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## **Wisconsin Farmers' Institutes : a hand-book of agriculture. A report of the sixteenth annual closing Farmers' Institute held at Oconomowoc, March 18, 19, and 20, 1902. Bulletin No. 16 1902**

Wisconsin Farmers' Institutes  
Madison, WI: Democrat Printing Co., 1902

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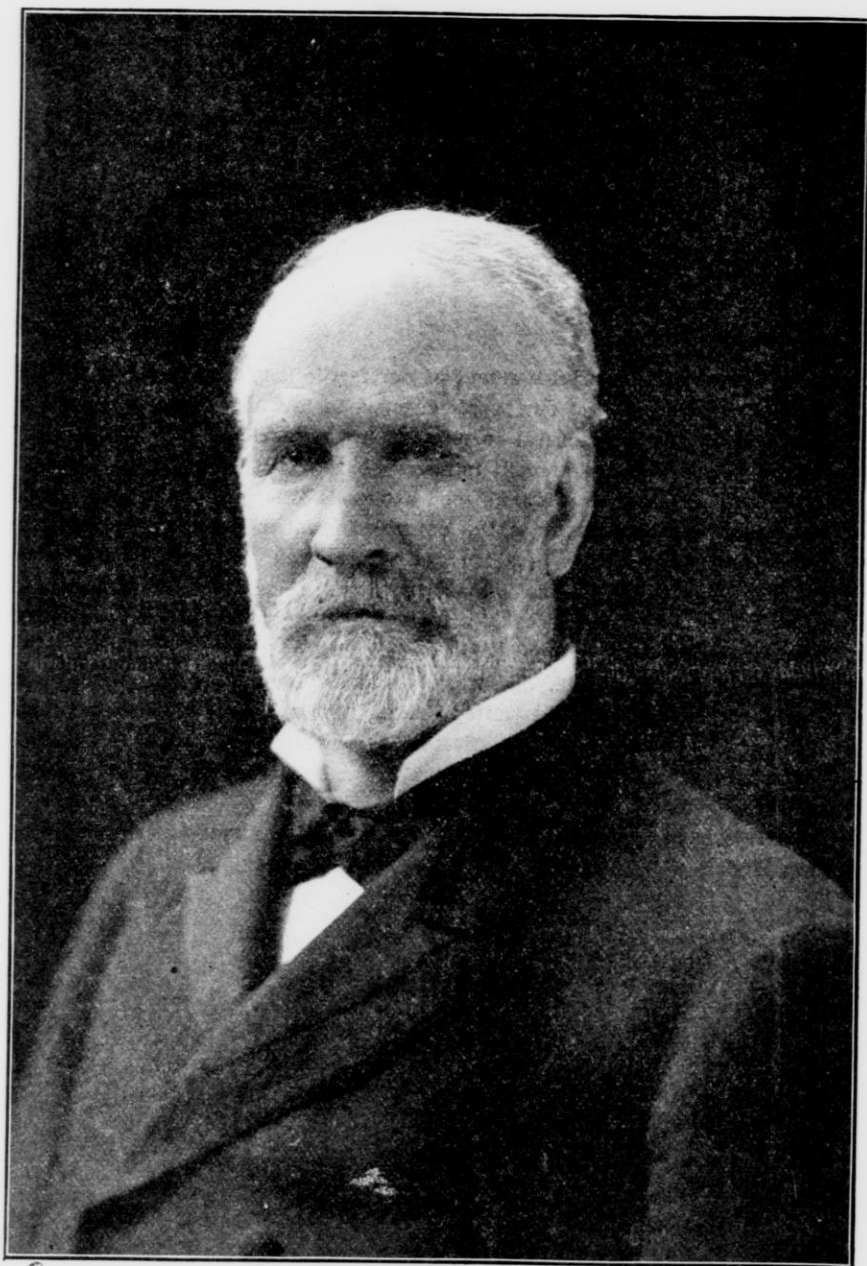
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of the  
**University of Wisconsin**





"By the almost illimitable extent of our fertile lands, by tradition, by the number and character of our people engaged in farming, by the amount and excellence of our agricultural surplus, we are an agricultural nation. Agriculture is easily the paramount industry of the United States. It is by our agriculture that we are distinguished above all other nations. Agricultural supremacy and ascendency is the natural, logical and manifest destiny of this nation. Agriculture, unaided and unprotected, is exporting one thousand millions of surplus as against five hundred millions of all manufactures and other commodities together. We are capable, naturally capable, without artificial aid, without bounties or tariffs of increasing this enormous surplus almost indefinitely. Agriculture is in fact and of right imperial among the industries of the United States. The sphere of agricultural influence extends to the legislation affecting agriculture or the relations of agriculture to other industries of the country, and that influence is, and should be, preponderant."

Extract from address of President McKinley at the Pan-American Exposition, Buffalo, N. Y., Sept. 5, 1901.



HON. JAMES WILSON, Secretary of Agriculture.

WISCONSIN  
FARMERS' INSTITUTES

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A Hand-Book of Agriculture.

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**Bulletin No. 16.**  
**1902.**

A Report of the Sixteenth Annual Closing Farmers' Institute held at Oconomowoc,  
March 18, 19 and 20, 1902.

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"Let us never forget that the cultivation of the earth is the most  
important labor of man."—*Daniel Webster.*

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Edited by GEO. McKERROW, Superintendent



SIXTY THOUSAND COPIES ISSUED.

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*Stenographic Report by Miss Florence Q. Norton, Madison, Wis.*

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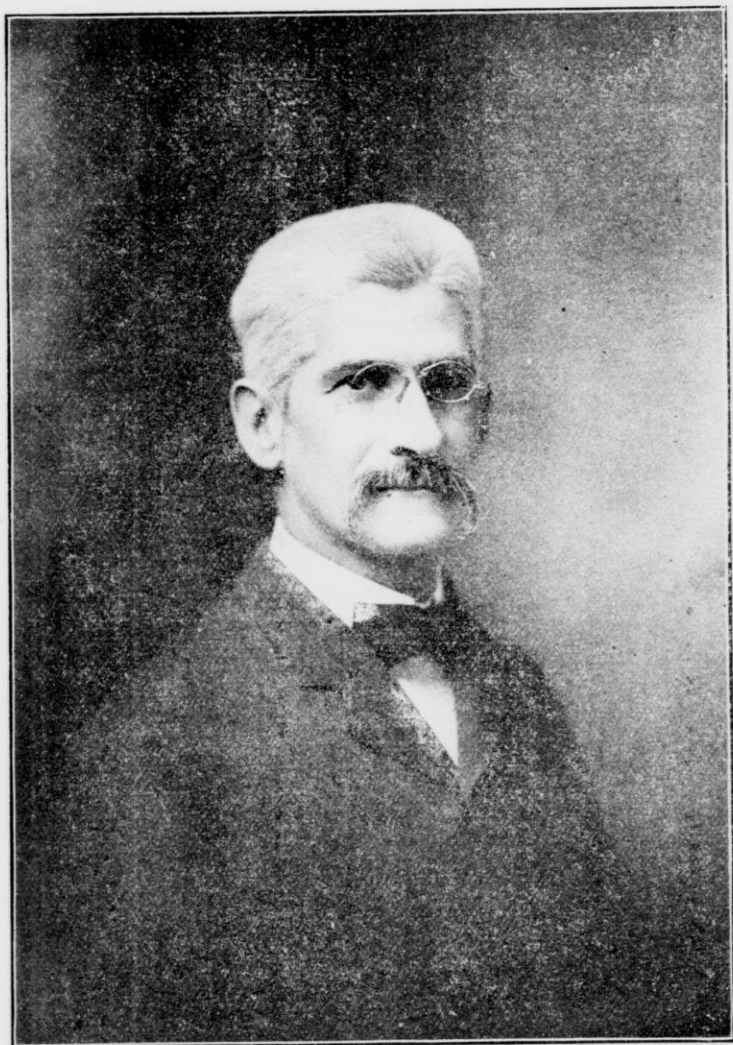


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E. A. BIRGE. Acting President of the University of Wisconsin.

## LETTER OF TRANSMITTAL.

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HON. J. H. STOUT,

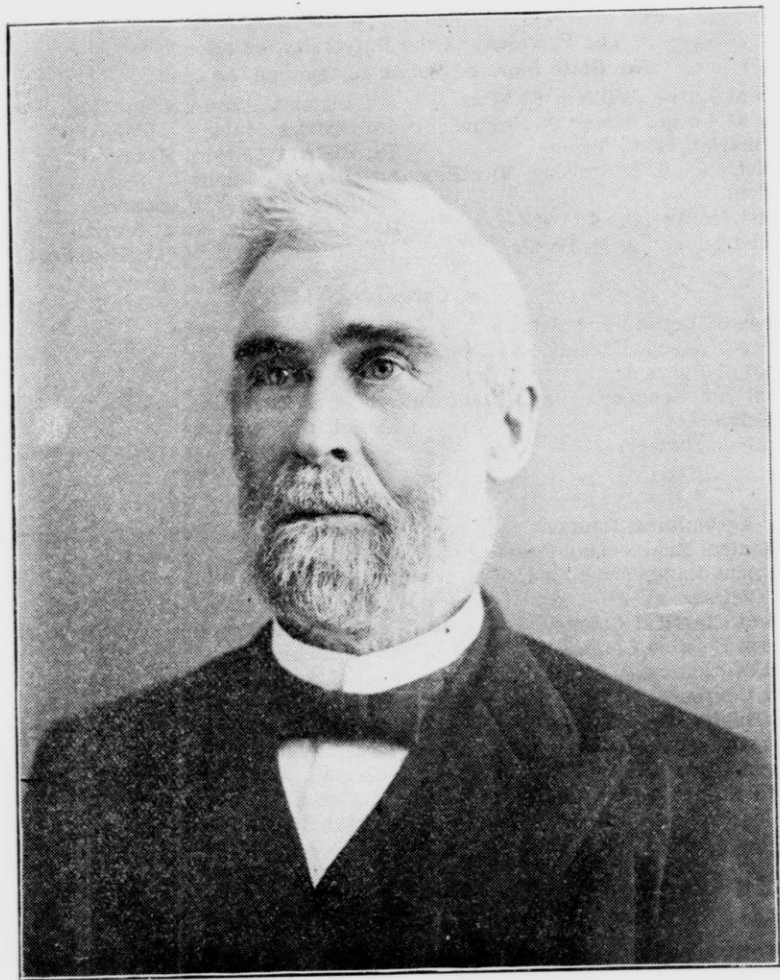
*President of the Board of Regents, University of Wisconsin:*

SIR:—I have the honor of herewith presenting to you Bulletin No. 16, of Wisconsin Farmers' Institutes.

Most respectfully yours,

GEORGE MCKERROW, *Superintendent.*

MADISON, WIS., Nov. 25, 1902.



Late B. S. HOXIE, Evansville, Wis.

Born 1846; died 1901. Sec. State Horticultural Society 6 yrs. Pres. Wis. Forestry Association 3 yrs.

# UNIVERSITY OF WISCONSIN.

## Board of Regents.

The President of the University, *ex officio*.

The State Supt. of Public Instruction, *ex officio*.

State at Large, William F. Vilas.	5th District, Arthur J. Puls.
State at Large, Almah J. Frisby.	6th District, Major C. Mead.
1st District, H. C. Taylor.	7th District, Edward Evans.
2d District, B. J. Stevens, Vice-President.	8th District, James C. Kerwin.
3d District, Dwight T. Parker.	9th District, E. A. Edmonds.
4th District, James M. Pereles.	10th District, George F. Merrill.
	11th District, J. H. Stout, President.

## Colleges.

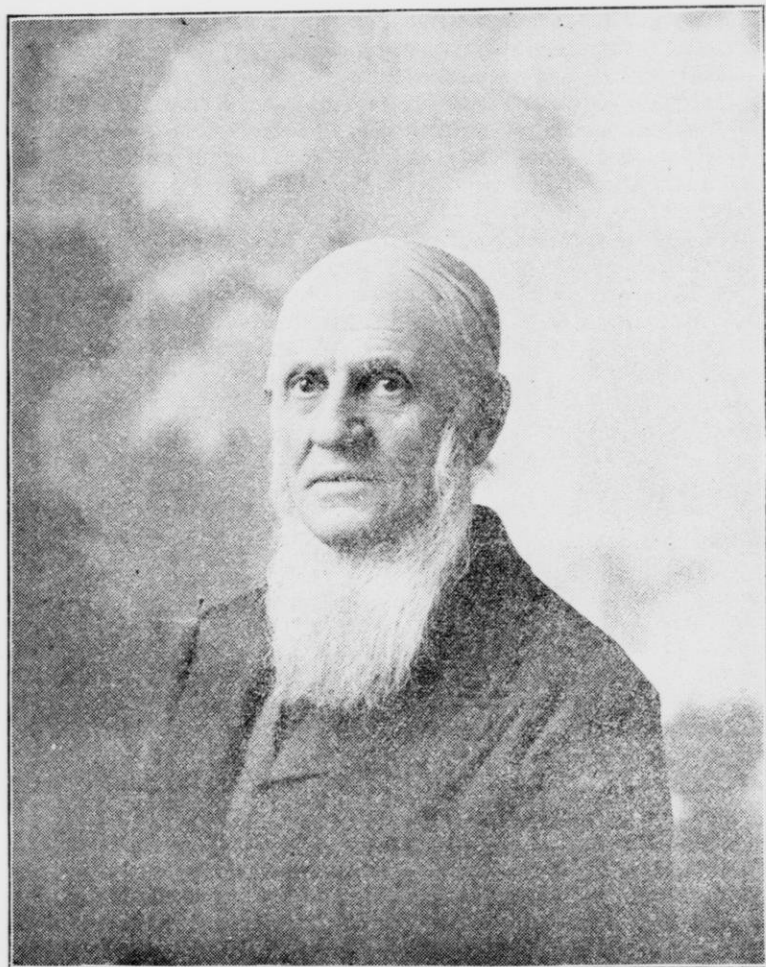
College of Letters and Science.	College of Agriculture.
College of Mechanics and Engineering.	College of Law.
School of Pharmacy.	School of Music.
School of Economics and Political Science.	School of Education.
School of History.	School of Commerce.

## Courses.

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

## 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.



Late F. C. CURTIS, Rocky Run, Wic.

Noted dairyman and agricultural writer. For many years a vice president of State Agricultural Society.

**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.

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

W. D. HIESTAND,  
Registrar.



Barns on Helendale Farm, Athens, Wis., property of Fred Rietbrock.

Cement floors all thro', the connective shed between the 2 barns covers manure vault 60 ft. long. He has about 40 head of pure bred Guernsey cattle, headed by the herd bull Guydette, one of the largest bulls in America, weight 2,000 lbs.



# UNIVERSITY OF WISCONSIN.

## COLLEGE OF AGRICULTURE.

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

GEORGE F. MERRILL, Chairman	Ashland
J. C. KERWIN	Neenah.
H. C. TAYLOR	Orfordville.
DWIGHT T. PARKER	Fennimore.
MAJOR C. MEAD	Plymouth.
DEAN E. A. BIRGE, Acting Pres. 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. P. SANDSTEN	Horticulturist.
W. L. CARLYLE	Animal Husbandman.
H. L. RUSSELL	Bacteriologist.
E. H. FARRINGTON	Dairy Husbandman.
A. R. WHITSON	Agricultural Physicist.
U. S. BAER	Cheese Instructor.
R. A. MOORE	Agriculturist.
T. F. MCCONNELL, JR.	Assist't in Animal Husbandry.
E. G. HASTINGS	Assistant Bacteriologist.
F. J. WELLS	Assistant in Agr. Physics.
F. CRANEFIELD	Assistant in Horticulture.
L. H. ADAMS	Farm Superintendent.
IDA HERFURTH	Clerk.
DAISY G. BEECROFT	Librarian and Stenographer.

### Farmers' Institutes.

GEORGE MCKERROW	Superintendent.
NELLIE E. GRIFFITHS	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 meetings are for practical instruction and conference on all matters pertaining to the farm and farm life, and at them 60,000 copies of the Farmers' 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 *George McKerrow, Supt., Madison, Wis.*



WISCONSIN FARMERS' INSTITUTES FOR 1902-1903.

Arranged by Counties.

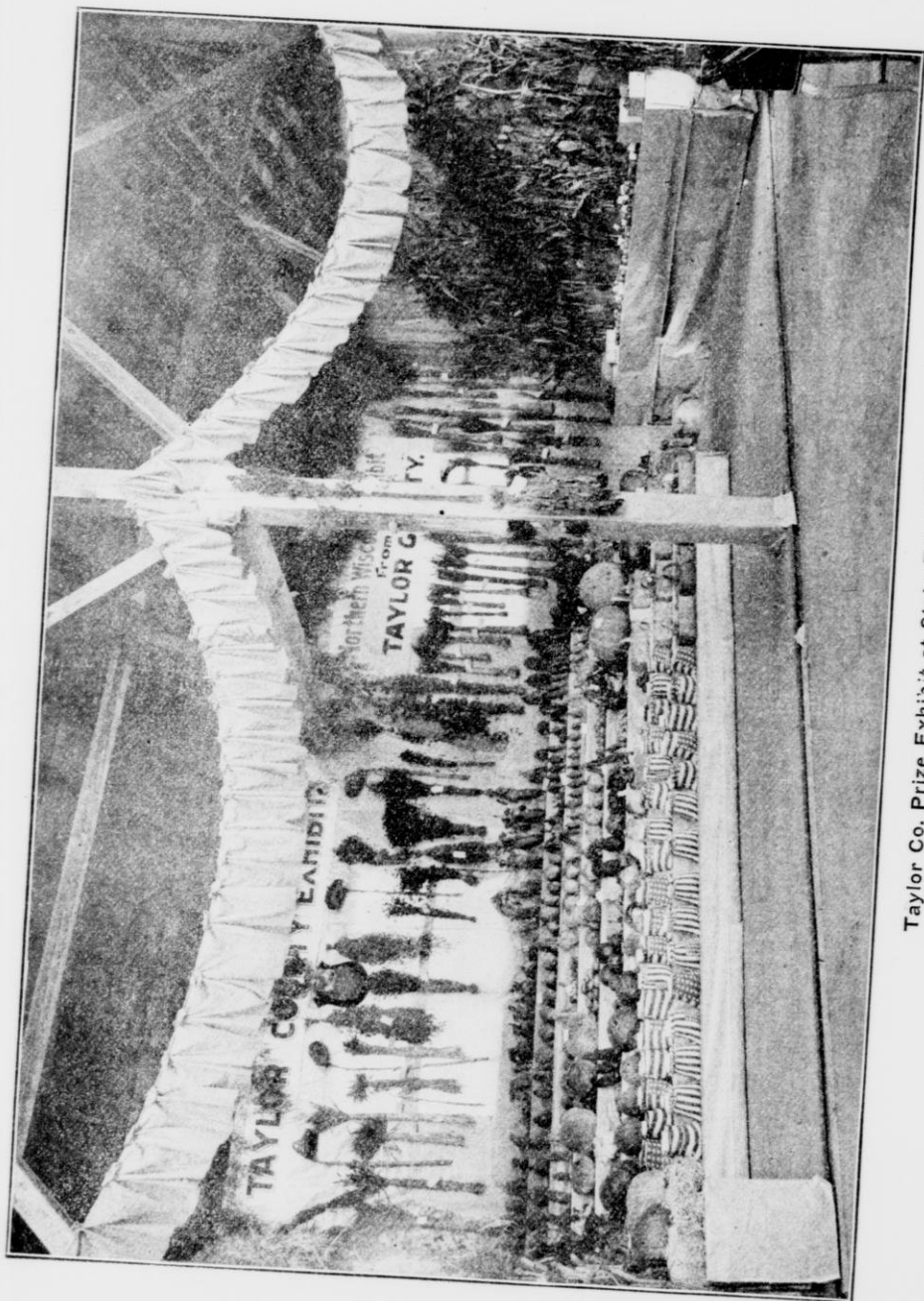
County.		County.
Adams.....		Marinette.....
Barron.....	Big Spring, Leola.	Marquette.....
Brown.....	Barron, Prairie Farm.	Milwaukee.....
Buffalo.....	Greenleaf, West DePere.	Monroe.....
Calumet.....	Cream, Mondovi, Nelson.	Oconto.....
Chippewa.....	Stockbridge.	Outagamie.....
Clark.....	Eagle Point, Stanley.	Ozaukee.....
Columbia.....	Dorchester, Neillsville, Withee.	Pierce.....
Crawford.....	Pardeeville, Poynette.	Polk.....
Dane.....	Steuben.	Portage.....
Dodge.....	Rockdale, Waunakee.	Price.....
Door.....	Brownsville, Reeseville.	Racine.....
Dunn.....	Valmy.	Richland.....
Eau Claire.....	Eau Galle, Fall City.	Rock.....
Fond du Lac.....	Brackett.	St. Croix.....
Grant.....	Eden, New Prospect, St. Cloud.	Sauk.....
Green.....	Hazel Green, North Andover.	Shawano.....
Green Lake.....	Stewart.	Sheboygan.....
Iowa.....	Berlin, Kingston.	Taylor.....
Jackson.....	Rewey.	Trempealeau.....
Jefferson.....	Merrillan, Shamrock, Taylor.	Vernon.....
Juneau.....	Palmyra.	Walworth.....
Kenosha.....	Mauston.	Washington.....
Kewaunee.....	New Munster.	Waukesha.....
La Crosse.....	Algoma.	Waupaca.....
La Fayette.....	Bangor.	Wausara.....
Lincoln.....	Darlington, South Wayne.	Winnebago.....
Manitowoc.....	Irma.	Wood.....
Marathon.....	Edwards, Kellnersville, Valders.	
	Bevent, Hamburg.	
		Harmony Corners.
		Montello, Oxford.
		Brown Deer.
		Norwalk, Portland, Tomah.
		Little Suamico, Mountain, Oconto Falls.
		Dale, Stephenville, Welcome.
		Belgium Station.
		Ono, Spring Valley.
		Luék.
		Custer.
		Prentice Junction.
		Raymond.
		Excelsior, Lone Rock, Twin Bluffs, Yuba
		Newark.
		Hammond, Star Prairie.
		Merrimac.
		Shawano.
		Cascade, Weedens.
		Medford.
		Arcadia, Osseo, Trempealeau.
		Dilly, LaFarge.
		Town of Bloomfield, School Districts
		4, 5, 6 and 8.
		Hartford, West Bend.
		Delafield, Menomonee Falls, Monches.
		Iola, Marion.
		Hancock, Mt. Morris.
		Omro.
		Marshfield (Closing Institute).

INSTITUTES WITH DATES AND CONDUCTORS.

DATE.	W. C. BRADLEY, Conductor.	L. E. SCOTT, Conductor.	R. J. COE, Conductor.	H. M. CULBERTSON, Conductor.	F. H. SCRIBNER, Conductor.
December.					
9-10	Little Suamico	Algoma	Oconto Falls	Bevent	Welcome.
11-12	Harmny Cor'ers	Valmy	Mountain	Marion	Shawano.
16-17	Luek	Custer	Dorchester	Star Prairie	Irma.
18-19	Barron	Withee	Prentice Junction	Prairie Farm	Hamburg.
January.					
6-7	Dale	Weedens	Stockbridge	Valders	West DePere.
8-9	Edwards	Kellnersville	Greenleaf	St. Cloud	Stephensville.
13-14	Ono	Cream	Fall City	Eagle Point	Arcadia.
15-16	Nelson	Trempealeau	Spring Valley	Eau Galle	Taylor.
20-21	Berlin	Montello	Brownsville	Big Spring	Hancock.
22-23	Mr. Morris	Laola	Omro	Kingston	Medford.
27-28	Iola*	Stauben	Excelsior	Lone Rock	Rewey.
29-30	Stanley*	LaFarge	Twin Bluffs	North Andover	Hazel Green.
February.					
17-18	Mauston	Hammond*	Ossau	Tomah	Merrillan.
19-20	Oxford	Neillsvil.*	Mondovi	Shamrock	Brackett.
24-25	Norwalk	Portage	Bargor*	Dilly	Yuba.
26-27	Portland	Rockdale	Pardeeville*	Merrimac	Waunakee.
March.					
3-4	New Munster	South Wayne	Delafield	Darlington	Palmyra.*
5-6	Raymond	Stewart	Menomonee Falls	D. 4 & 5 Bloomfield	Newark.*
10-11	Monches	New Prospect	Brown Deer	Reeseville*	Belgium Station.
12-13	Hartford	Eden	Cascade	West Bend*	D. 6 & 8 Bloomfield

\*Cooking school held in connection with Institute.  
Seventeenth Annual Closing Institute, Marshfield, March 17, 18, 19, 1903.  
All inquiries relative to Institutes will be promptly answered.

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



Taylor Co. Prize Exhibit at State Fair, 1902.

PROCEEDINGS  
OF THE  
SIXTEENTH ANNUAL  
**CLOSING FARMERS' INSTITUTE**

HELD AT  
**OCONOMOWOC, WIS., MARCH 18, 19, 20, 1902.**

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The meeting was called to order by Superintendent McKERROW. Conductor H. M. CULBERTSON in the chair.

Invocation by Rev. D. C. Garrett, of Oconomowoc.

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**ADDRESS OF WELCOME.**

G. Meissner, Mayor of Oconomowoc,  
Wis.

It is a very pleasing task which to fulfill I have been honored with by our citizens, to extend to every one of you a hearty welcome.

Judging from this large assembly and from the fact that we have been honored with the Closing Institute, it seems to me that we must have been successful in entertaining you last year, and, this being true, rest assured that we will do also this year all there is in our power to make your stay here a pleasant one and to make you feel home-like.

Your close attention to all pertaining to Institutes is very commendable and highly appreciated and gives us the assurance that you are progressive and public-spirited people, who never lose a chance of adding to their stock of knowledge and give of the same and



G. Meissner.

of their experience to their, in this respect, needy and wanting neighbors.

It is with your occupation like with any other, the more a man knows of his trade, profession, art or science, the more hungry he becomes for more knowledge and skill; the more interest he takes in his vocation and the more satisfied he is with the same, and if you can accomplish the latter,—to be satisfied with and be happy in your vocations as farmers, and, more especially, if you can elevate your daughters and sons to such a high standing, you will have made the farmer what he ought to be,—the most looked up to and the most independent person in the universe, and this should be your ambition.

In order to advance to such a high standing, the love and interest for farming must not only be impressed upon the child by his parents as soon as he takes notice of his surroundings, but as early as practicable farming must be taught in your schools; there the love and interest for the same must be developed, and there are many ways of doing it, if you engage the proper teaching for this purpose; but house or family and school must work hand in hand in order to be successful.

After your boys have learned of the advantages the farm offers, they will not feel so much like going to the cities and enter into sharp competition with shrewd business men, fretting and worrying away the best years of their lives with many a chance of being swamped, nor will they feel like going to the gold mines and dig for mineral gold, while they can raise the vegetable gold; for instance, the golden wheat and yellow corn, and many other paying products with more ease and pleasure at home.

How may it swell a farmer's breast to look around and down upon the whole animal and human kingdom and to know and to feel that both of them are depending upon him! And what a

power you hold in your hands! Suppose you would lock your granaries and store rooms for some weeks only, —both man and beast would have to perish.

But away with such thoughts,—we would not like to see you do this, we are fully aware of the fact and are glad of it and thank you very much for it, that—You feed us all!

## RESPONSE TO THE ADDRESS OF WELCOME.

Supt. Geo. McKerrow, Madison, Wis.

Mr. Mayor, Citizens of Oconomowoc —On behalf of the Farmers' Institute workers and the farmers from outside districts who are here in attendance at this meeting, I wish to thank you for your words of welcome, and the words of wisdom, which we may well ponder over. I wish to thank you for placing the farmer upon the high pinnacle which you have, and we will endeavor while here in your midst not to lower ourselves in your estimation and to keep the good standing and high position where you have placed us.

Now, we are here for business; we are here to follow out the program which you have in your hands, and to draw from this program all the practical knowledge bearing upon our line of work that we can. Therefore, I will say to you all that in order to make this meeting a success we depend upon all of you, and without your aid it cannot be a success.

We will now take up the regular work of the morning. I am pleased to say that the city has furnished us an excellent orchestra which will give us some music to break up the monotony of our hard work.

Thanking you again, Mr. Mayor, we will proceed with our work for the morning.

The Chairman appointed Committee on Resolutions as follows: C. H. Everett, Racine; L. E. Scott, Neenah; Thos. Convey, Ridgeway.

## THE CHICKEN ON THE FARM.

C. A. SMITH, Knapp, Wis.

Mr. Chairman, Ladies and Gentlemen:—Doubtless you have heard of the proverbial fondness of a Methodist preacher for “yellow-legged” chickens. That undoubtedly explains my presence here today, not to feast, but to tell some of the things I know about chickens.

My predecessors have covered the ground pretty thoroughly in the Bulletins issued, so the scope of my talk is necessarily limited.

thoroughbred poultry are tender, yet I have never found this to be the case. Imagine a man trying to run a successful dairy farm on this line. Supposing the choice is two of each of the popular dairy breeds, Guernsey, Jersey, Ayrshire and Holstein. Turn into one common feed-lot, with the same care and feed. Let them propagate their species and then after about a half dozen out-crosses imagine their owner to say: “There’s no money in



Mr. Smith and one of his choice birds.

## Advantages of Pure Bred Poultry.

I wish, in the first place, to emphasize the advantages of keeping pure-bred or thoroughbred poultry.

The improvement so generally noticed in all farm stock is sadly wanting in the line of our poultry. Mongrel bred poultry is the rule rather than the exception on the average farm, owing to the mistaken notion, I suppose, that

a dairy farm.” Who would expect it? Certainly no one. Yet this is largely the course that is pursued with poultry, and cattle will stand such treatment better than hens, because we treat cows more or less as individuals, while the flock of hens is treated as a unit.

To make a success of a flock of poultry, we must have as near as possible these conditions:



**First. Similarity of Temperament.**—A Brahma and a Leghorn are as much different in this respect as a Shorthorn and a Jersey or a Clydesdale and a roadster; one is phlegmatic, the other highly nervous and excitable.

**Second. Similarity of Appetite.**—To get eggs from a hen she must be just in the proper condition of flesh, neither too fat nor too lean. In either of these states she is not in business form. The Brahma has a strong tendency to fatten. The Leghorn is all nerve and will stand heavier feeding. In a mixed flock, some get too much, while some too little.

**Third. Similarity of Age.**—Adult hens and pullets will never do well together. The one having her growth completed needs only food to supply waste tissue and to produce eggs. The other needs enough to supply waste tissue, to produce eggs, and to grow her frame.

Better mark your chickens with a punch, so as to tell their age. Pullets give a very much greater profit as egg-producers than hens. Yearling hens come next. Either do better when separate than when allowed together.

Now, if even pullets and yearling hens do not go well together, how about the average flock on the farm, composed of birds all the way from late fall-hatched up to the patriarchs of the flock, that even a butcher feels a twinge of conscience to call "spring chickens." Judging by the apparent age of some specimens I have seen, Noah during the time of the deluge must have had several first-class incubators in operation. Never, as a rule, keep a hen longer than the second season. Put her on the market in July or August, just before she begins to moult. The market, as a rule, is higher then than later on and the hen is about through her season's production.

The first two points I have mentioned are only possessed by a flock of thoroughbreds or high-grades. Besides, nearly all admire the beautiful, and what is more pleasing than a flock

of poultry as nearly alike as two peas? I doubt if anything is even gained by one cross, for if we are after any particular line in poultry, our standard bred varieties are so numerous one can be found to just suit our needs.

If you feel you cannot invest in a trio of thoroughbred fowls or in a couple of settings of eggs, then after choosing your breed, purchase, say every second year, a thoroughbred male to head your flock. You can mate him to his own pullets, but don't in-breed more than one year; get a new male then. Don't under any circumstances use one of the grade males, for the moment you do you deteriorate. Every breeder of thoroughbred fowls has males off in some fancy points, such as color of the eye, etc., that are as good as any for crossing purposes, he will sell very reasonable.



A pen of Mr. Smith's Winners.

#### Proper Housing Important.

Then see that these birds are properly housed. The best house is the scratching shed house, built on an elevated spot, with a southern exposure, as near air-tight as possible; no top-ventilators by all means. It should have at least a head-air space of four inches and not too much glass surface.

A very neat and convenient arrangement for roosts is to make a platform to catch the droppings, say four or five feet wide, and as long as desired, about thirty inches above the floor, not too high, as jumping down too far is a fruitful source of Bumble-foot. Then set the roosts on benches about eight inches above these dropping boards. For roosts use two by fours, flat side down. Never use a sloping roost arrangement, as it results in a continual battle to see which will occupy the seat of honor—highest up. Don't use poles, as you will have crooked breast bones.

#### Feed.

For feed give plenty of grit, charcoal and fresh water once a day in winter and twice, or oftener in summer. Feed for morning a mash composed of cut-clover or clover chaff, ground corn, ground oats and bran. Steam the clover over night, about one quart to a dozen hens, then in the morning mix one quart of equal parts of the ground corn, ground oats and bran. Feed only about one-half what they will eat, then afterwards scatter some millet seed—about one gill to a dozen hens—in the litter in the scratching shed.

Keep the hens busy scratching all day, working in the litter, but see they have enough to fill their crops at supper. Feed all grain in the litter. Feed a variety of food. Cabbages, mangolds occasionally, are excellent. Green cut bone is the greatest egg-producing food, about one ounce three times a week to each hen. If skim milk is fed, feed in curd form.

#### Vermin.

Keep your fowls free from vermin. Provide a dust bath; paint the dropping boards at least twice a year with some good liquid lice killer; white-wash the house twice a year, spring and fall. If mites ever get in the house take everything out, for in a well-regulated poultry-house everything is movable. Spray it

well with kerosene emulsion made as follows: One pound soap well shaved in one gallon water. Bring to a sufficient heat to dissolve the soap. Remove from the fire and add one gallon kerosene. Agitate thoroughly until of the constituency of cream. A spray pump is an excellent agitator. You can now add ten or twelve gallons of water. Use this mixture to spray house and everything thoroughly. Repeat in ten days to get the nits. Spraying with a liquid lice killer I consider more efficacious but more costly.

#### Setting the Hens.

Every poultry place should be provided with a hatching pen, separate by itself, in which to set the hens when they become broody. Let them remain on their usual nest for a couple of days; then after night remove to their new quarters. Place a "dummy" setting of eggs under her, make her nest box dark by means of a gunny sack or board, place feed and water before her, when she comes off see she goes back on; if necessary fasten her on, and in a couple of days she will get down to business and will become as firmly established as a mule that doesn't want to draw.

Now dust her thoroughly with some good insect powder. I use Lambert's "Death to Lice." Three days before she is due to hatch, dust her again. It won't hurt the eggs nor chicks.

Should an egg become broken in the nest, wash the smeared eggs in tepid water, clean out the nest from the broken egg and place them back again. Eggs smeared over with broken egg are hermetically sealed and will not hatch.

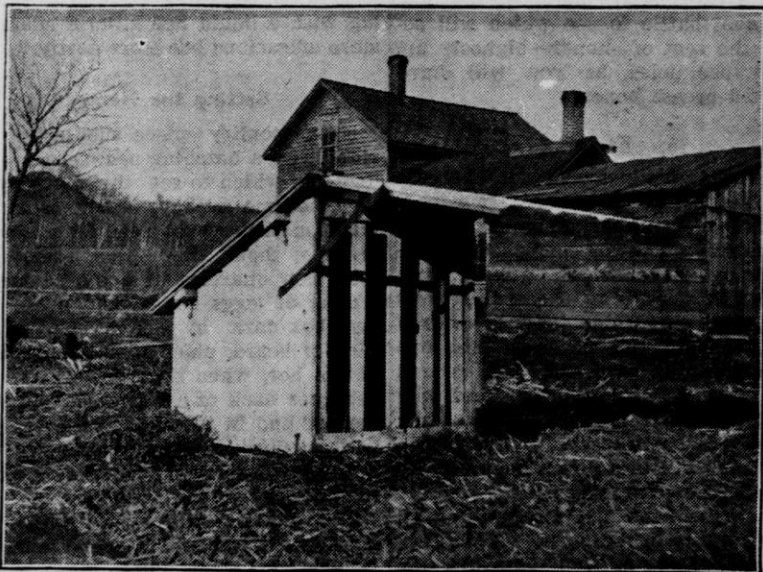
#### Care of Young Chicks.

Leave the chicks in the nest for twenty-four hours, thirty-six hours won't hurt, then remove and feed small grit and water. In a little while after feed some dry bread steeped in sweet milk and squeezed dry. Some advo-

cate hard-boiled eggs. I do not find it necessary. I like a Johnny-cake made as follows: One pint water, two eggs (infertile), one-half teaspoonful salt, one-half teaspoonful saleratus, corn meal to thicken. Dissolve salt and soda in the water, add the milk. Stir well and add meal and bake.

This Johnny-cake will crumble fine. Recipe is enough for one hundred chicks. Do not bake any more than

Top is movable so as to clean readily. Hen is kept in by lath gate; front hood can be set at any angle to keep out sun or rain; it can be laid clear back to admit sunlight; it fits against top with a mitre joint; it is hinged to top; top is held in place by screw eyes and hooks; hood fastens down at night and is fastened by screw eye and hook. The half-inch cleat on the inside gives ventilation. Material is novelty sid-



Coop as Described.

will last for two days, as it may become sour and that is fatal to young chicks. They can be fed this three times a day, up to three or four weeks old, when cracked corn, cracked wheat and wheat screenings may be substituted.

#### Description of Coop.

I find it best to keep the mother hen confined in a coop and I have found this style of coop the best I have ever seen. Here is a photo of the coop. Dimensions are:

Bottom 2 ft. x 18 inches.

Rear 12 inches high.

Front 21 inches high.

ing or matched flooring. When painted and put up, after using they will last for years. They are rat-proof and storm-proof; cost about one dollar each, but will more than pay for cost in the extra chicks saved.

Before placing in coop, grease the head and neck and fluff of the old hen; watch out for head lice on the chicks. Use sweet oil or lard, mixed with Lambert's "Death to Lice" on the heads; apply very lightly and remember about five drops of pure grease will kill the chicks and I suppose the lice at the same time.

## DISCUSSION.

Mr. Matteson—Do you think it is really necessary to use this lice killer, don't you think that kerosene is just as effective?

Mr. Smith—No, sir, not as effective, because with kerosene you must give every louse a personal application. If you don't get it on, it won't kill. If you use a liquid lice killer within six inches the fumes will penetrate and kill where you cannot get the kerosene.

Mr. Matteson—Do you think that those fumes are more or less injurious to the poultry?

Mr. Smith—No, sir.

Mr. Matteson—It is my experience, where used as recommended, that the kerosene is far more penetrating than the liquid lice killer and the cost is but one-eighth.

Mr. Smith—Kerosene is not more penetrating than liquid lice killer, because the base of the lice killer is kerosene, crude petroleum. It is more penetrating and so far as hurting my fowls is concerned, and I have some birds which are very valuable to me, some that I would not take a good sum of money for, I have never had an adult fowl injured.

Question—How is carbolic acid mixed with kerosene oil?

Mr. Smith—It is a very good disinfectant. It is in favor, but it won't kill the lice with the kerosene any better than pure kerosene alone. It is a pretty good disinfectant.

Mr. Potter—Is there any advantage in a common farmer keeping fowl over a year old?

Mr. Smith—No, I do not think so. If he can hatch out enough early pullets to do it, keep the pullets and kill off the rest of the fowls.

Mr. Potter—Won't he make more out of the early hatched pullets than out of fifty kept on the farm?

Mr. Culbertson—The question is to get the pullets to laying early,—hatching early. With the American breeds we must have them hatched out in

March or April. This is the reason the Leghorn has gained a wonderful reputation in Wisconsin as an egg-producer. She matures about two months earlier than the American breeds,—gets her adult plumage before cold weather and is in shape to lay. If we have larger birds we must get them well matured before cold weather.

Question—Would you feed raw corn meal?

Mr. Smith—You had better make Johnny-cake. You can feed raw food, but be very careful. You should moisten it. If the chicks are fed outdoors, it will blow away and will get wasted if not moistened. If you moisten it, moisten it very little. I prefer to bake it.

Question—Won't rolled oats and bread crumbs, equal parts, do as well? I have used this for a number of years. We save the crusts and put them through the bone-cutter.

Mr. Smith—Up in our country we have to eat the crusts and we do not have enough to go around.

Mrs. Vincent—We want to save the farmer's wife the work of baking the Johnny-cake when we have so much other work. I want to know whether it is safe to feed the chickens after they are two or three weeks old a mixture, either with water or sweet skimmed milk, and of course I do not ever approve of mixing more than they want at once.

Mr. Smith—I mentioned that in my paper. Feed Johnny-cake three weeks. I think you will have better results to cook your food for that time, and then you can begin to feed it raw.

Mrs. Vincent—Have you ever fed millet seed to young chicks?

Mr. Smith—It is an excellent food, but remember that it is very rich in protein and we want to feed it very carefully,—not feed too much to our young chicks,—feed very sparingly for a while, while they are real young.

Mrs. Howie—We have had the best results with our young chicks by feeding rolled oats. This is rather ex-

pensive if you feed the best quality of rolled oats, but nearly every grocer will have some damaged rolled oats (not so badly damaged that the chicks will not appreciate them) and they will make a very much better food for the young chicks. They will appreciate them. I found that out some years ago, and I now frequently take a handful of the rolled oats that are damaged and put it where the chicks can get it. You can get it reasonably if you can buy it at all.

Mr. Smith—That is a very good point, Mrs. Howie. I would sooner have steel-cut for young chicks.

Mr. Buskirk—In white-washing your hen-houses, would you recommend carbolic acid,—a little in the white-wash?

Mr. Smith—A very good recipe is that used for the government buildings. It does not rub off so readily and you do not get your clothes white.

Mr. Buskirk—Can you give the recipe?

Mr. Smith—I cannot give it here.

Mrs. Tilson—Are you in sympathy with the experiment station work of the country, Mr. McKerrow, and do you accept the results of the United States government experiments?

Supt. McKerrow—Certainly.

Mrs. Tilson—Their decision is that we should make our own insecticides. We can make the insecticides as well as the poultry "foods."

Mr. Matteson—Under what title is this information given?

Mrs. Tilson—U. S. Gov. bulletin entitled "Insecticides," No. 146.

Mr. Smith—If they go against Lambert's "Death to Lice," they are against my experience.

Mrs. Tilson—They give the constituents of Lambert's "Death to Lice" and an unfavorable mention.

Mr. Smith—Vermin are the greatest enemies that we have to contend with in the successful keeping of poultry. We must have aids.

Mr. Matteson—I agree in regard to Lambert's "Death to Lice." I have used it for fifteen years, but I have

never recommended it for a setting hen, during incubation. The tendency is to smother the embryo chick within the egg. I have never recommended this during incubation.

Mr. Smith—You remember at Knapp we had a discussion on that point. I got some men to experiment with me, one was Mr. Jackson, of the Dunn county asylum, and we tried that and we are absolutely sure that Lambert's "Death to Lice" will not hurt the egg one particle during the period of incubation.

Mr. Matteson—It has ruined a great many eggs for me. In my experience it has. It blights the embryo chick.

Supt. McKerrow—As the doctors disagree, I wish Mrs. Tilson could give a government recipe,—something that would do the same work.

Mrs. Tilson—I could not give anything off-hand, but will send you a note.\* The government publication says that Lambert's "Death to Lice" is a fraud for the reason that you are paying twenty-five cents for something which is worth only one-third of that. One thing which I have used successfully is a very little sulphur, a level

\*U. S. Bulletin 41 says a dust bath for fowls, with kerosene on perches and whitewash and thoroughness for house, are the most approved remedies for parasites.

A Florida experiment station bulletin says apply to all parts of house hot carbolic acid solution, one of acid to twenty parts water, or whitewash with one pound chloride of lime added to four gallons of wash, or kerosene emulsion. Upon the thin skin of young fowls only bland substances are permissible, like Persian insect powder, lard or cottonseed oil. In the case of old fowls, a little sulphur or kerosene may be added to grease, or a 5 per cent. solution of creolin used. Scald out nests and small coops.

I will add that the following are excellent deterrents in nests: onion skins, tobacco trash, wormwood, tansy, elder or cedar sprigs.

teaspoonful in the nest. It never did any harm whatever. But I would clean the hen and the nest before I began. I know kerosene will interfere in hatching.

Supt. McKerrow—We will ask Mrs. Tilson to get that recipe that is as good as Lambert's.

Mr. Smith—Mrs. Tilson, when you found that kerosene hurt the eggs, was it from the effects of the fumes, or was it from contact?

Mrs. Tilson—More particularly from contact.

Mr. Smith—Yes. I have used liquid lice killer occasionally, but my box was deep with hay and it never interfered with the hatching of the eggs. I took care not to have it come in contact with the eggs.

Mrs. Tilson—I am very economical, you see. I make my own lice killers. I never try too many experiments. Lice killers will sometimes kill fowls. I

never tried to see whether they would destroy eggs.

Mr. Hill—Have you ever heard of using moth balls in the nest with the setting hen? I tried it last summer very successfully.

Mr. Smith—It is recommended, and I have seen it published where a hen ate a moth ball and committed suicide.

Mr. Buskirk—Would you recommend putting eggs into warm water to make it easier for the chicks to break the shells?

Mr. Smith—A hen left to herself will get off her nest very early in the morning when the air is cool. She has those heated up to 103 degrees or 104 degrees. She gets off the nest and the cool air coming in contact with the warm eggs causes the moisture to precipitate and this moistens them sufficiently without any additional moisture.



## A POULTRY OUTFIT.

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



Mrs. Tilson.

