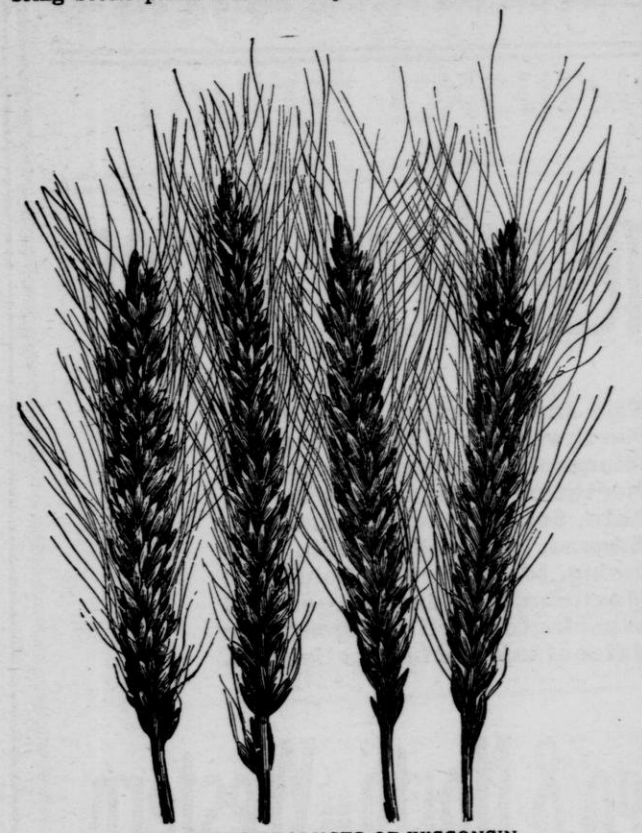
In choosing a farm it is of primary importance to select a location that will insure for the crops a ready access to the surest and best paying markets.

A WISCONSIN CABBAGE.

On the western shores of Green Bay, an arm of Lake Michigan, and extending for many miles west and northwest, there is in this area hundreds of small lakes of clear water, and containing many sparkling streams that course their way down to Lake Michigan. Several years ago this entire district was an almost unbroken forest, but the axe of the lumberman has steadily cleared away the larger timber, and many fine farms have sprung up in the wake of the lumber industries. To-day there are thousands of acres of unoccupied land there, of wonderful fertility and purchasable at a small price and on terms suitable to those in search of homes.

The greater part of this land had the large pine timber removed from it in earlier days, leaving the smaller timber to grow, while the hardwood, tamarack and cedar timber has been untouched, as in earlier days it was not considered worth cutting. At the present time, however, cedar is, if anything, more valuable than pine, and it and the other kinds of timber and wood left on the ground afford plenty of work during the winter season for men and teams getting out railroad ties, shingle bolts, match bolts, posts, telegraph poles, piling and various other things for which timber is now used. All these products bring good prices when delivered at the railway station, thus enabling the farmer to earn money in winter to improve his farm during the summer.

All kinds of small fruits are raised successfully in this district, strawberries in particular growing luxuriously; and, as the location is a little north of the Michigan fruit belt, these products come into the market at a later date and, consequently bring better prices than if they were marketed during the height of the season. Blackberries, raspberries, gooseberries, cherries and plums all yield well. The woods are full of wild berries of various kinds—blueberries, blackberries, and raspberries especially being in great abundance.



ONE OF THE PRODUCTS OF WISCONSIN.

Corn, wheat, rye, barley, oats and other cereals are raised successfully. Potatoes, turnips, beets, onions and other vegetables yield abundantly, while the hay crop is probably the most profitable of any that can be raised, as the lumber camps have to ship in thousands of tons of hay annually to feed their teams working in the woods; in fact the markets for all kinds of farm produce are of the best. For stock raising and dairy purposes there is

NO BETTER PLACE TO BE FOUND.

The grasses are sweet and grow luxuriantly during the summer season. Nearly everything in the way of crops can be raised in this country and all can be sold at the highest market price from the fact that the vast lumbering interests require much more farm produce than is at present produced or will be produced for many years to come. Thousands of carloads of farm products are annually shipped into this part of the country, consequently the farmer who takes advantage of this opportunity will be able for many years to dispose of his crops almost at his door at the highest city prices, without having the trouble of shipping them to the larger markets.