**Cost.**

If the grain a hen eats in a year is measured, it will be found to be about a bushel, but this need not all be expensive wheat. In addition, she will need considerable green food, bone and grit. The yearly cost of a hen's board, East, runs from seventy-five cents to one dollar. The Utah Station and my own accounts give sixty cents for the West. To get at cost, a poulterer cannot watch every pint, but must measure a considerable quantity of grain, etc., and put it in bins, boxes, or barrels by itself. One woman who did so, told me her husband muddled her by feeding the preacher's horse from her hens' portion.

A hen's four stomachs show she is meant for variety of food and bulky food. Nor would the Lord have given her four stomachs to pour slop

through, one stomach, like the pig's, answering that purpose as well as more.

Those who followed the late meeting of the American Poultry Association, at Charleston, noticed a discussion of the weight requirements for fowls, which qualification is advised dropped, because it leads exhibitors to fatten their fowls so they are not as good for breeders, neither in vitality nor number of eggs.

**The Ideal Hen.**

Neither a glutton nor a hungry hen is our ideal, but a compact, active one. A hen to produce a great product, needs an eating capacity, as good cows do. She must show room for food, have length, like Spanish fowls, or depth, like Wyandottes. She should have prominent breast and lungs, pliable neck, and velvety comb, the last indicating a soft skin and good health.

**Corn for Food.**

Corn is the grain which gives most value for its price. It can be fed winter nights, especially in cold locations, to active fowls, and by a skillful feeder who balances its fattening qualities by meat, etc. It was reported that the Amherst, Mass., Agricultural College poultryman said corn was the best grain for poultry. When I got his Bulletin, what he did say was that corn was best for Leghorns. One glance would show you they could be differently fed from lazy Cochins.

**Green Foods.**

Green food colors egg yolks, makes them hatch well, furnishes shells, keeps fowls healthy, and is cheap. Herbs of all sorts, catnip, spearmint, horse-radish, nettle, plantain, dande-

lion, etc., when chopped and added to their pudding, are relished by chicks that would not eat the pungent things clear.

### Protein Foods.

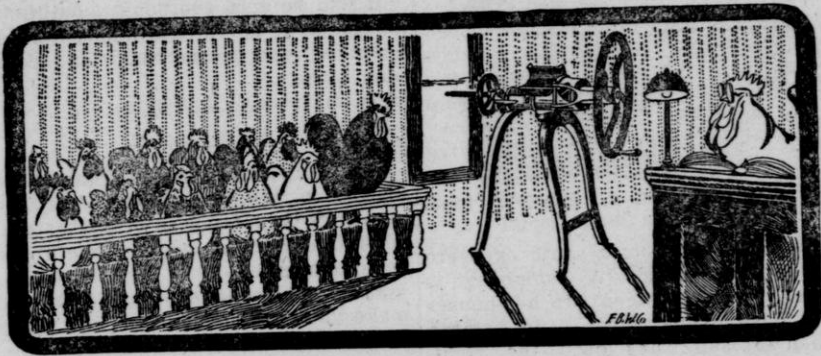
Where meat is not available, some may be glad to have their attention called to the protein foods. A teacup of either bean or linseed meals added to a four quart pudding of mixed grain, furnishes chickens an excellent builder. Beans can be ground at any feed mill, or can be cooked and mashed. Ducks, however, must have an animal builder, like cheese or meat,

### Making Averages.

There are different ways of making averages. Mine are made monthly, each hen counted for each day, or part of a month, present. After half are sold, I do not say those left laid all the eggs. One man, when closely catechised, admitted his total was what the hens would have yielded had every hen done her duty.

### Water.

The old theory that brown eggs are better than white ones is exploded. Individual eggs in the same breed differ



A poultry court declares the bone cutter necessary. (Commercial Poultry).

to agree with their natural fish-eating nature. My hens laid nearly one and one-half dozens eggs apiece in January, aided by a homemade condition powder of mashed beans, Venetian red, (a form of iron), and red peppers of my own raising. This was when "red albumen," that fake of oyster shells and common red clay, was selling at sixty cents a pound.

With large flocks, I have succeeded in getting one hundred and forty-five eggs apiece a year, and that is good work. The only hens I was ever acquainted with that did better were very small flocks, carefully selected, fed on table scraps, petted, studied, etc. But the 200-egg-a-year hen is as possible as the 12,000-pounds-milk-a-year cow.

more, so you can keep the kind of fowls you fancy. The proportion of solids to each other is always about the same with any hen's egg, but she puts in more or less water, as she has it. Like a dairy cow at her normal, which can add flow, but no more richness, so a well-fed hen at her normal can simply add water. It is distilled, flavored water, desired and sold at a high price, an honest watering of stock. Each fowl needs five to eight ounces a day, in dishes easily and regularly cleaned, or she ceases to drink.

### Quarters.

Houses which are comfortable save food bills in winter, from hens not having to turn everything eaten into heat. A house large enough for days is bleak



at night. If snug at night it is crowded days. Therefore, build a good lodging room and a cheaper day affair, a scratching shed or room, according to the protected or non-protected situ-



An important part of "Biddy's" food.

ation. The value of a south exposure I know in figures. A tank-house is south of, but between two hen-houses previously constructed. In winter, when the sun "runs low," the right-hand house is shaded about three hours in late afternoon. The left hand house about an equal time each morning. Repeated trials with thermometer showed whichever house was then in shade was seven degrees to twelve degrees colder than other house.



The plan of my hen-houses.

#### Parasites.

Two divisions of parasites are the main affliction of hens, namely, lice, which are true insects, and mites, of

the spider family. Some lice breed in filth and are scavengers only. Most of them breed on the fowls and many are bloodsuckers. Mites live in roosts, nests, walls, coops, etc., coming out at night to feast on blood, then retiring to their haunts through days. To avoid lice, clean the hens. To avoid mites, clean the house. A shallow box, in a sunny spot, with mellow dust inside, assists the hens in their care of themselves. Every bit of poultry-house furniture should be simple and movable to facilitate easy cleaning, a thing not true of some expensive outfits.

It will be seen the poultry outfit, to be complete, is internal and external, chemical, and mechanical, and common sense.

#### DISCUSSION.

The Chairman—Before taking up the discussion, I want to request that the questions be stated as briefly as possible, that we may use the time to the best advantage.

Mr. Brigham—How large do you make your hen-houses and how many in the house?

Mrs. Tilson—I allow four square feet house room per fowl, and at least half as much shed room. On a farm, fifty fowls is the limit, and twenty-five under village conditions.

Mr. Matteson—Would you recommend a platform under your roost?

Mrs. Tilson—Such a platform permits hens to utilize all the floor space, but should be kept very clean, or it becomes a harbor for insects. To catch droppings I use sand, often removed and renewed, because my hens are not crowded as to room.

Mr. Smith—Should you have a greater surface of scratching room?

Mrs. Tilson—Certainly, have all the scratching room that you can afford.

Mr. Matteson—Would it not be easier to fight the red mites if each box was single?

Mrs. Tilson—Yes. I would not have a nest attached to the house for any-

thing. I would have it so I could take it outdoors. Each perch and everything else should be movable.

Mr. Johnson—How wide do you have the perches?

Mrs. Tilson—Four inches, which permits heavy hens to be comfortable and chickens to roost young without contracting crooked breast-bones.

Mr. Culbertson—How necessary is a protein food for your hens? Will you give us a little explanation along the line of the necessity of protein?

Mrs. Tilson—Protein is the builder of bodies and eggs. I have figured on different rations and have concluded that I want 5.5 times as much carbohydrates as protein. That is the ration in New York which they figured out at Cornell.

Mr. Matteson—For winter or summer?

Mrs. Tilson—For the working winter animal.

Mr. Matteson—You should have a more starchy, heating ration in the winter than in the summer.

Mrs. Tilson—In this climate, more than further south, even in the summer.

Mr. Scribner—Is there any danger of feeding too much red pepper?

Mrs. Tilson—Yes, because it is a stimulant and not a food. Occasionally in the winter I feed red pepper.

Mr. Matteson—Would you not have to be very careful?

Mrs. Tilson—Yes, I would.

Mr. Matteson—Would you feed a very large percentage to young chicks?

Mrs. Tilson—No, rather to the old fowls that need a stimulant.

Mr. Smith—How do you tell when the fowls are stimulated?

Mrs. Tilson—Very much by their action, the way they sing, the way they walk.

Mr. Smith—A fowl in perfect condition does not need any stimulant, does it?

Mrs. Tilson—No, indeed, not any more than I do.

Mr. Stiles—Will milk take the place of food to any extent?

Mrs. Tilson—Yes, but it is thin. It is excellent to use, as a builder, only you cannot count upon its doing the work very rapidly, there is so much water.

Question—What do you think of cottage cheese?

Mrs. Tilson—You must not make it ropy. It must not go above 100 degrees. Made at 90 degrees it is safe to feed to the smallest chick on the farm.

Mr. Campbell—Which is better, sour or sweet milk?

Mrs. Tilson—I prefer sweet to sour, because it does not scour chicks, but when you are fattening fowls, the sour milk keeps up appetite. You must recollect that there is a difference between a fermented sour and a natural fruit acid. Sour milk is a fermented sour and it is apt to be physicking. Sometimes I put in soda and other times I make sour milk into cottage cheese.

Mr. Smith—But you have to be careful in feeding the sour milk to small chicks?

Mrs. Tilson—Yes.

Question—You would recommend cottage cheese?

Mrs. Tilson—Yes, but be sure it is not ropy.

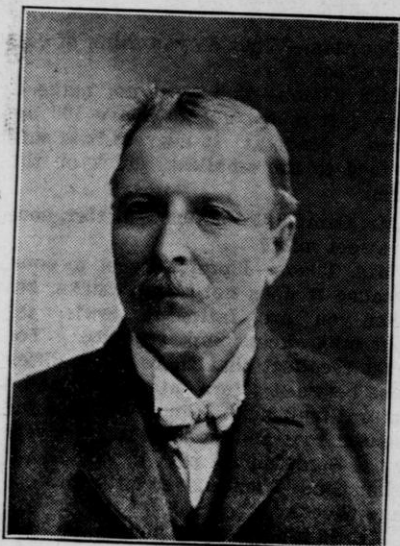
Mr. Smith—What do you think about sweet skimmed milk?

Mrs. Tilson—It is valuable. I have known even that to be too strong for chicks just hatched, and I have had to reduce sweet milk for such chicks. They are better off at first with one-half warm water and one-half sweet milk. Fowls will do well on milk just exactly as you would regulate it for pigs and lambs.

Mr. Matteson—I have fed sweet skimmed milk to chicks for fourteen years,—to young chicks,—with fair results,—good results.

## FARMERS' FRUIT TREES.

T. E. LOOPE, President State Horticultural Society, Eureka, Wis.



T. E. Loope.

I am well satisfied that a large portion of the inhabitants of our state believe that apples cannot be grown successfully in Wisconsin and I am equally sanguine that our state will, in the near future, become an important factor in apple production.

The person who came from New York, or Maine, or any of the eastern states, where they grew the Baldwin, Northern Spy, Seek-no-further, Pippins, or Belleflower, etc., thought they were the only apples worth raising and because they grew indifferently here jumped to the conclusion that Wisconsin could not grow apples.

#### Varieties Influenced by Isothermal Lines.

Did you ever think that varieties could be influenced by isothermal lines? California is a fruit state par excellence, but she cannot grow the

apples mentioned in all their eastern delicious quality; neither can Oregon nor Arkansas. Most apples have their native habitat and are not grown successfully outside of that. The Ben Davis has a wider range of successful production than any known apple, if I am not mistaken.

#### Trees Short Lived in Wisconsin.

Then they say that trees do not live as long here as in the east and prove it by quoting the trees of their boyhood days which grew as large as they could reach around.

That may be true, but, as a modification of that fact, is it not also true that the insect enemies have been imported since those trees were matured and do they not at the present day exert a potent influence upon the newly planted orchards, limiting the life of the eastern trees? Then the wholesale destruction of forests may also act unfavorably to their longevity.

If we cannot raise those old varieties, is it not possible to find varieties which do well in Wisconsin? I think that question can be affirmatively answered by looking at the list I shall mention later.

#### Wisconsin Apples at Pan-American and Other Expositions.

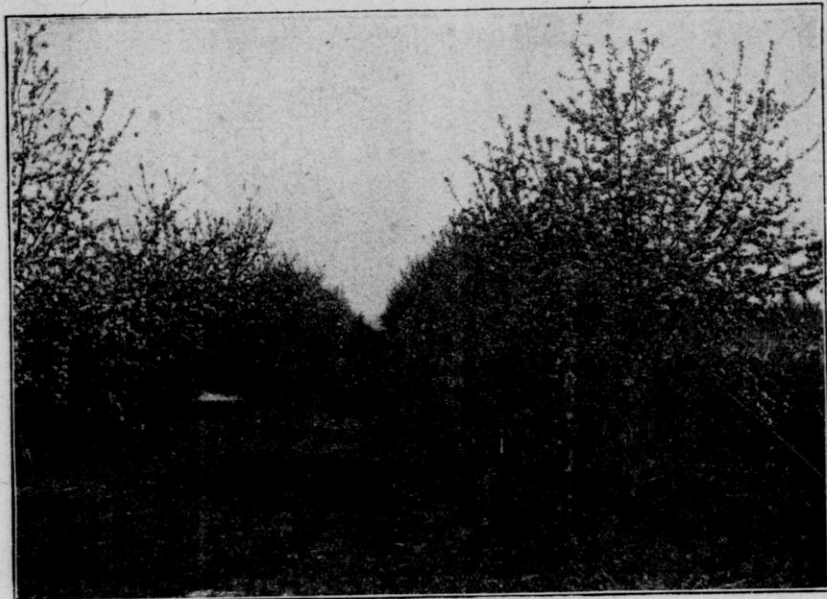
It is most true that we have crucial winters here that sap the vitality of fruit trees, and forest trees as well. One source of failure in fruit trees has been the fact that location and soil have not been carefully considered. This is as essential as in the growing of peas, tomatoes, corn or potatoes. The idea that an apple tree will grow successfully on any ground is fallacious. That we can grow beautiful, glossy-skinned apples has been well proven by the display the state made

at Chicago, Omaha, and at the Pan-American Exposition, where in each case they attracted universal admiration and favorable comment. From the time we opened our exhibit at Buffalo to the closing day, Wisconsin apples held their own against the elaborate showing of the greatest apple-growing states, winning golden opinions from visitors of all parts of our land and golden medals from the Exposition.

tite, for of all drinks hard cider, rank and often bitter, is a nauseous beverage for me. But apples are delicious and never pall upon the taste, be the season harvest or cold winter. How the children love them and that, if nothing else, makes them valuable.

#### Care of Trees.

If the farmer cannot have apples in abundance when he has the space and soil to grow them, then nobody can af-



Longfield Orchard.

#### Apples and Cider.

I need not at this time enter into a discussion of the healthfulness—the aid to digestion and all the dietetic excellence of that King of fruits—the apple, for it is almost, if not quite, a self-evident fact; at least it is an accepted fact.

You all know how that pan of apples and pitcher of cider have come down to us from time immemorial in winter evening stories. I must confess that the cider never appealed to my appe-

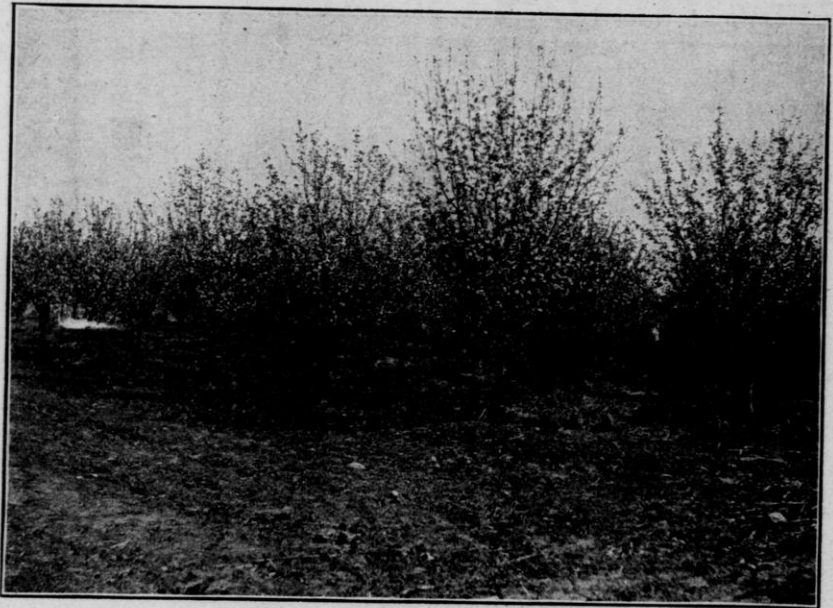
ford them, for he is getting to be the aristocrat in these days of registered cattle, hogs with lofty titles and sheep and horses of princely pedigree, these days of silos and parlor-fitted stables. Groom your apple trees well, blanket their roots, cross their breeds to add to their vitality, dehorn their branches, feed them balanced rations, and then, if they are blue-blooded stock, they will emerge from the frosts of winter like thoroughbreds and gladden your hearts with robes of gorgeous hue,

with heavenly fragrance exhaling like sweet incense from their flower-strewn branches and from the chrysalis dots on every limb when flowers are past emerges at last the perfect heaven-born fruit, whose delectable nectar is food fit for the gods.

A good part of the disbelief of the adaptability of our climate and soil to the production of fruit trees comes from the idea that when once planted

succeed and add to his secret belief that he is a wise and shrewd being.

First select your trees with care, having in your list the varieties to cover the longest season possible. Dig large holes two to three feet in diameter, at least large enough to accommodate the roots, and deep enough to place them three to six inches lower than they were in the nursery row. Trim the broken and bruised



Duchess Orchard.

a tree should grow and produce fruit without further care or attention on the part of the farmer. This may be true of weeds but not of fruit trees.

#### Common Sense Necessary in Planting an Orchard.

The farmer in planting trees to furnish fruit for himself and family, should take, before he commences, a long draught of common sense and use it as he would in raising cattle or hogs or corn. If he will do this he can

roots, leaving all small fibrous roots possible. The top must be cut back to balance the roots. Place the tree in the hole upright and fill in some good top soil, straightening out the fibrous roots and pressing the dirt firmly about them, leaving no vacancies in any place. Fill and firm the soil as you go till the hole is filled somewhat higher than the surrounding earth. Having done this much well, the farmer has usually prided himself on having performed his whole duty, but this is a great mistake. He

naturally supposes that bounteous nature will do the rest.

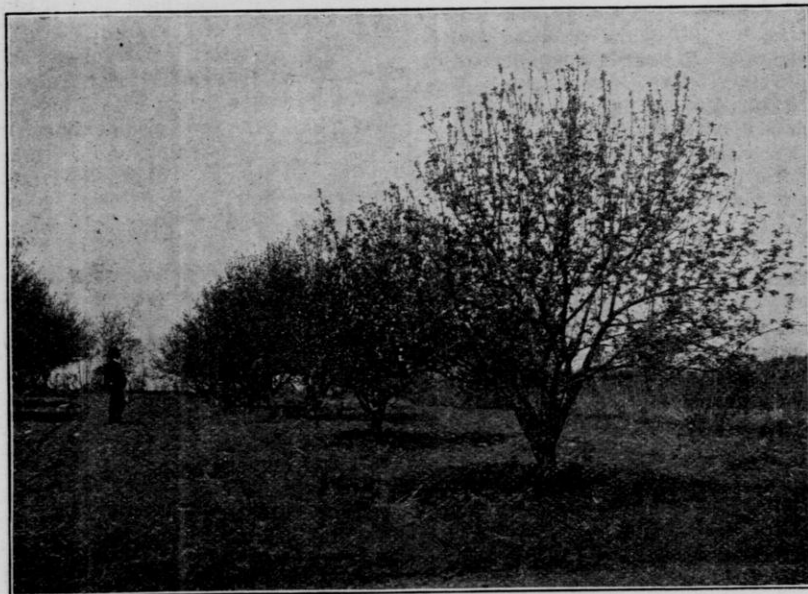
#### Enemies of Fruit Trees.

You must remember that mice, rabbits, the scale, curculio, Codlin moth and negligence are abroad in the land, seeking whom they may destroy. Weeds grow even among trees, grass

on a sheet and pinch his head. If you persevere, as you must, you will have the gratification of having fruit for yourself and family. What I have said of planting apples applies to plums, cherries and all fruit trees.

#### Beware of "Tree Sharks."

In buying fruit trees, go to your local nursery, or to some man you know



Wealthy Orchard.

imbeds itself about them, insect life stands ready to get in its work. You must protect them from mice and rabbits by putting on protectors made of lath or other material; you must cultivate the ground to protect them from grass and weeds; you must prune them judiciously to make them shapely and favor formation of fruit buds; you must watch for signs of the borer and kill him when you find him.

If a tree dies, as trees often do, replace it. Spray in spring according to well-established usage; thump your trees in June and catch the curculio

who is selling fruit trees and has an honest reputation. The tree shark infests the country and has an insinuating manner and a smooth tongue. He sells you any variety you select from one bundle at double the price your home nurseries ask. Beware of the man who offers to plant and care for your orchard for five years. He charges a dollar a tree, replaces the trees that die, does the pruning, etc. He wants half the money down and the rest at the end of five years. He gets it and gets out of the country and you get it in the neck.

### Cultivate Your Orchard.

Remember that trees die even as your neighbors drop out occasionally. Remember that trees that bear most die soonest. They are the trees I most desire to plant. The shy bearing tree occupies valuable ground without corresponding benefit. Don't imagine when your trees are large that you can grow full crops of other products on the same ground and because you can't grow other crops don't let the June grass or weeds occupy your orchard. Cultivate and clover your orchard alternately. Don't imagine that a good orchard will flourish on impoverished soil, or on a gravel bed, for the drought will kill them as surely as it would any other crop.

### Best Soil for Orchard.

Don't think that a low, mucky soil is the place for your orchard. Fruit trees are not aquatic in habit. Give them good, upland soil—high clay land if possible—for they won't do well in a sand pit.

### Varieties.

I shall not give an extended list of varieties, for the farmer cannot afford to scatter his efforts in trying to grow many kinds of apples.

For early varieties I name Yellow Transparent and Tetofsky. They are both subject to blight in some localities. On my own grounds I have dug them up and burned them for that fault.

Duchess is next in season, a beautiful apple, most excellent for cooking, tree hardy as an oak and a prolific bearer.

Longfield, an annual, prolific bearer, fruit handsome, of good quality, keeps with good conditions until the last of November.

McMahon White, a large, beautiful white apple, excellent for cooking, same season as Longfield.

Fameuse, the dessert apple which keeps until December.

Wealthy, an apple that cannot be

overestimated for quality and beauty, while the tree is hardy and a great bearer. Kept under the best conditions it lasts until the holidays and in cold storage indefinitely, retaining its flavor and juiciness perfectly. They are delicious in March, for I speak from experience. I have them now in my cellar.

For winter apples, I will name Northwestern Greening, a beautiful, large green apple, keeps until April.

Scott's Winter, Pewaukee, Ben Davis, Gano, Newell's Winter, Tallman Sweet, Fameuse Sweet, a seedling Parsons and Loope are propagating, and Walbridge. The Walbridge is rather small, but under high cultivation grows to fair size. Tree hardy and prolific, quality good, late, winter or spring.

For plums I would name Surprise, Quaker, Wyant and Forest Garden. There are many other good ones.

If the farmer wants fruit, he can surely raise all these varieties in abundance. As before stated, it requires care and perseverance. The insect pests have multiplied in recent years and you cannot ignore them.

In this paper I speak only from experience in North Central Wisconsin, but I have an abiding faith that even Northern Wisconsin can raise fruit and plenty of it, but it may have its limitations.

### Work of Trial Orchards.

The State Horticultural Society is engaged in testing many varieties in the northern part of the state, at Wausau and Eagle River, and will establish a third trial orchard in the northwest this spring. We feel sanguine of good results. Other orchards will be established as fast as possible with our limited means.

### DISCUSSION.

Mr. Loope—I want to say that the subject given me is quite a broad one. I do not know very much about it, but I have had some little experience. I

have an orchard of five thousand apple trees and they are bearing and in good condition, and I want to say that the idea that Wisconsin cannot grow apples is all folly.

Question—Mr. Loope, what is the soil used in your experiments?

Mr. Loope—You can get any soil you want, hard clay, or clay mixed with loam or sand. At Eagle River the soil is sand and clay mixed. When the Society asked me to go to Eagle River to select a site, I said: "I won't select the best site; I will select a medium site." They sent me and I got a sand and clay soil.

Mr. Buskirk—Do you think the soil in Wisconsin has more to do with the life of the tree than the winters do?

Mr. Loope—Very much more under certain circumstances. But here is the difference: In '97 or '98, we went into the winter after an extreme drought with no moisture. We had an extremely cold winter. That will kill anything.

Question—Haven't you noticed that our trees are more scurfy than in the neighboring states, for instance in Michigan?

Mr. Buskirk—I am not so well acquainted with the Michigan trees. The fruit is more smooth than ours.

Mr. Loope—I would not admit that. We can beat Michigan or any other state in the union. It is a fact. I am not bragging. That was so well proven at the Buffalo exposition last year. They would come over and stare at the sign "Wisconsin." They would ask: "Did you grow those apples out west in Wisconsin? Oh, look at them, ain't they bright? I wonder what they put on them. What do you use on your apples, what do you paint them with?" Hundreds of times those questions were asked. There was not any exhibit of apples that stood with Wisconsin in the way of glossiness of skin, color and beauty of appearance.

Mr. Buskirk—Don't you think we may have got them somewhere else,—bought them?

Mr. Loope—They asked that ques-

tion. One lady asked me: "Didn't you buy those apples in New York state?" I said: "I grew those apples, the finest ones," which I did.

Mr. Buskirk—Do you recommend planting young trees in old orchards where there has been a good deal of ash taken out of the ground?

Mr. Loope—Of course it is the best plan not to, but you have to do the best you can.

Question—Would you select a new place for an orchard?

Mr. Loope—Yes, I think it is better.

Question—What would you want to plant in; what is your method of treatment of the soil?

Mr. Loope—Furnish as good soil as possible, and if you get good soil I would risk the rest.

Mr. Smith—Is a northern slope all right?

Mr. Loope—Yes, all right.

Mr. Moran—What is your reason for mounding up the tree when planted.

Mr. Loope—Because it will sink a little anyway. I do not want a hole. The ground will be loose at first in spite of your firming.

Mr. Moran—Do you want to get the rainfall away from the roots of the tree?

Mr. Loope—I am not afraid of that. The ground will get the rainfall around there. The purpose is to have it so that if the soil settles too much it will not leave a hole.

Mr. Moran—Some of those apple tree men recommend leaving a hole to catch the rain.

Mr. Loope—No, I do not believe in that.

Mr. Buskirk—Wouldn't you recommend having the ground a little high?

Mr. Loope—I would not do that.

Mr. Buskirk—Would you recommend mulching?

Mr. Loope—It is a nice thing to mulch trees. You conserve the moisture in that way and keep off weeds.

Mr. Buskirk—Is it better than watering? A. Oh, yes.

Question—Don't you get the roots too close to the surface by mulching?



Mr. Loope—If continued.

Question—Is it a bad thing in the long run to mulch any orchard?

Mr. Loope—Yes, if continued.

Mr. Buskirk—How close do you plant the trees in the orchard?

Mr. Loope—Ours are sixteen feet.

Mr. Buskirk—Is not cultivation better than mulching?

Mr. Loope—A great deal better.

Question—Don't you think that the insect has more to do with the failure of the crop than the climate or soil?

Mr. Loope—Yes, the insects will destroy your crop. You cannot expect a full crop every year. I got eight hundred bushels last year.

Mr. Matteson—Would you recommend pruning the trees the first spring, or would you leave the limbs as they came from the nursery?

Mr. Loope—It would depend upon the roots,—the balance of the tree.

Mr. Hill—Didn't you say that you would plant a young tree six inches lower than at nursery?

Mr. Loope—From three to six inches.

Mr. Hill—What are your reasons for that?

Mr. Loope—There are a good many reasons. You want it so that it will be firm in the ground. You have got to get your roots a little lower than in the nursery. You need them lower. You want to get the tree firmly established. That is the main thing.

Mr. Hill—That is different from most of the advice we get.

Mr. Loope—I would say from three to six inches. I would not say less than three.

Mr. Hill—One thing more,—about keeping the orchard in cultivation. You said that you believed that cultivation was better than mulching. I have tried it and know it is best. But for an old, established orchard that is bearing,—with trees six or eight inches through on the stem, my practice is not to cultivate any more, not with the plow, but I believe that our orchards will last longer and bear more fruit if seeded down than they will in cultivation. I am speaking

now of old, bearing orchards with overhanging branches. We do not get very tough sod. Most farmers seed down their orchards for pasture. This is the objection to seeding an orchard. We never allow any kind of stock in our orchard and if we take out any grass crop we put back enough to make it up. We never let any kind of stock run through and we have the oldest orchard in that part of the county.

Mr. Loope—If your land makes June grass sod like mine does, in two years you could not get a bit of rain through the sod, and you are going to shorten up the life of your trees. You will not get good growth on those trees and if you do not have good growth you will not have good fruit. You will not get good apples because they will be scabby and little. I am speaking of the usual run. I would not dare come here and say that you can put orchards into grass, because I believe that it has been a great detriment. I believe that if a person goes along and cultivates his orchard right straight up, replacing the trees that die, he will get his money's worth out of the apples that are raised there.

Mr. Hill—Would you cultivate with a plow?

Mr. Loope—Not very much.

Question—You do not recommend pruning trees just as they are in bearing?

Mr. Loope—Yes, they ought to be pruned some. You do not want to chop a tree to pieces. You might as well cut off your own leg as to cut off a half or two-thirds of a tree. But each year there should be a little pruning of the limbs.

Supt. McKerrow—But you do this pruning from youth up.

Mr. Loope—I would keep a tree properly pruned all the time.

Mr. Potter—Would it not be as well, as this gentleman says, to seed your old orchard and mulch the trees and keep the grass from the young trees?

Mr. Loope—It is better to mulch than not to do anything, but if you

mulch you grow the roots on top of the ground.

Mr. Lounsbury—Is it advisable to set a young tree in a spot where an old tree has stood and died?

Mr. Loope—If you can get just as good soil as there was there in the first place, it is.

Mr. Lounsbury—Could you do this without replacing the soil?

Mr. Loope—It is very likely that it ought to be dug out and fresh put in.

Mr. Holt—Would you advise watering young trees?

Mr. Loope—I set out one thousand Duchess trees and they did not get rain until September after I set them out, and they didn't leaf out until then, but they are quite big trees now for the time they have been in. I do not think I would water my trees. I would rather plant more the next year.

Mr. France—The question was brought up about putting in a tree where one had died. It has been my experience that the tree had exhausted the soil. Before I plant another tree I grow potatoes or something and fertilize with ashes and manure. The next year I plant the tree.

Mr. Loope—That is a very good idea.

Mr. Culbertson—Mr. Loope, please tell us something about keeping apples through the winter. There is something in being able to keep these apples.

Mr. Loope—Of course, in keeping apples a great deal depends upon circumstances. I presume that in southern Wisconsin you do not keep the Wealthy very long. It is an early fall apple, but if you take your Wealthy as soon as it begins to color and put it in a cool place, wrap it up, keep the air from it and put it where it will be cool, you can keep it a long time. I have some apples that were in cold storage until the last week in January. They kept nice and bright and they have been out since that time. Those apples were delicious when they came out of cold storage. I

will show them to you,—and they were the smallest ones in the barrel.

Question—Are those the ones you had at Buffalo?

Mr. Loope—I had some bigger ones at Buffalo. Wealthy apples can be kept indefinitely, and if you want a good thing, go and find a place for cold storage and put your Wealthy barrel in there, take them out in January, or February, or March, and you will have some good apples. I kept mine in cold storage until the last week in January and then I brought them home and put them in the kitchen.

Mr. Culbertson—In what temperature were they after they were brought home?

Mr. Loope—They were in the kitchen,—in the cellar later.

Mr. Buskirk—Have you experimented with packing any barrels with straw?

Mr. Loope—No. They won't keep at all. Of course, a Wealthy grown at Sturgeon Bay will keep longer than one grown in this county.

Mr. France—I was speaking this morning at the hotel with a gentleman about wrapping the apples in paper, packing them in a barrel, and sinking that barrel down in the ground,—on high ground,—and he goes out any time during the winter and takes off the cover and has nice apples until spring.

Mr. Loope—These apples I have here are little ones. I do not want to hear anybody ever say again that Michigan apples are better than Wisconsin apples. It is not a fact.

Question—Did you ever notice any Nebraska apples out there?

Mr. Loope—Yes, I saw some. They were large and good, but they did not have the skin and color.

A Member—We have not as many scabs on our apples.

Mr. Loope—They are not in it. New York apples are not in it—the same varieties.

Question—Why do Sturgeon Bay apples keep better than Waukesha apples?

Mr. Loope—Because they are grown further north.

Question—How about the San Jose scale?

Mr. Loope—You have to have a glass to see those.

Mr. Culbertson—You spoke about jarring the trees to prevent the working of the curculio and get rid of the spots on the apples.

Mr. Loope—Along about the first of June that curculio comes along and gets onto the apples and makes a little crescent-shaped cut. Sometimes it lays its eggs and matures and comes out. Even if it does not, it makes a mark that spoils the apple. It will do that several times, and it makes the apple one-sided. If you thump the tree it will fall down, and it looks like a spider. You must pinch its head.

Mr. Matteson—How about the poultry to eat these bugs up?

Mr. Loope—They have got to be sharp and be there at the right time.

Mr. Matteson—I have one hundred and seventy-five plum trees, and I jar the insects down and the poultry do the rest.

Mr. Loope—It will lie there for twenty seconds, maybe not so long, still as if it was dead, and then it will get up and fly away. It would be bet-

ter if that jarring was done in the morning when they are more or less dormant.

Mr. Anchetel—How do you find him to pinch his head?

Mr. Loope—He lies there, a little black spot. You spread a sheet under the tree, then jar the tree and he falls down on the sheet.

Mr. Anchetel—How often do you do that?

Mr. Loope—Two or three times, in June, along from the first to the fifteenth.

Mr. Anchetel—After the fruit is formed?

Mr. Loope—Yes.

Mr. Hughes—Do you do any spraying? A. Yes.

Mr. Loope—There is one point that I made that has not been touched upon, with reference to the apple tree business. In Shawano county they were working the five-year plan. These sharks have been in some parts of the state, and have taken hundreds of dollars out of the country, promising to take care of the trees for five years. They get the money,—get double the price for the trees, and go away, and that is the last you see of them.

The Institute adjourned until 1:30 p. m.



## AFTERNOON SESSION.

The Institute met at 1:30 p. m. Conductor GEO. WYLIE in the Chair.

## SWINE BREEDING.

H. P. WEST, Sec'y Wisconsin Swine Breeders' Association, Fayetteville, Wis.



H. P. West.

The last census reports the highest value on swine of any of our domestic animals, amounting in the aggregate to \$62,876,000.00. If this is true, then the swine on our farms are entitled to and should have as much intelligent care and provision made for them as the horse, cow or sheep.

If I can give a few thoughts along the line of breeding and feeding swine that may be of help to those who have given the subject but little or no attention I shall feel repaid for my effort.

No one should embark in the breeding or feeding of swine unless he feels himself adapted to the business and will treat them with the same care and intelligence as he does other animals

on the farm. In the discussion of such an old and familiar topic, much old ground has to be worked over, yet it is soil which can be ploughed deeper each time, for it is a matter which should be fresh in the minds of those having the care of brood sows, especially at this season of the year. The success of the herd and the success of the breeder all depend on his knowledge of this subject.

## Selection of Sows.

A good start is half the battle. A good start in pig raising means a bunch of good, healthy sows from families noted for large litters. In the selection of these sows, choose whatever breed your fancy may dictate. I should prefer mature animals. Look well to constitutional vigor; they should have good length of body, broad backs, deep sides, not too short legged; twelve good developed teats; broad between the eyes, this denotes hog intelligence, and such a one will generally be of good disposition and this you should cultivate at all times.

## The Sire.

Always breed from a pure-bred sire, of good constitutional vigor, which should be greater than that of the sow. He should be a rapid grower and a good feeder. Keep him separate from the herd and give him plenty of yard room for exercise.

I do not advocate paying these inflated public sale prices for a boar on his pedigree, unless you are in the "sale ring," as the saying is. Pedit-

grees are all right and good hogs have good pedigrees, but do not make the pedigree superior to the hog. High prices, when they run into the thousands for these sires, have a tendency to discourage the farmer and feeder, but they stimulate the breeder to better efforts and a more critical study of the animal and breeding.

Swine breeders and feeders have learned the value of pure-bred animals whose types and excellencies follow in the offspring, and they are willing to pay good prices for choice breeding stock. Don't buy an over-fed, excessively fat boar pig for service in your herd. If you do you will be disappointed in the next crop of pigs, as a rule.

#### Care of the Brood Sows and Litters.

Having selected the boar, his health and comfort should be looked after the entire year. Hogs are commanding a fair price at the present time and the outlook for better prices as the days lengthen seems good. This will stimulate the farmer to give the brood sows and litters more careful attention, for on this largely depends the profit or loss in swine farming. I treat my brood sows at the present time about as follows:

Keep the old sows and gilts separate, as the gilts require more and better feed as they have more growth to make. It is not necessary to have an expensive or stylish hog-house, but provide comfortable places for them to sleep, bed liberally with marsh hay, wheat or rye straw, do not use oat straw.

Keep salt and ashes (mixed) and in a box where the hogs can have access to it. I sometimes mix a little copras with the ashes or dissolve it in salt and water and pour over the cob charcoal I make. This, with an occasional feed of kerosene, helps to destroy intestinal worms which cause so much trouble in pigs. The charcoal and ashes help build up the system, as they form an element in the growth and strength of the bones. This feed

helps to form a balanced ration to a certain extent.

#### Balanced Ration.

I believe in a balanced ration for a pig as well as a cow. At the present time I give the brood sows for a morning meal succotash (wheat and oats) scattered on a floor or the ground, so they can not get it too fast, but must eat slowly and work for their breakfast. At noon they get middlings and milk as a thin slop. At night I feed about four or five ears of corn to each animal. Give plenty of water.

I do not think best to give brood sows much corn. I know it is an easy way to make hogs look nice, but if you are practicing this and your sows are not getting plenty of exercise, the pigs will be puny, little fellows and difficult to raise and a disappointment to you. On the other hand, if you are feeding the sows all milk and middlings and no corn, the pigs will likely be very large at farrowing time and you will have trouble in that way. The necessary requirements for best results are a variety of feed and plenty of exercise.

#### Care at Farrowing Time.

Two or three weeks before farrowing get the sows in pens by themselves where you wish them to farrow, that they may get acquainted and feel at home. During these two or three weeks give a little oil meal and roots.

Be on hand when the sow farrows and if damp and cold weather provide some artificial heat. Don't molest the sow at this time unless necessary. Soon after farrowing give her a drink of warm water, with a little bran or oil meal in it, then let her alone for at least twenty-four hours.

I feed gently for a week or ten days, after which feed all she will eat three times a day, of such foods as will produce milk and a good growth in the pigs. At this season of the year comes a critical period in the pigs' life, they

need exercise and must have it, or you will find they are getting too fat and will soon have the thumps. Exercise is the antidote for thumps.

#### Pig Pasture.

Provide a shallow trough with oat meal, soaked corn and a little milk, as soon as the pigs are inclined to run around the pen. Put it where the pigs can have access to it and the sow cannot. Get the sow and pigs in clover pasture as soon as you can. Do not wean the pigs. If they are properly fed they will wean themselves at eight or ten weeks old.

Turn all the grass and green feed you can into pork. It is cheap feed. It does not rob the farm of anything; you are selling your grass at a good price and it benefits the health of the hog. Swine breeders who have no clover or fall rye pasture to turn their pigs into this spring are studying the problem of some early pasture; something that will afford green feed earlier than usual.

I think nothing can be grown quicker and turned into sooner for green feed than barley. It should not be sown until danger of frost is over. It does not stand as much tramping by stock as rye. I consider rye, rape, peas and oats, sown by themselves in strips through the field, the ideal pig pasture, if you don't have clover. I try to have my lots so arranged that they contain from one to three acres each. This year lot No. 1 contains about one-half acre; one-third of this was sown March 14th to rape and one-third to rye, the balance of the piece will be sown to oats and peas as soon as the ground can be plowed. At the same time I am to sow lot No. 2 to rape, rye, oats and peas. About the time of planting corn, sow lot No. 3 to sorghum, rape, rye, oats and peas. Rotate the pasturing of these lots.

If you have never tried these combinations for green pasture for your swine, I think you will be pleased with it. It is a great grain saver. But

don't forget that you must feed some grain with pasture to get best results.

#### Too Much Corn Fed in Wisconsin.

We, here in Wisconsin, feed more corn to brood sows and growing pigs than we ought. Our hogs, like those of the corn belt, have more fat and less lean meat than is profitable for market or home consumption. Corn is an ideal Wisconsin feed and a comparatively cheap one, so we are going to keep on feeding corn, but let us feed some other feed that does not produce the fat that corn does. Peas or wheat middlings produce muscle, or lean meat. I like corn and feed a good deal of it, but I feed something else to make them eat more corn. The best lot of pigs I ever raised was fed on corn meal with some oil meal, wheat middlings, whey, and all the ear corn they would eat.

#### Outlook Good for Prosperous Season.

Everything seems to point to a successful year for breeders of pure-bred animals. All kinds of business are branching out. Laboring men receive good wages and are, therefore, in condition to be buyers of meat; the stock on hand is not large, and the demand is active at good prices. The only thing necessary for a prosperous season in the swine business is intelligent care and watchfulness, and a good crop of corn.

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#### DISCUSSION.

Mr. Wylie—What is your opinion of oat straw for bedding?

Mr. West—Oat straw has usually a rust or smut in it that irritates the skin and the hog sometimes gets mangy.

Mr. Wylie—Is that the only objection?

Mr. West—Well, not the only objection. It hurts the breathing or lungs of the pigs. It is the smut in the oat straw. Wheat straw does not do this

as a usual thing. Oat straw packs too close in the nest and retains too much moisture. The best bedding one can use is marsh or slough hay.

Mr. Wylie—At the present price of corn, is it advisable to grind the feed for hogs?

Mr. West—Yes, I think it is.

Mr. Anchetel—What do you expect to get out of rape sowed the 14th of March?

Mr. West—If you will remember, last Thursday was a nice day and I thought I would experiment a little. I am inclined to do that. I went out to my hog pasture, plowed last fall, and I sowed rape on one strip, one side, and then I sowed some rye. I don't know how it will come out.

Mr. Wylie—You had harrowed it.

Mr. West—Yes. The rye will be all right.

Mr. Scott—Thursday was the thirtieth. Do you believe in unlucky numbers?

Mr. West—Yes, but I believe in doing my work on Thursday.

Mr. Wylie—What kind of hogs do you breed?

Mr. West—I breed Yorkshire and Victoria,—the white breeds.

Mr. Wylie—What is the difference between the two?

Mr. West—They are both white. The Yorkshire is small,—the Victoria is medium.

Question—Which is the most economical feeder?

Mr. West—The Yorkshires of the two.

Mr. Anchetel—Is that the small Yorkshire? A. Yes, the small Yorkshire.

Mr. Stiles—What do you feed little pigs to make them wean themselves?

Mr. West—All they will eat,—all of everything but corn. The mother's milk furnishes the protein. I have never had any trouble about their not weaning themselves at eight or ten weeks old. Sometimes they will not if they are too closely confined in pens.

Mr. Stiles—Do you hold up on the

mothers in addition at that time?

Mr. West—Yes.

Mr. Stiles—Don't you have to shut up the mothers or feed scant ration?

Mr. West—Yes, that is one of the secrets,—keep the mothers on a decreased ration.

Mr. Stiles—What grain should spring pigs make as a general thing?

Mr. West—Last summer, the first of July, I thought I would experiment a little with some pigs. They were four months old. I put those pigs in a pen by themselves and fed them about all that I thought was good for them to eat of a variety of feed; the principal feed was middlings and milk. At four months those pigs weighed ninety-four pounds, and that is not a large weight for that age. At five months those pigs weighed one hundred and sixty-three pounds, and at six months they weighed two hundred and fifty-four. The gain from the fourth to fifth months was sixty-nine pounds for each pig and the gain from the fifth to the sixth month was ninety-one each.

Question—You must have fed corn the whole six months?

Mr. West—No, sir. At the start, for the first month, I fed for the purpose of putting the pigs in condition to take on the fat at the last. I fed more corn during the last month.

Mr. Stiles—What did that pork cost you? Do you know?

Mr. West—No, I cannot tell. I fed without weighing my feed.

Mr. Hill—What breeds did you experiment on?

Mr. West—I had two Victorias and four Yorkshires.

Mr. Hill—Which was the best?

Mr. West—The Victorias.

Mr. Potter—Your principal feed was milk and middlings? Is there no better feed? Either separator or cooler milk and corn?

Mr. West—Pure milk supplies something that is lacking in the corn. Your milk and middlings are a lean meat producer.

Mr. Potter—Would you combine

corn with milk and middlings for a perfect feed?

Mr. West—Yes. You get in the corn the fat producer, in the milk and middlings the lean meat.

Mr. Potter—Would you feed corn in the whole state or grind it for the best results?

Mr. West—I would grind the corn for the best results.

Mr. Wylie—Regardless of expenso?

Mr. Potter—Would you feed it raw or cooked?

Mr. West—At the present price of corn I would say to grind it, but in ordinary years when we can buy corn and raise it for twenty-five cents a bushel, feed it whole, soak it.

Mr. Potter—Do you raise one or two litters a year?

Mr. West—I calculate to raise one litter, but with some of the older sows I raise two.

Mr. Hill—Do you think it pays to keep young pigs over the winter for another year's feeding?

Mr. West—No, sir. But if you have them, keep them.

Mr. Everett—What do you mean, winter-spring pigs or winter-fall pigs?