SHEEP LANDS IN NORTHERN WISCONSIN

The following is an extract from an article by Col. L. D. Burch, editor of the "American Sheep Breeder," in the September, 1899, issue of that paper:

"The region visited lies about 350 miles north of Chicago, along and tributary to the Wisconsin Central Railway, and embraces an area of about 3,500 square miles, covering the Counties of Price and Ashland and contiguous portions of Bayfield and Iron Counties. This great district forms as nearly an ideal sheep country as any the writer has seen in a quarter century of almost constant travel between the great lakes and the snowy range, and from Manitoba southward to middle Texas."

Men interested in sheep raising are requested to write for further information to

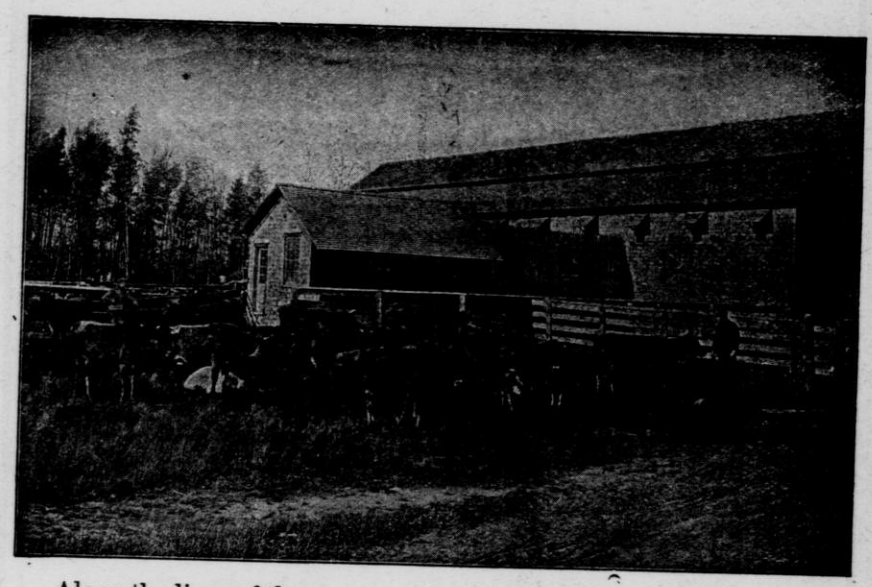
W. H. KILLEN,

Industrial Commissioner Wisconsin Central Railway Co.,

MILWAUKEE, WIS.

DAIRY PRODUCTS IN WISCONSIN.

The word "Wisconsin" in connection with creamery products is synonymous with "excellence" in the butter and cheese markets of the world. The State is fortunate in comprising among its agricultural population a large body of thorough dairy farmers from this country and Europe, conversant with the best methods and ever ready to adopt improvements. There is hardly a state in the Union where the people do more to encourage agricultural institutions bent upon promoting the spread of knowledge of correct methods.



Along the lines of the

CHICAGO, MILWAUKEE & ST. PAUL RAILWAY COMPANY

dairy farming is reaching the highest perfection.

The efforts made by Wisconsin dairymen during recent years to avail themselves of the richness which nature has bestowed upon the State have been untiring, and as a result Wisconsin butter and cheese is to-day famed far and wide. For further information, address

F. A. MILLER,
General Passenger Agent C., M. & St. P. R'y,
CHICAGO, ILLINOIS.

PERTINENT POINTS WHY ONE SHOULD BUY LAND IN WISCONSIN.

If we are disposed to give advice we should say *don't rent;* but if you do, work your father's farm. What he leaves you may balance the rent.

In Italy about ten per cent. of the population own the real estate and seventy-five per cent. beg. Their grandfathers were renters.

Our cheap land is the last avenue of escape from the deplorable conditions prevailing in all European and some American countries.

We are in the field to sell lands and furnish homes, and every sale produces the same joyous result that was felt by the ancients when the one-hundredth sheep returned to the fold.

To own a nice quarter section of land is worth a whole eternity in bondage. Remember, that if you continue to turn your neighbor's grindstone all the time, you won't see anything but the stone, and that isn't yours.

To the laboring man who can lay aside a portion of his wages, nothing is so safe and sure as a piece of good land. You "lay a nest egg," the land will do the rest. If you wait till you get able to pay all cash, you will never have a farm.

The rent that accumulates on the humblest dwelling while you are hunting work will make the payments on enough land to support your family.

We know of only one advantage in being a professional renter. He usually has no taxes to pay.

The renter is the only musician who fiddles and then pays for the music.

SOME REASONS

WHY

Wisconsin Should be Selected for a Home.

Abundant rainfall.
The climate is perfect.
Convenience of location.
The air is pure and bracing.
Grain worth Chicago prices.
The country is well watered.
The soil is prolific and easily tilled.
The most healthy location to be found.
The land is rolling and easily cultivated.
No time wasted—employment at all seasons.
An abundance of pure soft water easily obtained.
The best prices can be obtained for farm products.
The crop yield is large and prices are remunerative.
An abundance of fuel always obtainable without cost.
As a dairy and stock raising location it is unsurpassed.
There is no better location for the raising of small fruits.
A man can earn as much in the winter as in the summer.
The State is advancing; the value of property increasing.
Work can be obtained the year round at remunerative wages.
All timber growing or standing on land when cut brings cash.
The land produces sugar beets yielding a very high percentage of sugar.
A home market right at the farmer's door for everything that he can raise.
The large near-by manufacturing towns and cities require a great amount of farm products.
Forty acres of land can be bought for a trifling sum, which in a few years will be worth a large amount of money.

How to Get Good Dirt Roads

In Your Town, in Your County, in Your State of Wisconsin.
That's what You want to know, isn't it?

Gen. E. G. Harrison, the United States Government Road Expert, says that WATER is the road's greatest enemy, but

IT IS A COWARD.

It will run whenever it gets a chance.

GIVE IT A CHANCE.

Grade every foot of your roads so the water will have to run away, and

KEEP THEM GRADED,

for they won't stay that way.

Traffic wears them down. That's where they differ from stone roads. That's why they require more attention.

HOW TO DO IT?
WITH MACHINERY.

The only way it ever has or ever will be done.

You can not do it properly or economically by hand, or with plows and scoop scrapers, and if you could it *wouldn't stay done.*

A Modern Road Machine will build a perfect dirt road out of any kind of soil, on the hills or in the bottoms, and even where the rocks and roots are so thick you would think it couldn't run.

It will build it so the water *will have* to run off, and that's all there is to it.

WHAT IS BETTER STILL,

It will keep it built, which nothing else will do.

Don't wait till the road gets flat on top again and full of mud holes, *but pare off the shoulders* two or three times a year with a machine.

Don't dig up the roadbed or fill it with fresh dirt in the fall, but cut away the shoulders so the water can run off.

It Can be Done for Almost Nothing.

A machine and four horses will "dress up" ten miles of *machine-made road* in a day.

You can put this plan into operation in your own town right away,
You can have the best kind of dirt roads,
You can keep them in perfect condition,
Without waiting for town meeting,
Without raising a dollar more tax.
Without dispensing with the labor tax.

HOW?

By letting *the Road Districts* buy and own and use their own machines and *pay for them out of their labor tax.*

How can a district buy a machine with its labor tax?

THE WISCONSIN LEGISLATURE PROVIDED THE WAY.

It understood the importance and value of such a method, and at its last session passed such a law unanimously, and it was immediately signed by the Governor.

The districts buy on five annual payments, so each payment will be small.

They can't pay more than one-half the road tax for the machine in any one year, so that even while paying for it they will have half their tax left to use it, which will do five times as much as the whole tax will without it.

No district can buy a machine, or an interest in one, until it presents a petition to the Chairman of the Town Board, signed by its Road Overseer or Superintendent, and by a majority of all its taxpayers, and this majority must represent a majority of the road tax.

Could there be any easier method of getting the machinery than this one, which calls for no increase in taxes and makes the labor tax as effective as cash?

Write to AUSTIN & WESTERN CO., Ltd. CHICAGO, ILL.,

For a copy of the new law and for a catalogue of the largest and best line of modern road machinery on earth.