Mr. Wylie—I understand he means the fall pigs.

Mr. Hill—You would keep fall pigs at the price corn is now?

Mr. West—Yes, if I have them. That is the question. Feed is very high and the price of pork does not correspond with the price of corn. We should sell pork at \$10.00 a hundred to correspond with the price of corn.

Mr. Scott—It would pay to keep fall pigs if you had feed that would otherwise go to waste?

Mr. West—Yes.

Mr. Webber—Speaking of lean and fat hogs,—where does the difference come in? Is there any difference?

Mr. West—Our Canadian friends tell us there is. Our buyers in Chicago say if they can get a carload or a trainload of bacon hogs they are willing to pay an advance in price. But they cannot get them. One farmer keeps a bacon type of hog and the rest

keep the lard hog. The men with bacon hogs sell them under price because they are not uniform with their neighbor's hogs.

Question—Is it not a fact that the lard hog is bringing the premium price now?

Mr. West—I am not able to answer that intelligently.

Mr. Everett—Is it not a fact, Mr. West, that the lard hog will pay the best in the corn belt of the United States?

Mr. West—Yes.

Mr. Wylie—Just at present is it not a fact that they are discriminating against the light hog because they are running so many on the market? They have been getting too many light hogs, thin hogs. They could not make any use of them.

Mr. Anchetel—What is the general method of feeding hogs from birth to four months old?

Mr. West—As I told you, I provide a trough in a pen adjoining where I keep the sow with her litter. I keep this trough where the sow cannot get at it and the pigs can. It will not be long before the little fellows will feel around and find this trough with a damp morsel of corn, oat meal, or meal of some kind and a little milk. When they once get a taste of it they go at it. Then feed those pigs all they will eat, I do not care if it is corn for a little while. The mother's milk will furnish the bone-making material and the lean meat substances. If they are on grass do not forget the corn,—a little corn,—and your pigs will grow. Feed your sow, and when the pigs are four months old they should weigh more than mine did.

Mr. Anchetel—Did you pen the pigs up or let them run?

Mr. West—I let them run.

Mr. Wylie—Do you ever pen pigs up?

Mr. West—Yes.

Mr. Wylie—What for?

Mr. West—To feed them for the fair.

Mr. Wylie—Does it pay?



Mr. West—All things considered, sales and advertising, it does.

Mr. Wylie—Do you ring your hogs? Or do you let them root?

Mr. West—Some animals have to be ringed. I find it so, but usually I do not ring them.

Mr. Wylie—Will they root?

Mr. West—Some of them, especially in the fall of the year after a rain. During the early part of the season they do not root much. If I find a persistent rooter I ring. That is one reason why I have missed my alfalfa hog pasture.

Mr. Bowman—They will not root as much in a small field, will they?

Mr. West—No, sir.

Question—What do they root for?

Mr. West—I sometimes think they root to be mean, but the system craves something that they find in the soil, either angle worms, white grubs or roots,—something that they need,—something that nature tells the hog she can get by rooting.

Question—Don't you think that the work does them some good?

Mr. West—I don't know; I could not say.

Mr. Wylie—How do you account for the hog rooting more in the fall than at any other time?

Mr. West—After a shower, angle worms, etc., come to the surface and the hogs root to get those worms, and also to get the fresh grass roots.

Supt. McKerrow—Will not variety in the feed in a general way prevent this?

Mr. West—Yes, feed ashes, salt, charcoal, etc.

Mr. Potter—Then won't they root just the same afterwards?

Mr. West—Give them plenty of pasture and plenty of corn. When the grass is gone, supply something else green. They must have it.

Mr. Wylie—Is it not a fact that they root more in the fall because of the fact that you have begun to feed them heavily on corn and have their systems heated, and the feed is not balanced right, and the hog then roots to get

something that his system has not been supplied with?

Mr. West—I think that is right. I had not given it that thought, but I think that is right.

Question—How about stone coal? I have nine hogs that ate three hundred pounds this winter and they would have eaten a great deal more if they could have gotten it.

Mr. West—Of what nature is this stone coal? Is it simply anthracite coal?

Mr. Wylie—Soft coal.

Mr. West—Yes, I have fed soft coal.

Mr. Convey—Will feeding coal make white pigs black?

Mr. West—Only around the muzzle.

Mr. Wood—Is there not danger of overfeeding little pigs while you are weaning them?

Mr. West—I say yes. There is great danger in that. That is where one trouble comes in. I learned that years ago to my sorrow. When I started in the pig business I thought I knew all about it. My father used to keep a good many hogs, and I thought when I had fifty pigs about of an age I would show my father a thing or two about raising hogs. He said to me one day when he looked at my pigs: "Young man, what are you going to do with those pigs?" I replied: "I am going to have them at six months weigh more than yours." "Very well," he says, "six months will tell." I commenced to feed those sows all the corn they would eat and whey from the cheese factory. The pigs began to respond and grew very rapidly. I kept the pigs shut up in a place three or four times as large as this room. In six weeks from that time of the fifty pigs I had nine left and it was all on account of the manner in which I had fed those sows. I had spoiled my pigs with kindness. If I had fed middlings and milk or middlings and whey with a little corn and given them pasture, I might have shown my father how to raise pigs, but as it was he showed me.

Supt. McKerrow—You say you think you spoiled those pigs with kindness.

I think you spoiled those pigs with ignorance.

Mr. West—I spoiled them with ignorant feeding.

Mr. Imrie—Are there not more spoiled with lack of feeding than with feeding?

Mr. West—I think so.

Mr. Imrie—Little pigs, I mean.

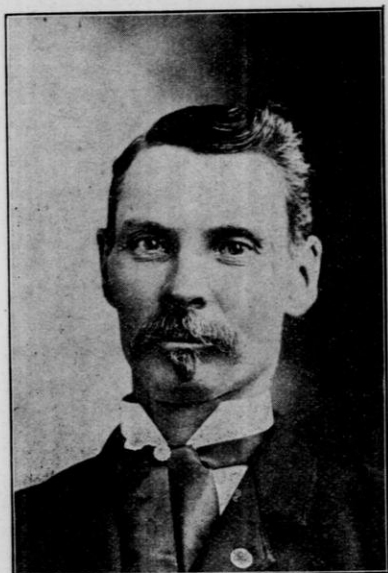
Mr. West—Yes.

Mr. Potter—Did you spoil those pigs directly or indirectly?

Mr. West—Indirectly. By feeding the sow and spoiling the hogs

## HANDLING EARLY LAMBS.

R. E. ROBERTS, Corliss, Wis.



R. E. Roberts.

Mr. Chairman, Ladies and Gentlemen—I will not attempt to present any new theory on this subject, but simply my experience in the care and handling of a flock of sheep, such as every ordinary farmer should have. Patient and intelligent shepherding has always belonged to the world's best agriculture, and sheep have ever wrought a most important part in increasing the wealth and happiness of the human family.

Their care, management and improvement have adapted them to every condition of civilization, in fact they are great civilizers in themselves. There is one fact I desire to impress upon you, and that is, that there is nothing mysterious and particularly difficult in the process of raising good lambs and sheep, and I know of no more pleasant or more remunerative branch of live stock industry for the capital invested and labor involved.

If to raise good lambs or sheep required great difficulties and expensive methods, then the business would not pay, and I would not be in it. I wish to say, I am raising lambs and sheep of good quality by simple, practical, common-sense methods, that can be adopted by any farmer.

### Establishing a Flock.

My subject leads to the question,—how to select and manage a flock so as to get the largest net profit, in the shortest time.

First, there are a few essential things to observe in establishing a flock,—shelter, winter-feeding and exercise.

I will not discuss the merits of the various breeds of sheep, as to which are the best, as it is something like choosing a wife, it comes by chance and every man thinks his choice the best, and yet there is a vast variety to choose from, as the term is used. The man falls in love—and his chosen girl responds to his affection—she is then

the best in the world to him ever after. So it is with the flock; in choosing from the various kinds of sheep, study the merits of each breed, your environments, circumstances, and ability to care for them. Then making your choice, keep wholly to that, forsaking all others, and cherishing your chosen flock you will make a success of it as well as your neighbor will with a different breed. But

year in a few years you will have a good flock of sheep that will answer all practical purposes and as your flock annually increases you will be growing in knowledge of the business.

In selecting a sheep to head your flock, secure one of good mutton form, with a full, bright, quick eye, and broad chested, as this denotes a vigorous constitution, with a broad back and heavy quarters, on short, strong



Residence of R. E. Roberts.

in choosing a breed it must be considered that mutton will be the essential source of profit in the business and wool the second consideration. However, there are conditions under which experience will guide the old shepherd in making his choice. To the novice, I would say not to invest a large amount of money for a pure-bred flock, but get a few good, common ewes and grade up by the use of a pure-bred ram of one of the mutton breeds that suits your fancy. Each year keep your best ewe lambs and by infusing pure blood every alternate

limbs, with even type and excellence, which is more preferable than extra large size or coarseness in his build.

In purchasing the new ram, select one as near the type of the old one as possible, providing he was satisfactory, as this will insure more uniformity in the flock.

#### Shelter.

The size of the buildings required will depend upon the number of sheep you wish to keep. A safe basis to figure on is sixteen square feet for a ewe and lamb. Their shelter need

not necessarily be expensive, but it is the nature of sheep to dislike dampness, therefore their barn should be dry under foot, as well as over head, and comfortable and well ventilated. Ventilation of the sheep barn is very important and should receive the careful consideration of the shepherd.

It is necessary that he fully realize the difference between proper ventilation and ruinous draughts. While the former means health and vigor, the latter means sickness and losses. While no animal enjoys the cold, invigorating elements of our Wisconsin winters and reveals the true evidence of its health-giving influence more than our modern mutton sheep, yet no animal suffers more from deadly draughts blowing through their barn than they do.

Draughts are decidedly injurious to young lambs and are often the direct cause of ills and losses which would scarcely ever be in evidence if proper measures were taken to avoid it, and it is important to place the doors and windows so as to get an abundance of sunlight in the barn, as this is essential for the comfort and growth of the lambs.

"Cleanliness is next to godliness," and in no place is this adage more applicable than in the sheep barn. The manure should be all hauled out just previous to the commencement of lambing, as the heating of the manure and the odor therefrom, if left in the barn, is injurious to the sheep and being compelled to lie in the barn on it in stormy weather is one cause of sheep losing some of their wool, hence the necessity of a cleanly kept and well-bedded barn.

#### Winter Feed for the Ewes.

Timothy hay is not good, for it is not sufficiently digestible, and it does not contain the needed nutriment, that is, of the right kind, and the very small awns (or spikes) in the heads of timothy are apt to gather in the stomach, forming balls of indigestible

and irritating matter, which lead to trouble.

Feed clover hay, which is a perfect food, with bright corn fodder, oats straw, and such other feed as we may have at hand, for roughage, up to about two months of lambing time. Then commence feeding a light ration of corn, oats, and bran, equal parts by weight, and if the hay crop is short and corn fodder and other roughage must constitute the coarse feed during the greater part of the winter, I would make bran the largest portion of their grain ration. Feed regularly what they will consume without waste.

Guard against seeds and chaff getting into their wool, as it depreciates its value from four to five cents per pound. Give them a good-sized yard, and, better, a few hours run in a corn field each day, when the snow is not too deep. It does them good. The experienced shepherd has long ago learned to give his breeding ewes during the winter plenty of exercise, fresh air, and a variety of coarse feed, and a plentiful supply of pure water and salt, as these are requisites for a crop of strong, healthy lambs, while ewes that are closely confined during the winter have poor and weakly lambs.

No hogs, or other stock, should be allowed to run with the flock, or in any way annoy or frighten them. Quiet, gentle and familiar handling of the flock will have a good influence on the coming crop of lambs. No class of stock are more susceptible to kindly treatment than sheep, and it is a pleasure, as well as profitable, to handle them so.

#### Attention at Lambing Time.

At lambing time, especially with early lambs, close attention is very necessary. Be on hand and see that each lamb is up on its feet at once and partaking of a square meal. First clip the wool from the ewe's udder, so that the lamb does not exhaust himself pulling on a wool tag. In his ef-

fort he may pull off some wool and swallow it, which frequently causes death. Generally that is all that is necessary, unless you put them in a small pen by themselves for a few days. From now on everything should be done to make them do their best.

Let us look first to the ewe; from her the lamb gets all the important and most indispensable part of his food. She digests the raw food stuffs in her large stomach and prepares the concentrated, easily digested, perfect mother's milk. In the abundance of this supply of milk depends your good lambs. You must feed the ewe generously, yet the food must be of the right sort to be turned readily into milk.

Not to go specifically into details, milk is very rich in what we call protein. This protein is what muscle, nerve and blood are made of. It is just what the young animal needs to make his frame grow and build up his young tissues. To produce this milk in abundance, the ewe must be fed foods that have in them the elements of milk. They must be foods that are rich in protein. Of course, there is fat in milk and the animal system burns a good deal of carbon, so we don't want a food free from starchy principles. Yet, for milk production, we must have a greater proportion of protein to starchy food. There are a number of combinations of food that will be good, but I will consider what we have mostly at hand. Take the following equal parts by weight, wheat, bran, oats, and shelled corn, and add 10 per cent of oil meal; mix well then give each ewe one quart per day, feed in flat bottom troughs, as they are apt to bolt their food if fed in V-shaped troughs.

#### A Lamb Feeder.

Now, the lambs will be getting what milk the ewes are capable of furnishing and if we have been fortunate to have a great many more lambs than

ewes and some are not supplied with enough milk you can aid the ewe by feeding the lambs cow's milk, good Jersey milk, as I feed the young lambs, so as to push them right along to get them on the market as early as possible. I have used for the past few years what I call a lamb feeder. It is a tin pail, with a tight fitted cover, that will hold one gallon of milk. On one side are three spouts soldered on near the bottom of the pail and extending outward as high as the top of the pail, made so that the rubber nipples can be put on. By feeding them a few times from a bottle, which is more convenient to teach them at first, they quickly learn to be on hand for their milk when they see you coming with the pail. Give them all they will take of this Jersey milk every morning and evening. By feeding in this way they get no setback, but grow equal to the best ones.

#### A Lamb Creep.

When the lambs get about two to three weeks of age, they will begin to pick at the hay and grain. They will soon want to be eating themselves. To have them do their best, they must be furnished a separate place to eat from the ewes, where they can go at will whenever they feel hungry,—what is termed a lamb creep, extending across one end of the barn where there is abundance of sunlight.

In here put flat bottom troughs extending the whole length of the apartment, with a board extending along the troughs six inches above the sides to prevent the lambs from getting their feet into it, as a lamb is very dainty about having his food clean.

In here give them crushed oats, wheat bran, corn meal ground coarsely, and oil meal, in the same proportions as I advised for the ewes. After they have learned to eat well, increase the feed until they have all they will eat. If any feed is left over, clean it out each morning and feed it to the ewes, as the troughs must be kept

clean in order to have them relish their food.

Lambs that are made perfectly happy and contented, as it is the happy lamb that grows and puts on flesh, being fed in this manner will be ready for market at eight or ten weeks of age, weighing from thirty-five to forty pounds or more, and will bring more net profit for the feed consumed than at any other age.

love many farmers have for these valuable, golden-foot animals, dies and they go out of the business at once with disgust.

This is an abuse of one of the most profitable branches of live stock industries. What would become of these useful animals if we had no stayers in the business? The successful sheep raisers are those who have stayed with them through thick and



Youngsters on the Roberts' farm—all at work.

But if the lambs are intended to spend their lives on the farm, instead of going early to the butcher's block, I would recommend a different grain ration. I would not feed but little corn meal, if any, keep his frame a-growing, give plenty of outdoor exercise, and let him develop naturally, then he will have more stamina when he grows to be a sheep.

#### Sheep Raising Profitable.

It is singular, yet it is true, that as soon as the sheep market takes a downward course, most, if not all the

thin, through prosperity and adversity. This not only applies to flock masters in our own state, but also those of other states.

Sheep always have and always will, when properly cared for, pay equally as well as any other farm product, yielding a dividend twice a year.

Stick by the sheep!

#### DISCUSSION.

Mr. Bowman—What time do you have your lambs dropped in the spring?

Mr. Roberts—The middle of February.

Supt. McKerrow—What time do you market these lambs?

Mr. Roberts—The latter part of April.

Mr. West—What do they weigh at that time?

Mr. Roberts—I have had them weigh as high as fifty pounds, dropped in the middle of February and marketed the last of April,—but a lamb weighing thirty-five pounds that is fat will go early in the spring.

Mr. Wylie—What did you get for them?

Mr. Roberts—I sold them at \$3.50 a head.

Question—What breed?

Mr. Roberts—Shropshires.

Mr. Smith—How many dollars' worth of Jersey milk did you use?

Mr. Roberts—I don't know, but I assure you it is a good way to market the milk at a profit.

Mr. Smith—What is the object of having three spouts?

Mr. Roberts—To feed three lambs at a time.

Mr. Smith—Won't the lamb that can drink the fastest get the most of the milk?

Mr. Roberts—Yes, sir, but when he has all he needs shove him aside and let another one take hold.

Question—Do you use a basement barn?

Mr. Roberts—No, sir.

Mr. Wylie—What kind of a barn do you have?

Mr. Roberts—I have an ordinary barn, boarded and battened, eight feet high, twenty-two feet wide and fifty feet long, or as long as will accommodate the flock.

Mr. Wylie—Which will stand the more cold weather, cattle or sheep?

Mr. Roberts—Sheep will, if dry.

Mr. Brigham—Do not open sheds answer when you have the lambs come a little later?

Mr. Roberts—Yes, sir, as long as they are dry.

Mr. Smith—Do you mean that the

sheep stand more cold than cattle, that is dry cold?

Mr. Roberts—Yes, sir.

Supt. McKerrow—Cattle won't stand sleet storms.

Mr. Roberts—No, sir, no stock will.

Supt. McKerrow—Where do you find your market?

Mr. Roberts—Chicago.

Supt. McKerrow—Do you ship them yourself?

Mr. Roberts—I sell them to a man in Chicago that furnishes all the best hotels, restaurants and dining-cars with young lambs. I have furnished him for the past fourteen or fifteen years.

Mr. Brigham—How many at a time? You are close to Chicago.

Mr. Roberts—Early in the spring we ship in crates, six in a crate. Later in the season, by obtaining other lambs in the vicinity, we ship by carload.

Mr. Convey—Does it make any difference to you whether you ship in crates or by carloads?

Mr. Roberts—No, sir. I get a stated price. Crates are furnished and all shipping charges paid.

Mr. Convey—Is there a limited market for your goods,—I understand you furnish the best hotels, restaurants and dining-cars. Does your market depend upon your location?

Mr. Roberts—No, sir. Other parties can sell to the same man, in any portion of the states, as he buys throughout all the central west. I sell to E. E. Wotten, of Downer's Grove, Ill.

Question—At what weight does he like the lambs best, considering they are all of the same flesh?

Mr. Roberts—Thirty-five to forty pounds early in the spring, later in the season fifty pounds. A thirty-five pound fat lamb is preferable to a fifty pound lean one.

Supt. McKerrow—But if the fifty pound lamb is just as fat as the other he would take the fifty pound lamb as quick as the lamb that weighed thirty-five pounds.

Mr. Wylie—Would it not pay you to keep the lamb longer?

Mr. Roberts—No, sir, not at \$3.50 a head on thirty-five to forty pound lambs.

Mr. Wylie—I was thinking it was by the hundred.

Mr. Stiles—Later in the season are not the lambs heavier?

Mr. Roberts—Yes, sir, but I ship early in the spring as soon as they are fat enough and attain the required weight.

Mr. Imrie—Will he pay you more for them then?

Mr. Roberts—Yes, sir, as an early spring lamb demands a far better price than summer lamb.

Mr. Hill—How much do your sheep shear a head?

Mr. Roberts—Eight and one-half pounds a head last season.

Mr. Hill—Is not that light?

Mr. Smith—It was a pretty dry season.

Mr. Roberts—That is a fair average for a Shropshire.

Mr. Smith—Have you had any experience with the Dorset sheep?

Mr. Roberts—No, sir.

Mr. Smith—Do you have a floor in your sheep barn?

Mr. Roberts—No, sir.

Mr. Smith—What is the reason a sheep will go and lie on a loose board in a trough rather than lie on the ground? Most any sheep will do that.

Mr. Roberts—It is their nature to get on some elevation.

Mr. Smith—You mentioned that the manure should be taken away before lambing time. I did not know but what it was the manure that caused it.

Mr. Roberts—The heating of the manure is injurious to the sheep and is one cause of their losing a portion of their wool, but I would not go to the expense of having a floor in the sheep barn, it is unnecessary.

Supt. McKerrow—The floor would soon be covered up.

Mr. Roberts—Yes, sir.

Question—Do they like to lie on loose boards?

Mr. Roberts—Yes, sir, and they like to lie on a flat rock in the pasture. Sheep always seek a high, dry place to lie on.

Mr. Selle—Do you use your young lambs for the next year?

Mr. Roberts—No, sir, I prefer to wait until they are two years old.

Question—Do you let the little lambs run outdoors?

Mr. Roberts—Yes, sir.

Mr. Selle—Will the wool on that lamb pay for its keep?

Mr. Roberts—It will shear considerably heavier.

Mr. Selle—Will it pay for its keep?

Mr. Roberts—I think so, for the reason that you have so much better sheep when it becomes matured.

Supt. McKerrow—You do not mean that the fleece or wool will pay for keeping the lamb a year. You mean that the fleece or wool and the extra growth and development, by making it a better sheep, together with the wool, will pay for the keeping item for a year.

Mr. Roberts—Yes, sir, that is what I mean.

Question—How do you manage to wean your lambs? Do you milk the ewes out?

Mr. Roberts—Yes, sir. We shut the ewes up by themselves and milk them out for a few days.

Supt. McKerrow—Do you change the feed?

Mr. Roberts—Yes, sir. We reduce the grain ration decidedly.

Mr. West—Where I live, there has been some trouble with ewes that are wild lamb dying. They seem to be in good flesh, but they will wander around the pen listlessly and carelessly, lean up against the fence and put their heads to one side, and after a few days they die. Will you tell me what is the cause and a good remedy?

Mr. Roberts—One of my neighbors has had trouble in that way. I am not a doctor, but if they wander around the barn as you say, I should think they had a grub in the head.



A Member—They are looking for salt, I guess.

Supt. McKerrow—It is more likely that they lacked the proper kind of grub in the stomach.

Mr. Roberts—That is the cause of the grub in the head,—lack of grub in the stomach.

Mr. Hughes—Is it not lack of exercise?

Supt. McKerrow—Too little succulent food or too much wood fiber,—not enough laxative food.

Mr. West—Timothy hay, oat straw, oats and a little corn.

Mr. Roberts—If they have been getting timothy hay that would be one cause.

Mr. Hughes—Would it not depend somewhat upon when that hay was cut, if it was cut early it would make better feed.

Mr. Roberts—I never considered timothy hay good feed for sheep.

Mr. Selle—Peas and oats generally go well for ewes.

Mr. Roberts—Yes, when cut early 't is very good.

Mr. Convey—The question is very commonly asked in this state,—Is ensilage good feed for sheep?

Mr. Roberts—I have not a silo myself so I cannot say, but I should judge it was good, a little of it.

Mr. Wylie—I understand Mr. McKerrow feeds his sheep ensilage and nothing else.

Supt. McKerrow—Such a statement may do in the Wisconsin legislature, but it won't do here. Our experiment station at Madison has demonstrated the effects of feeding ensilage by a series of tests. You can read them for yourselves. At our farm, twelve miles east of here, we have fed ensilage, a good deal of it, this winter, more than usual, because we have been short on some other feed, and none of our ewes have leaned up against the fence yet. We have a great many lambs and they all seem to be doing well, are fat, and the ewes have a large flow of milk. They are not living on ensilage alone. They are getting clover hay

and some alfalfa, but their main coarse ration is ensilage, all they will eat up clean in three-quarters of an hour at each end of the day. Our grain is largely oats with a small mixture of wheat and then their protein they get in a little clover and alfalfa.

Mr. Hughes—Can you tell us about how many head you are feeding and about how much you feed to each ewe?

Supt. McKerrow—I cannot tell you exactly. They are getting all they will clean up in a half or three-quarters of an hour, each end of the day.

Mr. West—How about rape for feeding sheep?

Mr. Roberts—It is the best feed I know of, judiciously fed.

Mr. West—Do you like flax?

Supt. McKerrow—Flax straw?

Mr. West—Flax.

Supt. McKerrow—No, sir.

Mr. Roberts—Flax seed is worth too much to feed to sheep.

A Member—Is it worth sixty cents in Wisconsin?

Mr. Roberts—Flax is worth \$1.70 per bushel now and in the fall usually \$1.25 to \$1.50 per bushel.

Supt. McKerrow—Have you fed flax?

Mr. West—Yes, and it is fine feed too.

Supt. McKerrow—For a long period, to breeding sheep for several years in succession?

Mr. West—Yes.

Supt. McKerrow—With no bad results?

Mr. West—No, sir. It is also nice to feed flax to milking cows.

Supt. McKerrow—Pretty heavily?

Mr. West—A small ration is a tonic.

Mr. Millet—Give to cows what you can carry on a fork once or twice a day and usually they won't eat much of any other grain.

Supt. McKerrow—The question was asked if rape was good for feeding sheep and was answered with very strong emphasis that rape was all right. After fifteen or sixteen years' experience, let me drop a word of warning about feeding your breeding

stock freely on rape. From our experience it is something that should not be fed freely to breeding stock. Rape causes too rapid development for the best interest of the breeding ewes in the fall of the year, both at that time and also in the matter of wintering them. They will winter better if they have about a half ration of rape. You can have your stock ready for the market very quickly on rape, but the exporters of mutton are very particular about rape sheep for export to England. If you feed rape and want the best results with your breeding stock, let them have a pretty good ration of something else and then you are apt to get your lamb crop when you expect to get it.

Question—Is wheat good?

Supt. McKerrow—I have fed it mixed with other grain.

Mr. Millet—That gentleman sells his lambs by the hundred. Couldn't you sell your lambs as well by the hundred, Mr. Roberts, as by the head?

Mr. Roberts—Yes, I could, but a thirty-five pound lamb at \$3.50 nets

me ten cents per pound and that is usually the top price for early spring lambs.

Mr. Millet—If you had a lamb that weighed forty-five pounds, would you get more for it than a thirty pound lamb?

Mr. Roberts—Yes, sir, as a thirty pound is less than the required weight, but by selling the entire crop of the season, I can make more by selling at stated price per head, as the few late lambs are not worth as much on the market as the season advances.

Mr. Everett—Would you get ten or twelve cents per pound on them all?

Mr. Roberts—No, sir, not on the late lambs if I did not have early ones.

Mr. Wylie—What will you do with the ewe that does not own her lamb?

Mr. Roberts—Put her in the pen with her lamb and usually in two or three days she will own it.

Mr. Scribner—Suppose she doesn't?

Mr. Roberts—The reason is usually a lack of milk. In a few days she will come to her milk and own her lamb.



## MODERN POTATO CULTURE.

CHAS. D. WOODS, Director, Maine Agricultural Experiment Station,  
Orono, Maine.



Chas. D. Woods.

The potato is so generally and so extensively grown, we are so familiar with its qualities and the various methods of culture, that most farmers are very positive as to the best method of growing this crop. During the past twenty-five years hundreds of experiments have been made at experiment stations and by practical growers, and the results from experiments in propagation and culture are so conflicting that the careful student will be very slow in drawing conclusions. While he will be convinced that there are ideal ways of treatment under certain conditions, he will be equally convinced that under different conditions very different practice will be necessary to insure the best crop. In potato growing, as with most farm

operations, the soil and atmosphere are such determining factors that there is no best way. Each farmer who would grow potatoes to the best advantage must be sufficiently intelligent to understand the conditions of the soil on his own farm. The methods of preparation of soil, of planting, cultivating and fertilizing the crop, depend largely on the character and condition of the soil and the season. If I were to give you the exact practice which is so successfully used on farms in Aroostook county of my state, and you should adopt it, it might be fatal to the production of a crop on your soil. No man can afford to blindly follow methods of his neighbor or those of public speakers unless the conditions are practically the same. So, with the distinct understanding that I do not expect to be able to give you specific directions for your conditions, I shall try to outline some of the methods which are followed under different conditions of soil and climate with success.

#### The Seed.

The selection of seed is important in the planting of any crop, but it is especially so in propagating the potato, because we do not plant the true seed but a tuber. A true seed is the result of a union between two incomplete germs of life (usually derived from different flowers in the same plant and often from flowers of two different plants), and partakes of the qualities of the parent plants, and is apparently affected by the qualities of preceding generations. A tuber is derived from one complete germ of life, and partakes, with very little tendency to deviation, of the qualities of the life from which it is derived. It is not a

new creation by the uniting of two life germs, but is simply the extension of one old life. A true seed contains one germ of life supplied with a limited amount of plant food. Different seed of the same kind have practically the same amount of plant food. The tuber contains many germs of life (buds), and there is great variation in the amount of plant food stored up to supply the varied members of life germs. Unequal as is this amount in different tubers, the inequality is, unless great care is taken, greatly increased in cutting seed for planting. A true seed is enclosed in covering which keeps out, to a certain extent, air and water until it is placed in earth, when warmth and moisture start the germ life so that it bursts the covering. The tuber has no such protective covering. The air and moisture often greatly injure it before the season for planting comes around, unless the grower makes an especial effort to keep it where heat, light and moisture are just right to maintain it at its best.

At planting time many farmers plant the potatoes they may chance to have, regardless of their condition, and cut them in small pieces, that they may use as few bushels as possible. And thus, with the interior of the tuber exposed to the action of the soil, the cut tuber, still bleeding, is placed in the soil, with no thought of how much has been done to weaken the power of the potato and how much it has been handicapped in its struggle to form a young plant and perpetuate itself. The results of the investigations at experiment stations and by practical growers, while not always uniform, in general indicate as follows regarding the care and selection of seed potatoes.

The seed should be from mature but not over-ripened potatoes. It should be kept in the dark in a not too dry atmosphere and as far as possible at a temperature of 33 degrees to 40 degrees F. The weight of the cutting is more important than the number of

the eyes, i. e., the heavier the piece the larger the yield. Whole potatoes give heavier crops than cuttings. In general the "seed" ends of the tubers give larger yields than the "stem" ends. While under careless management northern grown seed frequently gives larger yields than southern, the careful selection and storing of seed are of more importance than changes of latitude. Cut seed should be allowed to dry somewhat before being planted. If it is to be planted soon after cutting it should be covered with plaster or some other material to prevent "bleeding."

#### Fertilizers for Potatoes.

Analysis shows that the composition of potatoes, so far as nitrogen, phosphoric acid and potash are concerned, is fairly uniform, and that each one hundred pounds of fresh potatoes carry about .31 pound of nitrogen, .13 pound of phosphoric acid, .48 pound of potash and .01 pound of lime. If we assume these figures to fairly represent potatoes as grown in New England, a crop of two hundred bushels, weighing six tons, would remove thirty-seven pounds of nitrogen, sixteen pounds of phosphoric acid and fifty-eight pounds of potash.

If the amounts and proportions of fertilizing elements removed by a crop could be taken as a guide in preparing a field for that crop, the problem of supplying the proper amount and kind of plant food to the soil would be much simplified. To manure a field for a crop of potatoes, nitrogen, phosphoric acid and potash would have to be added in about the proportions given above, and in sufficient quantity to supply the vines and tubers the land was expected to yield. A formula made up on this basis would be very different from any mixed fertilizer on the market, and would contain the fertilizing elements in about the following proportions: nitrogen, five parts, phosphoric acid, two parts, and potash, eight parts. Twenty-six different brands of so-called potato fertilizers

sold in Maine had the following composition:—

	Nitrogen (per cent)	Available phosphoric acid (per cent)	Potash (per cent)
12 brands...	1.5—2.5	8—9	2—3.25
6 brands ...	2 —2.5	6—9	4—6
8 brands ...	2.5—3.5	5.5—8	7—10

The first twelve brands mentioned cannot properly be called potato or special fertilizers as their composition is practically the same as all general purpose goods. The formulas of the last eight approximate more nearly to the popular idea of what a potato manure should be, but even these carry much more phosphoric acid in proportion to the nitrogen and potash they contain than is found in the plants or in farmyard manure. It is possible that in using commercial fertilizers more phosphoric acid is applied than is needed in many cases, yet there is not much evidence at hand in the form of accurate experimental data to prove this assertion. An analysis of the ash of the potato shows it to be exceedingly rich in potash, and the fact has led many to believe that a potato manure should contain a large amount of this element, but when we consider the small amount of ash a potato contains, we find the amount removed by an ordinary crop (fifty-eight pounds) is not greater than is taken up by many other farm crops. Two tons of mixed hay would take away sixty-three pounds, while two tons of red clover would remove eighty-eight pounds of potash.

In preparing a field for any crop it is more essential to consider the special needs of the soil, to render it fertile, than the special needs of the crop to be grown upon it. While it is true that some plants take up more of some one element than others, the difference is significant when compared with the difference in soils. Most soils are variable in character and composition, and it is therefore impracticable to make a fertilizer formula for

potatoes or any other crop that would be applicable in all cases. Every farmer who uses commercial fertilizers extensively should experiment with unmixed goods enough to determine to what elements his soil most readily and profitably responds. Some marl or limestone soils are quite rich in phosphoric acid, and consequently a fertilizer containing a small amount of that element and relatively large amounts of nitrogen and potash would give best results, while some of our granite soils and clay loams are quite rich in potash, and respond best to a fertilizer containing relatively large amounts of phosphoric acid.

A study of the experimental data indicates that the potato plant thrives best in a rich soil which is abundantly supplied with all fertilizing elements. In the early stages of its growth, when the vines are forming, the demand for nitrogen is particularly large, and for this reason a potato fertilizer should contain quite a part of its nitrogen in a soluble, immediately available form. Later in the season, when the tubers are forming, large amounts of phosphoric acid and potash are required, also a bountiful supply of water to take up the plant food and transmit it through the vines.

#### The Water Supply.

There is no farm crop that is more easily, speedily and greatly affected by the supply of moisture than is the potato. It has been found by experiment that it takes about four hundred and twenty-five tons of water to grow a ton of dry matter of potatoes. A crop of two hundred bushels per acre would therefore require approximately six hundred and fifty tons of water, equivalent to a rainfall of nearly six inches. Because of its need for large water supply, and its remarkable susceptibility to climatic conditions, it follows that the average potato yield is affected more by water supply than by lack of plant food. The selection of soil and methods of culture must be

with this fact in view if success is to be had. The liberal application of fertilizers or the presence of large amounts of readily available plant food will prove of but little value if the moisture supply is deficient. It is also true that too much water will check the growth as quickly and effectually as too little. In most seasons here year in and year out you probably suffer much more from droughts than from too much wet. In Aroostook county, in northern Maine, with a gravelly, loam soil underlain by broken ledge so as to form natural drainage, with a copious rainfall during the growing season, the method of culture is very different from what your conditions demand. Although better methods are frequently used and with profit, plowing in the fall, and once harrowing in the spring, will, in Aroostook county, Me., suffice for preparation of the soil, and cultivating two or three times, and finishing with a shovel plow or other hilling device, will in most seasons give a fair crop.

Here in Wisconsin the conditions of climate are so different that the treatment must be very different. Too much attention to the fitting of the soil for the crop can hardly be given, for no amount of after tillage can overcome neglect in preparation. Deep and thorough plowing and harrowing, so as to make a perfect seed bed, not only establishes an earth mulch so as to prevent the loss of moisture of the spring rains, but it so fines the soil that the plant food contained in it becomes accessible to the growing plant. The conservation of moisture by frequent tillage is not understood or practiced as it should be. The old notion that potatoes should be hilled, and that tillage should cease as soon as the potato is in bloom, is wrong for most situations. Hilling is frequently practiced so as to keep the tubers from becoming exposed to the sun; this is not necessary if the soil was properly prepared. On hard, compact soil the potato will, because of less resistance of the soil, push out of

the ground. This will not happen in deeply worked land.

#### Insect Enemies of the Potato.

Indispensable as an abundance of plant food and moisture are to the successful potato culture, healthy foliage is another requisite of equal or even greater importance. There are two insects which annually do great damage to the potato plant. One, the Colorado potato beetle, or potato bug, as it is commonly called, is easily and generally fought; the other works its mischief without attracting much attention.

#### Flea Beetle.

Early in the summer, usually when the potatoes are not more than two or three inches high, a small beetle, not more than a tenth of an inch long, appears and begins feeding upon the young leaves. The beetles eat small cavities in the tender foliage, often to such an extent that the plants are ruined. After they have been feeding for a little time the leaves will be found perforated with small circular holes, as though made by fine shot. If the beetles do not destroy the crop, the injured parts afford a foothold to the spores of the early blight, and these two pests together may do what neither would be able to do alone in destroying the crop.

The beetles are very active, and their name, flea beetle, is appropriate. They often escape notice, for when disturbed they jump off the vines at once. No uniformly protective measures are known. Spraying with the arsenites, dusting young plants, while the foliage is wet, with tobacco dust, lime, ashes or plaster, have been tried with more or less of success. On the whole, the most successful remedy tried by us is the Bordeaux mixture (formula 2). This does not kill the beetle but makes them unhappy, and to a great extent drives them from the vines. If applied with an arsenite

(formula 3 and 3a) it will be more effective, and any early appearing potato bugs will be destroyed at the same time. The early application of Bordeaux mixture will also protect the already formed leaves from the early blight.

#### The Colorado Potato Beetle.

This pest, originating in the Rocky Mountains, where it lived upon weeds, found that it preferred the potato to its original food, and spread in a few years' time over the whole country. While it prefers leaves of potatoes it will eat the stems or even the tubers if nothing better offers. Its very greediness suggests the remedy, poisons. No adequate substitute for the arsenical poisons has as yet been found, when all things are taken into consideration. Something only mildly poisonous, such as Bug Death (practically impure zinc oxide, finely ground), will, if liberally applied, free the vines from this pest, but such things are expensive and time-consuming in their application. The arsenical insecticides are best, applied with water, in the form of a fine spray, as soon as the slugs appear. To kill all the bugs the poison must be distributed over the entire plant. Unless applied in connection with Bordeaux mixture it is safest to use lime with all arsenical compounds. The applications should be repeated as often as necessary (formulas 3, 3a, 4 and 4a). Some of the cheaper arsenoids are as effective as Paris green. There is no reason for using them or Paragrene in place of Paris green unless they can be had at a lower price. Lead arsenate is the most satisfactory of the insecticides used by the Maine station. It is apparently slower in action than the copper compounds of arsenic, but it can be more evenly applied, and it adheres firmly to the foliage without burning. Early application, as soon as the eggs hatch, is important, because the young, small slugs succumb more readily to arsenical poisons than do the large, nearly full-grown ones.

The purity of Paris green can be quite readily and fairly accurately tested by dissolving the Paris green in strong ammonia water. If pure all of the Paris green will dissolve, the solution turning a deep blue color. Undissolved sediment indicates impurities or adulterations. Another test is to place a little of the Paris green between two pieces of window glass and rub them together. If the Paris green is adulterated with lime, barium sulphate, or similar white materials, the Paris green will appear to turn white in places. Paris green of good quality is intensely bright green and uniform. When adulterated, the green loses something of its intensity and is grayish green and is not always uniform.

Although the purity of the Paris green is of the greatest moment, its mechanical condition is also important. To thoroughly protect the plant it is necessary that the poison be thoroughly distributed. It follows, therefore, that of two equally pure greens, the one that is in the finer powder will prove the more effective. In our experience there is greater danger of purchasing imperfectly pulverized than adulterated Paris green.

#### Blight Rust.

There are a number of fungous diseases to which the potato is subject which affect the foliage and annually cause large losses to the grower. Two of these so-called blights are very prevalent and there is no year but what they do much damage and in some seasons completely ruin the crop over large districts. There is no subject relating to potato culture which is now of so much importance as the blights to which this plant is liable. There is very little doubt that these enemies have come to stay, and that while in certain seasons and localities their ravages may be less than others, they are diseases which must be yearly taken into account in order to insure the success of the potato crop. There

are two kinds of blight, the early and the late. It is difficult to decide which does the most damage, although they work in quite different ways. The early blight kills the tops and stops the growth of the tuber. The late blight not only kills the tops but causes the tubers to decay.

#### Early Blight or Potato Leaf Blight (*Alternaria Solani*).

This disease is widespread and causes great damage. As the name indicates, it usually appears early in the season. It is confined to the leaves and green stems, and is usually first noticed about the time the tubers begin to form. Hot, dry weather seems to favor its growth, and it is usually most severe on dry soils. In Maine this disease is most prevalent in the more southern parts of the state, while it does comparatively little damage in most seasons in Aroostook county, which is the great potato section of the state. It is quite possible for the early blight to attack a field of potatoes and the owner not realize the fact, but think the death of the vines is due to early maturity. This fact very likely explains why early blight does not attract so much attention as late blight.

The first indication of the disease is the appearance on the leaves of spots, usually grayish brown, which soon become hard and brittle. The disease ordinarily progresses slowly; the spots become gradually larger, particularly along the edges of the leaves. At the end of two weeks, if the progress of the disease is not interrupted, half of the leaf surface may be brown, withered and brittle while the remainder is of a greenish color. It may be three or four weeks before all of the leaves are entirely dead. In the mean time, the stems keep green, but these finally succumb. The tubers stop growing nearly as soon as the leaves are attacked, and in case of an early appearance of the disease the crop is a failure.

Anything which interferes with the health of the plant predisposes it to this disease. Whenever the foliage has been injured, as by attacks of the flea beetle, the plant is more liable to the attacks of this fungus. Strong, healthy plants may be entirely free from the disease, while plants which have for any reason been checked in their growth are ready victims. Since vigorous plants are less likely to be attacked, one means of reducing the damage of this disease is to do everything that will keep the plant in healthy growth. Deep plowing, to furnish an abundant supply of plant foods; frequent tillage, to conserve the moisture; large pieces of well-kept seed, and protection from the flea beetle and Colorado potato beetle will do much to ward off this disease.

Bordeaux mixture is an effective preventive of this as of other fungous diseases. It is not a cure but a preventive, and to be of much value it must be thoroughly applied before the trouble presents itself. If the potatoes are treated with Bordeaux mixture and Paris green or other reliable poison as soon as they are two or three inches high, and the applications are followed up after each six inches of new growth of tops, the foliage will be kept healthy and vigorous and free from insect pests, which will in itself tend to lessen the liability of attack by this blight. The Bordeaux mixture forms a coating of copper which prevents the entrance of the blight into the tissue of the leaf.

#### Potato Blight, Late Blight or Rot.

This disease attacks the leaves, stems and tubers. Generally the first noticeable effect upon the leaves is the sudden appearance of brownish or blacking areas, which soon become soft and foul smelling. So sudden is the appearance of the disease in some cases that fields which one day look green and healthy may within the next day or two become blackened as though swept by fire. The rapid spread of the disease, which is caused



by a parasitic fungus, is dependent in large measure upon certain conditions of moisture and heat. A daily mean temperature of from 72 degrees to 74 degrees F. for any considerable time, accompanied by moist weather, furnishes the best conditions for the spread of the parasite. On the other hand, if the daily temperature exceeds 77 degrees for a few days, the development of the disease is checked. This fact explains why the fungus seldom occurs to any serious extent in sections where the mean daily temperature exceeds 77 degrees for any length of time, and probably why it appears later than the so-called early blight.

This fungous disease is an old offender, and until quite recently has been regarded as the most serious enemy the potato grower has to deal with. Because of the difficulty, in mild cases, of distinguishing between this and the early blight, much of the damage of the latter has in the past been overlooked or attributed to the late blight. In all severe cases it is accompanied by a strong, disagreeable odor, which is easily recognized after it has once been experienced.

Unlike the early blight it attacks strong, healthy plants as freely and readily as those that have been partially eaten by the flea beetle or Colorado potato bug. The age of the potato plant has little influence upon the spread of the disease. Apparently the fungus is able to thrive upon all potato foliage, and old and young foliage and plants suffer equally from its attacks. The late blight not only stops the growth of the tubers but causes them to rot.

This potato disease is sometimes called the "downy mildew," because in favorable circumstances a downy or moldy growth appears on the under surface of the leaves. This is white in color and of considerable density. The upper surface of the foliage does not show it, but wherever this frost-like growth is present it is almost certain that the potato rot fungus is pres-

ent. This external growth consists of the spores and all the parts bearing them. These spores mature very quickly and have the power of immediately propagating the disease. They are small and light and are carried rapidly by the wind. It is these bodies that cause the rapid spread of this potato disease. After maturing from the leaf, some of these spores fall to the ground and by rains, or otherwise, are brought in contact with the tubers under ground; here they germinate in the same way as upon the foliage. The color of the affected tubers changes, and unless the disease is proceeding with great rapidity, a brown, dry rot takes the place of the normal white color. Under favorable atmospheric conditions the disease may spread with such rapidity that a black foul-smelling, wet rot results. The decay may take place slowly, and produce black, discolored places throughout the potato, or it may occasion its complete destruction. It is, of course, possible that the disease may be communicated to the tuber through the stem, but this is not supposed to be its usual method of attack.

Fortunately the growth of this fungus, with all its attendant ills, can be prevented by the timely and thorough application of fungicides. Bordeaux mixture is the standard mixture for this as for the great majority of fungous diseases. The same treatment recommended for early blight will be efficacious in preventing the late blight upon the tops and the subsequent rotting of the tubers.

#### Leaf Diseases, etc., Resembling Blight.

Leaf burn or scald sometimes occurs and may be confused with early blight. The tips and edges of the leaves turn brown, and these discolored areas soon become hard and brittle. The burning or scalding may occur at any time and is the result of unfavorable conditions surrounding the plant. Long-continued cloudy and damp weather, followed by several hot

and bright days, is apt to result in the burning of the foliage. Leaf burn may also occur as the result of protracted dry weather.

Leaf poisoning or burning may occur where Paris green is applied to potatoes, and frequently it cannot be distinguished from early blight by an ordinary examination. It sometimes happens, therefore, that farmers are led to believe that their potatoes are affected with early blight and other diseases when the trouble has been brought on by themselves through the improper use of Paris green. Injuries resulting from the use of this substance are very apt to occur where flea beetles have eaten the foliage. The arsenic attacks the tissues at such points, and as a result more or less circular brown spots are produced, having for their centers the holes eaten by the flea-beetles. By combining the Paris green with Bordeaux or with lime, these injuries may usually be avoided.

#### Potato Scab.

Scab is one of the most widespread diseases affecting the potato, and is unfortunately too well known to need description. While injuries of various kinds produce a roughened surface, which is sometimes mistaken for scab, it is safe to say that nine-tenths of what is known as scab is due to the attack of a minute fungus studied and described by Dr. Thaxter, at that time mycologist to the Connecticut Experiment Station. The fungus will live in infested soil for years, and once established it is well nigh impossible to get it out of the land. Every precaution should be taken to keep land free from this disease. The most likely sources of contamination are potatoes used for seed, although farm manures may become a source of contamination, usually because of scabby potatoes or roots which have been fed to stock or added to the compost heap. All potatoes used for seed, whether apparently affected with scab or not, should before being cut be treated

with a weak solution of corrosive sublimate (formula 1) or formaline (formula 1a) and then spread out to dry. After drying, the potatoes may be cut and planted in the usual way, care being taken not to allow them to touch any box, bag or bin where scabby potatoes have been kept. All treated tubers should be planted, to avoid danger from the poison on them.

#### Summary.

Keeping in mind, as I stated at the outset, that there is no best method for growing potatoes more than any other crop, and that conditions must modify practice, the following are the general points to be observed in successful potato culture.

The soil must be thoroughly prepared and fined. Wherever possible there should be both fall and spring plowing. The potato crop seems to demand a complete fertilizer for its best growth. Farm manures are best applied broadcast, and either plowed in or worked in with a suitable harrow. For most localities with small summer rainfall flat culture is to be recommended. If the seed is to be dropped by hand the furrow should be opened with a shovel plow; if the planting is done by machinery the planter should be set so as to place the seed two to four inches below the surface. The rows should be thirty to thirty-six inches apart and the seed dropped twelve to sixteen inches apart in the row. The light application of commercial fertilizers (five hundred to one thousand pounds to the acre) for starting the crop will in most cases prove remunerative. This should be applied in the drill, care being taken that the fertilizer does not come in contact with the seed.

The seed should be well grown, medium sized and carefully kept in the dark and in the cold until time for planting. The seed should be soaked for two hours before cutting, in a solution of corrosive sublimate (formula 1) or formaline (formula 1a); because of its less poisonous qualities forma-

line is to be preferred. After being treated, the seed should be spread out and carefully dried, and not allowed to come in contact with anything that has been used as a receptacle for scab-by potatoes. This will prevent inoculating the soil with the fungus which produces scab, but will not kill the fungus already present in the soil. The seed should be cut into as large pieces as practicable, with not less than two eyes to each piece.

A few days after planting, the field should be harrowed with a fine-toothed harrow. This is the beginning of the soil mulch which it is important to keep over the land during the growing season so as to conserve the moisture. Furthermore, this first harrowing will kill the weeds which are beginning to germinate. It sometimes is practicable to harrow a second time before the potatoes are up. After the potatoes are through the ground the horse weeder can be used once to advantage. A fine-toothed cultivator should be used between the rows throughout the growing season, until the vines practically cover the ground. This can ordinarily be used to advantage as frequently as once in ten days, and should always be used after a rain of sufficient amount to compact the surface soil. It will, of course, be necessary to narrow up the cultivator as the vines begin to spread.

The fighting of insect and fungous enemies is as important as any other part of potato culture. The application of an arsenical poison is the only reliable inexpensive method for fighting the insect pests, and Bordeaux mixture is the only sure preventive of the blight. As soon as the potatoes are three or four inches in height they should be sprayed with Bordeaux mixture and Paris green (formula 3), or Bordeaux mixture and lead arsenate (formula 3a). This treatment should be repeated as often as the plants make five or six inches of additional growth. When the danger of the Colorado beetle is passed, Bordeaux mixture alone (formula 2) can

be used. The spraying should be continued as long as the potatoes continue to make rapid growth. To ward off the blights it is necessary that each leaf be protected so far as practicable with a coating of copper.

Spraying is the most effective method of applying insecticides and fungicides. To obtain the best results the material must be forced through a proper nozzle so as to make a very fine mist. On small fields a force pump, a hose, nozzle and a barrel for holding the spraying mixture, and a wagon for carrying the above, would constitute the necessary spraying outfit. This form of an outfit can be used not only for spraying potatoes but also used on fruit trees. In large fields, ten and twenty acres or more, it is advisable to use an automatic sprayer. In our practice we have found those that spray four rows better than where it is attempted to spray a larger number at one time. The Vermorel is the most satisfactory spraying nozzle which we have used. It throws a finer spray than others and is on this account easily clogged, and care must be exercised that the spraying mixture is carefully strained.

#### Formulas.

Caution.—The following formulas are for use on the potato. In many cases they are not adapted for more tender plants. Keep all poisons carefully labelled and out of the reach of children and animals.

##### Formula 1. Corrosive Sublimate.

Corrosive sublimate, ..... 2 oz.  
Water ..... 15 gals.

The corrosive sublimate dissolves readily in water.

##### Formula 1a. Formaline.

Formaline (40 per cent. solution formaldehyde), ..... 8 fluid oz.  
Water, ..... 15 gals.

##### Formula 2. Bordeaux Mixture.

Copper sulphate, ..... 5 lbs.  
Fresh lime (unslacked), ..... 5 lbs.  
Water ..... 50 gals.\*

\*An ordinary oil barrel holds about fifty gallons.

The copper salt is dissolved and the lime slacked in separate vessels. Dissolve the copper sulphate (blue stone) in about two gallons of hot water, in a wooden or earthen vessel, by stirring, or by suspending it from the top of the vessel in a cloth bag; pour the solution into the tank or barrel used for spraying and fill one-third to one-half full of water. Slack the lime by the addition of a small quantity of water, and when slacked add two or three gallons of water and stir freely. Pour the milk of lime thus made into the sulphate, passing it through a brass wire strainer of about thirty meshes to the inch (No. 50), or through a cheese-cloth backed by common window screen. Stir constantly while adding the lime.

Much time may be saved by preparing stock solutions. While any proportions can be used, the following was found in the spraying experiments made by the station a convenient way:

The stock solution of copper sulphate is made by weighing out fifty pounds of copper sulphate, placing it in a bag, and suspending it in the top of a barrel containing thirty gallons of water. The copper sulphate dissolves completely in a few hours. The stock solution of the lime is prepared by slacking fifty pounds of lime, and adding water so as to make it up to thirty gallons, and straining through No. 50 brass screen cloth. To slack and strain this amount of lime takes less than one-half hour. For use, three gallons of each solution and forty-four gallons of water make up the formula given above. The stock solution of lime should be kept well covered and be thoroughly stirred before dipping out.

Formula 3. Bordeaux Mixture and Paris Green.  
Paris green, ..... ½ lb.  
Bordeaux mixture, ..... 50 gals.

Make a paste with the Paris green and a little water. Add to the Bordeaux mixture and stir thoroughly.

Formula 3a. Bordeaux Mixture and Lead Arsenate.

Lead arsenate or disparene, ..... 1 lb.  
Bordeaux mixture, ..... 50 gals.

Formula 4. Paris Green.

Paris green, ..... ½ lb.  
Lime (unslacked) ..... 3 lbs.  
Water ..... 50 gals.

The standard remedy for the destruction of insects which eat the foliage or fruit. The lime is added to prevent the Paris green from burning the foliage. Slack the lime in a little water, make into a thin paste. Mix the lime and Paris green and add the remainder of the water. A stock solution of lime can be made as described under formula 2.

Formula 4a. Lead Arsenate.\*

Lead arsenate, ..... 1 lb.  
Water ..... 50 gals.

Arsenate of lead acts slower as a poison than Paris green. It can be kept suspended in the water better than Paris green; it does not burn the foliage and sticks to it better than Paris green. For these reasons it proved, in our experiments in 1900, more satisfactory than Paris green.

#### DISCUSSION.

Mr. Convey—Prof. Woods spoke of over-ripe seed potatoes. What are we to understand by over-ripe potatoes?

Prof. Woods—The longer the potato is kept growing the more starch it is storing up. With us, we seem to get the best results from seed potatoes when we dig them while the tops are still green, of a good size, but before they are absolutely mature. I do not think I can answer the question more definitely.

Mr. Convey—Would you consider potatoes where the growth has been stopped by blight,—would they make good seed?

\*Swift's lead arsenate or Bowker's disparene.

Prof. Woods—I would not take potatoes finished in July to plant the next spring. With early blight the growth would sometimes be stopped in July. If I were living in a locality where the seasons were long enough, I would plant some later potatoes for my seed for the next year instead of depending upon the crop for market. In Virginia this has been practiced with great success.

Mr. Matteson—What season of the year?

Prof. Woods—I would plant as late as practicable to harvest before frost. The potatoes should be stored at a low temperature, and it is pretty difficult to do that in August and September. If the potatoes are fairly matured by the middle of September there will be no trouble in storing them, and they will make better seed than if planted so as to mature earlier.

Mr. Knox—What is this horse weeder you speak of?

Prof. Woods—Do you have the Breed weeder? A. Yes.

Prof. Woods—That is all right.

Mr. West—Why do you use sulphur?

Prof. Woods—I did not mean to say that we use sulphur.

Mr. West—What do you use for treatment?

Prof. Woods—When I spoke of the use of sulphur I was talking about potato scab, and said if it once gets into the soil it is almost impossible to get it out, and that many experiment stations, prominently among them the New Jersey station, had tried different methods of getting rid of it, and that they had found sulphur to be the most efficacious. But they had to use such a quantity to the acre that its cost made it prohibitive.

Mr. West—That is contrary to my experience with sulphur.

Prof. Woods—Did you use a large application?

Mr. West—No, I used on two rows, twenty-four rods long, half a tablespoon of sulphur for each piece of tuber.

Prof. Woods—They scattered it all

over the whole field and harrowed it in just as we work in a fertilizer,—scattered it through the soil. Sulphur is perfectly insoluble. You have to move it mechanically somehow.

Mr. West—I used sulphur to affect the growing tuber and on the next two rows I used a tablespoon of salt on each piece of tuber with good result.

Prof. Woods—Salt is soluble. The sulphur would stay in one spot. Salt will take up water and will be distributed through the soil. I think the best way to do, if you have good clean land, is to let the scab-infected land alone.

Mr. Scott—Plowing under green crops has a good deal to do with curing scab.

Question—You stated that whole tubers were better than cut ones?

Prof. Woods—Yes, so far as the experiments went. I do not know whether that would be true carried out financially. Apparently the larger the piece of seed potato, the larger the yield, consequently whole tubers will give a larger yield than a small piece, but I do not know that it would work financially.

Mr. Scott—I think the U. S. experiments have shown that from one-fourth to one-half have been the best financially.

Mr. Millet—Do you always cut them?

Prof. Woods—Yes, we always cut them. They are usually cut into four pieces, taking a medium sized potato to start with.

Question—How many eyes in the pieces?

Prof. Woods—We plan to have not less than two.

Question—If you find a piece with a bunch of eyes, do you cut it?

Prof. Woods—No.

Question—What is the size or weight of a piece of potato, two ounces?

Prof. Woods—Not so large,—not more than one ounce.

Question—Would a small potato weighing one ounce give just as good

results as a one-ounce piece of a larger potato?

Prof. Woods—Has any man here tried it?

Mr. Brigham—In prepared ground they give larger results, because it doesn't dry out so fast.

Mr. Utter—Would you cut the potato according to its variety?

Prof. Woods—To some extent. Of course, with some varieties if the potato is very large, you can cut it into more pieces.

A Member—You say that a whole potato is better to plant and then you say you do not want any more than two eyes, and I have come to the conclusion that we will have to pick out the potatoes that have two eyes.

Prof. Woods—I did not say that, sir. I said that the piece of seed should have not less than two eyes.

Mr. Culbertson—Have you made any experiments along the line of increasing the starch content?

Prof. Woods—We have tried. The starch industry is a very important one with us. We made some experiments, hoping that sufficiently marked results might be had to induce the factories to buy potatoes by the starch content instead of paying the same for poor as for good ones, but the greatest success along that line, and that is not very marked, is in the character of the fertilizer,—anything that will keep the vines growing just as long as possible. Protracting the length of the growth will increase the starch content.

Mr. Selle—How long before planting would you cut seed potatoes?

Prof. Woods—In practice, if you have a large field, you may have to take advantage of weather conditions, and cut longer before than you would theoretically. It would be best four to six hours before planting.

Mr. Scott—Have you had any experience with the potato bug,—something like the squash bug?

Prof. Woods—The old-fashioned potato bug?

Mr. Scott—We have only had recent

experience with it. It is a long, three-cornered bug,—something like the bugs which have recently devastated our squash patches.

Prof. Woods—I am inclined to think from your description, it is what we call the old-fashioned potato bug, which did a great deal of damage, but it is best to let it grow, because, while in the adult stage it does a great deal of harm to the potato vine, it lays eggs with the grasshopper eggs and the young kill the grasshoppers. So, really, it is our friend.

Mr. Convey—Are early or late potatoes the most subject to blight?

Prof. Woods—That depends a good deal upon the season. It depends upon the climatic conditions, but the late blight grows best at a temperature of 72 degrees to 74 degrees. If we can get the potato out of the way before those average temperatures, we will not run so much risk with the late blight.

Mr. Convey—I think the late planting is the most subject to blight.

Prof. Woods—It is according to the atmospheric conditions.

Mr. Brigham—When you plant your seed six hours after cutting, do you recommend rolling the seed in plaster?

Prof. Woods—The results in experimenting are conflicting. In some cases the experiments indicated good results, but I have prejudice enough left from my father to prefer to roll them in plaster.

Mr. Selle—Are not ashes good for potatoes?

Prof. Woods—Yes. One reason why they have grown potatoes in Aroostook county successfully is that they have cut off a hardwood growth and burned it on the land.

Mr. Scott—Don't you want potash incorporated in a soil which has been apparently exhausted of that element?

Prof. Woods—Potash is soluble and the heavy rains would be likely to distribute it through the soil.

Mr. Brigham—How much ashes to the acre?

Prof. Woods—Ashes vary from one per cent. potash to seven or eight, and the composition makes a great deal of difference. In some localities, where the soil is deficient in lime, they are valuable because of the lime which they carry. The per cent. of potash varies according to the kind of the wood and the heat in burning.

A Member—We use forty to sixty bushels to the acre.

Mr. Scott—What varieties do you grow in Maine?

Prof. Woods—There is a fashion in varieties. At the present time the Green Mountain is the fad in Aroostook county.

Mr. Scott—What are good crops to grow with potatoes?

Prof. Woods—We are urging at least a three-year rotation. If I lived in Minnesota I should preach against continuous wheat growing. In our country we usually overdo the thing. A very good rotation is to grow the potatoes with either farm manure or a commercial fertilizer; the next year seed with grain, mixed with alsike or red clover; the third year cut one crop of clover and plow under in the fall to have it ready to grow the potatoes on again. You get the advantage of a large amount of nitrogenous matter in the soil from the roots and stubble of the clover.

Mr. Hughes—How do you apply manure to the potatoes?

Prof. Woods—We apply it broadcast and work it in. With a commercial fertilizer we plant with planters and apply in the planter at the time the potato is planted.

Mr. Hughes—Have you had any experience with the potato called the "State of Maine?"

Prof. Woods—Personally, no.

Mr. Hughes—When do you cut your potatoes?

Prof. Woods—When convenient. In theory, a few hours before planting.

Mr. Scott—Don't you think a three-year rotation is too short?

Prof. Woods—Yes, I do. But, you

understand, a three-year rotation is far better than a two-year.

Mr. Brigham—You advise a thorough cultivation of the soil before planting. Is there any danger in getting the ground too solid?

Prof. Woods—You know your own land and I do not. On the kind of land that I am talking about a thorough preparation of the soil would not make it too solid.

Mr. Utter—Don't you think that the mechanical condition of the soil has something to do with success?

Prof. Woods—Very much.

Mr. Utter—The plowing under of the clover has much to do with the mechanical condition when we have light, sandy soil with too little humus, —and also with clay soils.

Prof. Woods—I think you are right. Every man knows his own farm, and naturally nobody else can know it as well. A man has to get acquainted with his own soil.

Mr. Scott—I think the lack of vegetable matter in Wisconsin soils is a very common fault.

Prof. Woods—Then the clover crops would be the best thing for you.

A Member—Yes, but we cannot grow clover.

Prof. Woods—I think some of your farmers can. Find some one of your neighbors that grow it successfully and learn from them.

Mr. Scott—If you were living further north, there would be no difficulty in growing clover.

Question—What is the best method of cultivation?

Prof. Woods—For ordinary sections, where there is liable to be a lack of moisture or rainfall, level cultivation is extremely satisfactory.

Mr. Purvis—Did you ever try a weeder?

Supt. McKerrow—I believe Prof. Woods said that all weeders were good.

Question—A piece of land planted and after it was first harrowed, put part of it under a covering of straw

or even manure and not cultivate it any,—did you ever try that?

Prof. Woods—I have never tried it.

Supt. McKerrow—You do not have straw enough, do you?

Prof. Woods—No, we have not.

Mr. France—What variety of insects work upon potato bloom?

Prof. Woods—I do not know. I do not think that the honey bees work upon the potato blossoms. The potato is closely related to the tomato and the bees do not work upon the tomato.

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

Prof. Woods—We do not plant in hills. We plant in rows and put them from fourteen to sixteen inches apart in the row and one piece in each place.

Mr. France—How far apart are the rows?

Prof. Woods—From twenty to thirty-six inches.

Mr. France—About how deep do you plant them?

Prof. Woods—From two to four inches.

Question—Is three inches about right?

Prof. Woods—That would be the average.

Supt. McKerrow—Would not the depth depend upon the soil?

Prof. Woods—It would depend upon that very largely.

Supt. McKerrow—Would you plant the deepest in loose, porous sandy soil, or in heavy clay?

Prof. Woods—Well, if the heavy clay was not going to be easily pene-

trated and could not be worked up real well, I would plant deepest in that, because there would be so much more danger of crowding out and getting sun-burned.

Mr. Convey—Prof. Woods, stated that he would prefer to keep the seed in a dark place until planting time. We have tried cutting the seed and exposing it to more or less light for a short time and it would start a single green sprout that would help to make the crop earlier later on.

Prof. Woods—There are several ways that have been worked out very successfully for getting early potatoes, and among others the one you suggest.

Mr. Scott—About the depth of planting, would it not depend largely upon the drainage of the soil and also the time of planting?

Prof. Woods—All of those things must come into consideration. No man can make rules for another man to follow on his farm.

Mr. Brigham—Would you plant early and late crops the same depth?

Prof. Woods—Now you are getting beyond my own practical knowledge. You see, we only have one crop.

Mr. Scott—It is practiced in this state. We plant late crops from the last of May to the 10th of June, about four inches in depth.

Mr. Convey—You spoke about the bleeding of the seed at cutting time. Would it be as detrimental in moist as in dry soil?

Prof. Woods—Probably not.

The Institute adjourned to 7:30 p. m.



## EVENING SESSION.

The Institute convened at 7:30 p. m., MR. L. E. SCOTT in the Chair.

## AGRICULTURE IN THE PUBLIC SCHOOLS.

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

Harvard's brilliant President, Edward Everett, in a speech delivered in 1837, over sixty years ago, said that next to eternal things, the people of the U. S. showed most interest in education. Did he live now, he might not make his exception, if we may trust Gen. O. O. Howard, who recently declared we have no more theological sermons because ministers themselves are so busy with the practical details of this life of doing. If we do not lose sight of heaven, it seems to me the best possible preparation for it is to live aright the life that now is. I always take pleasure in presenting agricultural education, because it certainly has much to do with our material prosperity, and surely we can look up through Nature to Nature's God. Though God is behind history and figures, agriculture opens a more direct path to Him than figures do.

## Why Teach Children Agriculture?

Usually the first question asked me is "Why teach children agriculture?" To help preserve a balanced state of our population, I reply. According to various statisticians, city population is gaining by a much more rapid per cent. than our country population is. In the last one hundred years, the collective population of our cities has doubled itself one hundred and fifty times, while that of the rural districts has only doubled itself fifteen times. Of our people, 40 per cent. now live in cities, 20 per cent. in villages, and 40 per cent. are farmers.

## Advantages of Rural Life.

Naturally, this is the next question which comes: "Is the country any better place to live in than a city?" Well, where do poets, artists and novelists go for subjects and examples, when they wish to depict innocence and comfort, and where when they portray sin and suffering?

According to the researches of Arthur McDonald, for the Journal of Sociology, and he is said to have examined five thousand children, those of the city are more vivacious, while those of the country have more endurance, and, after five years of age, country children are taller and weigh more. Mr. Wm. Porter, who is said to have examined thirty thousand children in St. Louis, and other scientists in the U. S., France and Russia, find a general correspondence between brain power and weight of children, that is those promoted oftenest and easiest, average better size than the laggards at the foot of classes.

Putting these conclusions together, we see the country is not only the best place to grow cabbage, but also to grow bodies and brains. You remember when Senator Dolliver interviewed the great men of New York city, he found every last one walked in from the country, except Theodore Roosevelt, just one exception to keep city boys from despair.

## Agricultural Text-Books and Teachers.

One frequent objection has been "There are no text-books." A demand

always creates a supply. The textbooks are in sight, and when states make agriculture a branch of public instruction, Normal Schools will attend to fitting the teachers. It is hardly a passing fad, like so many things that have wearied the souls of teachers. The Agricultural colleges, Experiment Stations, and various agricultural and horticultural societies, inaugurated at great expense, are anxious for new recruits and are a large body of men to reckon with.

One county superintendent of schools sent word to me there was nothing a young woman could teach about agriculture which a farmer would value. Yet, many a young woman very acceptably teaches the science of numbers, who never did try to measure a load of stone or wood, and some of them couldn't if they tried. I remember a brilliant and popular Farm Institute speaker, who always began by saying "Now, farmers, don't ask me how to plow, because I never turned a furrow, but I have studied soils."

#### Some Methods of Teaching Agriculture.

Let us take up some of the more important methods of teaching agriculture, or practical Nature study.

Children learn a great deal by mere absorption. Instead of entirely covering school house walls with spelling and geography charts, we might have some charts of the birds helpful or injurious to the farmers, as does every rural school house in France. The State University of New York has made a specialty of charts of insects injurious or helpful, and the Minnesota Agricultural college is preparing grain charts, showing stages of growth and how inflorescence and kernel appear under the microscope. I remember one school room with an impressive picture of Luther and his open Bible, unfortunately flanked on one side by a pictured bottle of Hire's root beer and on the other by a gay reaping machine, and this is a frequent office combination. Could we

not teach the children, and through them the homes, that grains and grasses, alone, make a more artistic decoration than unsuitable pictures or combinations?

Some microscopes and a field glass would cost no more than globes. One of my great pleasures, the past summer, was looking through a microscope at the flowers of my double white hollyhocks, the seeds of which came from Whittier's garden. Among other wonders of construction, the petals seemed covered with diamond dust, invisible to naked eyes.

If there is an intelligent farmer and tidy farm near the school house, let the teacher ask permission to go there some afternoon and be escorted around. Then ask the children who accompany, to write essays on their inspection, and draw plans of the farm and fields, locating the buildings. Even in general essay writing, at other times, rural subjects have been too often neglected for "high-flown" topics.

Besides seeing agricultural work, there is much doing which can be arranged. In an experimental garden, a variety of seeds may all be planted at the same depth. Some will come up readily, others with great difficulty, and some be lost entirely, showing seeds require different depths. Similar seeds may be put in different soils, that the effect of sand, clay, or humus may be seen. Soils in the neighborhood can be washed and sifted, to discover the proportion of sand, etc. These are exactly the things Agricultural colleges are doing more elaborately and perfectly. Old seeds or "weedy, mixed seeds could be used, to determine what percentage of valuable growth resulted.

My soul is weary of letters from Northwestern poultry keepers, asking whether they shall buy screenings or wheat itself. If screenings are sixty cents a bushel, or a cent a pound, and one-third of the bushel is foxtail or mustard seed, our wheat kernels will really cost one and one-half cents a pound, equal to clear wheat at ninety

cents a bushel, because poultry rarely eat those weed seeds uncooked. If teachers in that section, even without ever sowing any wheat or clover, would get small samples of these seeds, have pupils pick them over and compare face and real values, they would learn much, and I be relieved.

#### Decorating School Grounds.

Then, there is decorating school grounds, in which children should have an important part, helping to plant the trees, pulverizing the new bed, keeping the roots wet in transit, firming the earth under the tree trunks, and trimming the heads according to amount of roots saved. Grafting and budding are easily taught and learned in connection. Our fine trees in the West Salem school-yard, are all in front of the building and on the north side, at that. Let children discuss arrangement, and learn that a background for main building and a screen for outhouses, is most effective.

#### Study of Birds.

A bright woman who heard this lecture once, brought up her boy to talk with me at its close. "He is so fond of Nature study," she said. "No, I am not," very unexpectedly and emphatically broke in the boy. It was quite embarrassing for his mother, and a trifle so for me. By tactful inquiry, I found he was learning, in school, the divisions of birds. Accipiters, passeres, etc., scansores, gallimaceae, grallatores, natatores, brevipennate, and you would not like those names, yourselves. "Does your teacher ever walk and talk with you, and show you the birds eating those insects which would otherwise ruin our crops and trees?" I asked. "Oh, yes," said the little fellow, and, fairly clapping his hands, he gave a most animated, intelligent account of what had been done in that line. Here is testimony to the value of practical Nature study or agriculture, and also to the advisability of conducting such instruction as much

as possible, away from text-books and out of doors.

#### Weeds.

President Roosevelt says the greatest internal question is how to preserve and enlarge our forests. If I should give specimen talks on that great subject, or on the formation of soils, would never get done, so will, instead, make some suggestions about weeds.

Perennial weeds, you know, have long roots, spreading in different directions, like those of shrubs. These weeds mean to stay, and prepare to draw on a large territory and get well anchored. The fight with them must be constant and complete. Biennials have a tuberous root, in which is stored material for the second and main year, while annuals, which must get their nourishment quickly, have a thick, circular mat of short roots. If biennials and annuals can only be kept from seeding, they will disappear. Pasture grasses have roots more like annuals, and may seem an exception, but they are only meant to grow thickly, giving us beautiful turf, while couch grass, and other undesirable sorts, have the long, branching perennial style of root.

This whole lesson can be taught children, in any school-yard, or by any road-side, and would have a great effect on cleaning future farms.

#### In Conclusion.

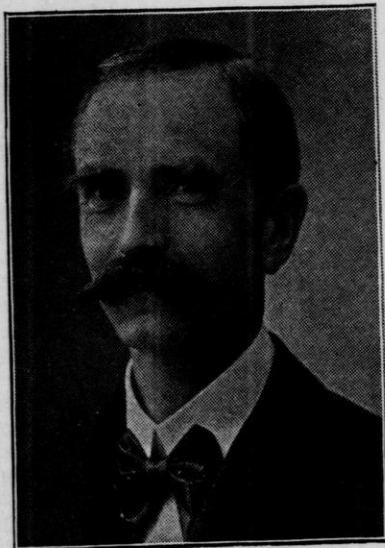
I call the country school teacher, the educational "maid of all work." When we get consolidated rural schools, may we not, next hope that both here and in towns or cities, there will be, for each school, one instructor who can teach agriculture, the foundation of all other kinds of business, and also one other instructor who can teach cookery, or transmuting farm products into healthy boys and girls? Are not some modern educational ideas "far fetched?" Was not the clerk correct, who, taking civil service examination, was asked the sun's distance from the

earth, and replied he did not know, but was sure it was not near enough to interfere with his work?

"Is not the word of truth very high thee, even in thine own mouth?"

## MODERN METHODS OF DOING BUSINESS.

REV. THOS. W. NORTH, Milton, Wis.



Thos. W. North.

Modern business methods are in decided contrast with the methods of former years. This change is apparent in every line of business. How different the work and business on the farm as compared with those of forty or even twenty-five years ago, and what is so plainly manifest there is but on a parallel with what has taken place in all lines of business.

When we speak of the farm of former days, we think of the sickle, the scythe, the flail, a crude plow, and an ox-team, or of the ever-present knitting needles, the hand cards, the foot-power spinning wheel and of the

quarter acre of shallow milk pans and the old hand-dash churn, that was a true test of the perseverance of the saints.

In former days the shoemaker went from house to house with his tools and roll of leather, staying until he had the family shod for the winter, and he was followed in his rounds by the tailor, the clock tinker and the peddler with his pack.

This has all changed and on the farm we have the era of improved machinery. Now we see the traction engine, the gang-plow, the self binder, the steam thresher, and the horse-power corn planter. The farmer takes his milk to the creamery, where it is separated and churned and worked by steam power. Great mills and factories card and weave and knit and make the clothing for the family much easier and cheaper and better than it could be done at home. Machinery has done much to emancipate the farmer and especially the farmer's wife.

The traveling man of today is not the shoemaker, the tailor, and the clock tinker, but the army of men sent out by the great commercial houses to deal with the merchants and supply them with goods. The small shop, in which one man with a few tools did all departments of work, has given place to the large factories with hundreds of men and costly machinery. Business on a large scale and with vast capital is one of the characteristics of the present time.

Our grandfathers never dreamed, in their most visionary moments, of the

vast scale on which business enterprises are conducted at present. An old adage was "As rich as Croesus," but Croesus was a pauper as compared with the great merchant princes and business kings of our day. The total wealth of Croesus, the Lydian king, would scarcely have equaled the annual income of the men of our day.

#### Magnitude of Business Enterprises.

In magnitude of business enterprises, our day is the marvel of the centuries. One of the best illustrations is the United States Steel Corporation. This great corporation, with a capital of \$1,404,000,000, was organized by Mr. J. Pierpont Morgan in January and February of 1901, and is, without doubt, the largest concern of the kind ever organized by man. In two months Mr. Morgan bought out and consolidated into one great corporation eleven of the great steel and iron companies of the country and within three months from the time of buying the first plant had this great corporation perfected and doing business as the United States Steel Corporation. In this transaction Mr. Morgan bought the interests of The Carnegie Company for \$160,000,000 and the Federal Steel Company for \$200,000,000, and \$50,000,000 was the smallest amount paid for any of the eleven companies' interests. Our fathers did business on the scale of hundreds of dollars, and sometimes transactions reached thousands or tens of thousands, but today it is hundreds of millions.

#### Concentration of Great Wealth.

One of the marked features of modern methods is the concentration of great wealth in a few hands and the concentration of business enterprises into great trusts and corporations. The multi-millionaire, or even the millionaire, is a recent product. Forty years ago there may have been one or two persons in our country worth a million dollars each. Today there are perhaps a dozen who are worth not

less than one hundred million each and a hundred families whose average wealth is \$25,000,000, or more. No other nation can furnish such an array of wealthy men. The richest dukes and lords, or bankers and railroad magnates of the old world cannot compare in wealth with our rich Americans. We have departed a long way from the simplicity and equality of former times.

"Sixty years ago," says James Bryce, M. P., "there were no great fortunes in America and few large fortunes and no poverty. Now there is some poverty, many large fortunes, and a greater number of gigantic fortunes than in any other country of the world. . . . Great fortunes will continue to be made, they will be less easily and quickly spent than in Europe, and one may surmise that the equality of material conditions, almost universal in the last century, still general sixty years ago, will more and more diminish by the growth of a very rich class at one end of the line and a very poor class at the other end."

This was written nearly twenty years ago. During those twenty years the building up of great fortunes has rapidly increased. United States census expert Geo. K. Holmes, shows that seventy-one per cent. of all the wealth of the country is owned by nine per cent. of the families. Thirty-six per cent. of the families own ninety-one per cent. of the wealth and thus the other sixty-four per cent. of the families own but nine per cent. of the wealth and more than half of these own nothing.

Only one man in four in New York City at death leaves any property except his clothing and household effects. One-tenth of the families own more than three times as much as the other nine-tenths.

A few years ago, Extra Census bulletin No. 63 revealed the fact that at that time two-thirds of our people lived in rented or mortgaged homes. Only about one-third owned their homes unincumbered.

These facts furnish food for medi-

tation. Wealth does not necessarily make a man dangerous, it may make him a great benefactor, it certainly gives him great power. In a government like ours the concentration of so much power in a few hands is certainly not the most healthful conditions of affairs.

"Every age in its decline," says Cannon Farrar, "has exhibited the spectacle of selfish luxury side by side with abject poverty, of

'Wealth a monster gorged'  
'Mid starving populations'

"Avarice and luxury," says Charles Sumner, "have been the ruin of every great state." "Sedition," says Bancroft, "is bred in the lap of luxury."

We in America are apt to think that this condition of affairs prevails to an alarming extent in many European countries. While we may learn useful lessons by studying our neighbors across the seas, we may find some material for reflection nearer at home. If anarchy and dangerous socialism ever make any great headway in our country, it will be because of the abuse of the power that great wealth gives.

#### Power of Trusts.

Our people rebelled and sought freedom from British rule because of taxation without representation. The great trusts and monopolies of the present day have power to tax the people far beyond anything of which the British people ever conceived.

Several years ago the Sugar trust, without any just cause, advanced the price of sugar three cents a pound and held it at that price for several months. It was practically an arbitrary tax levied by a great corporation for private use. Had the advanced prices been maintained for a year, it would have been equivalent to a tax of \$90,000,000. Compared with this the famous British tea tax, against which our fathers rebelled, was a weak and sickly infant in both size and odious qualities. In this latter case we had little means of redress, except to refuse to use sugar. In the neighbor-

hood of \$25,000,000 was the neat little sum, over and above otherwise large profits, that the trust gathered in by this tax.

At this time, according to the New York Commercial Bulletin, the annual profits of the trust was \$25,593,000. The trust was at the time capitalized for \$37,500,000, of seven per cent. preferred stock and \$10,000,000 of six per cent. bonds. After paying the interest on the preferred stock and on the bonds, the profit on the common stock would be 59.65 per cent. This ought to be sufficient without the additional tax. Subsequent Congressional investigation revealed the fact that this trust virtually bought up both the great political parties in 1892, at least so far as the tax on sugar was concerned, and dictated the sugar schedule on both the McKinley and Wilson tariff bills.

#### Danger of Great Business Combinations.

It is the abuse of the power of wealth that makes these great business combinations, called trusts, dangerous. Their rights and powers should be carefully prescribed. The large business enterprises of modern times cannot be successfully conducted without large capital and the large combinations are essential to the fullest development of our vast resources, if honestly and safely conducted they would prove a blessing; they become a menace and a curse because they are so often selfishly and dishonestly conducted. By this means the large stockholders defraud the small holders, kill competition and rob the people.

#### Standard Oil Company an Illustration.

One of the most striking illustrations of this is the rise of the so-called Standard Oil Company, first known as the "South Improvement Company." The South Improvement Company made a secret contract with all leading lines of railroads, the principal features of which were:

1. To double all freight rates to all competitors (other oil companies) and to pay the extra charge collected from competitors into the treasury of the South Improvement (or Standard Oil) Company.

2. To make any other changes in rates necessary to guarantee the destruction of competing companies and the success of the South Improvement Company.

3. To spy out the details of their competitors' business and to make daily reports to the South Improvement Company of all the shipments by other persons, with full particulars.

This secret contract would give to the South Improvement Company an average of nearly a dollar a day on each of the eighteen thousand barrels then being produced daily by competing companies, with no work whatever on the part of the company itself.

A member of the Congressional committee of investigation estimated that the railroad companies under this agreement in a single year paid to the South Improvement Company's treasury \$6,000,000, collected as extra freight rates from other oil companies. The result was disastrous, business failures were multiplied and there was general distress in the oil regions and the commercial panic of 1873 was partially caused by the unjust manipulations of this company.

History of trade furnishes few parallels of the extortions and usurpations of power as those practiced by the Sugar trust, the Whiskey trust, the Standard Oil Company, the Big Four Meat trust and the Western Grain Elevator combine. These great trade pirates have largely secured this great power in the business world through secret contracts with the railroad lines, similar to those mentioned between the railroads and the South Improvement or Standard Oil Company.

#### Legislative Investigation in Minnesota.

The Minnesota legislature, by an investigation in 1892, revealed the fact that the wheat elevator combine con-

trolled the buying and shipping of all wheat from the Northwest, forced the freight rates on all roads and thus completely controlled the wheat market. It was estimated that by this understanding with the railroads the farmers were being defrauded to the extent of \$5,000,000 annually. The "Big Four" meat packers have controlled the market price of meat and live stock in a similar manner.

#### Public Ownership of Railroads Necessary.

For some years every Congress and many state legislatures were called upon to appoint committees to investigate the encroachments of some great trust or corporation and not infrequently such investigation revealed the fact that the corporation had been far-sighted enough to anticipate such action. Congress has more than once been balked in such investigation by pre-election pledges made to private corporations. The interstate commerce law was passed to meet this difficulty, so far as the railroads are concerned. In my opinion the bill needs an over-hauling. While no doubt it has accomplished much, it has not done all that is desired. The railroads are our creatures and should be under our control and should not be used as a means of injuring the public. I should be in favor of annulling the franchise or charter of any road that would enter into any such secret compact as that I have mentioned. Better that the public own the railroads than that the public be owned by the railroads.

#### Annual Income of Trusts.

The annual incomes of these gigantic trusts and combinations is fabulous. The New York Sun several years ago, speaking of one of the trustees of the Standard Oil Company, said: "His regular income is twenty millions of dollars a year." The New York Mail and Express places the income of one of the Vanderbilts at \$30,-

000,000 a year. This is more than three times the annual dividend of the Bank of England to all its stockholders.

The dividend of the Standard Oil Company from 1891 to 1895 was twelve per cent. a year on its capital. In 1896 it was thirty-one per cent; in 1897 it was thirty-three per cent; in 1898 it was thirty per cent; in 1899 it was thirty-three per cent; in 1900 it was forty-eight per cent; in 1901 it was forty-eight per cent, and a similar dividend, amounting to \$20,000,000 has just been distributed.

#### Average Wages of Working Men.

The average wages of working men is not far from \$600.00 a year. In the state of Massachusetts, the average of working men's wages is \$558.68. An income of \$20,000,000 a year, the income, according to the New York Sun, of one of the trustees of the Standard Oil Company, is equivalent to an income of \$53,680 a day, or \$5,368 an hour, for a ten-hour day, more than the average income of thirty thousand laboring men. Vanderbilt's income of \$30,000,000 is equal to the average income of fifty thousand laboring men. A man who earns \$1,000 a year must live a thousand years to earn \$1,000,000,000.

Richard H. Titherington, in Munsey's Magazine for October, 1894, says that William Vanderbilt inherited from his father \$75,000,000 and in nine years had added quite or nearly \$150,000,000, an increase of fortune over and above all expenses of more than a million dollars a month for nine years; and such a fortune would be equivalent to more than \$10,000 a day for fifty years.

#### Plea for More Even Distribution of Wealth.

These things are out of right proportions and the tendency is not a healthy one. A more even distribution of wealth is a safer condition. Large fortunes and reasonably large incomes are to be expected and are not

necessarily dangerous. Our civilization demands accumulation of wealth. We cannot have well-equipped schools and large charitable institutions and great business enterprises without considerable accumulations of capital and naturally more will be in some hands than in others. To this no reasonable person can object. The thing to which we object is that the directors or managers of a great financial concern should unjustly use their power to defraud and rob smaller stockholders and oppress the people, and add millions to their fortunes that rightly belong to others.

#### State Should Prescribe Powers of Corporations.

A few directors or trustees of a large corporation can, in a few days, by skillful manipulation of the stock markets, transfer to their own account, without any return, millions of dollars that belong to smaller stockholders, who are outside the management. Because of the growing numbers, size, wealth and influence of business corporations, the state should have better control of them. It is useless longer to say that the natural competition of business will correct these things. It will not. As another has said: "Two or three men at the head of the management of a combination or trust can, at will, abolish the law of supply and demand, set aside the principle of competition which has governed the commercial world since the beginning of commerce, close factories, tell thousands at a time whether they can work or not, determine who shall and who shall not do business, and dictate to the public both their market and also the price they shall pay."

This being the case, the state that grants the right for the corporations to live and do business should more definitely prescribe their powers. The state should govern the corporations and not the corporations the state. The time has come when definite steps should be taken to correct these evils.



### Prevalency of Trusts.

One or two such trusts as the Standard Oil or the Sugar trust are objectionable, but they are by no means alone. We meet them at every turn. From the time we first take our milk in infancy through a rubber nipple, all through the journey of life, the "Trust" is on our track to tax us at every turn. The rubber nipple and, in many cities, even the milk is subject to trust monopoly. At last, wearied with the unequal task, we lie down for our last long sleep. Surely now with us the days of the Trust are numbered, but it is not so, for there stands the Coffin trust to tax us on the casket that receives our earthly remains. Finally we are lowered to our last resting place in the bosom of mother earth and the sexton rounds the mound above us. Surely now the dread monster can disturb us no more! But there stands the Marble trust demanding his stipend on the slab that is to mark our last resting place. And now it is suggested:—

"Let us corner up the sunbeams  
Lying all around our path;  
Get a trust on wheat and roses,  
Give the poor man thorns and chaff;  
Let us find our chiefest pleasure  
Hoarding bounties of today,  
So the poor shall have scant measure  
And two prices have to pay.

Yes, we'll reservoir the rivers,  
And we'll levy on the lakes,  
And we'll lay a trifling toll-tax  
On each poor man who partakes;  
We'll brand his number on him  
That he'll carry through his life;  
We'll apprentice all his children,  
Get a mortgage on his wife.

We will capture e'en the wind-god,  
And confine him in a cave;  
And then through our patent process,  
We the atmosphere will save;  
Thus we'll squeeze our little brother  
When he tries his lungs to fill,  
Put a meter on his windpipe  
And present our little bill.

We will syndicate the starlight,  
And monopolize the moon,  
Claim a royalty on rest days,  
A proprietary noon;  
For right of way through ocean's  
spray  
We'll charge just what it's worth;  
We'll drive our stakes around the  
lakes,  
In fact we'll own the earth."

### Laws for Treatment of the Problem.

A study of the laws of the different states will show a great variety of treatment of this problem. The laws of the state of Massachusetts are in advance of most, if not all, of the states, on this question and can be studied with profit.

In Massachusetts no corporation can do business until the whole amount of its capital stock has been paid in and a certificate of that fact, and of the manner in which it has been paid, signed and sworn to by the president, treasurer, and a majority of the directors, has been filed in the office of the Secretary of State. It further provides that all property offered as stock must be entered at a reasonable valuation and this must be sworn to by the president, the treasurer, and a majority of the directors, and must be examined by the proper state or county official and he must certify that the stock has been fully paid at par in cash or its equivalent.

This prevents the watering of stock or entering property at fictitious values and prevents deception of the public and makes it more difficult to defraud the smaller holders of stock.

In addition to this all directors of corporations should be regarded as simply trustees, dealing with trust funds, a trust as sacred as that of the administrator of an estate, and should be placed under bonds and be made amenable to the courts and no director or officer of a corporation should be allowed to directly, or indirectly, buy or sell the stock of the corporation during his term of office, and all books and transactions of all business cor-

porations should be subject annually to as careful inspection by a proper state officer as are our national banks. This would bring to light any such secret contracts with railroads and transportation companies as those that we have mentioned.

**Modern Means of Travel.**

In means of travel and rapid transmitting of intelligence, the past had nothing that will compare with our modern methods. Mackenzie tells us in his history of the nineteenth century that "toward the close of the eighteenth century Lord Campbell accomplished the journey from Edinburgh to London in three days and three nights. But judicious friends warned him of the danger of this enterprise and told him that several persons who had been so rash as to attempt it had actually died from rapidity of motion." The distance is four hundred and twenty miles, an average of less than six miles an hour. An athlete on a bicycle and a good road could accomplish that journey in the same time and have his nights for sleep. The distance from Minneapolis to Chicago is three hundred and twenty-five miles and you can eat your supper in Minneapolis, go to bed in a Pullman sleeper, and, after a good night's sleep, eat your breakfast in Chicago, with no thought of danger from rapidity of motion.

On October 24, 1895, a train of two parlor cars and one private car ran from Chicago to Buffalo, New York, a distance of five hundred and ten miles, in eight hours, one minute and seven seconds, at one time attaining the speed of ninety-two miles an hour.

**Rapid Transmission of Intelligence.**

The methods of transmitting intelligence have made no less rapid strides than speed in travel. Great efforts were made to send with all possible speed the news of the victory of Waterloo to London, but it took three days. This was in 1815. Such

an event today would be known in all the commercial centers of the world before the smoke had cleared away from the field of battle.

On the 16th of May, 1896, at the National Electrical Exposition at New York, Mr. Chauncey M. Depew sent out a telegram, which, after making a circuit of the world, was returned to the same building. The message went from New York to Chicago, thence to Los Angeles, Cal., to San Francisco, to Vancouver, British Columbia, thence to Winnipeg, to Montreal, was cabled to London, thence to Lisbon, Spain, to Gibraltar, to Malta, to Alexandria, Egypt, to Suez, to Bombay, Madras and Singapore, India, to Shanghai, China, to Nagasaki and Tokyo, Japan, and thence returned over the same line to the exposition building at New York just fifty minutes from the time when it was sent out, having traveled twenty-seven thousand five hundred miles. In a similar manner another message was sent to Galveston, Texas, thence to Mexico around the South American continent, then cabled to Lisbon, Spain, then to London and back to New York, a distance of ten thousand miles in twenty-one minutes.

Modern ingenuity and modern business enterprise have transformed the world and practically annihilated distance. The telegraph, the telephone and the phonograph, with many other great improvements and inventions, are of our own time. Today a man can speak or sing in New York and be heard in San Francisco, the very tones of the voice being recognized. On the anniversary of the great Chicago fire, Oct. 9th, 1896, there was a grand celebration and four long distance transmitting telephones were placed behind large funnels at a point in the line of the procession and a constant strain of music from the different bands, combined with the cheers of the people, were heard in New York, Boston, Philadelphia and other places, the very words of the cheers being distinctly audible.

Such are the wonders of modern science and business enterprise. The telegraph, the telephone, the great daily newspapers, the fast mail trains and the rural delivery have made the people of the world neighbors and opened a field for business opportunities such as the world has never before furnished. It should be a clean and honest business, without avarice, fraud or selfishness.

## WHAT THE NATION IS DOING FOR THE AMERICAN FARMER.

DR. WILFORD M. WILSON, Representative of the U. S. Department of Agriculture.



Dr. Wilford M. Wilson.

Agriculture is the basis of national greatness. It furnishes the sinews of war and fosters the arts of peace; ladens fleets, builds railroads, feeds humanity, and turns the wheels of Commerce and Industry.

There is perhaps no better evidence of the greatness of our own country than the fact that there is probably no other nation on the face of the globe

which, in the aggregate, employs so much money and so many persons in the service of agriculture as does the United States at the present time.

The recognition of the needs of the country in this respect came early in the life of the Republic, but in its early struggle for existence, Agriculture received but scant encouragement and still more meagre support from the National Government. But Washington and others soon saw that to develop a great country first meant the development of a practical, scientific Agriculture and that this was only possible under a wise system of national patronage. He did not, however, appear to be sanguine of its early accomplishment. Or at the beginning of his second term he said "It will be some time, I fear, before an agricultural society with congressional aid will be established in this country; but we must walk, as other countries have done, before we can run." The following years of his administration only served to impress him still more forcibly with the necessity of at once publicly recognizing and fostering the farming industry of the country and in his last message to congress he urged upon that body the importance of providing for the development of scientific agriculture under national supervision. In that message he touched the key note of agricultural progress

and marked out the foundation upon which the great superstructure of Agriculture in this country stands to day. He said, "In proportion as nations advance in population the cultivation of the soil becomes more and more an object of public patronage. Institutions grow up supported by the public purse. . . ."

#### Action by Congress.

Among the means which have been employed to this end, none have been attended with greater success than the establishment of boards composed of public characters charged with collecting and diffusing information, and enabled by premiums and small pecuniary aid to encourage and assist a spirit of discovery and improvement. This species of establishment contributes doubly to the increase of improvement by stimulating to enterprise and experiment, and by drawing to a common center the results of individual skill and observation and spreading them thence over the whole nation.

Congress was not slow to act on these suggestions and during the earlier years small appropriations were made for obtaining the latest and best information on agricultural matters and its dissemination among the people, as well as for the introduction into the new country of new and desirable varieties of seeds and plants.

The first distribution of seeds was made under the direction of the Commissioner of Patents in 1836 and the first garden for the cultivation and improvement of economic plants was established in 1852. Ten years later the work which had been previously carried on by various officials was consolidated with Isaac Newton as Commissioner of Agriculture.

The endowment of agricultural colleges by congress, which followed in the same year, and the organization of agricultural experiment stations in 1887, for the advancement of practical education in agriculture and for the dissemination of correct information

to the farmers along the lines of their life work, are probably the most effective and far-reaching means to these ends ever devised by the government of any people.

#### Establishment of Department of Agriculture.

It was not until 1888 that the work attained to the dignity of an Executive Department, when Norman J. Coleman, of Missouri, became a cabinet officer with the title of Secretary of Agriculture.

Since that time, the ever increasing scope of its work, under the wise and efficient administration of our own Rusk, Morton, and the present Honorable Secretary of Agriculture, James Wilson, in keeping pace with the wonderful diversification of production has resulted in a rapid though conservative growth, until today its researches and experiments touch every phase of practical and scientific Agriculture.

#### Divisions of Work.

The Department of Agriculture is fortunate in having under its direction men, many of whom are recognized throughout the country, as well as in foreign lands, as experts in their particular line of investigation. In its libraries are to be found the accumulated knowledge and experience in matters agricultural of all the past; in its laboratories are conducted the most refined, scientific investigations, and on its farms practical demonstration is made of what applied science may accomplish. And all this is at the service of the humblest farmer in the land if he will but avail himself of it. We may mention some of the work of the various Bureaus and Divisions:

The Weather Bureau informs the farmer of the climatic conditions of his own and other states; by weekly reports keeps him in touch with the general crop conditions throughout the country; warns him of the approach of damaging storms and floods, and as-

sists him to protect his crops against damage by frost and cold waves.

The Bureau of Animal Industry tells him how to detect those diseases most dangerous to his stock and the best methods for their extirpation. It places its stamp of approval on his exports and guards his interests in foreign countries. It protects him against the importation of diseased animals and reports to him on the condition and best means of improving the animal industries of the country.

The Bureau of Chemistry analyzes the soils of his farm and shows him the best fertilizers to use; it informs him how to rid his crop of pestiferous insects and how to destroy fungi; it instructs him in the chemical composition and physical properties of dairy products and informs him how to detect their adulteration.

This Bureau will also not only tell him how to make a good country road, but will tell him why it is good.

The Bureau of Plant Industry informs him of the most advanced methods in the rotation of crops and how to grow better varieties and more hardy plants; advises him what fruits are most profitable for his locality and the best method for handling and marketing them.

The Bureau of Forestry and the Bureau of Soils are ready to give information in their particular lines of investigation, while the Division of Statistics, Publication, and other important branches, altogether combine to make up the one great Department of Agriculture, which for practical, every day utility to the general public, is not surpassed by any other branch of the public service.

#### **State Agricultural Colleges and Experiment Stations.**

But this is not all that is being done for the American farmer, for besides the National Department of Agriculture, where some three thousand (3,000) persons are employed and where about \$3,250,000.00 are devoted annually to the service of agriculture,

to say nothing of the half million spent for printing and the one-fourth million borne by the Postoffice Department in the transmission of its publications through the mails, we have an additional contribution on the part of the nation of some \$2,000,000.00 distributed among the State Agricultural Colleges and Experiment Stations.

Statistics of the state Agricultural Experiment Stations for 1899 show that six hundred and seventy-eight persons were employed in the work of administration and inquiry and that the total annual income was \$1,143,000, of which \$720,000 represented the share received from the National Government. But this is not all.

#### **State Agricultural Organizations.**

In the various states of the Union Agriculture is represented by certain state officials. In one state, Pennsylvania, we have a Secretary of Agriculture, in sixteen other states there are Commissioners of Agriculture. In Idaho the State Engineer represents the agricultural interests, while twenty-four states have State Boards of Agriculture whose Secretaries are the principal executive officers in agricultural matters.

In addition to these, twelve states have State Agricultural Societies, and forty-three states have special officials in charge of farmers' institutes. So much for what might be termed the official representation of Agriculture in the National and State governments.

#### **Need of More Effective Co-Operation of Forces.**

These several forces, then, namely, the U. S. Department of Agriculture, the experiment stations, the agricultural colleges, the commissioners of agriculture and the state boards are the government representatives of the agricultural interests in the United States. Through these several channels the efforts of five or six thousand and trained men, either administrative officers, or in still greater number,

scientists and experts in the several lines of agricultural inquiry, are directed to the service of the farmer. These forces, moreover, represent in the aggregate a total annual expenditure of not less than seven or eight millions of dollars.

These few figures will certainly justify the statement as to the number of persons and the amount of money devoted to the service of the agricultural interests in this country as compared with any other country throughout the world, but gratifying as this showing is, it is worth while to inquire whether as much is being accomplished for agriculture by the forces engaged as this brief enumeration would imply.

In this connection I am charged by the Secretary of Agriculture to say that: "A little investigation of the subject will, unfortunately, convince us very quickly that the results, great as they are, do not fully meet anticipations, the reason therefor is as obvious as the conclusion, viz., the lack of systematic, co-ordinate, thorough and effective co-operation of these several forces in the work in which they are engaged." It is true that legislation has greatly encouraged co-operation between the experiment stations and the Agricultural Department, and that through the operations of the admirable organization known as the Association of Agricultural Colleges and Experiment Stations, sympathy and co-operation between the workers in the National Department and the teachers and investigators in the colleges and stations have been stimulated and encouraged, but that this co-operation should be far more extensive and intimate than it is, no one familiar with the conditions will for a moment doubt. In the meantime, we can only rejoice that the need of this effective co-operation at least is fully recognized and that, too, among those most actively engaged on behalf of agricultural development, but even as much as this cannot be said as to the rela-

tion existing between the Department at Washington and the agricultural officials of the state governments. It is a remarkable fact that in many cases friendly relations seem to be more easily established between the Department of Agriculture and the agricultural officials of foreign governments than with the agricultural representatives of many of our state governments. It is difficult to say, and it is probably not necessary to discuss, who is to blame for this state of things; the main thing to be noted is that it exists, the main argument to present is that it should not last.

It may readily be conceded that in many states the Commissioners of Agriculture and the state boards are doing grand work for the agricultural development of their own states, but this does not diminish the force of the argument presented; on the contrary, it rather emphasizes it. Were the relations between the agricultural representatives of the state governments on the one hand, and of the National Government on the other, to be as intimate and cordial as they might and should be, working, as they are, with the same object in view, it would be manifestly easy for both to be reciprocally useful. The forces of the Department of Agriculture, its extensive means for carrying on scientific investigations, its opportunities for acquiring information in relation to what may be termed agricultural economics, both in our own country and abroad, should be available to, and, indeed, are available to the agricultural departments of the state governments, if the latter choose to take advantage of them.

One of the things to be greatly regretted is the infrequency of personal visits to the Department at Washington of the agricultural officials of the state governments. It is a remarkable fact that representatives of the Agricultural Departments of at least a dozen foreign countries have been in Washington investigating the methods

and workings of the Department of Agriculture almost every year during the past decade, while it is really doubtful whether during the entire period of ten years a score of representatives of the government of our forty-five states have visited the Capitol for a like purpose.

On the other hand, representatives of the Department are frequently sent to various parts of the country, but then almost always on some special mission, with no time to spare save for its fulfillment and unable, therefore, to do anything to cultivate a closer and more friendly relation with state officials. The effect of a closer intercourse between our own and the state departments would unquestionably have the two-fold result of enabling our own workers and investigators to learn what are the needs of Agriculture in the various sections of the country and thus to so shape their work as to meet the wants of the greatest number, while, at the same time, it would tend to spread throughout the country and through authoritative channels a knowledge of what the Department is doing.

Moreover, through such cordial sympathy and intimate relations with the state departments, the National Department would be enabled to establish co-operation with the several voluntary state organizations devoted to the agricultural interests in some of its many phases. The national organizations can, and do, though not nearly so much as they might, maintain relations with the Department of Agriculture and avail themselves of its work and its accumulation of information, but with the majority of the state organizations their relations with the Department are extremely slender, and we find it difficult to even induce them to keep the Department informed of the bare data necessary to supply the Agricultural Directory, which forms a part of the Appendix of the Department Year Book.

Speaking of the rare presence in Washington of state officials for the

purpose of studying the Department and its work, I may state as an interesting fact that some of the foreign governments maintain permanently at the Capitol agricultural and forestry experts who thoroughly study and avail themselves of the work and investigations of the Department of Agriculture.

There are then at least two very obvious ways in which the relations and mutual service of the National and State workers for agriculture may be greatly extended and encouraged—namely, more frequent visits to the Department by state officials and more extensive travel and visiting of state officials by representatives of the Department—in other words, a more frequent intercourse resulting in a more intimate acquaintance.

At present only the first of these methods is available. The second would entail an increase in the Department force and an increase in traveling expenses, which can only be supplied through the liberality of Congress. It seems probable, however, that even under existing conditions the steps of state officials charged with supervision of agricultural interests might be more frequently directed to the National Capitol, where they could meet the Secretary of Agriculture and discuss with him and subordinate officers of the Department the needs of Agriculture in their several sections, and become more familiar with the work of the Department and its methods. The value of such visits would be greater to the department workers who need and desire to be kept in touch with the country at large, and I speak for them as well as for the Secretary and myself when I proclaim a warm welcome for all those state officials who will favor the Department with their presence. But I want to warn them that the Department is a pretty big institution and that its work cannot be studied in a day. But whether they can devote a day or a week to the study of its methods, the same welcome will be ex-

tended to them and they will find the same eagerness to receive their practical suggestions as to enlighten them as to the scope and character of the Department work.

**A Tribute to the Secretary.**

In concluding this brief summary of the work being done for the American farmer, I wish to say that it has been my privilege and honor to thus imperfectly represent the great Department of which I am a member and through it my distinguished Chief, the Honorable Secretary of Agriculture, James Wilson, of Iowa.

To those of you who have not been privileged to enjoy his personal acquaintance, I may say that he is a practical farmer, an honored member of your own profession. He understands the difficulties under which you

labor and it is his endeavor to serve your interests whenever occasion requires or opportunity presents. His life has been devoted to American Agriculture and he rejoices in the success to which it has attained.

His sentiment to the American farmers is worthy of preservation. "I am glad to testify that the spirit of improvement and progress is more general among American farmers than ever before; that the necessity of education along lines pertaining to economic production is more fully recognized and that the farmer's home is becoming more and more the seat of comfort, the center of intelligence, virtue and happiness, the source of strong men for all vocations and the sure safeguard of the Republic."

The meeting adjourned until 9 a. m. Wednesday.



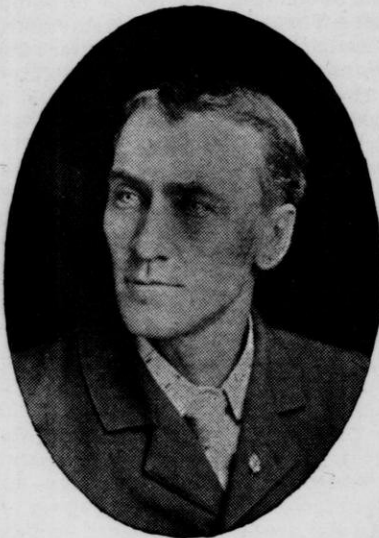


## SECOND DAY.

The Institute met at 9 a. m. Meeting called to order by SUPT. MCKERROW.  
 Conductor R. J. COE in the Chair. Prayer by Rev. J. R. REITZEL.

## FARMERS' TELEPHONES.

JAMES FISHER, Jr., Eastman, Wis.



Jas. Fisher, Jr.

The telephone is to the farmer what steamboats and locomotives are to transportation, a medium through which distance is largely annihilated, and a closer relationship established among the people. With the advent of the telephone on our farms, that lonesome monotony of farm life, of which we so often hear, becomes a thing of the past; and that isolated condition, which has hitherto been one of the drawbacks of country life, beats

a hasty retreat at the click of the electric bells.

## Advantages of Farm Telephones.

The advantages of farm telephones! Who can measure them in their entirety or fully appreciate to the greatest extent the good things that they bring upon our farms? A conscious security comes to the family through the assurance that they have ever at hand a tireless and trusty servant to run their errands, and, in time of danger or pressing need a messenger as swift as lightning flashes, can be summoned to their aid. One cannot fully comprehend the full value of a telephone in the house until he has had the real experience of it. If people in towns and cities need a telephone, and of this there is no question, how much more so must those who reside in the country, where every little errand means a trip to town, or to one's neighbors, covering probably a distance of many miles. But that little wire running from one farm house to another, think how much it will do for you; that ring of the telephone bell; the cheery "hello," and the familiar tone of some neighbor's voice in a friendly talk is something that must be fully appreciated before you can thoroughly comprehend the advantages of a telephone in your farm house.

If there is some bit of news, how it flashes over the wire from one neighbor to another, therefore by the use

of the farm telephone we are constantly receiving some neighborly news and our thoughts are turned into new channels; we become brighter and pleasanter and have more to talk about when the family circle comes together at the close of a day's work. It will sell hogs and cattle, or other farm products. You get the market report a day sooner than by mail, often saving the price of the telephone in one transaction. It will hire help, it will bring the latest news from the town, the state, the country and the world. If a machine breaks down, it will order repairs; it will enable our families to visit with each other.

The greatest convenience of the farm telephone is perhaps felt most in cases of sickness; the doctor can be immediately summoned and much time is saved, which often means one's life. Also the trip of a doctor is often saved, for when a patient is very sick it will require the doctor seeing him every day, but with the telephone in your home he can at any time find out just how the sick is doing and give necessary directions over the 'phone, thus saving several trips, which would far more than pay for your telephone.

I was born and brought up on the farm that I now live on and I can think back of how often I have been obliged to hitch up the tired farm team and go to town for some errand that could be accomplished over the 'phone, or for the doctor, fifteen miles away while now at our home I can do this in less time than it takes to tell you.

If telephones cost more than carriages, they would be far cheaper at the price, because each telephone renders far greater service than any carriage, but it is a fact that telephone service is far cheaper than most household necessities and when it is more generally understood at what small expense every farm and village will be supplied with a complete telephone system, then the life upon the farm will be much more comfortable.

We have those who seem to think that the telephone system is somewhat

complicated and difficult to keep in repair and construct, but such is not the case. A good 'phone will last for years; the only thing that gives out about it is the batteries and they can be easily replaced at a small cost.

So far I have only spoken to you of the convenience of the telephone in your homes and perhaps a few hints and precautions might be of benefit to those who have had no experience in building a line.

#### How to Build a Line.

The first thing to do if you want a telephone line in your neighborhood is for the farmers to get together and organize; adopt a set of rules to govern the company; elect a president, vice-president, secretary and treasurer, and a superintendent and an executive committee, stating the duties of each. It is better to go at it in a businesslike way; estimate the probable cost and fix shares accordingly, and for the good of all, allow each man one vote, no matter how many shares he may hold. This keeps the line from being monopolized by a few. The amount of shares on the line that I am connected with is \$10.00 each; the holder pays over to the treasurer \$5.00 and agrees to furnish ten poles, but where poles cannot be had and the company will be obliged to buy them, the full amount of stock must be paid in. This way our company has built about sixty miles of line in the last three years and each stockholder who wishes a 'phone buys it himself and all stockholders have the free use of the 'phone. To those who have no stock in a farm line, the sum of ten cents is charged, one-third of which goes to the party who collects the fee, and the balance, two-thirds, goes to the company. Every three months a report is made to the secretary of the amount of money collected and the condition of the line in his vicinity.

Don't make the mistake of buying a cheap 'phone. A good one can be had for \$14.00 or \$15.00, and such a 'phone, carefully handled, will last a lifetime.

With us we prefer the dry batteries, they have given better satisfaction. The poles should be good size, at least four inches at the top, and firmly set in the ground three and one-half to four feet, and poles, especially where a turn is made, securely guyed by a wire. This prevents them from leaning and loosening the wire. Before a pole is raised, firmly spike a bracket to it. We use a No. 12 wire and for

started them to work. The same kind of 'phones should be used on a line if possible.

If you wish good service, don't have more than fifteen 'phones on a line. A line too heavily loaded will not give you good service. If more 'phones are wanted, have a switch. Each station is given its ring, such as "Central" one long ring, next station one short and one long, and so on. In this way



The Fisher home.

a short private wire No. 14 will do. No. 12 wire goes about one hundred and sixty rods to the hundred pounds. Considerable attention should be given to get wire tight. In stringing out the wire, a reel is made, a bundle of wire is placed on the reel in the back of a wagon, and in this way three good men with two light ladders can put up wire quite rapidly. But it will pay you if an experienced man can be had to put the 'phones in your homes. On our line the man we contracted 'phones from put them all up and

as many as you want for one line can have different rings.

#### The Social Side.

We are living in the age of progress and we farmers are entitled to all improvements. In fact, it becomes a necessity in order to keep abreast with the progress of our country, and the telephone on our farms is numbered among the vast improvements that are worthy of the farmer's notice.

Always bear in mind that the telephone is for the whole family, not

alone for business, but there is that social side to it where the real enjoyment comes in. If we wish to keep our boys and girls on the farms to fill our places, which we will soon leave vacant, we must make home a pleasure and a farm telephone offers the very best of inducements for a contented family. There is no question but what farm life is the most independent occupation offered a young man, yet so many flock to cities, and again you very often find the older generation turning back to rural life with a longing heart.

#### An Antidote for Lonesomeness.

There must be some reason why so many young men and women leave their homes and fathers and mothers, who need them so much in their declining years, to seek a living in the cities when a better living could be had on the farm. Turn to the reason and you will find it is that lonesomeness and the lack of companionship and other similar causes, which, up to the present time, have been denied our boys and girls growing up on our farms.

What does a young man care for independence coupled with lonesome-

ness? What does pure air, pure food and health count with a young man or woman when they find that their friends in the cities are apparently, if not in reality, possessed with more opportunities and certainly more companionship than they? Remember that companionship has a practical as well as a sentimental value. Then the problem that confronts the mothers and fathers on our farms today is to provide means to remove this lonesomeness and discomfort from the lives of their children and themselves. If they do this the tide of population will turn and, mark what I say, the next general census will show that the flow of population is not to the cities but back on the farms, establishing homes upon the broad acres of our glorious land.

There is one way of overcoming a portion of this, establish telephones in your homes, it will abolish that lonesomeness and bring the comforts of city life to the homes of every farm. I feel that the telephone has come to stay with us and must be considered a necessity to all and not, as has hitherto been supposed, a luxury to the rich alone.



## FARMERS' TELEPHONES.

GEO. WYLIE, Morrisonville, Wis.

### The Telephone a New Departure.

This telephone is not such an old concern. It is only about twenty-two years since the telephone was discovered, and the peculiar thing about it is that its possibilities were never dreamed of for a long time after it was discovered. Some fifteen years ago business men began using it as a convenience and then it got to be a necessity, and the last two or three years it transpires that the telephone is adapted to the farm, that the farmer needs it worse than anybody else, and that the farmer can get a telephone cheaper than anybody else. He can build his own line and maintain it cheaper than can the business man in the city, for the simple reason that lines in the country cost far less than lines in the city.

### Organization.

Now, a farmers' line is largely a question of organization. Personally I would not advise farmers to form large companies and go into the business of covering an entire county, because it takes too much time to effect the organization and too much time to run the company after it is organized, but circumstances alter cases, and conditions are different in different localities.

In our locality we go about it in about this way. A few farmers get together and organize a line. Our company was organized by five of us getting together and talking the matter over. We organized to build ten miles of line and after estimating the cost we estimated what we could afford to let anyone else come in for. When we came to build the line we found that nearly everybody wanted to get onto it. We commenced in the country and built in toward the sta-

tion. We were exercised as to whom we could get to attend to the business in the station. We came to the conclusion that we would have to buy a telephone there and put someone there to attend to that end of the business. We found when we got to the station that nearly every business man in that station, notwithstanding the fact that most of them had 'phones on a toll line, wanted to be connected with the farmers' line. This was a surprise at first, but it was easy to see why it was. They were there for the purpose of doing business with the farmers and the farmers' telephone helped their trade. First the stockmen wanted the connection, then the man running the lumber yard, then the elevator man, the doctor and the merchant. The result was that the line was a greater success than we anticipated.

Now, you will find in every community in the state of Wisconsin today people wanting to get onto a line. If you have more than ten who want to get together and form a company, I would advise forming two companies. It takes less time to attend to the business. Make the lines interchangeable. A company consisting of six or eight or ten does not give any more trouble than attending to the business of an annual school meeting and none of the officers get any salary.

### Cost of Building a Line.

As to the cost, I find that the farmers are very much at sea as to the cost of a line, and they have an idea, too, that it takes some technical skill and practical knowledge in order to build a telephone line. This is a mistake. The fact is that any man that can dig a post hole and set a post and draw a wire can put up a telephone line. Any man that ever saw a telephone set together and set up can set up tele-

phones himself. It is the simplest proposition imaginable, but now most manufacturers send out their 'phones all set up.

Some farmers are a little afraid to go into a company with anybody else. They are afraid of this word "Co-operation." They get their idea from co-operative creameries or co-operative factories of some kind they have been connected with and lost money. A co-operative telephone line of this kind is an entirely different proposition from a co-operative creamery or a co-operative anything else, and for this reason: You build a co-operative creamery, and, as a rule, unless it is run right, trouble begins. You build a telephone line and when it is built that is all there is to it. It runs itself, it must only be kept in repair. There is always money enough in the treasury to employ a man to go out and repair the line.

We find, too, that there are certain toll line men that are opposed to farmers' lines. The idea is simply this: The toll line people are not in this business for their health, and their idea is that if the farmers will only wait long enough they will get around some day to build a line for them. The farmer can build cheaper than anybody else can do it for him. I have here some figures showing the cost, approximately, of a telephone line per mile. They may not be exactly correct, but are based upon prices quoted within the last six months.

White or Burr oak poles 25c each, 32 to the mile .....	\$3 00
Digging holes and setting poles at 10c each .....	3 20
260 lbs. No. 10 wire at \$3.00 per 100 lbs. ....	7 80
32 Porcelain insulators at 1c each .....	32
Stringing and fastening wires to poles .....	2 00
<hr/>	
Total cost 1 mile .....	\$21 32

If the work is done by the farmers themselves, as it usually is, deduct

\$5.20 for digging holes, setting poles and stringing and fastening wire, leaving \$16.12 the actual cash outlay for one mile; or, if the farmers themselves can furnish poles suitable, deduct \$8.00, leaving the actual cash outlay for one mile \$8.12. If cedar poles are used, add twenty-five cents per pole additional, making the total cost of one mile with cedar poles and No. 10 wire \$29.32.

Something might be saved on the above figures by using lighter wire. If No. 12 wire is used, it will require one hundred and seventy-five pounds per mile at \$3.10 per hundred pounds, making \$5.43 per mile, a saving of \$2.37 per mile over the No. 10 wire. If No. 14 is used, and many do use it, it will require one hundred and three pounds per mile at \$3.20 per hundred pounds, making the cost for a mile \$3.30, or \$4.50 per mile less than No. 10. Then why use No. 10? Because it is less liable to be affected by weather conditions; it does not get broken so easily and they tell us the smaller the wire the greater the resistance. In other words, you can talk farther and plainer over No. 10 than you can over No. 12 or 14.

The above figures are for a single wire or ground line. For a metallic circuit double the cost of wire and the expense of stringing and tying the wire to poles. For a neighborhood line, covering say forty or fifty miles, a ground circuit will be found to give equally as good service, if not better, than a metallic circuit. A ground circuit can easily be changed to a metallic at any time after the line is built.

**Discussion.**

Mr. Culbertson—What do you mean by ground circuit?

Mr. Wylie—It is one wire. At every place where you install a 'phone you run a wire into the ground from the 'phone.

Mr. Matteson—What do you mean by No. 12 wire, steel or iron?

Mr. Fisher—It is common wire, same quality as fence wire.

Mr. Wylie—The sizes of wire mostly used are No. 10, No. 12 and No. 14.

Mr. Matteson—Did you ever have any experience before you started in this business?

Mr. Wylie—No, sir.

Supt. McKerrow—Who made that splice?

Mr. Wylie—That is what is termed a "Badger tie." That makes a connection that won't slip. Outside of a spade and tamper, about all the tools you need are pliers and splicing clamp. An ordinary wire stretcher will do for No. 10 wire, but for smaller wire you need a stretcher something like this (indicating). It is called a "come along" stretcher.

Mr. Matteson—Do you recommend buying your own 'phones, or would you recommend renting them from these companies?

Mr. Wylie—Build your own lines and put in your own 'phones and then you will feel independent, but don't buy cheap 'phones.

Mr. West—Is there any statute or law in this state requiring stock companies to procure a charter in order to do a legal business of this kind?

Mr. Wylie—No, sir, not that I know of. A few get together and start a company, and you are then the same as any other partnership concern. You start in and build a line in that way, but if your wire should get down and some one get hurt, each one of you would be liable individually for that damage to the extent of any amount that might be sued for. On the other hand, if you organized your company and got incorporated, you would only be liable for what your line was worth.

Mr. Fisher—Only liable for the amount of money you put in the company.

Mr. Brigham—What is the expense of incorporation?

Mr. Wylie—Twenty-five dollars.

Mr. Brigham—That is the fee that you pay to the Secretary of State?

Mr. Wylie—Yes, besides getting the papers drawn up. The Secretary of State will furnish you blanks, that almost any one can fill out, without any additional expense more than the twenty-five dollars.

Mr. West—Wouldn't you recommend incorporating under the state law?

Mr. Wylie—I think it would be better, all things considered.

Mr. West—How many officers do you have in your company?

Mr. Wylie—That is a matter of choice with each company organizing. You can have that your own way. Some will have a president, vice-president, secretary and treasurer, and perhaps a manager, or something like that. But a secretary, president, and treasurer is all that we have.

A Member—Who looks after the wire when it is down?

Mr. Wylie—The president or manager orders some one out to fix it.

Mr. Fisher—We elect a president with the same duties as any other president; we elect a vice-president, and then a secretary, treasurer and general superintendent.

Mr. Imrie—The superintendent of the line acts under the direction of the five directors that we have in this company.

Question—Is there any law regulating the shares?

Mr. Fisher—No. I don't know. We make the shares according to expense of building the line.

Mr. Imrie—For a co-operative creamery company, the law provides that the shares shall not be more than ten dollars nor less than one, but you can have as many shares as you like.

Mr. Wylie—You can make the shares anything you want to. Our shares are twenty-five dollars each.

Mr. Fisher—Ours are ten dollars and we completed the line with this amount.

Mr. Wright—Would you put any restrictions on the use of the line?

Mr. Wylie—Certainly. We allow each party five minutes on the 'phone, but we don't enforce this unless some-

one else is waiting, and we have rules which strictly prohibit any improper use of the line.

Mr. Wright—Don't you have a good deal of trouble, when you have fifteen or twenty people on the line, with the parties who are not talking taking down the 'phones and listening to the conversation and weakening the service in that way?

Mr. Wylie—It does not weaken it if you do not have more than fifteen. I do not care if they do listen.

Mr. Wright—Doesn't it weaken the service?

Mr. Wylie—Yes, but the circuit is plenty strong for fifteen 'phones. If you buy a good phone it won't weaken it with twelve to fifteen 'phones.

Mr. Wright—That has been the trouble with our line. We have fifty miles of line in Marathon county, and the great trouble is that when some one calls up, some women will take down the 'phones and it weakens the service.

Mr. Wylie—I would like to ask how you know it is a woman that takes the 'phone down?

Mr. Wright—Well, I don't know.

Supt. McKerrow—I was up north the other day and a land agent was talking to another in another town, and by the remarks he made I judged that he thought some other land agent had taken down the 'phone.

Mr. Imrie—How do you get the money in the treasury?

Mr. Wylie—There is always something coming from toll, outsiders using the line, also rent from those who own 'phones and hire the use of the line.

Question—Does a neighbor who uses the 'phone have to pay?

Mr. Wylie—Yes.

Mr. Fisher—With our company, there is hardly one in ten that has a 'phone,—one 'phone in the neighborhood. Parties not stockholders pay the sum of ten cents, one-third goes to the person who collects and two-thirds goes to the company. A report has to be made every three

months to the secretary and the money collected is paid over.

Mr. Imrie—Every man keeps a record of the tolls.

Mr. Wylie—How do you decide whose house the 'phone goes into?

Mr. Fisher—We buy our 'phones and put them in, anyone that wants a 'phone has the right to the line to connect his 'phone.

Mr. Hill—Do you issue more shares than you have patrons,—those who buy 'phones?

Mr. Fisher—Certainly, we will always sell a share to anyone that wants it. It is for the good of the community. We are selling shares every week, almost.

Supt. McKerrow—Everybody that buys a share does not put in a 'phone.

Mr. Fisher—It is not necessary. It is optional with him. If he wants to put in a 'phone, the company has to run a wire to his 'phone.

Mr. Wylie—Does the company own the 'phones?

Mr. Fisher—The individual owns them.

Mr. Wylie—Have you had any experience in using tamarack for poles?

Mr. Fisher—No. On our line white oak is used.

Mr. Wylie—Our observation is that green tamarack lasts about four years.

Mr. Imrie—White or red?

Mr. Wylie—White.

A Member—A red tamarack will last thirty years.

Mr. Convey—In parts of this state private parties are going around and soliciting the sole right to erect a telephone line in a town. Can a town board grant that right?

Mr. Wylie—They can grant it, but it does not do any good. They cannot prohibit another coming. You can go into any city in Wisconsin, subject to certain restrictions of the common council.

Mr. Convey—Parties have gone around with papers and claimed they had the sole right in that town and no other parties can erect a line without securing a permit from them.



Mr. Wylie—This right to erect telephone lines comes through the legislature and the town board cannot overrule it.

Mr. Hodgson—I would like to ask, Mr. Wylie, if you have fifteen or twenty on the line, how do you designate the person you wish to ring up?

Mr. Wylie—We have different rings. For instance, your ring will be a short and a long, and my ring will be just the reverse, a long and a short, or a short and long and short, and so on, through the system. We have twenty 'phones at present on our circuit, but that number is most too many.

Mr. West—Mr. Wylie, are there any restrictions in regard to where you set your poles in the public highway?

Mr. Wylie—Yes.

Mr. West—Can a man prohibit your setting poles along his premises?

Mr. Wylie—I think so.

Mr. West—What is the redress?

Mr. Wylie—If you are building a line and someone objects, you can institute condemnation proceedings so as to see how much the damage is. When the damage is adjusted you can go ahead and set the poles.

Mr. Goodrich—Can that be done?

Mr. Wylie—It has been done and I believe it is the usual way of getting around objections of this kind?

Mr. Fisher—In all our buildings of lines, which cover a good many miles, I have never yet found a man who was not perfectly willing for us to set poles along his line or road, so they don't interfere with him or the public.

Mr. Goodrich—There are such men you find them once in a while. But there are others who would do everything to defeat anything that would help anybody else. I do not want to say anything to discourage you, but I have had enough of building telephones myself. I will never undertake the job again, just for that reason.

Mr. Imrie—Was Mr. Goodrich's experience in the city or in the country?

Mr. Goodrich—It was in the city, running out into the country.

Supt. McKerrow—Country people are better than city people.

Mr. Imrie—We had a telephone line built past our house. It did a great deal of damage to the shade trees, by the cutting off of the limbs. I finally got them to set the alternate poles on the other side. They can avoid hurting the trees by crossing the street with the wires.

Mr. West—There has been some trouble in the section where I live in regard to getting permission to set the poles along certain premises. I don't know but what it has come to a lawsuit.

Mr. Wylie—Are the poles set there now?

Mr. West—Yes. They were set there when the farmer was away from home.

Mr. Convey—Is it wise in every case to locate the poles along the highway?

Mr. Wylie—Why, not necessarily, no. The law requires, you know, that the poles be set within four feet of the line. That does not mean four feet from the fence. I find some farmers have their fence a little out in the road, and if you get your poles a foot or two from the fence you are usually coming as near complying with the law as if you set the poles four feet from the fence.

Mr. Reese—Would it not be better to set the poles four feet from the fence and run the chances with that man and get his good will? You understand what I mean. You say most men encroach a few feet on the highway.

Mr. Wylie—Some do ten feet. Most farmers prefer the poles set close to the fence.

Mr. Reese—Some do not have any fence at all. We are trying to get a line from Brookfield to Milwaukee. What do you think would be our prospects for getting city connections there?

Mr. Wylie—I think you would ultimately get it.

Mr. Reese—They have 'phones to rent for \$1.50 a month and they will connect us with the city by paying a toll of ten cents. If we could build our line

right straight through, how are we to get connection with Milwaukee? I do not believe it can be done without going to the council and securing a franchise.

Supt. McKerrow—You think that would be expensive in Milwaukee?

Mr. Reese—I know by experience and by reading the daily papers that there are companies trying to get into Milwaukee and have not been able to do it,—men of money. And the poor farmer does not stand any chance because he won't put much money into it.

Mr. Wylie—You don't want to strike for Milwaukee at all, it is too big. For a farmers' line to go in there it would take a fortune for poles alone.

Mr. Reese—We do want to strike for Milwaukee.

Mr. Wylie—Strike for a local railroad station:

Mr. Webber—Could not farmers make telephone poles of fence posts?

Mr. Wylie—Yes. For short distances you can use a barb-wire fence for a telephone line. It answers every purpose, with a little adjusting and fixing.

Mr. Hodgson—I would like to ask why the Bell Telephone Co. in coming into our neighborhood paid fifty cents to \$1.00. Do I understand Mr. Wylie to say that it is possible to put these local farm wires on those poles and defy the company to take them off? Was this little bonus given to keep this local company away from these poles?

Mr. Wylie—They have paid for their right of way.

Mr. Reese—By that little bonus?

Mr. Wylie—They have paid for the right of way and you cannot put your wires on their poles.

Mr. Wright—They do so that if you should afterwards want them to remove the poles they would not have to do it. In Neenah a suit was brought against the Wisconsin Telephone Company by a druggist there. He made them take a pole down. Now, the Wisconsin Telephone Company does

not put a pole anywhere without the right of way. They came through our county and paid for the right of way across every piece of land.

Mr. Scott—The matter is in litigation now and has been for the last six years, and an appeal is now pending upon the part of the Telephone Co.

Mr. West—There is a telephone line that passes my house. Supposing we want to run an independent line from my place to our town right over the same road, can they prohibit my setting poles and running a line along there?

Mr. Wylie—No, sir.

Mr. Reese—Suppose you wanted to set the poles on the same side of the road that they were, how would it be in that case? Could you use their poles?

Mr. Wylie—You could not use their poles if they objected.

Mr. Brigham—Could you use poles set through your land?

Mr. Wylie—If they had not asked permission and given no compensation, you could make a deal with them perhaps.

Mr. Brigham—In our town they asked permission of the chairman. We never gave any permission.

Mr. Hodgson—Was that lawful?

Supt. McKerrow—I see Mr. Reitbrock is looking thoughtful and studying a little. I suppose he has an idea. Mr. Reitbrock, have you anything to say?

Mr. Reitbrock—It has no such right, I suppose. It has been thoroughly threshed over.

Mr. Convey—I would like to hear from Mr. Bradley as to how he secured the use of the Long Distance company's poles.

Mr. Bradley—I am no legal authority. Some three or four years ago a telephone shark came through our town and wanted to build a line and got me to help him locate his line. He went through my place, as it was more convenient, with the understanding that I should have the use of the 'phone, and that I should have the use of the line in the county, and if I

wanted to build an independent line to the city, I could use the poles. Well, he had not had it built over three months when he sold out to some big concern. This concern would not give me any franchise. They would not let me put a wire on their poles or give me any advantages at all. I

wanted a wire between my brother's place and my own, so I simply nailed my wire on their poles. They told me to take it down. I did not do it and they said they would take it down. I said if they did I would take down their poles. My wire is there yet.

## FORAGE CROPS: FIVE MINUTE TALKS.

### PEAS AND OATS.

THOMAS CONVEY, Ridgeway, Wis.

Mr. Chairman, Ladies and Gentlemen:—It is hard on me to be limited to a five-minute talk. If I had a sheet of paper six by four inches it would hide my embarrassment. But I am limited in time and I suppose it is for the good of the audience. Mr. McKerrow knows we are inclined to talk longer at times than it is wise for us to do.

One of the objects in planting a crop of this kind is to endeavor to raise a class of feeds that will take the place of the commercial feed stuffs. You must realize that it is an expensive matter to buy commercial feed stuffs. Oats is a first-class stock feed, very nearly a balanced food, but if we wish to make it as narrow as we may, I think we had better use peas and oats. This has been our practice for a number of years. It costs little, if any, more to raise a crop of peas and oats than oats alone. That is, the seeding and harvesting and threshing would be the same expense in either case, and I feel satisfied that those of you who have raised a crop of this kind realize that you are getting more food value out of peas and oats than out of oats alone. It is valuable as a soiling crop, and it does not come as early in the season as we would like, but it comes

after clover and can be used for soiling purposes for a long time by seeding at intervals.

In the case of raising peas and oats for a hay crop, you will have a great deal more food value, a great deal more protein, than with the same crop harvested with a binder and threshed. On rich land there is a likelihood of its lodging. In that case it would be better to make hay of it.

Originally I liked to sow a bushel of peas to a bushel and a half of oats. Later, I find it is better to reduce the quantity of peas and in that way secure a standing crop, because it is difficult to harvest a pea crop if it is partly lodged, unless you can recover with the binder. It makes a valuable hay crop. Some people say to cut oats early, but I would rather let them get into the doughy condition. I think you get more feeding value than if you cut earlier. In cutting with the binder I find no difficulty whatever. It makes a larger bulk of product than oats alone and there seems to be a heavier crop standing in the field.

For a grain crop put in shocks immediately, eight bundles to the shock with cap sheaf. When the weather is good, it dries out thoroughly when

shocked immediately. We find one disadvantage, however, in stacking outside. Peas will not shed rain. The past few seasons we have been stacking our grain in the barn. Where you have many peas in the oats, it is unsafe to put them in the top of the stack. In topping out the stack it would be better to use straight oats than the mixture.

Of course, in some parts of the state this is not a successful crop every season. About one year in five it has been a failure with us, but in our case

or eight inches. Plant peas early and get them in the ground as deep as is necessary for the oats, anywhere from two to four inches deep, depending upon the character of the soil, planting sufficiently early, and you need not worry about results. You can plant the peas and oats together if you want to at one seeding. It is immaterial, because you find in every case that if you pay attention to the condition of the oats, the peas will take care of themselves. We have cut both early and late oats with the com-



Peas and oats cut with binder.

we have not land as thoroughly adapted to it as some other parts of the state. We have a black land. With a sandy, or light land you can do very much better. Peas like a rather cool, moist climate and they do very much better in the eastern and northern parts of the state than in the southwestern part. If I can get fairly good results with peas and oats, I think in the majority of cases you will have very much better results.

Many people seem to have conflicting opinions about planting this crop. They want to get the seeds down six

mon pea and in every case we have had plump peas, and almost without paying any attention to the degrees of their maturity at the time of cutting. We pay more attention to the degree of maturity of the oats. We have used the common field pea and the green pea of the field variety. I think the marrowfat pea would give just as good results, but as the seed is scarce and high-priced we have not made an effort to get it. If you wish to use it for a forage crop, for hay or soiling, you better use the green pea.

## DISCUSSION.

A Member—How much peas do you plant to the acre when you sow for hay?

Mr. Convey—I prefer a bushel of each.

Question—Do you cut with a binder?

Mr. Convey—No, I rather cut with a mower for hay.

Question—When do you cut for hay?

At what stage are the oats?

Mr. Convey—When the oats are in the doughy condition.

Question—What is the condition of the peas at that time?

Mr. Convey—Somewhat immature at that time, but they plump up in the curing out.

Mr. Reese—I have made some little investigation on a number of varieties of peas, and I found that the common field pea, the cheapest I could buy was \$1.20, and the Scotch pea was \$1.60. Do you think I could get enough forage to pay the difference?

Mr. Convey—Usually the price is very nearly the same. I buy nearly every year and I buy whatever I find is the cheapest on the market, of good quality however.

Mr. Reese—I find that the field pea is about forty cents better this year.

Mr. Convey—Higher priced?

Mr. Reese—No, the Scotch pea is forty cents higher.

Mr. Convey—I would take the choice field pea in that case.

Mr. Hughes—Why do you let your oats get mature? Doesn't it reduce the moisture in the stalk?

Mr. Convey—No, not much, if you put it up in the form of hay.

Mr. Webber—Do you sow the two kinds of seeds with one machine?

Mr. Convey—Yes, and in our case we have better results by disking the ground, giving a thorough preparation, and then drilling with the Buckeye drill.

Mr. Hodgson—I would like to ask Mr. Convey if he has not changed his mind some on the quantity of peas and oats. If I remember, he gave his idea

as about two bushels of peas to one bushel of oats some years ago.

Mr. Convey—I have never recommended that. I might have for hog pasture. I would rather have a large percentage of peas. For a general feeding crop I would not recommend sowing on good land very much more than a peck of peas to one and one-half bushels of oats.

Mr. Hodgson—Our experience is that the oats will take the lead every time. We cannot get hardly any peas, especially if it is a dry season. If we have a wet season the peas may do better, but I think that for our part we prefer more peas and less oats.

Mr. Convey—To turn hogs in on, I would recommend two bushels of peas. I have never taken any different stand from that. If you sow too many peas you cannot get the crop to stand up and handle it with any satisfaction.

Prof. Henry—I want to call the attention of the ladies of this audience to the importance of this subject to them. I hope every one will urge her husband to sow some peas this spring in the field. When these peas are in the proper stage for the table, let her be sure to get her share. These peas are delicious. They are the same peas that are used quite commonly for canning purposes. There is no reason why the farmer should not have on his table all the peas he wants. Send the children out in the field with pails and let them bring in all you want, and then let the pigs, etc., have the rest.

Mr. Reese—I would like to ask the gentleman if the common white pea is used to any extent for canning.

Prof. Henry—The white pea is a splendid pea for that purpose.

Mr. Reese—The Canada pea?

Prof. Henry—Yes.

Mr. Anchetel—It is a delicious table pea.

Mr. Convey—I am afraid Prof. Henry is not speaking from experience. I have allowed the children to go into the pea field to pick peas and in that way a whole lot of mischief has been done.

Prof. Henry—You have too many children. Suppose they do tramp down a few peas. I think the farmer can afford to allow that because he gets most of the peas after they are cooked.

Supt. McKerrow—Mr. Convey has not too many children. He only has twelve at his house.

Mr. Reese—Mr. Convey spoke about putting in the seed with a Buckeye drill. How would a common seeder do?

Mr. Convey—It is difficult to get them deep enough in the ground for the best results. Get them in two or three inches and sow early and you will have good results. Harrowing will not put them in. It will leave more on the top the more you harrow.

Mr. Reese—Would you advise me not to harrow at all?

Mr. Convey—Before you put them in give the ground good preparation. I could not very well tell you how to put them in with a broadcast seeder and get them sufficiently deep. If I did not have a drill, and I would not have a broadcast seeder on the place, I think it is a mistake, I would disc them in and sow on the ground. Have your ground thoroughly prepared, because the success of peas depends very largely upon the condition of the ground. It is a crop that is inclined to dry out. Have the ground sufficiently well worked so that it won't dry out.

Mr. Hill—The best results we have had in growing peas and oats was in sowing broadcast and plowing in four inches deep, and then putting the oats two or three days later on nearer the surface.

Mr. Roberts—I have practiced plowing my peas in, for three or four years, and then sowing the oats a week or two after.

A Gentleman from New York—I would like to ask information about peas and oats. Has anybody had any experience with peas and oats for killing out quack?

Mr. Coe—I have sown oats to kill quack and it did it pretty well. It killed it almost entirely,—in just a few places where there were some rocks there was some left. The field was first planted to corn and well cared for, so that that injured the quack some. The next year it was sown thickly to oats. Of course, we know that oats take a large amount of water from the soil and are harvested in the dryest part of the year. When the oats were taken off the ground was dry. We plowed this, and the ground, being so dry, plowed easily and we plowed deeper than before. There has been very little quack in that field since.

Mr. Selle—Have you had any difficulty with the pea louse on late peas?

Mr. Convey—You will have less likelihood of damage from that source where the peas are sowed with oats. That is true of all mixed crops. It is a better crop to seed down with than the straight oats. We all know that oats is a poor crop to seed down with. Peas and oats are better. If you use very heavy seeding of grain it will smother out everything, and I think we use too much seed anyhow, especially if we do not cut it for hay.

Mr. Brigham—In that case how much would you use per acre?

Mr. Convey—I have been in the habit of sowing a bag of grain to the acre, but I am inclined to think it is too much. In dry seasons the peas kill out with the hot weather,—a light seeding of oats and a heavy seeding of peas is best for soiling.

Supt. McKerrow—In regard to your sowing peas and oats to kill quack, if you follow up the peas and oats by plowing the land and cultivating thoroughly and sowing to rape broadcast, it will help to smother the quack.

Mr. Buskirk—You spoke of the condition of your soil, Mr. Convey. I think you can sow as heavy on rich as on poor soil.

Mr. Convey—I doubt the advisability of sowing heavily in either case.

Mr. Bender—How much wheat would you sow to the acre?

Mr. Convey—I have not sown very much wheat and oats. In many cases they sow one-third wheat to two-thirds oats.

A Member—Mr. Chairman, we have sown wheat and oats more or less for thirty years. For feed alone I would not say more than one-fourth wheat.

Mr. Jones—Mr. Convey, don't you find that green peas mature nearer the same time as your oats?

Mr. Convey—I have used several different varieties, but have paid no attention to the condition of the peas and I have had no shrunken peas and no fault with the condition of the peas.

Mr. Jones—How much seed per acre do you put on,—of the mixed wheat and oats?

Mr. Convey—About two bushels per acre.

Prof. Henry—Those who sow peas should remember to get them in the ground early. Mildew and blight bother the pea-plant in hot weather, and the earlier you get in your peas the better.

Mr. Stiles—Isn't there also some danger of getting the oats too deep in soft clay soil?

Mr. Convey—Do not sow oats any deeper than the peas. I have sown peas late in the season and put them in deep to guard against mildew, but you cannot get the best results with late seeding.

Supt. McKerrow—We have put them in at different seasons, and in nearly every case the late seeding is the poorest.

Mr. Hodgson—Would you sow early for a soiling crop?

Mr. Convey—Yes, and at different times, late too.

Mr. Hodgson—And for a grain crop also,—sow early anyhow?

Mr. Convey—Yes.

Mr. Hodgson—Our experience is that the green Scotch pea is much better than the white pea—has a better strength of growth, gives better results and is later.

Mrs. Lehman—Would you put your soiling crop right into the silo or feed directly from the field?

Mr. Convey—Where we have used it for feeding,—summer feeding,—we have never put any in the silo. I think it would not be the best kind of a crop for that.

Mr. Hill—It gives excellent summer feeding put into the silo.

Mr. Jones—If you sow both white and green peas, don't you find that the green pea matures nearer the same time as the oats? We find that by sowing green peas and oats together it makes a nicer crop because they mature together.

The Chairman—At almost every Institute we have held this winter, we have had the clover subject on the program and in every case there has bobbed up this question. What about alfalfa? What do you know about alfalfa? Is it a good feeding crop? Is our soil good for it? This crop is coming to the front very, very fast. I am glad to see it upon this Round-up program, to be presented by Supt. McKerrow, who has had experience in growing it.

## ALFALFA.

Supt. GEO. MCKERROW, Madison, Wis.

When I made up this program and put the subject of alfalfa upon it, I expected that Governor Hoard would be in attendance at this meeting, and I knew that if he was I could persuade him to take up the subject and I would get out of it. As he is not here, I suppose I will have to talk a little about alfalfa.

I want to say this, after experience in feeding alfalfa for the last five years, that it is the best and richest coarse feed that I know anything about. It is a little ahead of our best clover hay, and chemical analysis has shown that it is very rich in digestible protein and also digestible ash, more so than our best clover, even than bran, and it will come nearer taking the place of bran than any other food we can grow upon Wisconsin farms.

#### How to Grow Alfalfa.

Now, as to growing alfalfa. This is where the Wisconsin farmer is going to have trouble. You will find out if you grow it that it has great feeding value, but the trouble is to grow it first. Where we have been growing it, or have been trying to grow it for the last four or five years, in the northern part of Waukesha county, we have not the ideal conditions. We have some of the poorest conditions in the state, that is, a very hard subsoil. Alfalfa is a deep-rooted plant, and if you have a subsoil not too hard and a rich surface soil, there you will have the best conditions. I will say this from our brief experience, that the first thing to have is a rich soil with a porous subsoil, well prepared, so that you can make the seed-bed early in the spring and sow the alfalfa early. Twenty pounds of good alfalfa seed is about the proper amount to sow to the acre. If I were going to change the amount from twenty, I would make it

a little more, but not thirty. My reason is this: the plant that gets a good big root is the plant that lives, and if it is sowed too thick, the roots remain small and they do not stand some of our winters. Twenty pounds, I think, is enough of seed in a well-prepared, rich seed-bed where it will nearly all grow.

Sow it early. Now, I think on general principles I would prefer to sow it alone. That means we must have a mower going and keep the weeds down. If you have the beardless barley sow one to one and a half bushels to the acre. You can cut this early and it makes a very nice hay. When you cut it, the alfalfa grows right up again. Every time you see yellow leaves clip it off with your mower and let it lay on the ground as a mulch. The second season mow for hay as soon as the first blossoms appear. Do not wait for it all to bloom. Cure it as you would clover, by sweating it in the cock, airing and putting in the barn. Cut the second crop early, before many blossoms appear, and so on with the third and fourth crops.

#### Need of Discretion the First Year.

Last summer was a dry summer and upon our farm in the northern part of the county, about the only green thing that grew during the dry months of June and July was the alfalfa. The corn stood still, but the alfalfa grew, and it pleased me very much in its general appearance and the work that it did. We only cut our alfalfa twice and then use for pasture for some of our stock. Governor Hoard cut his four times and estimates six tons of hay to the acre, worth the past season, at a very low estimate, \$15.00 per ton, making \$90.00 per acre. He is going to sow forty acres this spring. We are not going to sow so much.



Because alfalfa is a good thing, and because some of us have become alfalfa enthusiasts, do not go and buy a ton of seed and sow your whole farm to alfalfa. Try an acre or a half an acre and prepare your seed-bed carefully. Cut it back. Do not miss this, for when the leaves are yellow, it won't grow. Cut it back and then it will grow at the top and at the bottom. Get as large roots as possible and as deep roots as possible the first season. The first year is the hardest to get it through the winter. The second is easier and the third still easier. It will grow better with age. Use discretion the first year. Do not sow too much until you know more about it than you do now.

#### DISCUSSION.

Mr. Emery—I have been in Colorado many times where they feed it to horses and find it a very good feed for them. I have seen it growing on barren prairies that twenty-two or three years ago were not supposed to be worth anything. The market has got up into millions of dollars, and the demand for it in Denver for horses is good. I don't know about cows. I also saw Governor Hoard's crop last fall—his fourth crop. I was very much pleased with it and I was surprised that it would do so well in our climate.

Question—Would you recommend seeding on top of rye, sowed in the fall?

Supt. McKerrow—No, sir, you must expect to lose it if you do. The alfalfa seed is larger than the clover seed and it ought to be covered. It won't do much if sowed on rye.

Mr. West—Is there much danger of bloat in feeding alfalfa to stock?

Supt. McKerrow—As a general pasure I would not recommend alfalfa to stock.

Mr. West—How would it do as a hog pasture?

Supt. McKerrow—It is all right if you do not pasture too close. Too much tramping bruises the roots and injures the alfalfa.

Mr. Selle—Won't the hogs root it out?

Supt. McKerrow—They will have pretty hard rooting.

A Member—Can you grow your own seed?

Supt. McKerrow—I have not tried. We are paying this year \$6.25 a bushel for seed.

Mr. Goodrich—Where do you get it for \$6.25?

Supt. McKerrow—Of Currie Bros.

Mr. Goodrich—Governor Hoard two weeks ago got two thousand pounds and it cost him \$6.40.

Mr. Rust—Friday or Saturday I was in Currie Bros. and they wanted \$10.50 a hundred and would guarantee it free from mustard.

Prof. Henry—There are all kinds of alfalfa seeds and all kinds of weeds and consequently all kinds of prices.

Supt. McKerrow—I bought the highest priced seed of Mr. Currie because it looked nice, and he guaranteed it to be all right.

Mr. Roberts—Can you grow alfalfa on marsh land, tile-drained?

Supt. McKerrow—I would not say no. I would go carefully. In the five-acre field where we grew alfalfa last year, part of it ran down onto a piece of rather low land. It has been very dry the past two seasons, and that was nearly the best alfalfa we had.

Mr. Bender—You do not try to get a crop the first year?

Supt. McKerrow—We do not expect to get a crop the first year. But, if you have an extra good growing season it is possible that you will get so much that you will hate to leave it for mulching.

Question—Is Turkestan alfalfa better than any other?

Prof. Henry—We think it is from our experiments at the University. I am willing to go on record as making the statement that Waukesha county and the region north on the lake shore

will prove the best in Wisconsin. That is my judgment and my expectation, and I urge the farmers of Waukesha county and those to the northeast, up to Calumet county, to try alfalfa. But go slowly; plant a small area very carefully; tend it carefully; and when you have learned about it, enlarge your area as you like. Do not treat it as you have red clover. It will be a failure and you will be discouraged. Alfalfa is doing well in New York. They are producing large hay crops on the old Geddes farm, east of Syracuse. Start in slowly, and plant in ground exceedingly well-pre-

pared, cutting frequently. Keep the hogs and cattle off. After you have learned how to take care of it, gradually increase your acreage.

Supt. McKerrow—Do not sow any other kind of grass or clover with it. Give alfalfa good, clean land, and enough land so that it won't get near the blue grass or June grass, for when that works in it will spoil the alfalfa and when you want to break up the field with a sharp plow and a good team, set the hired man at it, and then go away from home so you won't hear what he says.

#### CORN FODDER.

W. C. BRADLEY, Hudson, Wis.

Corn is king of the forage crops in Wisconsin. Nine years out of ten, if given a fair show, it makes a fair crop. Very dry weather early in the season may ruin the clover and oat and pea crop, but corn, well tended, grows. Excessive rains at cutting time may spoil the hay, but we seldom get heavy rains in the fall to spoil corn.

#### Varieties.

We like to plant several varieties of corn so that the period of green feeding may begin early and last till frost comes. An acre of early Minnesota Sweet gives us the first cutting for the cows and pigs; then two or three acres of Southern Sweet to cut before Stowell's Evergreen is ready. For the main crop for silo, or to shock, we like Pride of the North as well as any

of the Dent varieties, it yields a fair crop of ears and a large crop of leafy digestible stalks.

The Flint varieties, like King Phillip and Longfellow, make an abundance of good fodder for feeding green or putting in the silo, but these varieties are harder to cut, either by hand or with the binder, on account of the large number of sucker stalks and another objection on flat clay soils, if there come heavy rains after corn is in the shock, being very short jointed, a large part of the leaves touch the ground and absorb the moisture, sometimes spoiling the entire shock.

So I say, plant corn for the cows, several varieties. Corn for husking, the largest variety that will ripen in your locality. Corn for Johnnie-cake and mush, but you had better let corn whiskey alone.

**CLEANLINESS IN DAIRYING.**

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

The most important factor in satisfactory and profitable dairying is cleanliness. Not alone in the building or room where the product is kept, but in every stage of the business, from the care of the cows to the delivery of the goods.

article that is not produced with the praiseworthy aim for thorough cleanliness throughout the entire process of manufacture.

Many a deficiency in other respects will be amply condoned by the more appreciated feature of absolute clean-



Miss Lawrence; Sweepstake cow in the Sunny Peak Herd.

A dairyman who is earnestly striving to reach the highest standard in the equality of his product and to obtain the greatest amount of profit, cannot afford to ignore the value of this essential commodity, for, without doubt, it is a part of his stock in trade, and one that in the eyes of refined patrons will receive the first and most weighty consideration. For this reason he can never hope to obtain a superior quality or a fancy price for an

liness, for cleanliness like charity will cover a multitude of defects and nowhere is its influence to be more conspicuously noted than in the requirements of high class dairy farming as an imperative requisite for furnishing a laudable grade of milk or cream, or in the manufacture of a first-class article of butter and cheese. The farmer who by painstaking methods has established a reputation for neatness and system will have little if any

difficulty in disposing of all his product, be the amount small or great, at an advance above the market price, whereas the man who is lax in his efforts and filthy in habits may go through life constantly seeking new customers and grumbling over the numerous shortcomings of his occupation, forgetting to consider the undeniable fact that, as a rule, the man

odors that will always pervade an ill-kept or filthy barn. Lime and sand plaster are valuable assistants in keeping a barn in a commendable condition, while a solution of blue vitriol or copperas are most excellent agents in the purging and purifying of underground drains, particularly those that are frequently flooded with water used in the manufacture of butter or the



Homeward Bound.

makes the profession and that it is not the profession that makes the man.

#### Cleanliness Must Begin With the Cow Barn.

To begin, the man with a natural or acquired instinct for neatness conscientiously developed to its proper proportions may fittingly start his crusade against unwholesome conditions and indifferent results by a thorough renovation of the cow barn or stable. This place should be held sacred to the occupancy of the bovine race alone. Neither horses, pigs, chickens or domestic animals of any other kind should be permitted to dwell within its walls.

Careful attention must be given to the matter of ventilation and drainage, not only to insure a healthful habitation for the cows but to destroy the contaminating effects of unpleasant

cleansing of dairy utensils, or where ducts are subject to clogging with grease.

#### Care of the Stock.

When the barn is in such a condition that the owner will take pleasure and pride in extending an invitation to his customers to inspect the premises, he should not forget that the pleasing appearance of a clean stable may be speedily dissolved from view by the disgusting spectacle of filthy and ill-cared for stock, and that an appetizing product can never be secured from such animals, it matters not of what breed or ability. A thorough grooming each day with a careful brushing of the udder before milking will be gratefully appreciated by both cows and customers, for any filth allowed to fall into the milk pail cannot be wholly removed by the best and most ap-

proved strainer that has ever been invented. A man might as well empty a bottle of camphor into a pail of milk and then attempt to eliminate the odor by running it through cotton, flannel or gauze strainer. The only sure way to prevent contamination is to never allow filth to enter the pail. For this reason, if no other, the milker's hands should be thoroughly washed before milking and every care exercised in handling the milk in order to preserve its purity.

#### Handling of the Milk.

Its transfer from stable to dairy should be made quickly and in covered cans or pails. Too great care cannot be exercised in protecting milk or butter from unpleasant odors. For this reason every dairy room should be devoted to the use of dairy products alone, nothing whatever outside of milk, butter and dairy utensils should be permitted in this room, sour milk must never be allowed to stand for any length of time in a dairy. Unwashed butter jars or tinware should at once be removed, milk spilled on table or floor should be wiped up without delay and a constant watchfulness observed as to ventilation and the many seemingly little things that have so weighty a bearing in marking the boundaries of success or failure. Separate cloths should be used in washing dairy utensils and the beneficial results of a judicious employment of soap and soda in the laborious task of cleansing unusually dirty milk cans will be readily appreciated. Sapolio and sand make excellent companions in an energetic raid against unclean and time-worn buildings and utensils.

Every dairyman who ships milk would find it recorded to his credit if he would insist that the decorative little brass plate bearing his name and address be frequently polished. At any rate it would prove a pleasing source of satisfaction and a dealer would regard it as an indication of enterprise and energy that would no doubt have

a favorable bearing on the right side when making a new contract.

When supplying cheese factory or creamery, no self-respecting dairyman will take refuge in the flimsy excuse that another's milk is below the standard and for that reason it is unnecessary for him to practice cleanly methods when his product is mixed with an inferior article. His ambition should be to furnish the best and most desirable quality that goes to the factory which he patronizes. By painstaking methods he may be able to secure the confidence and esteem of the buyer which, outside of the gratifying consciousness of having done his duty, will eventually make a reputation for skill and honesty that will be rewarded in proportion to his efforts.

#### Cleanliness the Dairyman's Watchword.

Cleanliness should be the watchword on every dairy farm, for it may well be regarded in the light of a good investment and its presence should be as carefully fostered as land, buildings, or personal honor, for it is not only a marketable stock in trade, but a passport to the good opinion of refined and cultured patrons, while the example may be far-reaching in its beneficial influence on markets, cattle, the elevation of the character of the man himself and the occupation in which we all should take an honest pride and pleasure in stamping with the impress of our earnest desire to make it the most beloved and honored calling in the world.

#### DISCUSSION.

Mr. Foster—Do you prefer soap to sal soda in cleansing milk vessels?

Mrs. Howie—No, sir, but in some cases where cans are returned from the city it is almost impossible, even with acid, to get them clean. I like the old-fashioned soft soap and a brush. You must not forget, however, after using this soap to thoroughly scald the can and also to steam and give it a

sun bath of at least one day, because the odor will linger, but there is an element about it that will take off the effects of the old milk better than any soap or soda I have ever tried.

Mr. Tenney—Did you ever try using wood ashes? That would be about the same thing.

Mrs. Howie—That does not leave an odor. I really think we should have some legislation in regard to the returning of filthy milk cans from the city. They come back from the customer in all kinds of conditions, many half filled with garbage and some returned after several days without even having been rinsed. There ought to be a law prohibiting the railroad companies from carrying any such article. They are too filthy for respectable people to handle or wash, and when they are filled with milk and sent back to the city without the most careful cleansing, I should not vouch for the quality of the milk, no matter how carefully prepared before putting into these cans.

Mr. Bradley—Is it not the duty of the health officers in Milwaukee to do something to get the cans returned in better shape?

Mrs. Howie—I have never heard of their doing anything in this direction. I know that in one or two instances milk men have, when called upon to do so, rinsed the cans and turned them upside down, which is a great help, but in many cases I have known cans to be returned from restaurants in such a filthy condition as to be disgusting. Many times on dairy farms, when the cans are retained too long by the customers and there is a shortage, the cans are hastily washed but not sunned thoroughly before the milk is put into them to ship to the city. I think that is one cause of poor milk and it has a bad influence on the health of the consumer. I think that is something to which the health officer should give his attention.

Mr. Hughes—How would it be to refuse to ship to individuals who won't return clean cans?

Mrs. Howie—Some may be in a position to do that, others are so fearful of losing their customers that they would ship in anything. We have known of men to ship at a loss of from four to six cents a can, simply because they were afraid of losing custom.

Mr. Scribner—There is an objection to feeding ensilage. I know of some milk factories, some condensing factories, that do object to it. Do you think they have any real reason to object?

Mrs. Howie—No, I do not. When we first began feeding ensilage it was an experiment. We had before that fed mangolds and carrots. In the beginning we fed ensilage sparingly and carefully after milking time. We had no complaint and we became bolder and began feeding it before milking. We have never received a complaint and so we have continued. I think the flavor is something that is appreciated as a June grass flavor. People become accustomed to it.

Mr. Scribner—We had some trouble last week with our ensilage. We were finishing up one lot near the bottom. This year we had the greenest ensilage that we ever had, the juice actually ran at the bottom. It made it very strong, but by running it through the aerator we were able to overcome it to a great degree. I think aeration is necessary for the shipping of milk.

Mrs. Howie—Yes. I think, however, that the greatest evil is uncleanly methods in handling. If you will look about the country you will see cows in such a filthy condition that if customers who are buying the milk should see the stable they would say they would never drink milk again. They would prefer lake water. You may go into many barns and find the odor will be so bad that the milk will become contaminated in a very few minutes. You may go into the dairy and you will find a dirty old cream tank, sour milk, and greasy jars that have not been washed. I have found these conditions on "nice" dairy farms. If anyone had said that

they were unclean people they would have felt insulted. I think there is very little trouble with the cow herself if she is properly groomed and fed, and if the barn is well cared for, and the milk properly cooled I do not believe there will be very much trouble caused by milk in Milwaukee, outside of getting the dealers to pay reasonable prices.

Mr. Bradley—Do you aerate your cream?

Mrs. Howie—Yes, we do in a way. We do not use a patent aerator. We have a long spoon made on purpose. The cream is plunged into ice water in the summer and is stirred until it cools.

Mr. Hodgson—I think Mr. Scribner made a mistake in not keeping the juice in the stalk.

Supt. McKerrow—Mr. Hodgson puts in his ensilage whole.

Mr. Coe—Is it not sometimes the case that the milk at the other end of the route gets contaminated?

Mrs. Howie—Yes. I know of a case where a serious complaint was received by the producer and he looked about the premises to find out what the trouble could be and as he did not discover it there he went to the other end of the route and asked the people there if they would please show him where they kept this milk. The instant he was taken into the room the fault was very plain. There was the milk standing on a rotten and water-soaked floor that had not been washed for some time, there was no ventilation and other things were put in this same room. No pains had been taken to preserve the milk and no doubt that milk had been standing on the platform of a railway station for several hours, then, when taken to this room, it was ready to be condemned. No, not all the dirty people are in the country, I am happy to say.

Mr. Hodgson—I want to ask Mrs. Howie if aerating the milk won't take away some of the taint of the milk. Would it not be advisable to practice

that or stir the milk in the cooling tank?

Mrs. Howie—What was the reason for aerating? What was it that you wished to take away? Where would you get these odors? At the Michigan Experiment Station there was an experiment made. The udder of the cow was sterilized, the hands of the milker were sterilized and the milk milked directly into the can. The cover was screwed on tight and the can was set aside to cool. All supposed that would be very detrimental to the milk. When opened they found pure, sweet milk, without odor. We must get as near these conditions as possible by keeping the cows clean and insisting that the milkers wash their hands. It is not asking too much for they will soon become accustomed to it and won't like to milk without doing so. Think of milking after working about the stable without washing the hands. I did see one man who really dipped his hands in the milk pail and then began to milk. We dairy people should have a pride in our business and be above such methods. No matter what happens at the other end of the route we should do our duty at our end. We know how to do it. We must have clean cows, clean milkers, clean tools, and then take proper care of the product. There is only one way to do it and that is to do it right.

Mr. Reese—I have heard a great many people say that that sounds well on paper. If you will go to Mrs. Howie's you will find it there as clean as it is stated in this paper. After you have done all these things, get the proper price and stick to it. We are selling our milk down below cost of production on an average.

Mrs. Howie—Do not think that we expect to do it for nothing. Furnish a perfect milk and people will be glad to pay the price.

Question—When some odors get into the milk, will aerating remove them?

Mrs. Howie—I have never thought so.

Mr. Convey—Mrs. Howie has taken

the correct position in this matter, yet, after all, it is a wise thing to aerate the milk.

Mrs. Howie—Yes, I believe in it, but I believe there are different methods in doing it. I do not think that any expensive machinery is necessary, for it is usually so complicated that it makes more labor. I know of some aerators that are harder to wash than all the rest of the dairy utensils. I know of nothing more effectual than a good spoon, a long spoon. You can dip up the milk and stir it so that it comes in contact with the cooling surface.

Mr. Buskirk—I stopped at a place here last month and asked for a glass of milk, and when I tasted it I found something wrong, and when I got down to the bottom I found a good deal wrong. I said to the lady "Where are you buying your milk?" She told me the name. I had supposed they were clean people. All the aeration you could put into that milk would not clean that dirt out.

Mr. Foster—What do you consider the simplest aerator and cooler?

Mrs. Howie—The one I use at present is a long spoon. I think it cost me fifteen cents. There are some holes in the bottom of it. We have a fine, handsome one that cost \$8.00, and it is up in the attic, but so far I have found nothing superior to the spoon. Before you begin buying this expensive machinery, think about it a little. Use your brains in this business as well as your hands. See if you cannot think of something yourself. You know that this milk must be stirred in order to cool rapidly, and you can do it easily with a long spoon.

Mr. Foster—Mrs. Howie, how long will it take you to cool a ten-gallon can of milk to sixty degrees by your method?

Mrs. Howie—We keep the cream in five-gallon cans, and three to five minutes stirring is sufficient. We plunge the cans at once into ice water.

You must leave the cover off until it is thoroughly cool.

Mr. Convey—Does Mrs. Howie stir the cream or stir the milk?

Mrs. Howie—The cream.

Mr. Convey—Does it not get some aeration in passing through the separator?

Mrs. Howie—Certainly, as it flows through the spout into the can.

Prof. Henry—In the matter of keeping the milk and the introduction of germs into the milk, I wish to endorse what Mrs. Howie has said. In 1900, at the Paris Exposition, I saw bottles of milk which were entirely sweet,—good sweet milk, just such as you would have on the table to drink. They had been shipped from Illinois to Paris,—De Kalb, Ills.,—without any chemical preservation,—simply clean milk in clean bottles and kept cold,—and the milk was sweet two weeks after reaching the city of Paris. When we allow milk to sour in our houses in a few hours, it is plain that that milk, although we think it is clean, cannot be free from the germs that make bacteria. The milk I mention was produced by H. B. Gurler, of De Kalb, Ills.

Mr. Everett—It might be well to say in connection with this, that he runs his milk through aerators and provides his patrons at the creamery with aerators at his own personal expense.

Mr. Scribner—I think we are a little too easy on this aerating business, and I think the time spent in pouring and stirring the milk is quite an object. We have used a patent aerator and it is one of the most simple things to handle. We can attach our windmill to it and run the milk right through while we are at breakfast, without wasting any time. I think the aerators are a good thing, and I think everybody should try them, either for milk or for cream.

Recess to 1:30 p. m.

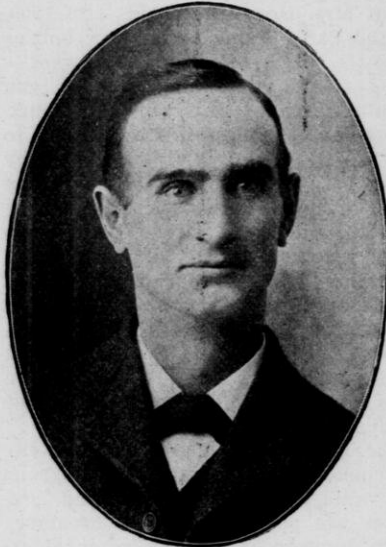


## AFTERNOON SESSION.

The Institute met at 1:30 p. m. Conductor W. C. BRADLEY in the Chair.

## STARTING A SMALL DAIRY.

D. B. FOSTER, Fairchild, Wis.



D. B. Foster.

My subject may seem somewhat inopportune just now to an old line dairyman, in view of the past winter's abnormal and excessive prices of feeding stuffs and labor, unaccompanied as they have been by corresponding prices for the product of the dairy, and if we expected to be always confronted with forty-two cent oats, \$24.00 bran and \$40.00 per month common labor men; if dairymen were all to continue to look to the millers for their principal supply of protein, and conduct their business in the old-fashioned way without any particular standard or ideal, and if no cheap form

of protein could be raised on our own Wisconsin farms, it would be needless to discuss the starting of even a small dairy farm as a financial venture.

But the old ways of doing much of the work of dairying have been changed already, and the end of the changes will not be reached until we get all through the cow, the stable, the feed, and the very bottom of the would-be dairyman's innermost soul; the coming dairyman must figure and figure fine.

Many more dairymen than usual will this spring wonder where the profit is in keeping cows, and it would give many a one, at least a melancholy satisfaction, to know just what hole in the business his profits leaked out of, and as none of us here are in the dairy business simply for the fun of getting up at four o'clock every morning, and just living with and for those cows three hundred and sixty-five and one-fourth days in the year, we will assume that hope of profit is the main-spring of our efforts in this line.

#### Results of Ignorance.

I believe I am right in saying that the worst curse of the whole dairy business is the utter indifference and disregard by the human part of it to the plainest and commonest rules by which our other business affairs are managed,—for instance:

What a lot of men in Wisconsin are keeping cows, in many cases whole herds of them, for the paltry pittance of \$25.00 or less total gross receipts per cow per year.

What a whole lot of fellows who keep cows dare not look the business right in the face, nor figure up fairly and squarely just how much they received per hour for their work on cows last year, and what they got their pay in.

And what a lot of farmers and cow-keepers will talk and argue for six months or a year trying to learn about silage and silo building, and other new departures, and oft-times making what proved to be costly experiments, when they could get the whole thing in printed form, perfectly reliable, just by asking the experiment station for it.

And lastly, how many men go through all the labor and trouble of producing and hauling milk to the factory, year after year, without making one decent effort to absolutely know the cost of that milk, or to Babcock and figure up for themselves what price it should sell for. They simply dump it into the weigh can and take what they get, always grumbling, always suspecting, frequently cursing the creameryman, but too pig-headed to test and figure for themselves. We have got to get over all this.

#### Need of Milk Records.

Twenty years of mercantile training have served me well in the dairy by keeping me close to figures, and never in all those twenty years have I found the need of accurate calculations greater than during my later experience in dairying.

Compelled some years ago by reason of failing health to quit the mercantile business and get out of doors, we (my wife and I) rented a small farm with about twenty acres under the plow (I have since increased it to thirty), and forty acres of brush pasture, and tried farming. We designed and agreed to keep only one cow.

One of our neighbors wanted to buy milk of us, then another, then a couple more, and then of course we had to buy another cow, and then another,

and so on, until we have to keep twenty cows, that average nearly seven thousand eight hundred pounds of milk each yearly, to supply the demand, and this in a manufacturing country village of about nine hundred total population, where about every second family was supposed to keep a cow.

When buying cows the owners always recommended them to give a "twelve-quart pail nearly full," if in summer, and "two-thirds full," if in winter, or else a "fair mess"—"but awful rich," but I have never yet bought a cow whose owner knew just what she had done in any year of her life, and I don't expect to, they won't try, they "have no time" for figures or records.

I purchased cows regardless of size, color or breed. I tried to get good milkers and succeeded in about one case in every four in getting cows that would come up to my standard if well fed and cared for. I cannot size them up scientifically, as to their dairy form, but want a cow to have a good udder, lots of ambition and force, and good width of chest.

I weigh the milk from each cow at each milking and record the same, I won't trust the cow, nor the hired man's judgment, nor my own ability to guess, as to the amount of work she is doing, and I won't let her fool me by giving a pail full for a short time and then merely killing time or loafing a large proportion of the year.

A dairyman should be a man of high ideals and to materialize those ideals he must have a minimum limit of performance, below which he will not go. My minimum requirement is six thousand pounds of 4 per cent. milk, or its equivalent, and no perfection of supposed dairy form, nor personal beauty will excuse a cow that cannot accomplish that much work in a year, accidents barred.

#### How Records are Kept.

In the most convenient place on each side of my stable I hang a spring

scale and very conveniently is placed a lead pencil and a card, (about five and one-half by fifteen inches for ten cows, small as possible so as to be handy), ruled and cross ruled, to make one square for each cow for each day of the month.

The weight of the morning milking for each cow is put in the top of her particular square, and the night's weight underneath.

The scale, pencil, and record must be convenient, and the work of weighing and recording will soon become a fixed habit just as much as the brushing off of the cow's udder, or any one of the thousand things we do without ever thinking of the work it is, or the time it takes.

At the end of each month a new card replaces the old one, which goes to the—office, I was going to say, but I don't want to scare anybody—house, to be figured up and entered in the yearly record book, so as to show just how many pounds of milk each cow has given each month, since she came to our dairy.

Much may be learned from this monthly and yearly milk record as the months go by. I soon found that I did not know much about "dairy form" and some cows that "run the pail over" when fresh, fall behind, on the year's production, others that never gave more than thirty pounds per day. A live man oft-times wants to know how some cow's work this year compares with what she did last year or year before. Comparing figures like this often reminds one also that his rations are out of balance.

#### Value of Milk Records.

I find this daily record quite servicable as a feed saver, enabling me to feed judiciously as to the productive capacity of the individual animal, to watch the effect of the different feeds, and to judge intelligently the results of well balanced rations.

It also gets the hired help interested in getting the largest possible amount of milk from each cow, and largely

prevents shrinkage through careless milking, neglect and abusive conduct.

I find that even a lax hired man takes a great interest in the daily milk record and takes special pride in the good performance of the cows on his side of the stable, and he becomes the warm personal friend of the largest producer, and I count it well worth the time and care spent recording to have the hired help personally interested in the cows' welfare. The daily record always registers any complaint from the cow as to her health, her happiness and her general welfare and the fact of her dropping off, just a little, is immediately noted and commented upon.

The monthly and yearly record indicates the largest producers and what is of far more importance, shows accurately the poorest cow in the herd, and she is the one we are after. The result is simple.

If we will not keep a cow that can't give as much as six thousand pounds of 4 per cent. milk in a year, then what cows we keep over will all be good ones, but if we guess at this and guess at that, guess that they pay, and guess that the hired man does his duty, we shall in the end have only "Apples of Sodon," which turn to ashes in our hands, and take our pay in fertilizer and our satisfaction in the belief that the creamery man cheated us. Don't play the Baby Act.

#### Establishing a Herd.

Now, after we have got our herd all culled out until there isn't a cow in the lot that won't come up to our minimum figure, we have yet to procure the other half of the herd in the person of a first rate dairy sire. In this line, the very best is the cheapest; and I don't want any guessing about that part either.

Give me a sire, the breeder of whom has kept individual records as I have described for twenty years, a sire whose pedigree for twenty years contains only cows with large yearly records, and of sires whose mothers

and grandmothers for away back were also all of the best according to actual record; a sire about the qualities of whose lineage for at least a score of years there is no guessing, and to such a sire, if he can be found, I will trust the future breeding of my herd, and may reasonably expect a greater proportion of good heifers than it is possible to procure by any other method.

#### The Cow Stable.

Now, a dairy is not started until we have summered and wintered it. A stable becomes necessary. Let the walls be air-tight, let the ceiling be low, not over seven and one-half feet in the clear, let there be at least one window thirty inches square to each two animals, and in the winter put in a double sash and keep the glass all clean. The inside must be thoroughly and neatly whitewashed at least yearly, so as to make it seem like home. It must be ventilated by the King system, so it won't stink. A two-cent stamp sent to the experiment station in Madison will bring you the full particulars about this system.

The cows must face each other. I made up my mind to this last month at Menomonie. Mrs. Howie says: "It is pleasanter for the cows," and "how should you like to be fastened facing a blank wall or a staring window all day long?" That settles that part of it. If that woman does not understand feminine feelings then nobody does.

#### Silage for Forage.

Now, next summer there will be a drought; there always is, sometimes early, sometimes late, maybe only a short one, maybe a terror, like last year's, but the man who has enough silage to feed all next summer don't care much, he's all right. And I believe that for actual results and from field to manger, silage, I mean first-class silage, is actually the cheapest and best green forage crop that we can grow with absolute certainty, to help out scant pasture and keep up the flow of milk in the latter part of the

summer. By first-class silage I mean silage made from a leafy corn, fully mature, not dry, with ears averaging three inches long to each stalk eight feet high, preserved in a silo with absolutely air-tight walls, the corn being kept highest next to the walls while filling. The result, if the corn is cut fine, is sure. There will be no bedding left, no butts, no cobs, absolutely no waste. I plow for corn in the fall, because it gets that much work out of the way for spring and because it conserves the moisture near the surface better and because I want the manure, on the surface, merely disked in, fifteen loads to the acre for corn, hauled in winter, right from the stable. In the spring as soon as possible I thoroughly disk the land and then drag it every time it dries off after a rain.

When planting time comes, about May 15th, I plant the biggest, leafiest kind of corn that is reasonably sure to mature before frost. I plant in drills three feet, eight inches apart, that being as close as will allow late cultivation, and put in from twelve to sixteen quarts to the acre, according to the size of the kernels, and two and one-half inches deep. I want a stalk to grow every four inches in the row. I always test my seed corn before planting, and plant more or less according.

After planting, the ground is rolled, then dragged, the rest of the cultivation depends largely upon the weather. I always stir the surface every time it dries off enough after a rain, so it works up mealy. I want the ground kept loose and fine for two inches deep. I never cultivate to kill weeds because, if the ground is stirred as often as it should be, there will be no weeds.

The last cultivation is done with one-horse, fine-tooth cultivators, just as late as the horse can crowd through without smashing too much, usually about July 15th to 20th, and just ahead of the cultivators I sow six quarts of medium clover seed per acre.

I practice a three or four-year rotation, according to my success in get-

ting a stand of clover in the corn ground. If I miss, which will be once in a while, I shall seed clover with oats, or oats and peas the next year, and cut the oats and peas just after the oats head out, and cure them for hay.

Fifteen acres of corn, seven and a half acres of clover, and seven and a half acres of oats and peas cut for hay will furnish all the good, rich roughage needed by twenty cows, fifteen head of young stock and three horses, for one whole year, silage fed to cows three hundred and sixty-five days.

#### Reciprocity.

Some of my neighbors argue that I wear out the land by raising such heavy crops, "the biggest corn they ever saw," but I "have the figures" to show that my crops are getting bigger every year. I feed everything I raise and nearly two car loads of grain besides and apply the residue all to this land.

I feed grain to cows all the year round, very little of course when the grass is at its best.

I feed as narrow a ration as practicable, having due regard to economy. I mix up a lot of feed in the right proportions to balance my roughage and figure out a standard ration, then I feed more or less to each cow, according to the work she is doing. When fairly fresh and doing well she may have anything within reason that she wants, and just as much as I dare give her. She is let out to drink warm water twice a day in winter, is given as much liberty as possible in the stable, and is carded off every day and kept clean. I try to keep her fairly comfortable and happy if possible, and she tries to pay me back. That's reciprocity.

My neighbors tell me cows will wear out if they get all the good food they want to eat, but my cows get better every year under liberal treatment. One of my heaviest milkers,

for instance, gave seven thousand seven hundred pounds in '99, nine thousand seven hundred pounds in 1900 and over ten thousand pounds in 1901, and I have a number of others that show about the same proportionate increase. My neighbors are guessing that I am wearing my cows out, but "I have the figures" to prove that I am not.

I seldom have any kind of sickness whatever, and think much trouble of that kind might be easily avoided by proper feed and sensible care.

#### Requirements for Starting and Maintaining a Dairy.

I realize more and more how little I know about this cow business, but I like it. The figures are more to me than the most interesting story, and lighten the drudgery amazingly. It makes a vast difference with our work whether we are interested in it or not. I have regained my health, and mean to keep it, by the same method.

I know that what I have done others may do, it is so simple, scientific information, push, thought and calculation, are the fore-most requirements for starting or maintaining a dairy.

#### DISCUSSION.

Question—I would like to ask, should not this gentleman keep the cow awhile before he discharges her? How long would you keep a cow before you found whether you wanted her?

Mr. Foster—I have kept cows as long as four days and others as long as six months. With some I could tell in four days that they were not going to pay for their keep, and the sooner I took my medicine and lost ten dollars or so difference on the price, the better for me.

Mr. Scribner—Don't you think it is possible to keep a cow the second year profitably?

Mr. Foster—We cannot afford to lose on her for two-thirds of the year in order to try her the second.

The Chairman—With thoroughbred

cattle it might be different. But I think in Mr. Foster's case the sensible thing is to get rid of them as soon as possible.

Mr. Foster—In connection with that I will say that I have a heifer in my stable now that has disappointed me for the last three months since she came in the first time, but I will keep her until next year. But a boughten cow must not disappoint me.

Question—What breed of cows do you keep?

Mr. Foster—I have no special preference for any breed. I want the cow that will do the work. It would be nicer to have a whole row of cows all alike in your stable, but you cannot buy them at reasonable figures. At the same time, I sold the prettiest animal in my stable the first of this month for \$25.00. I bought her for her beauty and I sold her for her laziness.

Question—Do you raise heifer calves?

Mr. Foster—Yes, from my best cows, all of them. I discard some before they calve the first time, others I try, —some one year, some two, some not more than three months. They satisfy me in that time. I do not claim to be infallible, but business is business.

Question—Where do you sell your milk and what do your cows net you?

Mr. Foster—I retail my milk in the village. My cows last year, gross receipts, netted me a trifle over \$100.00 per cow, and I sold milk at three and one-half cents per quart. We made butter of what was left,—that is taking out what we used ourselves. Last year I was reckless. Those twenty cows this year will net me \$1,000.00 and I hire all my work and will not be at home more than two-thirds of the time.

Question—You do not buy your feed?

Mr. Foster—I buy all my grain feed.

Mr. Bradley—He has twenty cows on thirty acres.

Question—Would you make as much

by taking your milk to a factory as by selling it?

Mr. Foster—There would not be a great deal of difference. My milk, the total production of my milk, taking out what we use in the house, netted me \$1.35 per hundred, and there is the expense of retailing to come out of that. It would not cost so much to take it to the creamery and you would have the skimmed milk left to feed to the hogs and calves.

Mrs. Howie—The reason you expect to make so much money this year is because when you are gone two-thirds of the time Mrs. Foster is running the business.

A Member—I believe it, if his wife is like Mrs. Howie.

Question—How do you remove your manure?

Mr. Foster—I do not have a space wide enough behind the cows to get a wagon in there, so I remove mine with a wheel-barrow.

Prof. Henry—These annual meetings are historical in a way and the records of this meeting, being published, are very important. I would like the chairman to call upon the farmers in this audience who weigh the milk of their cows with regularity to raise their hands that we may know them from the others and how many there are who do this and keep records of the milk production of each cow.

The Chairman—I think there are fourteen or fifteen hands up.

Mr. Hodgson—I would like to ask the gentleman how many cows fail him in the year, and if you have somebody to take the cows that are not worth anything to you and where you get other cows to fill their places. How many do you discard in a year and how many cows do you have to replace?

Mr. Foster—I have sold in the last year eight cows. In this retail milk business you have to keep up your production and must have just so much milk per day. I have had to go out

and buy four. From now on I have young stock enough to take the place of all I shall discard, which will be in the next year not over three, unless some have accidents.

Question—How many silos have you?

Mr. Foster—I have two. One is fourteen feet in diameter and the other is twelve feet and thirty-five feet high. The large one I feed from in the winter and the small one in the summer time.

Mr. Purvis—How are your silos built?

Mr. Foster—They are stave silos.

Mr. Purvis—How much does it cost per cow on an average to keep these cows a year?

Mr. Foster—Last year I bought \$375 worth of feed, that is, grain for the horses, cows and young stock. I attempted to figure that out, but so much of my labor bill goes into the production of feed I gave it up.

Question—How much grain per day do you feed your cows on an average, including the grain that is in the silage?

Mr. Foster—I have not estimated the grain in the silage. I feed 6.5 pounds. That is my standard ration. It is a ration that will feed two-thirds and sometimes not over half, the cows; the others vary above and below it. For the cow that slacks up in her milk, or when it is time for her to go dry, I slack off in the feed. The cow that is doing well and is fresh gets anything she wants.

Question—Is that 6.5 pounds for every day during the year?

Mr. Foster—Well, no. That is the ration I made out on February 11th and I am still feeding it, but I shall probably change that very soon. That is what my standard ration is.

The Chairman—An average ration?

Mr. Foster—It is a winter ration.

Question—What is this ration composed of?

Mr. Foster—I am ashamed to tell you some things about that ration I feed my cows, because you won't like

it, but it must come out. I have an opportunity to buy from my home elevator something that they cannot sell ordinarily and that nobody else wants. There is a lot of buckwheat screenings composed largely of pigeon grass and sorrel seed, all kinds of weed seeds, and about one-fourth broken grains of buckwheat. I mix this with one-fifth corn and grind it up. I take one hundred pounds of bran, one hundred and fifty pounds of grain screenings, one hundred pounds of buckwheat middlings, and thirty-three and thirty-three hundredths pounds of gluten feed, and then I figure the elements that go to make that up and deduce my ration from that.

Mr. Reese—Did I understand the gentleman to say that he gets three and one-half cents per quart for his 4 per cent. milk?

Mr. Foster—They do not limit me to any per cent. I try to average 4 per cent. as nearly as possible.

Mr. Reese—You are really getting about \$1.12 a can, thirty-two quarts to the can?

Mr. Foster—Yes, sometimes I sell very nearly all of the milk. Sometimes I have some left to make into butter. We do not have enough to pay to make butter systematically.

Mr. Reese—Wouldn't it pay you better to run that milk through a separator, if it tests better than 4 per cent., and keep the skimmed milk at home on the farm? That is where I think a great many farmers make their mistake. They send every pound of milk they have to the city and they take away from the farm just that much. Now, I have lived around here all my life. I am a young man, but I notice this much, that the men who are shipping milk have the poorest stables, the poorest farms and the poorest barns, and the men that are making butter from twenty-five cents a pound up have got money in the bank and generally have a plaster on their neighbor's farm.

Mr. Foster—The gentleman's position is well taken. I am living on a

rented farm, very limited in size, and I do not care now to change my system of farming until I know what I want. That is why I took to peddling milk.

Prof. Henry—The gentleman at my left has put this thing so well I want to clinch it. It is my privilege to be in a position where I can be helpful to Wisconsin farmers. I have been closely watching for some time the influence of the city upon the farming radius,—its effect upon the population as to their happiness, their bank accounts, and the condition of the farms, etc. I want to say to you farmers who are shipping milk to Chicago, or, in this county, more likely to Milwaukee, that in the end you will not be prosperous, the farms will not be prosperous, and that many a farmer is now shipping milk into Milwaukee or Chicago who would much better be patronizing a creamery. I know farmers who are shipping to Chicago and getting \$700.00 a month cash for their milk. They are poor, hard up all the time, and the farms are running down. Send your milk to a creamery unless they will pay you more in the city. Do not cut each others' throats. This is a cut-throat business.

Mr. Ezra Goodrich—I can knock the creamery idea into a cocked hat. Skim your milk at home and have it sweet and good, ship your cream and feed the rest to the calves. I get \$1.50 for the cream from an eight-gallon can of milk, and no creamery on God's earth can do better.

Mr. Foster—We never had a creamery in our town until this year, and the first of January I made up my mind that I was going to the creamery and I would raise the price of milk from three and one-half cents to five cents and if the people did not want the milk I would practice the other system of dairying and I would have the skimmed milk left to feed to the stock.

Question—What time do you have your heifers come in?

Mr. Foster—At a year and three-quarters. They sometimes run to two.

Question—Is six thousand pounds of milk your standard?

Mr. Foster—That is my minimum. They have run as high as ten thousand pounds, as high as a little over eleven thousand pounds.

Mr. Reese—Do you test your milk by any system?

Mr. Foster—No, I do not.

Mr. Reese—Then those cows may be giving all skimmed milk and you not know it.

Mr. Foster—They may. The herd will average 4 per cent. milk.

Question—You are not getting down to what your individual cow will produce. You are looking for quantity and not quality.

Mr. Foster—My position is different from what it would be if I were selling that milk to a creamery, because in that case I would sell on a butter-fat basis. I cannot sell milk entirely on a butter-fat basis. There is no call for it. I try to suit my customers.

Mr. Hodgson—Where do you get 4 per cent. cows?

Mr. Foster—It is easy to get cows giving 4 per cent. milk, because up and down the road our neighbors' milk averages 4 per cent., but I require a cow to give a certain quantity of milk and then I look after the test afterwards. I must have the quantity. I do not want a cow that gives less than six thousand pounds.

Mr. Arnold—When you commence taking milk to a creamery it does not pay to guess at the test of the milk. You can determine how much the test is and go by the test.

Mr. Foster—The only test then is the butter content, regardless of the amount of milk.

Mr. Reese—If you are going to ship milk you want quantity and if you get anywhere over 3 per cent. you are safe so far as the health department is concerned, but for men that are getting down to the individual cow and want to know what she is doing, they do not want to run the business on his basis.

Mr. Foster—Out in the country, a



few miles from my place, is a small cheese factory, operated by German farmers. They do not buy milk by the test. A man would be a fool to go to work and furnish them Guernsey or Jersey 5 per cent. milk. If I were a patron of that factory I would get the biggest milkers I could and I would not care a cent what the test was. I try to fit my product for the market that I have. If I took my product to a creamery, the fat content would be the only test. If I took it to that factory, I would want the quantity, but would not care about the quality, for they don't apparently.

Mr. Reese—How long has that cheese factory been in business?

Mr. Foster—I think about four years.

Mr. Reese—Then, according to your theory, if you brought skimmed milk it would not make any difference. Will they take skimmed milk?

Mr. Foster—No, they won't.

The Chairman—There are hundreds of cheese factories in Wisconsin where they do not test their milk.

Mr. Foster—I think they are very foolish.

The Chairman—In regard to the silo. Why do you have the ensilage higher on the outside than in the center?

Mr. Foster—Well, when you stack hay you tread the center and leave the outside loose, so that when the stack settles it will draw in at the sides, but when silage settles you want it to crowd against the walls so as to exclude the air, and the way to produce that result is to reverse the hay stacking process.

Mr. Purvis—Do you keep a man in the silo all the time?

Mr. Foster—Yes.

The Chairman—His silo is built of

staves. A good many people object to silos on account of the cost. Here is Mr. Foster milking twenty cows and he says he must have the silo in order to have cheap milk. He built two silos on that rented farm.

Mr. Foster—The material cost seventy-five dollars apiece for the two silos.

Mr. Reese—How long have they been standing?

Mr. Foster—Three years.

Mr. Buskirk—Do you have any difficulty with frost in the silos?

Mr. Foster—To some extent. In the coldest weather I put a cheap, light cover across the silo, about six feet above the top of the silage where I am feeding, and then by covering this over with straw and planer shavings and opening the door into the stable the frozen silage soon thaws out if scattered around the surface. In our coldest weather it will freeze some around the walls, but by digging it away and scattering it over the silo it thaws out before the next feeding.

Mr. Utter—Would you advise a farmer on his own farm to build a stave silo?

Mr. Foster—Yes, sooner than go without one. If a man going into northern Wisconsin would build no house until he could build a first-class one, he would be a long time without. If you put up a cheap silo, use it for a few years. The seventy-five dollars will come back the first year. Then you have the lumber left. I say by all means build a silo. If you cannot build a good one, build two cheap ones. Have the walls tight.

The Chairman—There are a good many silos built of stone and brick and they are better than the stave silos.

## CORN BREEDING AND IMPROVEMENT.

W. H. STEVENSON, Champaign, Ill.

One familiar with our great cereal crop and who has carefully studied type and quality in corn and their relation to production cannot but feel and realize that an unfortunately large number of farmers, in this and other states, raise corn inferior in type and breeding. The result is a lessened yield per acre and financial loss.

If the thoughtful corn grower will look with observing eyes he will note two facts. First, that of all the varieties and types of corn which he finds but few are creditable, or even good specimens of the corn grower's skill. Second, that few articles are written on corn breeding and improvement. There are an almost endless number, however, relative to corn production considered from almost every other view point.

There are many men today, in every state, who have toiled long and diligently to increase the average yield of corn per acre, but there have ever been few—very few—among the number, who have endeavored to accomplish this important work by systematically breeding corn. We can readily understand why this is so. It has been comparatively easy to investigate improved methods of planting and cultivating, but what time and patience and study have been required to breed aright! And yet, by reason of its inherent capacity for variation, corn improvement opens to every intelligent farmer a large and exceedingly fertile field for practicable and profitable investigation and work.

Corn sustains such a vital relation to the agricultural interests of our country and the world, owing to its value as a food, both for animals and men, that its breeding along practical and scientific lines is a matter of the greatest importance. Therefore, I ad-

dress you today, on the assumption that a knowledge and application of the principles of breeding are as important and fundamental to success in producing desirable types of corn as in bringing our various breeds of live stock to a more perfect development.

Within recent years it has been found that the work of improvement in plant life and in animal life can be conducted along similar lines by similar methods.

To the great breeders of the past are the stockmen of the present indebted for the choice animals in their flocks and herds. What would be the type and quality of our live stock today had not Bakewell, Collings, Bates, Booth, Cruikshank, Webb, and other breeders, during the past century and a half, studied animal life and form, and through careful selection, mating and breeding, pursued with persistency during many years, laid such an admirable foundation for our modern live stock husbandry?

Successive generations of sheep and cattle, upon a thousand hills, in both hemispheres, have borne the impress of these master-breeders' handiwork, in feature, form, quality, and other characteristics.

And now we believe that in the fullness of time the day has arrived, when the reward is as certain and as great for those who will give of their energy and time to the improvement of our farm crops as that which crowned the efforts of the pioneer in live stock improvement. It is true that all work in plant breeding demands, in a measure, scientific operations. But the breeding and improvement of corn is of such great importance and can be carried on so successfully and profitably by the intelligent, enthusiastic farmer that we

deem this work worthy of the most careful and thoughtful study.

Successful corn breeding is inseparately linked with three all-important factors in crop production. These are fertile soil, proper methods of cultivation and improved seed. Unless they are the very foundation on which the corn breeder's efforts are based, failure and disappointment must follow.

#### Soil Fertility.

The farmers of the great corn belt a generation ago apparently believed that the virgin fertility of the soil was inexhaustible. With little thought regarding the penalty which the immutable laws of Nature inevitably exact from every soil robber, these pioneer farmers raised corn after corn, wheat after wheat, or corn after wheat, producing large and profitable crops of each. The wonderful productiveness of the soil encouraged and fostered a system of grain growing and soil robbing, which in time, threatened to completely exhaust the fertility of the land. When the pioneer farmer discovered that he had worn out his fields and that they would no longer produce profitable crops, he made haste to move to a new section. But, in these later days, there is little available new corn land for the younger generation. In many sections the children of the early settlers are today striving to solve the problem of restoring the fertility to the soils.

Many have learned that a one-crop system of farming assuredly brings poverty and want to any community. Many, too, have advanced a step and now realize how much more steady the profit is in meat and milk than it is in corn and wheat; how much better corn pays in cattle, hogs and sheep than when sold to the grain buyer. When all grain growers master this one underlying principle in successful agriculture a new and brighter era will come most speedily and with a promise of reward rich beyond compare. The problem, then, before every corn grower is to keep up the fertility

of his soil in order that he may continue to produce profitable crops. We offer a few practical methods by which the mechanical as well as the chemical condition of the soil may be improved at the same time that profitable crops are produced.

The leguminous crops, e. g., soy beans, cowpeas, clover, and alfalfa, furnish one of the best means of building up soil fertility. They are grown under widely different conditions and are especially beneficial to the soil and valuable as feeds.

Increased yields of five to fifteen bushels per acre are frequently reported where corn follows one of the legumes in a rotation. The great value of leguminous crops is based on the fact that they furnish the cheapest food for stock and the cheapest manure for the soil. This is true because they obtain from the air nitrogen, a substance necessary for plants and animals alike, which costs in the form of fertilizers and feeding stuffs fifteen to twenty cents a pound.

The soy bean and cowpea hay has been found to be as valuable as ordinary red-clover hay and the crop is harvested in much the same way. In rich, black, prairie loam the soy bean is more successful than the cowpea. The latter, on rich land, produces an excessive growth of vine with very little seed.

However, these leguminous crops cannot be rotated with corn indefinitely when the entire growth is annually removed from the land. They add much to the supply of available nitrogen in the soil, but they do not add potash and phosphorous. Continuous cropping of any kind will sooner or later exhaust the land. Therefore, it is imperative that every corn grower heed the warnings of waning fertility and speedily learn that there is no such thing practicable as maintaining fertility without live stock. Barn-yard manure, when properly cared for and applied to the fields, is the best of fertilizers for the corn grower. The use of commercial

fertilizers, the growing of legumes, and the turning-under of green crops are helpful, but they only delay the inevitable loss of fertility in the fields in which they are used.

#### Culture.

The second important factor in the production of a corn crop is the culture. This includes the preparation of the seed bed, the planting and the cultivation. Conditions of soil and climate vary to such an extent that no fixed rules can be given regarding the depth and time of plowing, disking and harrowing. The preparation of the seed bed, however, should be such as to provide, in fullest measure, moisture, heat, and air, which are absolutely essential for the germination and healthy development of the seed corn. A large number of experiments have been made to secure valuable data regarding such important points as the distance apart of the hills, the number of stalks in a hill, and hilling vs. drilling. All of these items contribute, in part, to the success or failure of the corn crop, but, here again, so many conditions enter into the problem that we can do little more than call attention, very briefly, to three or four facts which may prove valuable as guide posts to the corn grower who would profit by the accumulated evidence of many investigators.

Year after year the trend has been to increase the number of hills per acre and to decrease the number of stalks in a hill. There are good reasons for this change from the planters three feet ten inches wide, or even wider, to those three feet six inches wide, and less. Two and three stalks in a hill give a maximum yield and the ears are usually larger and more fully developed. In addition, a three-foot six-inch planter drops three thousand five hundred and fifty-six hills per acre or three hundred and sixteen hills more than a three-foot eight-inch planter. If each hill produces two well-developed ears, this represents

an increased yield of six or seven bushels per acre. Drilling is very often practiced on rich, new land, quite free from noxious weeds. Under these conditions an increased number of stalks per acre give very satisfactory yields. However, whenever grasses and weeds threaten to seriously interfere with proper cultivation of the drilled corn it always proves best to adopt the hill system. A series of experiments at the Illinois Station, repeated with different soils, varieties of corn and seasons, show that the average yield for the two systems is practically the same. In view of the great advantage in favor of hilled corn during the period of cultivation we must grant that it is the most practicable system for nearly all conditions.

We cultivate corn to kill weeds, to improve the physical and chemical conditions of the soil and to conserve moisture. Careful plowing, dragging and harrowing improve the physical condition of the soil by making it finer and looser, thereby affording a larger feeding area for the roots of the plants. Chemical improvement is brought about by admitting a larger quantity of air into the soil. This process increases the fertility by hastening the formation of plant food. An adequate supply of moisture is an essential condition for the growth of corn. The amount of water used by the corn crop during the growing season is enormous. An idea of the total moisture needed is gained from the fact that three hundred and ten pounds of water are required for every pound of dry matter. During the hot summer months, the period of least rainfall, the growing crop requires the major part of this vast quantity of water and it is during this time that the great reserve supply of moisture in the soil finds its way to the surface by capillary attraction and evaporates rapidly. Now, the point is, will the corn grower permit this loss of water which sustains such a vital relation to his crop? He

need not permit it for this evaporation can be retarded by stirring the surface of the soil and keeping it light and porous, the loose soil serving as a mulch. The pores in this soil are too large for capillary action and the moisture fails to reach the surface. The corn grower, then, must cultivate more frequently, and less deeply, too, as we shall find, in order that, while killing the weeds, he may preserve the moisture for the corn roots and spare the corn roots to gather the moisture. Many successful corn growers have found it very profitable to continue cultivation after the corn is too high for the regular two-horse cultivators. They go between the rows with a one-horse cultivator, or drag, while the ears are setting and thus maintain a dust mulch. This work is of value only in a dry season.

Root-pruning or cutting off the roots of the corn plants effects serious injury to the crop and demands the thoughtful attention of the majority of corn growers. The loss from this source is so great and yet so frequently entirely overlooked that we desire to offer a few figures which will clearly show the importance of a system of cultivation which does not cut and injure the roots of the corn plants.

The result of three years' work in testing the effects of root pruning were as follows:

Not pruned	62 bu. per acre.
Pruned two in. deep	60 bu. per acre.
Pruned four in. deep	45 bu. per acre.
Pruned six in. deep	30 bu. per acre.

The experiments explain the reduction of the yield which almost invariably follows deep cultivation.

#### Selection of Seed.

The third factor in the growing of a corn crop is the seed corn. It is in this connection that the possibilities of corn breeding are most pointedly emphasized. With few exceptions, only in the past decade have earnest efforts been put forth in the way of systematically breeding corn. More than half a century ago a few men,

realizing the far-reaching importance of well-bred seed corn, began to improve their strains of corn by careful selection and cultivation. Their labors, prosecuted amid innumerable difficulties and discouragements, finally gave to the corn growers of the United States improved varieties of corn. They are today the very foundation on which rests much of the advancement which has been made in establishing our most valuable pure bred varieties of corn. One of these pioneer breeders, J. S. Leaming, of Wilmington, Ohio, as early as 1825 began to select and breed the variety which now bears his name. This corn was brought to Illinois, the shape and size improved by selection and breeding for desirable characteristics, and today this variety is one of the best grown. The valuable results accruing from these long years of breeding are proved by the record made by the Leaming corn in a series of comparative variety tests of yields per acre which began in 1888. During this long period this variety has maintained its lead as the best yielder. Another pioneer breeder, Mr. James Riley, of Thorntown, Indiana, more than a quarter of a century ago, selected the best white corn in his state for a foundation and by persistently weeding out the barren stalks and other undesirable types in his corn fields he succeeded in producing the very valuable strain of corn known as the Boone County White. This variety is widely grown and has been a potent factor in improving the corn in many sections. The truth is, there is ample proof that careful breeding and selection give more profitable types of corn. We have referred to the splendid achievements in improving the various breeds of live stock. The profit to the American farmers from their well-bred herds and flocks has reached millions of dollars. Practical corn growers who have put the improved breeds of corn to the test are unanimous in their statements that we may obtain results, equally val-

able and profitable, from highly bred varieties of corn. This is not theory nor speculation. Abundant evidence of the most reliable character is available to prove that well-bred seed corn increases the yield per acre, improves the quality, and advances and fixes desirable types in the varieties. The average yield of corn per acre in the great corn states is about thirty bushels. This fact shows that our farmers are not at the present time producing a maximum yield. If every hill of corn at the average distance of planting, three feet six inches by three feet six inches, produced a single pound of corn, the yield would be about fifty bushels per acre. Here we have an increase of twenty bushels over the average and yet if each hill contains two or three stalks, the most profitable number, and each stalk bears a well-developed ear, the yield would reach nearly a hundred bushels. Can we not find a reason for the low average in the fact that every stalk does not produce an ear and that many of the fruitful ones give ears dwarfed and greatly lacking in development and soundness?

One of the factors which directly contributes to this reduction of yield is the great number of barren stalks in our corn fields. It is a matter of surprise to one who has not noted the fact that careful counts establishes the average number of barren stalks at thirty per cent. Here in Wisconsin your speakers on dairy subjects have long advised the weeding out from your herds of the unprofitable cows, because they not only fail to return a profit themselves but often absorb that afforded by their superior stable companions. Is there not as strong an argument in favor of eliminating this excessive number of barren stalks from our fields? They are little better than weeds; serve no good purpose; doubtless take quite as much fertility from the soil as the fertile stalks, and the labor and expense of growing them fully equals that of the desirable ones. It is extremely

difficult to find in any crib even a very limited number of ears of corn uniform in shape, size and other characteristics. Nearly all of them are deficient in length or circumference, have poorly filled butts and tips and shallow or rounded kernels. Only in the cribs of those who have improved their corn by selection and breeding is it possible to secure samples approaching that degree of uniformity and trueness to type which is so valuable and an indication of good breeding and prepotency. The value of this uniformity is not a fictitious one. A farmer can cultivate and care for a field of corn which has been planted with improved seed without expending a dollar more than his neighbor who persists in planting corn without any prepotency other than that which tends to reproduce its own undesirable characteristics.

If, then, with pure bred seed the yield can be increased five bushels, or even one bushel, per acre, which one of these men, think you, will most certainly be rewarded for his diligence in business? Ah, yes, perhaps you say, how easy it is to figure these increased yields and profits! But are the facts fully in accord with these very interesting figures? Let us see. Will we accept, unimpeached, the testimony of scores of our business-like practicable corn growers? Most certainly. There can be no more trustworthy authority. Within recent years a large number of farmers have profited by planting pure bred seed corn. Their reports of results are interesting and to the point.

One of these men, a renter, decided to plant his own unimproved seed corn, for he believed that he could not afford to purchase pure bred seed, although he had unbounded confidence in the prepotency and value of the improved corn. His landlord, however, bought enough pure bred seed to plant half of the land, and thus the improved and the unimproved were grown side by side in the same field, and the cultivation and soil conditions

were practically identical. The results, as given to me, are not surprising but fully in keeping with those which we may reasonably expect when these conditions exist.

The number of barren stalks was fifty per cent. less in the well-bred corn and the yield at least six bushels per acre more. But the profit in this case will not end with the larger cash income from this one crop. Enough well-bred, prepotent seed was secured to plant the entire acreage this year and thus the profits from that first small outlay for seed corn will be materially augmented by the increased yields from succeeding crops.

Another farmer planted eighty acres with Boone County White. The yield from this field was nearly twenty bushels per acre more than that from any other field on the farm. The seed for these eighty acres cost twenty-five dollars, and the farmer figures that the net profit from the investment amounted to the handsome sum of \$600.00. No comment is necessary. Pure bred seed corn will increase the yield per acre. The important point for our consideration is the fact that corn breeding is not for the few. This work, which must prove of unbounded value to corn producers, is not hedged about by impassable barriers. Far from it. On the contrary the system of breeding is so simple and practicable, and, withal, so scientific and profitable, that it cannot fail to appeal strongly to every thoughtful corn grower who is intent on maintaining a leading position in corn production.

The system of breeding is as follows: Buy pure seed, in the ear, of the variety selected for improvement, from a reliable breeder. This plan insures seed of the best type and greatest prepotency and enables the grower to start at the point which it has taken the breeders many years to reach. Examine the bushel or more of corn very carefully, and select thirty or forty ears for the breeding plat which show the greatest number of

desirable type characteristics. Shell off the tips and butts of these ears and plant three kernels in a hill by hand, carefully covering with a hoe. When the hills are three feet six inches apart each, a field twenty-eight rows wide and one hundred and twenty-seven hills long is an exact acre. This is a field of convenient size and shape. Plant each row with corn from a single ear. The corn which is left can be planted around the seed plat to protect it from foreign pollen. The most difficult problem is to keep the variety pure and free from all mixture. The difficulty arises from the fact that pollen from other fields will drift as far as eighty rods. The breeding plat, therefore, should be in an isolated spot, if possible, or surrounded for a distance of forty rods with corn of the same variety. This is an important point for the reason that cross fertilization with inferior and barren stalks, even of the same variety, is detrimental to the development of desirable variety characteristics and the weeding out of unfavorable types. About an acre of the best corn land on the farm should be selected for the breeding field. The preparation of the seed bed should receive the most careful attention and should be of such a character as to insure favorable conditions for germination and growth. The cultivation should be such as will conserve moisture and remove all weeds without injury to the roots. As soon as the tassels appear and the ears begin to set, it is necessary to go through the field several times, every other day, and remove all weak, inferior and barren stalks and suckers. It is impossible to give too much care to this work, for every inferior and barren stalk produces pollen which will fertilize the seed of the plat. Cross fertilization of this kind must be prevented; otherwise, little progress can be made toward establishing a prepotency for the production of fruitful, vigorous stalks which develop uniform ears of desirable types and quality. At the

Illinois Station, in five years, as a result of this weeding-out process, the per cent. of barren stalks has been reduced from sixty per cent. to twelve per cent. In the fall each row should be husked separately. Examine the ears from each row and select for next year's breeding field from those rows producing the largest proportion of ears true to type. The ears which have produced this large proportion of desirable ears must be prepotent. It is the business of the corn breeder to improve his corn by selecting and planting these ears which have inherited this prepotency.

When this plan is pursued and the same type of ear selected year after year, a marked improvement in type and quality gradually adds to the value of the variety for seed purposes. If the breeding has been for the purpose of changing the composition of the kernel, the results may mean much to feeders, stockmen, and glucose factories. This is true, for if the per cent. of protein can be increased by breeding, the corn becomes more valuable as a feed for live stock because it is more nearly a balanced ration. On the other hand, an increase in the oil content is of great importance to the glucose factories and by decreasing the per cent. content of these elements a larger per cent. of starch is obtained. After the best ears have thus been selected for next year's breeding plat, the farmer will have a large quantity of well-bred seed for planting his entire acreage. In this way he can economically provide himself every year with choice seed corn which he has gradually suited to his latitude and soil conditions. Experience has taught many corn growers that it is very difficult and expensive to obtain seed corn of this quality

when they seek to secure it from others.

The vitality of all seed corn should be tested. Only vigorous seed with strong germinating power can be depended upon for a full stand. The following is a simple and practicable method of testing for vitality: Fill an ordinary china plate with sand and saturate it with water. Select three kernels from each ear, one from near the tip, one from near the middle, and the other from near the butt. Place the kernels in the sand, point down, and turn a smaller plate over the first to prevent too rapid evaporation of moisture. Set the plate in a warm room. Keep a record of the time and number of kernels sprouted. If the seed is of high vitality at least ninety-five per cent. should germinate within seven days. If this result is not obtained better seed should be secured.

The vitality of seed corn is often seriously impaired by improper handling and storing. Therefore, it is practicable and profitable to store seed corn in a room provided with a stove until the ears are thoroughly dried out. When the seed is thus perfectly dried, it is not affected by extremes in temperature, for it is only in moist and immature kernels that the cold freezes the moisture and kills or injures the germ.

The score card adopted by the Illinois Corn Growers' Association is helpful in the study of seed corn in that it serves as a guide in calling attention to the various points in an ear of corn according to their relative importance. We give this score card, with a few words in explanation of each point, in the hope that it may prove helpful to farmers who desire to select seed corn of the most desirable type:



## SCORE CARD.

Points.	Perfect score.	Explanation.
1. Uniformity of exhibit .....	10	Conformity to variety in type, size, shape, color and indentation.
2. Shape of ears.....	5	Cylindrical, straight rows; proportional length to circumference.
3. Color of ears.....	10	White kernels—white cob; yellow kernels—red cob.
4. Market condition.....	5	Soundness; freedom from injury; maturity.
5. Tips of ears.....	10	Filled out with regular sized kernels.
6. Butts of ears.....	5	Kernels swelled out about shank regularly.
7. Uniformity of kernels.....	5	Uniform type, shape, color, etc.
8. Shape of kernels.....	5	Wedge shape, straight edges.
9. Length of ears.....	10	Conformity to standard.
10. Circumference of ears.....	5	Conformity to standard.
11. Space between rows.....	10	Furrow between rows of kernels.
12. Per cent. of corn.....	20	Conformity to standard.

## Conclusion.

In concluding this subject I would not in any sense underestimate the importance of the work of many farmers, which has for its object an increased yield of corn per acre. You will agree with me, however, that the practicable system of corn breeding which we have outlined gives greater promise of yielding a suitable reward in profit than any other. That a larger number of farmers in Wisconsin may enjoy a share of this reward is my reason at this time for making this plea in behalf of better practices in breeding and improving our varieties of corn.

## DISCUSSION.

Prof. Henry—I would like to ask the gentleman what he means by a barren stalk, and what they have found in Illinois concerning their number and possible effects.

Mr. Stevenson—A barren stalk is one which has no ear of corn on it and which has set no ear of corn at all. We have found by investigation, by getting reports from many parts of the state, that the average number was 30 per cent. A man would go into the field and mark out one hundred hills square and actually count the barren stalks in that space and keep a record of the proportion of barren stalks in the various parts of the field. That determination was two years ago

and was made in many parts of the state. This last year the per cent. was not so large, running from 18 per cent. to 20 per cent.

The cause of barren stalks is something difficult to get at. I do not know that I can give you in a few words what we consider the cause of the barren stalk. I believe there is a tendency in many strains of corn to produce these barren stalks, because the seed corn in years past has been pollinated by undesirable types, i. e., barren stalks, and thus a prepotency has been established along that line, because these stalks have no other business than the production of pollen, and it seems reasonable to believe that they produce more pollen than the fertile stalk.

Mr. Selle—How would you remove the barren stalks?

Mr. Stevenson—Just at the time of tasseling. It is the only time we know definitely, before fertilization takes place, that a stalk is barren. I would remove the barren stalks from the seed plat only. It is not practical to remove them from a very large area, simply remove them from the seed plat and in that way try to increase the prepotency in the seed corn for the production of fertile stalks. We believe that we can almost eliminate any tendency of that kind toward barrenness by breeding in this prepotency.

Mr. Buskirk—Will you explain to us

the danger of smut in corn and the way you have of getting rid of it?

Mr. Stevenson—I am not prepared to discuss that point.

Mr. Buskirk—Can't you tell us how to get rid of it?

Mr. Stevenson—I do not know.

Question—Will this depreciation continue along if we give the corn the best of treatment?

Mr. Stevenson—I believe that by persistently eliminating the barren stalks from our seed plats year after year, we will increase the prepotency of our corn naturally and the number of barren stalks will eventually be very small. It has been reduced from 60 per cent. to 12 per cent. in five years at the University of Illinois.

Supt. McKerrow—Mr. Hill takes exception to the large number of barren stalks.

Mr. Hill—On our field I made a careful count and I found from 15 per cent. to 8 per cent. of what are called barren stalks or stalks without ears, and then I examined them over again as I went along and I found out that about one-third of this number were suckers,—suckers from dent corn, which are not supposed to bear. Again, I found about another third of those that were made barren by smut destroying the germ of the ear. That was not the fault of the corn. That left only 5 per cent. or 6 per cent. of what I called genuine barren stalks. That was on corn that has been selected for a number of years, but without reference to this particular thing,—corn that has been grown on good soil with good cultivation.

Mr. Stevenson—The pure bred varieties of corn I am certain can be pushed up into this latitude successfully if they are bred up gradually from year to year.

Question—Do you want to plant the seeds from the butts and tips?

Mr. Stevenson—I suggested that the tips and butts be rejected. They are vital; they will grow corn, but they are smaller, more irregular as a rule than the kernels from the other portion of the ear and, therefore, we reject them because they will not give a uniform stand. They do not go through the planter box as uniformly as the other kernels. While they will germinate and are vital, yet I do not believe they contain as much plant food and therefore will not give as vigorous a young plant as the larger kernels, and for that reason they are rejected.

Question—What do you mean by fire-dried seed corn?

Mr. Stevenson—It is that seed corn which has been placed in a room where heat has been supplied, either by a stove or from some other source.

Mr. Hill—Don't you believe that in the rejection of the kernels from the tips and butts that you will breed corn that will not grow kernels on the tips and butts?

Mr. Stevenson—Most emphatically no.

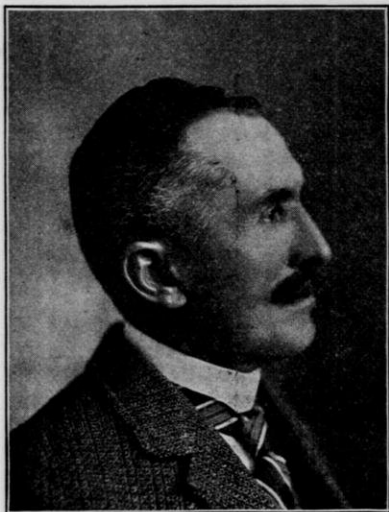
Mr. Reitbrock—Prof. Plumb, of Indiana, recommended the planting of the kernels on the tips and butts for the reason that they will not mature quite as rapidly and they continue the season of pollenating a little longer, and in the experiments made (this was a couple of years ago), they produced an ear that was more generally filled.

Mr. Stevenson—It may be possible, but I do not think that the experiment just referred to has been scientifically carried out. I think it is far more important that we have a uniform stand than that we seek to lengthen the season of pollenization.

The Chairman—In justice to the next speaker, we will have to close this interesting subject.

## SUGAR BEET CULTURE.

A. F. POSTEL, Menomonee Falls, Wis.



A. F. Postel.

To be successful in sugar beet culture necessitates the proper selection of the soil upon which the beets are to be planted. The subsoil is of great importance and should be of a substantial character. Subsoils like clay rich in lime, clay loam and sandy loam, which will hold moisture well in case of a dry season, are the best subsoils for beet culture, providing that they are well drained. Very heavy clay soils, as well as very light soils like sand and gravel, should be avoided. The first named will not permit the beet to easily grow down and makes harvesting difficult, whereas the very sandy and gravelly subsoils have no capacity to hold moisture well. The top soil should be rich, easily tillable and free from stones, as the latter give too much trouble in cultivating, especially so long as the beets are small. The soil should also be as free from weeds as possible. Al-

though the soil must be rich, yet it should not be manured the same spring that the beets are to be planted, as this will cause a rank growth of the beets, and for this reason they would not become sufficiently rich in sugar and moreover in case of fall rains would not ripen out well. Yet the latter is an essential requirement for successful sugar extraction in the factory and it also enhances the keeping qualities of the beets.

### Preparation of the Soil.

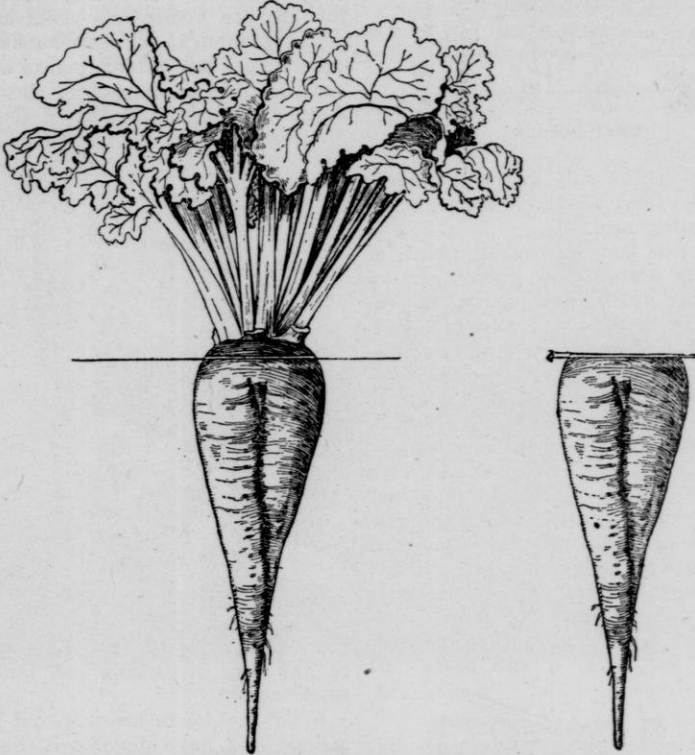
Soil manured early in fall, the manure having been immediately plowed under, or soil which has been well manured to potatoes or corn last spring, the potato or corn field having been kept clean of weeds, or clover sod plowed under early in fall, will be the soils that are likely to give the best results in beet culture this spring. Barley, potatoes, corn and clover are very good preceding crops for sugar beets.

If the soil has been plowed deep in fall, say six inches and over, and if it has not settled too much, I should not advise to plow it again, but would harrow it so soon as the condition of the soil permits and create a dust mulch on top in order to preserve the winter moisture in the soil. If it is necessary to plough the soil in spring do so as early as it can be done without injury to the soil, but be careful to immediately roll and harrow what soil has been ploughed within a half a day, so that the chance of drying out will be reduced to a minimum. As to the depth to which a soil should be ploughed, would say that the throwing up of more than one inch of subsoil must be avoided. It is well to deepen the soil, but this should be done gradually and not at once, as otherwise the succeeding crops will be poor for

several seasons and the responsibility for this will be saddled upon the sugar beet in that it will be claimed that the sugar beet exhausts the fertility of the soil. To stir the soil sufficiently deep, a subsoil plow should be used in fall, but in spring this is not advisable, as such soil will remain too loose and dry

#### Planting.

So soon as the time for planting arrives, which will be earlier in some seasons than in others, but if the soil is in proper condition would be around the beginning of May, take a disc harrow or pulverizer, or a spring tooth harrow, or the cultivator attached to



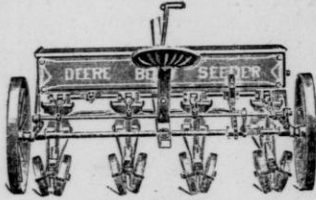
Sugar Beet With Line Showing Where it Should be Cut.

out too easily in case of a dry season.

After the soil has been ploughed, rolled and harrowed, or if fall ploughed, has been harrowed well and has been made sufficiently fine on top, harrow once a week until planting time arrives. It is a foregone conclusion that corn stubble and all kinds of trash should be raked off as they would give trouble later on.

your broadcast seeder and pulverize the soil to a depth of from four to five inches, harrow, roll and harrow in quick succession. The soil should be packed well, as this will enable the moisture from the subsoil to rise to the surface by capillary attraction and in this wise aid in germinating the seed. How often a soil should be rolled must be left to the judgment of

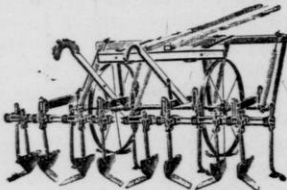
the farmer, but so soon as the horses leave no more heavy foot-prints behind, the rolling could cease. After the last rolling or floating, give a light harrowing with the harrow teeth well thrown back. This will preserve the



Beet Seeder.

moisture in the soil and will prevent the latter from heavy crusting in case of a beating rain.

After this last harrowing, plant immediately across the harrow marks, preferably north and south, but always across the dead furrows. The horse beet seeder drills four rows at a time, sixteen, eighteen or twenty inches apart. The seed should not be dropped any deeper than one-half to one inch. In a heavy, well-prepared soil, wherein the moisture has been carefully preserved, one-half inch will be a sufficient depth at which the seed should be dropped. In somewhat lighter soils, i. e., soils that will dry out quicker on top, one inch may be better. The amount of seed to be used should not be less than eighteen pounds per acre, if the beets are



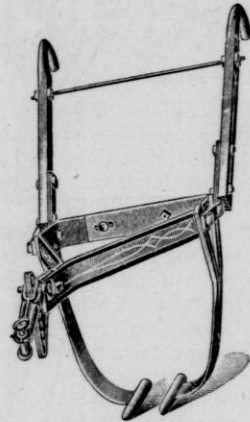
Beet Cultivator.

planted eighteen inches apart, but it should be twenty pounds in case the beets are planted sixteen inches apart. The wisdom of this has been questioned by beet growers, yet it is very essential that a sufficient quantity of

seed is used to secure a full stand. And a full stand we must have to get the best results in beet culture, moreover, wherever a beet grows, there will grow no weed.

#### Cultivation.

So soon as the beets show above ground cultivation should begin. Sometimes it may become necessary to cultivate before the beets are out of the ground. If the planting has been done across the harrow marks, and the dead furrows as heretofore stated, the distinctly showing marks of the seed-er press wheels will enable us to fol-



Beet Digger.

low them with the cultivator without in any way disturbing the sprouting seed.

After the beets are well out of the ground and have developed the third and fourth leaf, bunching should begin. According to the richness of the soil and its capacity for holding moisture well, as also according to the width of the rows, we take a six or seven inch hoe and hoe right across the rows, leaving bunches standing about two inches long. Here it is where the advantage of a full stand will be appreciated, as it enables the farmer to do the bunching much faster than where the stand is thin. Here, too, comes that we will have the

beets at even distances after they are thinned out and in this wise we will get beets of a more even size, which is necessary to get the best results.

After the beets are bunched they should be cultivated again and then the thinning out of the bunches has to begin. It is of the utmost importance that this work, as well as the bunching, should not be delayed, as otherwise it will be more difficult,

ceed to the next bunch. The work of bunching should not take longer than two days per acre for one person and the thinning should be finished in about four days.

After the beets are thinned, they should be cultivated from week to week, or from ten days to ten days, not only on account of weeds, but on account of the preservation of the moisture in the soil. After a heavy



Sugar Beet Weeders.

take more time and consequently enhance the cost of raising the beets. This can be easily avoided as this work comes in at a time when the other farm crops are all planted and when school vacations begin, because in thinning out of the beets, children of nine years and over will do very good work if a grown-up person is present to oversee it. If possible, leave the beet standing which grows somewhat outside of the bunch and pull the rest out sideways, so as not to loosen the beet remaining, then pull a little dirt up around the beet and pro-

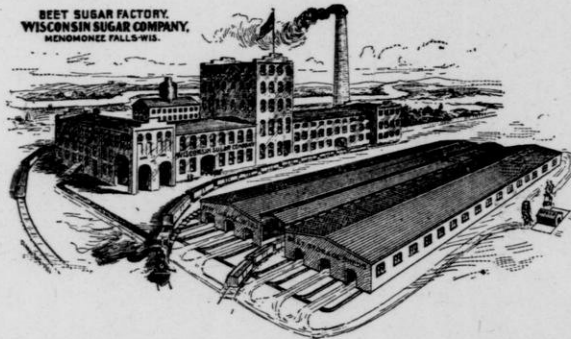
rain cultivation is also necessary as this will aerate the soil and enable it to utilize the nitrogen contained in the air. It is not necessary to cultivate deeper than two inches at any time, as deep cultivation will dry out the soil quicker. If necessary, the beets may be hoed once more in the rows, but for the work between the rows the cultivator will be sufficient, if used often enough.

The beets are laid by when the tops begin to grow together and when no more cultivation can be done without breaking off leaves. This must be

avoided, as the sugar is elaborated in the beet through the influence of the atmosphere and sunshine upon the leaves. It is for this reason that the beet will not exhaust the soil, if the tops and the pulp are fed to cattle and the manure brought back to the land. On the contrary, the farmer will soon find out that the thorough culture, etc., which the beet requires in order to bring big returns, will benefit the succeeding crops and still more so if a regular rotation of crops is followed.

when it is time to do it. In this wise he will keep down the expense of raising the crop and his net profits will become larger.

It is a fact that the state of Wisconsin sends over \$7,000,000 in cash out of the state every year to buy the sugar which is consumed by its population. There is no reason why this money could not be kept in the state. It takes twenty factories of the capacity of the Menomonee Falls Factory, i. e., of 500 to 600 tons of beets per day for a season of one hundred



#### Financial Value of Beet Crop.

The sugar beet furnishes one more crop for the farmer to grow, the price for which is fixed before it is even planted. That it is a profitable crop and the safest one the farmer can grow has been demonstrated by quite a number of beet growers that raised beets for the Menomonee Falls Factory last season. In spite of the prevailing drought, these farmers had crops averaging from twelve to twenty-six tones of beets per acre, receiving from fifty to one hundred twenty-one dollars therefor. Hereto must be added the feeding value of the pulp, which amounted to from \$6 to \$12 per acre, and the feeding value of the tops, which can easily be placed at the same figure. Thereby it may be seen that beet-raising is profitable, providing the farmer is careful in the selection and in the treatment of his beet soil and will do the work just

days, to manufacture the sugar needed by the people of Wisconsin. This will necessitate the raising of about one million tons of beets by the farmers of the state, for which they would receive from four and one-half to five million dollars, to which must be added the value of the tops and pulp as feed, which amounts to another million dollars. Thereby it can be seen that by far the lion's share of the proceeds in the beet sugar business goes to the farmer and although it is not all profit where help has to be hired, yet if properly managed fifty per cent. and over of the proceeds should be. This will, in most cases, mean fifty per cent. and over on the capital invested where the soil is worth from eighty to one hundred dollars and upwards per acre. The more or less rapid development of the beet sugar industry in the state of Wisconsin rests with the willingness

of the farmers to raise the beets, providing that the tariff on sugar is left undisturbed for some time to come.

## DISCUSSION.

Mr. Scribner—What difference does it make with farmers that get behind in thinning?

Mr. Postel—It would be this: In that case the farmer would have to spend two weeks in doing one week's work. He would have to go at it with his whole family, when if the work was done in time the farmer, with his hired hands, could do it in one week.

Mr. Scribner—What is the cost of raising an acre of beets if you do the work in season?

Mr. Postel—It would be around the \$30.00 notch, if you count hauling and everything, every stroke of work connected with it.

Mr. Scribner—And you pay a hired man \$18.00 a month?

Mr. Postel—There comes to my mind one farmer who raised beets last season. He did the work in time and his hired hands did the thinning for him, and it is not very often they do it cheerfully, yet they said after all it was not so much work. It took one man a day and a half to bunch an acre and the hired hands did the thinning, for which it took one man three days to thin out an acre.

Mr. Matteson—What do you mean by bunching?

Mr. Postel—Hoing out the beets before thinning, leaving little bunches.

A Member—I would ask if the bunching could be accomplished by a machine going crosswise of the row?

Mr. Postel—Yes, we have done that in the old country twenty years ago, but it necessitates a very full stand. It necessitates the use of a little more seed than we are in the habit of using in this country. It necessitates a machine which you can steer very straight through the field.

Question—Would not a machine be cheaper than hired help at present?

Mr. Postel—That is correct. That

is what I want to impress upon farmers. Last season a good many farmers did not even bunch their beets. They made a mistake, but as a matter of fact they didn't see it that way. It did take them too long to do the work, and, moreover, the beets did not stand apart at as even distances as when they were bunched.

Mr. Matteson—What is the proper time for thinning the beets?

Mr. Postel—As I said in my paper, when they have four well-developed leaves.

Mr. Matteson—I want to know if you furnish the machinery for the farmers; does the company furnish machinery?

Mr. Postel—Yes, we do it at present.

Mr. Matteson—I would like this explained.

Mr. Postel—We furnish the machinery and charge so much per acre.

Mr. Matteson—How many beets could one man take care of in a season and do it in time?

Mr. Postel—Three or four acres provided he divides his work up a little,—divides the seeding up so that the thinning will not all come at one time.

Mr. Matteson—Would he plant at different times?

Mr. Postel—Do the seeding a little apart,—about five or six days to each acre.

Prof. Henry—Mr. Chairman: The point where we now are is not a great distance from the Menomonee Falls beet sugar factory, but that factory is not so near but that some day a factory may be located near this point. I want to say one or two things to the farmers here.

In the first place, the growing of sugar beets is an industry in which you may well embark in this region. It is a safe industry. Sugar beet culture, properly practiced, is not hard upon the soil. This is shown by the fact that in Europe, where they have been growing the beets for a long time for the factories, the country is pros-



perous and the soil is yielding large crops.

Now, farmers, think of this matter seriously. Raise some beets and send them to the Menomonee Falls factory and later, when they start a factory near you, you will be ready to furnish them for the local factory.

It costs Wisconsin \$20,000.00 a day for the sugar which we eat in that time. Tonight, the sugar which we have consumed during the day will have cost the state \$20,000.00. That money goes to Germany and little Cuba. We have to gather up and send away in a year over \$7,000,000.00. Every dollar of it could be paid out for Wisconsin labor. We could keep these millions of dollars, and if our neighbors wanted some sugar, we could raise more for them. The best sugar belt runs through New York, Michigan, Wisconsin and Minnesota.

Two-thirds of the sugar of the world is raised from the beet root. Wisconsin produces nearly six million pounds annually. It is refined, white sugar. It is the sugar that you put in your coffee in the morning. It is not brown sugar or yellow sugar, as three people out of four seem to think. Two-thirds of the sugar which is imported is brought from Germany and is beet sugar.

You farmers are wonderfully slow about this matter in Wisconsin. They have twelve factories over in Michigan and we have one, and we have a better state on the whole than Michigan.

Mr. Hughes—On how small an acreage is it profitable to start a beet sugar factory.

Mr. Postel—About four thousand acres. We want enough acreage so that we will not have to be everlastingly on the jump for beets.

Mr. Hughes—Which is the more exhausting crop, beet or corn?

Mr. Postel—Well, you know, on the whole you can raise corn after corn for years, providing the soil is well manured from time to time. I have

myself farmed on a farm where corn had been raised thirty years in succession on the same soil. The beet does not exhaust the soil at all, for this reason: When the sugar, which as heretofore stated is taken from the atmosphere, is extracted from the beet, whatever has been taken from the soil is put back in the form of manure, providing the pulp, etc., is fed to the cattle and the manure put back on the land. On the other hand, if you sell the corn you lose just so much fertility and impoverish your soil thereby.

A Member—How far can you profitably draw these beets to a factory?

Mr. Postel—Well, that depends upon what opinion a farmer holds about hauling. Perhaps four miles may be too far according to his opinion, and others may be perfectly willing to haul ten miles. If it comes to a close proposition, I will say that there is no reason why the beets which a factory of the capacity of ours at Menomonee Falls requires cannot be grown within a radius of six miles around the factory and be hauled there by wagon. It is only necessary that on each quarter-section ten acres of beets should be raised, which would make to every eighty acre farm five acres of beets. Every beet that the factory can use can be raised within a radius of six miles, provided every farmer should take up beet culture. That would be one-sixteenth of the area. In the old country we raised one-fifth of the entire area.

Moreover, before they took up beet culture they used to raise small grain and took up the beet culture on a small scale. After they had learned the culture of beets, they raised annually on three-quarters of the farm more small grain than they ever did before on the whole, and that was brought about by the thorough cultivation of the soil that they had learned in the cultivation of the beets. You take this simple item of keeping the moisture in the soil, which is required in the culture of the sugar

beet. Beet culture has brought about a better understanding of the treatment of the soil and the proper rotation of crops, etc. It has elevated the whole status of farming and it is a wonder that farmers are not willing to give it a trial even on a very small scale. It will not kill any farmer to risk two acres of beets. Pay attention to them and not let the field go until nothing can be done with them anyway.

Mr. Hill—In regard to the gentleman's question about the distance that it will pay to haul beets to a factory, —I live seventy-five miles from Menomonee Falls and I have a neighbor who grew four to six acres of beets. He loaded them on the cars and sent them, and he is well satisfied with his season's work.

Mr. Hughes—How are those factories conducted? Does somebody own the factory and the farmers grow the beets?

Mr. Postel—Yes. So far here in the

United States there is only one factory which has attempted to run on the co-operative plan. It is in Michigan, with perhaps only a little outside capital invested in it. All of the other factories are capitalistic enterprises, for the reason that it is quite an undertaking which necessitates about half a million dollars to start a factory with. You know how hard it has been for you to start a creamery and secure the \$2,000.00 capital needed. The farmers are too timid yet to even raise the beets, let alone an investment in the factory. It would be a good plan if the farmers were interested in the factory. Our president, Mr. Wagner, is perfectly willing to give the farmers a chance to buy stock with us. He does not want cash, but prefers that they raise the beets and pay for the stock with beets.

The Institute adjourned till 7:30 p. m.



## EVENING SESSION.

The Institute met at 7:30 o'clock. Supt. GEO. MCKERROW in the chair.

## HOME MAKING.

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

For many years we have had Farmers' Institutes and have, with more or less profit, discussed the most desirable methods of breeding and rearing live stock; the best ways to plant

on which to build a home, just as the broad spreading elm, oak or maple is the most fitting place for nesting birds. And while I might speak enthusiastically of the poetical and



A Cosy Nook at Sunny Peak Farm.

cultivate and harvest various crops; and numerous other subjects of interest and value to our line of work. But during all this time only an occasional talk meagrely bearing upon that most important topic of farm life, has been heard. Now it seems to me that the farm is the ideal spot

artistic side of farm life, I have no wish to dwell on these phases, because I sincerely believe that if we give careful thought and attention to the little practical things that have so weighty an influence on the happiness and comfort of our loved ones, the aesthetic features will soon fol-

low, on the same principle as "look after the pennies and the dollars will take care of themselves."

#### Not Enough Sentiment.

It is an undeniable fact that the most of us put too much labor and not enough sentiment into our lives. We look upon endearing words and gentle, thoughtful courtesies used in the family circle as superfluous to every day life and practice, when, if rightly applied, they prove a healing balm for tired bodies as well as bruised hearts. We count our cattle and reckon their money value before we consider their keeping and development as a sacred trust. We measure our grand old forest trees by the cord, and coolly estimate the gain by their ruthless destruction, rather than bend our heads in awe before the mysteries of Nature's greatness. Familiarity has bred contempt and one of the finest attributes of human nature, that of appreciation, has been starved and dwarfed by a surfeit of blessings.

In passing through the country one may see from the car window many a weather-beaten farm house with not a tree, a vine or shrub to mark it as the home of refined, interested people. The door yard will be untidy and littered with unsightly objects; the out-buildings filthy and the cattle scrawny and wild-eyed; farm implements carelessly left unprotected from sun and rain in field or yard. Can one wonder that such a picture does not prove alluring, and that such a dwelling passes for no more than a shelter, even to a farm-born generation whose tendency to discontent is frequently encouraged, rather than uprooted, by the methods and teachings of slovenly, short-sighted parents.

#### How to Keep the Boys on the Farm.

A pathetic wail has gone forth throughout the length and breadth of the land "What can we do to keep the boys on the farm?" Before attempting

to answer, may I ask what we have ever done to make farm life congenial and attractive to our young people? Have they ever heard aught from us of a laudatory nature concerning our calling? Have not we farmers placed a stigma on our own occupation by holding up the defects instead of the praiseworthy qualities, by impressing upon the young minds the idea that farm life and labor was degrading; that there was neither profit nor satisfaction in the business and that in the nearby or distant city could be found more respectable and attractive modes of earning a competence? Yes, we have woefully belittled our own calling in an attempt to magnify the greatness of others. In a maudling self abnegation, we have said to our children: "Our lives have necessarily been ones of self-denial and drudgery. We will still work our fingers to the bone that you who are too good for this labor may have the advantages of a broader education. John shall be a lawyer, a doctor or merchant and, with good clothes and polished manners, occupy a higher position in the esteem of his fellow men."

In planning for an ennobling mental and physical development, why not educate John in the same line of business his father has followed. Let him go forth and study the improved methods of agriculture that with his practical training and newly acquired knowledge he may help the old farm to keep pace with modern science and skill. Teach him there is no more dignified, honorable or wholesome way of earning a livelihood than by forming a partnership with the forces of Nature. Do not hold up before his young eyes the almighty dollar as a scale by which to measure the length and breadth of success. Impress upon his youthful mind that the results of conscientious thought and toil will daily gain in force and influence while the minted coin diminishes in value by constant circulation.

Mary shall be given accomplishments. She shall be taught music,

painting and art-needlework in order to make her so attractive that she may marry well. What is the meaning of marrying well? Is it to give our daughter to the dissipated son of some rich man who is eagerly waiting for his father's death that he may spend in riotous living the money accumulated in a lifetime of labor; that

and devoted our lives to what we believed to be their best interests, we were carefully following out the instructions of our early training and we never questioned the wisdom of the motto that to us had become a law. And yet, it was a big mistake, what should have been written is "Be useful and you will be happy." That



An Informal Luncheon at Sunny Peak Farm.

by neglect and indifference he may break her heart and ruin her life?

#### An Old Precept.

Is it for this that we toil and save and scheme? When a little girl I used to diligently copy after a form written by my teacher "Be good and you will be happy." No doubt many mothers and fathers schooled in that day faithfully traced the same lines and do you know, I believe it is owing to that sentiment that we have made this great mistake. We thought if we sent our children to church and Sunday school, if we prayed over them

is a sentiment we may safely hand down through the ages.

#### The Dignity of Labor.

Let us teach our children by both precept and example the true dignity of labor. Let us teach them that no honest work is degrading, that the only disgrace is the manner in which it is performed. Let us teach them to love and revere the farm and farm life; that their hearts should ever be filled with gratitude to God that He has given them broad acres rather than a tiny patch of ground; that He has entrusted His lowly creatures to

their care and that they may with earnest solicitude study so well the requirements of this great trust that when an accounting shall be called for the response will eagerly be

Here are the talents, Lord, Thou gavest me,

Not idly hidden in the earth away,  
But scattered o'er the broad and sun-flecked lea

To grow in Beauty's strength from day to day.

These soft-eyed kine entrusted to my care

To lead with love, not by the flaming sword,

I bring with faith that Thou wilt deem them fair,

All, all are Thine, and I thy herdsman, Lord.

#### A Wrong Standard Set Up.

Either by design or unconsciously we have held up a wrong standard for our loved ones to follow. We have taught them to regard money and position above character and worth. We weak, foolish and ambitious mothers in our desire to uplift our daughters in the esteem of a frivolous society, have stamped upon their childish, impressionable minds the belief that the practical duties of home-making, the things that represent so much in the welfare and comfort of our dear ones, are beneath the best efforts of an intelligent and self-respecting woman.

#### Woman's Divine Mission.

Why, it is the heaven born mission of woman to be a home-maker. From the time as a wee toddling girlie she hugs her dollies and plays at house-keeping with bits of broken china the home-making trait is strong within her and if we succeed in diverting her natural instinct we will have blotted out the sweetest, most lovable and noblest characteristic God has given to woman. Let us teach her that if she possess the dignity of self-respect others will respect her. Let us hold

up the high ideals of thoroughness, system and order in the curriculum of exalted Home-Making. Let us teach her that there is art and science in cookery, dish-washing and scrubbing. Don't say: "Mary, I'll wash the dishes, it will make your hands coarse and red. You go and practice, I'll attend to the kitchen." Teach her the neatest and most thorough way to do the work. Why, do you know, there is not one woman in fifty who knows how to properly wash dishes.

Let her feel that you depend upon her assistance. Let her see that you take pride and pleasure in your kitchen and the utensils best suited to the convenience of doing superior work. An ample sized and well made dishpan is more to be desired in the kitchen than a plush album in the parlor. Don't say. "Mary, go and dress up. Someone may come in and it won't do to let them find you in your working clothes." Teach her to look tidy at all times; that she is as much a lady in print as in silk; to meet company without embarrassment, even though she holds a scrubbing brush in her hand and her sleeves are rolled to the shoulder. Teach her it is far better to darn a stocking neatly than to injure her eyesight making fancy work. In short, teach her so thoroughly and well the practical accomplishments that rightfully belong to the higher education of a capable housewife, that she will prove a blessing and a helpmate to the fortunate man, be he rich or poor, whose name she may some day bear. In this way we may build a substantial foundation for her future happiness.

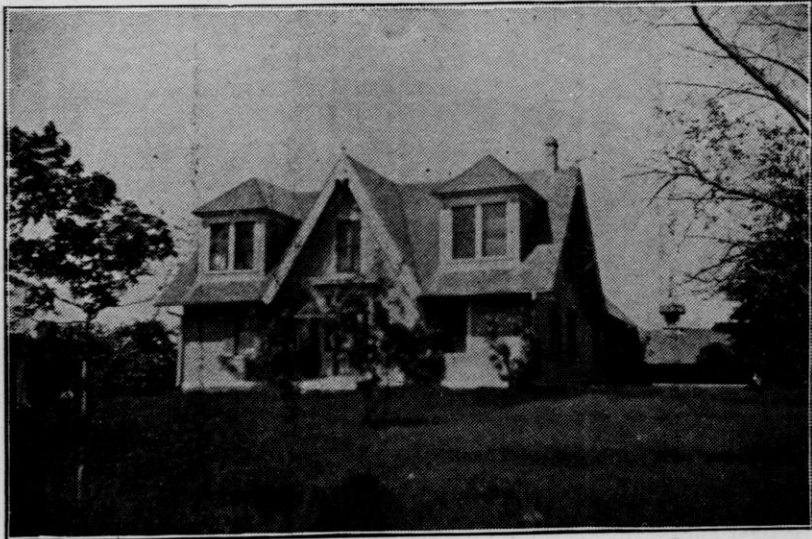
#### A Good Foundation Needful.

Supposing an architect was to erect a beautiful palace by beginning at the cupola, adding ornamental bay windows, with elaborate flagree work here and there, and then place the structure on posts, no foundation to this magnificence. The result is quite apparent, he would receive and de-

serve the scathing criticism of those who passed by. Undoubtedly they would remark: "Look at all that filigree nonsense, and no foundation. Surely the builder had more ambition than sense." Let us first build a solid foundation for her future usefulness as a home-maker and then add the less essential features of music and art to her education. What is education? Is it a little book learning,

dulum. Yes, even to the days of our great grandmothers, if need be, to an age when women baked and brewed, spun and wove, cooked and sewed and did not lose caste by doing cheerfully and faithfully the manifold duties that by right of dower fell to the mistress of a home and family.

A little more than a year ago it was my good fortune to be installed for a few weeks in one of those



The Old Farm House.

too often acquired at the expense of hand and heart? The best and truest education is the knowledge gained where heart and hand and brain have been developed in unison and such wisdom used for the benefit of all mankind. We are riding our educational hobby too fast and the unmistakable wood is exposed every time the lash of progression chips from its flank the gaudily painted dapples.

#### The Accomplishments of Our Grandmothers.

Let us turn back the hand of time and more carefully regulate the pen-

dear old New England homes. My room was picturesque in the quaintness of furnishings belonging to a by-gone period. The bed linen was exquisite with dainty needlework and, on inquiry, I learned that it had been a part of the maker's wedding outfit. And although the hands that had set each stitch with such exact preciseness had been folded beneath the Green Mountain turf for more than half a century, one might still read in this dainty handiwork the character of a refined, gentle and lovable woman who had nobly filled the niche in which her devoted family had enshrined her as a home-maker.

Why not take pride in handing down from generation to generation this womanly accomplishment, that the exquisite needlework of our ancestors, the hemming, felling and stitching may not become a lost art.

#### Need of Raising Home-Makers.

Yes, let us raise a few generations of home-makers, rather than the strong-minded, ambitious self-supporting girls who in the hand to hand struggle of bread winning become heart hardened and aggressive. Look out for number one is the precept laid down for them to follow, and by so doing they grow selfish and skeptical. Look out for the welfare and comfort of those about you and take no thought as to the fate of number one, is the counsel that will come from the gentle heart and lips of a wise mother. Why, it is like looking into a mirror; what you give to others will quickly reflect. No, she need not look out for number one, let her best efforts be used for the betterment of her dear ones, and I promise you number one will in no wise suffer.

A quarter of a century ago it was not unusual to see brides of sixteen and seventeen years. And while today we have just as sweet, just as lovable and attractive girls, you may find many at twenty-eight and thirty who have never received a proposal. Why is it?

Well, in spoiling our daughters we have also harmed our sons. We have taught them to admire the stylishly dressed girl; the girl with a few superficial accomplishments, who sometimes in a longing for luxuries beyond her means grows restless and discontented. The average young man who must make his own way in the world quickly arrives at the conclusion that without an abundance of money or high social position it would be utter folly to attempt to make such a girl satisfied and happy. Therefore he assumes an indifferent air; talks lightly of matrimony; has it understood that he is not a marrying man,

although fond of women's society. The money that he might have put by for the purpose of building a modest home is used selfishly and extravagantly in an attempt to keep up an appearance of social standing. He cultivates an egotistical belief that all the young women of his acquaintance must regret his determination to be a life-long bachelor. One evening he will favor Mary with his company. He will explain that Mary is a delightful companion. She can play rag time music and sing coon songs too cute for anything. The next evening he will devote his time to Kate. She is such a delightfully sweet and dignified girl, plays the mandolin and talks entertainingly of prehistoric art. Yes, she is perfectly charming. But, after sober reflection, he doesn't care to risk injuring his digestion by eating the cooking of either of these girls.

#### How to Get a Good Husband.

Now, girls, I'm going to tell you in strict confidence how to get a good sensible husband and then, if he prove worth the effort, how to keep him constant and content throughout all time, for the saddest thing in the world is, when a woman has once won the love and respect of a good man, to have it slip away from her through either her own carelessness or ignorance.

First of all, lay well the foundation of a perfect home-maker, by learning to be a good cook, a systematic and tidy housekeeper, an excellent needle woman who understands the art of darning and mending, for "A dollar saved is a dollar earned," and by painstaking care in this direction you may almost double a man's income. When you feel yourself so thoroughly proficient in these accomplishments that you may unhesitatingly take your place beside the man you love as his helpmate, to encourage and assist him on the road to greatness and prosperity, you stand ready to fill the sacred mission for which you were intended.



Now, did you ever see a man catch a colt? He puts some oats in a little pan and goes to the field, where he stands quietly and shakes the pan until the colt hears the rattle of the oats and comes prancing up. But the man never runs after the colt and don't you ever run after a man. When the colt becomes interested in the oats the man slips the halter over its head and leads it away. But sometimes, even after the halter is safely fastened, the colt will rear and plunge and if the man does not hold firmly to the strap, it will break away and the task of bringing him back will be more difficult than before.

Now, put these housewifery attractions in a pan, as it were, and while standing in your father's doorway shake the pan—the safest place a young girl ever stood is under the shelter of her father's roof. The young man will hear the tinkle, for the novel sound will echo far and wide. Such rumors as: "Mary Jones is a remarkable girl, such agreeable manners, such a model housekeeper; a wonderful help to her mother; why, her parents couldn't do without her," will go floating through the air, and men are queer creatures, whenever they hear that someone has something that they cannot spare they're bound to possess it. And in all probability more than one young man will have a longing to claim for his wife so capable a companion as Mary Jones.

Now, should a young man come whose love you cannot return, remember that in tendering you his heart and name he has offered you the greatest honor a good man can confer upon a woman. If you do not love him, do not lower yourself in his or another's estimation by refusing him and then going about saying: "I could have married John Smith, but I didn't want him." Let your lips be sealed, regard his confidence as sacred, for if you do not love him you can at least respect him, and never for a moment let him feel that he has made a mistake in thinking you worthy of hon-

orable love. But when the right one comes; the one you 'can gladly say you will "love, honor and obey" there will be no fear of poverty. If you are a true type of American womanhood, you will staunchly and proudly take your place by his side, feeling it a privilege to be in every sense the help-mate that may nobly win the right to receive a royal share of credit for his ultimate success.

#### The Ideal Home.

Some may think that in order to have an attractive home it will require a large outlay for a suitable building and the necessary furnishings. Don't make a mistake. The most beautiful home I was ever in was a little log house of but one room and a shed. It was so exquisitely clean, and, after all, true elegance is thorough cleanliness. Fifty dollars would have paid for every bit of furniture it contained, including the bed and cookstove, and yet, it was amply furnished; the most artistically fitted up home I have ever seen. Every article was for use and was held dear from association. The floor was scrubbed so white that no one would have ventured to step within until he had first wiped his feet on the husk mat that Margaret had woven with her own hands. There was a braided rug upon the floor, and an old-fashioned rocker with a feather cushion. On the little log window sill was a pot of plants that Margaret had brought from her eastern home, and the snowy muslin curtains were bits of her wedding dress. There was a cheery picture on the wall and a mending basket that gave an added charm to the room.

I don't believe John ever put on a pair of socks that had not been darned with all the painstaking care given to the finest embroidery. There was a little pine table, so fair and spotless that I used to wonder if it would melt away into fairyland should I put my childish finger on it. And above the table were some little shelves—put

there by John, to hold the few dishes they owned. Do you think Margaret carelessly dumped those dishes in a pan and hastily banged them about regardless of nick or crack? No, she handled them with tender care. She was John's faithful, loving wife and well knew they could not afford to waste money replacing things broken by carelessness. Nor did she wish to see their table, however plain, made poorer or unsightly by chipped and blemished ware.

And there was dainty, refined Margaret and sturdy John, who had in no wise ceased to be a lover while bearing the title of husband. Yes, it was the most beautiful home I have ever seen, for it contained the necessary elements to make it such. There was cleanliness, system and order. There was unselfishness, contentment and love. What more do you want? With these elements you could make an acceptable home out of a dry goods box. I have since been in a number of beautiful dwellings, where there was marble and tiling elaborately carved wood and artistic frescoing, antique rugs and luxurious furnishings, rich draperies and magnificent paintings, rare bric-a-brac and exquisite statuary, but I have never been in a home that left so marked an impression upon my heart and brain as did that little pioneer hut on the border of an Iowa prairie.

#### Furnishing a Farm House.

In furnishing a home we farm women too often seek to imitate a style quite unsuited to our conditions and surroundings. For instance, the large, heavy carpets, that in the city would be sent away to be cleaned, would prove a formidable tax on woman's strength; and it would indeed be a brave housewife whose courage would admit of asking assistance from the men during the stress of spring work. Hardwood and painted floors with rugs of a size easily handled are more in keeping with farm conditions. Deeply tufted, upholstered sofas and

chairs will require a vast amount of time and patience to keep in a pleasing state of freshness, while easy chairs with movable cushions are more inviting and require far less attention. Good books and pictures will be the first consideration in a cultured home and the occasional purchase of a thoughtfully selected volume is a wise and profitable investment. A well-ventilated sleeping room, provided with the customary toilet necessities, with a simple iron bedstead and roomy washstand is more desirable than a stuffy apartment containing a massive set and a shortage of towels and toilet soap. If comfort and convenience be considered paramount to magnificence, we will make fewer mistakes in selecting our furnishings.

#### Advice to the Women.

When one possesses a husband and home, she should bear in mind that it matters not how warm and glowing a fire one may have kindled, that, if it would be kept burning, fuel must be added from time to time. And so it is with the fires of love. If treated with indifference and neglect they will soon smoulder to ashes of regret.

Therefore, if you are a wise woman, you will from the start plan a practical course by recognizing the fact that no man is an angel, consequently do not expect too much. And if you would make his home more attractive than any other place look well to his physical comfort. See that his meals are carefully prepared and served on time. You know you deceived him when you made him think you the dearest, sweetest girl on earth. Now, keep up the delusion. Never let him suspect that you are not. I have seen just an ordinary little woman, who didn't know much—you don't have to know much, men, as a rule, are content to know it all—fool her husband for thirty years and even longer and he'd never find out that she wasn't the sweetest, smartest and most lovable woman in the world.

I have actually known a woman of this kind to give her husband so good an impression of the sex that if he lost one wife he wouldn't hesitate to marry again. You can do this if you only try, why, you can wind a man around your little finger and he'll never be the wiser. Men are dependent creatures. Did you ever see one with a missing button or something gone wrong with his suspenders? He'll go calling through the house, "Mother, Mary, come quick, I've lost a button!" Now's the opportunity to show him you're the most wonderful woman on earth, for whenever a man sees another do something he can't do, he thinks it marvelous. Put on your thimble and sew that button good and firm, while you casually remark that you don't know how he ever managed to get along without you. And he'll wonder that he ever did. O, you can fool them in a hundred loving little ways. Men like petting and many of them have been used to it, for, if there is anything dearer to a mother's heart than her girls, it's her boys.

If you are a wise woman you'll never let him miss his mother's sympathetic encouragement and approval. Remember that what is for his interest is for yours and that he can work better and harder when he hears your cheery words of approbation ringing in his ears and knows he will be welcomed by your happy smile.

Make yourself a necessity to him and take advantage of his every weakness. Men are conspicuously vain. Why, a woman's vanity is nothing compared to that of a man. Praise his every commendable effort. It will spur him on to greater achievements. Go out to the barn and show an interest in the cattle. Commend his manner of feeding pigs. Jolly him up a bit by drawing flattering comparisons between his and his neighbor's methods. Yes, take a loving interest in everything on the farm. The barns will be sweeter and cleaner by your presence; the cows will be more tenderly cared for and you will be so rich

in joy that a more sordid ambition will be forgotten.

But there are three things you must not do if you would keep your husband's love and respect. You must not complain, you must not find fault and you must not nag him. If you have a trifling headache never say, just as he is starting to his work, "John, I don't feel well." It will put a damper on his best efforts. Women were born to make believe and you can smile, even if you're not feeling quite right, until he has left the house. Then, if it's any benefit to yourself, do yourself up in camphor and groan to your heart's content. If you are really ill, go to bed and call a doctor and you'll then know the sweetness of a tender sympathy. John will exclaim: "Bless me, the dear little woman must be sick for she never complains," and he'll undoubtedly do all in his power to restore you to health.

And don't find fault when he's making every effort to succeed. Don't paralyze his ambition by saying: "John, I was over at neighbor Smith's and they've got a new carpet and a rocking chair and a picture and are going to have their parlor newly papered, and—I don't see why we can't have such things. We're just as good and I work just as hard as Mrs. Smith. There must be something wrong with your management. I don't think you're very ambitious." O, if you value your happiness, don't do it. Can't you see you are pushing him away from you? Never for a moment let your husband see you have lost faith in his ability. Though he fail in many schemes, encourage him to try again. Though all the world loses confidence in him, if he is an honorable man, never let him know that you are disappointed or that your trust has wavered.

I'll tell you what to do. Put your arm around his neck and say cheerily: "John dear, do you know what those foolish Smiths have done? They've bought a carpet and a patent rocker and a lot of truck and now

they'll have it to care for. I'm so thankful we've more sense. When we get enough money to pay for such trash we'll use it to buy a cow." You may punctuate this with kisses if you like and John will think was there ever on earth such another sensible little body. O, you can fool them to the end, if you only understand your business.

And above all, don't nag. A constant nagging would break the spirit of any man. You may have a temper (some women acquire one by inheritance), but you never allowed him to see the ugly side of it before you were married, and don't do it now. If you feel you must give vent to it, wait until he has gone, then grit your teeth, take a good, solid chair and shake it furiously. You can make believe it's John and no harm will come to the delusion your husband is laboring under. John, all unconscious, will very likely be heard bragging about the even disposition of his wife. Still, if you are unable to control your temper, if you must give John a piece of your mind, have it out, in a hand to hand conflict, if need be. It may clear the atmosphere, like a thunder storm. Still, I wouldn't advise it, but it's better than nagging. Whatever you do, don't nag

#### Company at the Farm.

The usual monotonous round of indoor work is broken all to smithereens by the occasional appearance of one or more guests, for while some town-bred people shrink from the responsibilities incident to rural life they are not unmindful of its summertime attractions. And when spring buds and bloom are beckoning in tantalizing fascination the temptation to make a raid on some nearby farm house becomes so irresistible that a cheery voice will be heard calling to a neighbor: "It's a lovely day. Don't you want to take a drive in the country. I know a farmer who lives a few miles out. They're farmers, but they're nice people," is hastily added by way of apology for so obscure an acquaint-

ance. "They own a big farm and have lots of cows, sheep and chickens. Don't you want to go? Pshaw, they won't mind if you are a stranger, they'll be tickled to death to see us. Bring the children and we'll have a fine time." Did you ever, right in the midst of house cleaning, when you were struggling to gain time by having a picked up dinner, look out and see a load of jolly, daintily dressed city people drive up to your door? Did you? And did you wring your hands in despair as the meagerness of the family larder flashed through your startled brain? No pie, no cake, no seasonable delicacy on hand, and then go forth hospitably to meet them and say "I'm glad to see you," and at the same time feeling yourself the old hypocrite that you so heartily despise?

Now, I beg of you, don't put those people in a stuffy parlor and offer them amusement in the shape of a family album. They don't care a rap for the pictured faces of "your sisters, your cousins or your aunts." They may take a passing interest in the well decked bride or the chubby charms of an unknown infant, but it won't add to their good opinion of the restful side of farm life to have you rush to the kitchen and begin baking and stewing until your strength is exhausted and your nerves all a quiver. Don't let them carry back to their city homes the impression that you are an ignorant drudge whose sole conception of hospitality is an overloaded table and an apologizing hostess.

There are refined, thoughtful people, who live in cities, who do not come to you for a meal. They can buy that. But they do come longingly to the farm for what is priceless. They come for the peace and rest and comfort that country life affords. They come to fill their weakened lungs with that rare oxygen of which we have so much and to spare. They come to be in closer touch with Mother Nature and to lay their weary

heads upon her soothing bosom; to learn something of her wondrous secrets, and for a time to break loose from the galling chains of formality.

Now don't give them the idea that farm life dwarfs the intellect. Greet them with a cordial welcome. Let them see that while you may know nought of the latest social fads, you are quite familiar with every phase of your calling. Give them a part of yourself and a share of your wisdom. Take them to your clean barns, show them your gentle cattle and call their attention to the individual merits of your stock. You may be able to quite astonish them with the glibness by which you can tabulate the pedigree of a favorite cow. Have a dignity and pride that will serve to point to the uplifting character and attractive features of your profession rather than assume a bearing that will tend to accent its defects.

If you are the good housewife you should be, your bread and butter will be wholesome and palatable. If you have tea and coffee, well and good, if not, perhaps you have milk, in case of a shortage in this liquid, there is water. Your table should at all times be clean and it will require but a moment to lay the extra plates. Now, ring the bell or blow the dinner horn; call in the men. It will not be necessary to offer an explanation for having your help eat at the same table; your guests will readily understand that it is your usual custom, and one best suited to your conditions. Have a dignity and manner of your own and it will be respected. Do not strive to imitate ways unsuited to your means or mode of life.

#### "Honor Thy Father and Thy Mother."

Yet, I have known of cases where fathers and mothers had toiled and saved and planned all the best years of their lives in order to give their children advantages of which they themselves had been denied. They had sent them to academy or college to obtain the education that should

prove a potent passport to the esteem of all men, and these young people had returned vainglorious enough to feel the knowledge acquired had raised them superior to those who through long years of self-denial had made this educational training possible.

I have known these young men and women when entertaining some college friend to say: "Let's get father to wait." Perhaps father likes to eat in his shirt sleeves, or with his knife. Well, what of that? Isn't it father's home? And such breaches of etiquette are mere trifles compared to the sneaking ingratitude of a nature that would postpone father's meal in order to cater to the good will of a stranger.

Now is the time to show father the true value of a creditable education. Let him see that the money obtained by many sacrifices on his part was not misapplied; that it had helped to make a man of you and not a contemptible snob. Place him at the head of the table with the unmistakable air, you are honored today by being permitted to eat with my father.

The man or woman, young or old, who is too good to sit at father's table and eat father's bread in father's company is not the person for you to cultivate. Cut the acquaintance at once and let your aim in life be to move in a better grade of society. It may be your father's clothes are not the latest cut; possibly they are sunbleached and shiny at the seams. Still, if you will stop to think, he may have been so occupied in his efforts to pay the bills for your improvement that there was little time for thought of his own apparel. Remember this and that your filial obligation is a lasting debt of gratitude. See that it is paid in full and with usury, for if his son does not show him deference you cannot expect others to do so.

#### Need of Literature.

The progressive farmer of today needs no urging to supply his family with abundant and suitable reading

matter, therefore, the country woman may be as well informed on both foreign and domestic subjects as one who resides in a city, and with the helpful influence of natural surroundings there is no reason why the home on the farm may not become a veritable paradise.

#### To the Men.

While the task of home-making is more generally supposed to devolve on the woman of a family, each member, great or small, should bear a responsibility and take both interest and action in preserving the dignity of home life, be it lowly or grand. Some men are utterly unconscious of the fact that they have formed an entirely erroneous idea of woman and her claims upon them. They are unable to comprehend the real nature and characteristics of the true type of an intelligent, refined woman. They do not know how to draw out and develop her finest qualities any better than some farmers understand managing a dairy cow to obtain best results.

They are laboring under the impression that all women are vain, frivolous, irresponsible creatures that should be firmly held in subjection, that if a man is unable to provide one with fine clothes, jewelry and social amusement she will soon become discontented and wretched. A greater mistake was never made. The real woman doesn't care for fine clothes, jewelry or social position. If she favors them, it is only because she believes such adornment and position will make her more pleasing in the eyes of the man she loves. Women were born to make believe, and I have known them to serenely smile while their hearts were breaking. No, she does not hinge her happiness on luxurious raiment. If she cannot command something better, she'll take it, just as a starving cow will eat straw when she can't get hay, but

she'll not thrive and develop all the tender possibilities that lie within the fertile soil of a glorious nature.

What she does desire above all things is appreciation, love and petting. It doesn't cost anything. She'll never tell you, for the woman I have in mind is too proud to beg for what rightfully belongs to her. When you have taken this girl to share your fortune of either weal or woe, when you, by your protestations of love and fidelity, have severed the ties that bound her to the home of her girlhood, when she has willingly forsaken father and mother to cling only unto you, make it your life long study and duty to see that she never has cause to regret the step that you are responsible for her having taken.

Be patient. Remember that heretofore she has leaned upon the counsel and encouragement of her mother, and now she is called upon to exercise her own judgment and skill. She'll make mistakes, she wouldn't be human if she didn't. Commend her every effort, even if the result fall short. Let her see that you have faith in her ability to accomplish all things, and she'll not disappoint you. Tell her she is the neatest, most orderly, little housekeeper in the country, and you are proud to have the neighbors go through her kitchen. She'll not fail you. Tell her if she keeps on improving she will beat your mother cooking. Why, man alive, she'll do it every time. You don't know of the qualities to be brought out and emphasized with a little judicious praise. Save her strength, because an ambitious little woman will place no limit on her endurance when she's bidding for the approval of the man she loves. Keep a watchful eye on her that she may not overtax her energy, and, if you cannot afford help, there are numerous ways in which you may render valuable assistance about the house.

See to it that she has an income or allowance that is quite her own, and

for which she need render no accounting. Let her feel that you would gladly provide her with every luxury if it were within your power. Give her the chickens—you'll have a better flock of fowls—and see that she has the proper place and the needed assistance to enable her to show her skill and business ability in their management. Say to her: "The money you get from this source shall be yours without question." You'll find it will pay you well, for when taxes are due or you want to cancel a note, you won't have to go to the bank, you can borrow of your wife,—she'll have it saved.

No, women are not the extravagant creatures some men think them. Give her your confidence and let her feel the blessing of your unbounded trust. Say to her: "Here is the pocket-book. There are such and such payments to meet, you know what we can afford as well as I; use the money as you think best." This liberty and confidence will be its safest guard, she will never touch it without first consulting you. You'll find it all there and she will cheerfully make over her old dresses and trim her bonnets, year after year, until you begin to admire the more up-to-date clothes of some other woman.

Don't say my farm. This is a partnership affair and the proper term is our farm. Ask her advice on all business matters. If you don't see fit to follow her suggestions, explain your objections and she'll be satisfied. Let her be thoroughly conversant with your business and business methods, then, if you should leave her unprotected, she will be less liable to fall a victim in the toils of unscrupulous estate adjusters.

Don't go about with your lips shut and your mind occupied on matters too weighty for her comprehension. If she timidly calls your attention to the merits of some new dish or improvement, don't carelessly say: "O, it's all right, if it wasn't you'd hear from me." Such comments will crush

the spirit and ambition in any woman.

Don't take it for granted that she knows you love her, tell her so. I'll give you a ration. Tell her three times a day that you love her—no roughage in this if you please. Don't tell her in an indifferent way. You know how you said it the first time, now repeat it with renewed tenderness. Three times a day is not too often and many women can assimilate to advantage a much heavier ration. Don't be afraid to use endearing terms, have a pet name for her and call her girl, even if she be sixty or older. Youth and age are the times when love is best appreciated.

Don't complain that women fade and that the stylish, lively girl is too often apt to change into a morose, commonplace matron, for it lies within your power to prevent this transformation. A woman's heart is a strange creation, it is a sensitive plant that sends out tiny clinging tendrils and if they come in contact with a cold, unresponsive barrier, they will turn and seek sustenance elsewhere.

Sometimes she will transfer to her children the love and devotion that would have been gladly given to her husband had she met encouragement. Again the better part of her affectionate nature is bestowed upon clubs, charity work, educational aims or ambitious schemes. Sometimes Satan, in the guise of one who understands her nature, offers a glittering imitation of the more substantial love she craves, and if she has been taught to regard indolence and luxury above honor and industry, her situation is indeed a perilous one, but, if from childhood she has been trained in a belief that humble duty conscientiously performed may bring greater reward and joy than a realized ambition, she stands serene and safe.

So long as she has assurance of her husband's love and confidence she will never grow old or discontented. Tall sons and daughters, yes, and tiny grandchildren may mark the progress of years, but she, living in an atmos-

phere of love and appreciation, will remain forever young and attractive.

O, if we will but cultivate these little tender courtesies as painstakingly as we do our grains and grasses! If we will by daily effort and example sow the fertile seeds of a spirit of industry, sincerity and appreciation in

the minds and hearts of our little ones, we shall have dowered them with a higher education and a far more valuable legacy than lands and gold, for we will then surely find that all of earth and the greater part of heaven is centered right in that little spot called Home.

## ADDRESS.

Governor ROBERT M. La FOLLETTE, Madison, Wis.

It is an honor to greet you here tonight in the name of the state which you are doing so much to advance in wealth and power in the Union. It is a privilege to express to you the profound interest and appreciation which I, in common with all our citizens, feel in the important work which is being accomplished through this branch of our educational system,—blending as it does the practical and scientific instruction so valuable to the leading industry of our commonwealth.

As I have followed the range and scope of your work, as I look over this fine assemblage of men and women, I am filled with wonder at the changes which have taken place in twenty years. This branch of University extension, reaching forth over the state, multiplying these centers for the dissemination of practical learning and knowledge known as Farmers' Institutes, have become blood and bone of the agricultural life of Wisconsin in less than two decades.

### School of Agriculture's Great Growth.

I well remember that only twenty-four years ago, as the graduating class at the University for that year filed past President Bascom to receive their degrees, the last man in the line to be thus honored was William W. Brown of Waukesha county, first graduate of

the Department of Agriculture of the University of Wisconsin. So novel and extraordinary did the idea of receiving a degree in Agriculture appear then, that the audience smiled audibly and applauded half in jest.

It would have been difficult to convince any one in that audience, or any one in the state at that time that before another generation had come to maturity, the Department of Agriculture would be one of the most important in the University; that it would have buildings and equipment equaling, if not surpassing, any others; and that the graduates from the long, the short, and the dairy courses would number nearly two thousand men. Not only this, but that the Bureau of Agriculture would be raised to the dignity of a Cabinet Department of the National Government, whose first and greatest secretary should be "Jerry" Rusk, of Wisconsin; that, besides, experimental stations should be established over the country to co-operate with the state governments in placing Agriculture on a scientific basis; that, associated with these and completing the system, should be these traveling institutes uniting the practical with the experimental, carrying the knowledge of the scientist directly to the farmer in form ready for every day use in the varied problems of Agriculture.



It is hardly conceivable, that there is anything comparable in the history of education to this rapid advancement in the science of Agriculture and its practical application to life upon the farm.

ly and thoroughly demonstrated, of tenets which cannot be clearly and completely proven to the student's satisfaction, just so long will it be difficult to make strong, devoted, and enthusiastic students. The firm grasp



Governor R. M. La Follette.

**President Chamberlin's Wise Words.**

Fifteen years ago President Chamberlin,—whose clear comprehension of the meaning and importance of this vast educational movement made him one of its strongest promoters,—said to me:

"The most serious obstacle to the complete success of agricultural colleges is the lack of a thorough-going science of agriculture. So long as a part of the matter taught is composed of opinions, of doctrines not complete-

that mathematics and the classics have on our educational system is more largely due to the perfection of the development of knowledge in those branches than to any inherent superiority in the subjects themselves. Now, in agriculture as soon as we have a body of well-defined lines of investigation, and show them that along these lines the complete science is to be wrought out, and that they are to be the participators in this noble work of construction, then will

our agricultural courses command their affection and become assured successes whether put in competition with other courses or not."

These words were spoken to me in the closing days of the Forty-ninth Congress, at the end of a hard fight to secure the recognition which would insure the passage of the Agricultural Experiment Station Bill. How true were those words then! What marvelous progress has been made since they were uttered! Measured by the rule which he laid down, taking the "body of well-determined facts" as a standard, I suppose it might be safely asserted that Agricultural Science has been mainly established within these years. How much that legislation contributed to it, I do not know, but I well remember how painfully anxious respecting the fate of that bill, were the presidents and representatives of several agricultural colleges then assembled at Washington, for I was in constant touch with them in making the organization to insure its passage through the House during the life of that Congress.

#### A Prophecy Twenty Years Ago.

Looking back over the years, at all that has been accomplished since, I recall with much pleasure the share which I had in securing that legislation, and quote with some satisfaction from the Congressional Record the following prophecy I then made:

"The work proposed here is to give to agriculture, not theories and sermons and lectures, but facts. Facts which will further systematize farming, make returns more certain and swift, insure profits, economize expenditure and effort, and render every farmer less the creature and more the master of the circumstances and conditions which environ him and his business. Why, sir, it is scarcely possible in language to measure the real worth of this legislation to every farmer in the land. I may anticipate too much, but to me this seems a

fortunate hour for American Agriculture. Much legislation has been designed to promote this industry, but this measure goes forth as no other one ever has to carry instruction in Agriculture, of the sort it needs, into every farm-house and every field. It annexes an experimental farm to every man's land, places him next door to a chemical laboratory, makes him neighbor to and a sharer in all technical skill and scientific information, touching the business in which he is engaged.

"I believe, also, that it will help us to keep the boys upon the farm. It will more and more make the business an absorbing study. More and more, each day will be filled with mental exercise, made more zestful with increasing profit. Every piece of labor will be rendered a fresh lesson in the chemistry and physiology of farm life. Every changing phase will acquire a new interest, be fraught with peculiar significance. The turning furrow, the curing hay, the rotting straw, the replenished earth, the quickening germ, will become more and more an object of special investigation and study. Thought will be mingled in many new ways with the sowing and reaping, the springtime and the harvest. And more and more as the years go by will this ultimately be felt as a powerful influence in giving the boys a profound and increasing affection and esteem for the wholesome life which honors every man who honors it.

"And giving, as I think this measure does, precisely the instrumentalities necessary to the complete success of all agricultural colleges, disseminating day by day among farmers practical knowledge of priceless value to them, laying day by day new foundation facts, to bring their business to a better command of natural conditions, into a better understood alliance with economic laws, I am glad, sir, to have contributed something to its success. I esteem it the wisest and best offering made through legislation in many years to our chief industry."

### A Marvelous Development.

Since that time experimental work in connection with our Agricultural College has given a new dignity and a higher rank to that department of knowledge, and brought it into close fellowship with original investigation in every department of science. No abler men are today engaged along any lines of research than those who are now making our own University known in every country of the world where progressive agriculture is awakened into new life. It is the opportunity which opens for advance into the unexplored realms of the science of Agriculture, as in all other sciences, which has drawn young men of the highest talents into these fields of labor in later years. Who shall measure the value of all this to the industry itself, in a better understanding of the soil, its foods, its rest, its cultivation, its responsiveness to intelligent treatment; in the better knowledge of plant life, of animal life, and their development into the highest types possible for each.

Surely the standard raised by President Chamberlin has been achieved. The investigator has mastered problems, settled doubts, secured data, until today there is a vast "body of well-determined facts to offer our students" and to marshal the way as they advance along the now clearly defined lines of ever-extending research.

In all this marvelous development Agriculture has been enriched most abundantly upon its material side. To what extent can never be accurately known. The increasing millions from dairy products may be fairly estimated. The vast sums realized in live stock production, feeding and fitting for markets by more rational processes may be approximated. But in that great field of agricultural development where each new truth itself lights the way for another, where advance in one direction stimulates to independent activities in many directions, and every progressive farm be-

comes an experimental station, there is no way to measure the growth and expansion. We see the general upliftment and are partly conscious of the great process of evolution which is so rapidly carrying forward this noble industry.

### The Farm Life of the Future.

It requires no gift of prophecy to foresee the changes which another generation will unfold.

The development of this new country, with its privations and hardships, made life upon the farm one of long hours, of exacting toil, anxious watching for results, and, often, the closest kind of living. There was little leisure, little opportunity for reading and study, almost no time for recreation or holiday. Yet, so wholesome was the life, so normal the education of hand and brain, so exacting the demands upon self-reliance and individual courage, so firm and secure the moral foundations made by habits of industry and thrift, that the farm has furnished not only the State and Nation, but the professional and business world, with its leaders of men and captains of industry.

### Combinations and the Farm.

Only a few years ago one of the most vexing problems was how to keep the boys and girls upon the farm. But important and sweeping changes are taking place in the professional, the commercial, and industrial world. Consolidation and combination are rapidly narrowing the field of individual opportunity and effort, in the pursuits which a quarter of a century ago, tempted ambition and rewarded talent and industry. Except for the few masters of finance, he who is now counted fortunate enough to find a place in the complex system of modern business life, must encounter an abnormal strain and tension, and from the very conditions of success, forego all opportunity for individual and personal achievement.

With the increasing competition in the professions and the lessening opportunity for large profits and great fortunes for the average individual in business, contrasted with the advancement in agriculture and increasing advantages of country life, the conditions may soon be reversed and our problem be how to keep our sons and daughters away from the farm and with us in business and professional life.

#### The Ideal Life.

Be that as it may, it is plain that agriculture in this country has a future heretofore unknown in the world. Farming is now the most distinctive American occupation. It is the source of our safest, most conservative citizenship and highest average of intelligence.

Put the farm in direct communication with the world by rural delivery, the telephone, the electric railway, the traveling library, the township school, the improved highway, and you have given it the essential advantages of the city without depriving it of the essential advantages of the country.

There will be left the sweet and vitalizing country air, the isolation of broad acres, the beauty of hill and valley, woodland and meadow, and living, running water. The charm of the ripening grain, coming to its mysterious fullness in the warm embrace of the sunshine, the honest pride in the grazing flocks, and the affectionate interest in their growing young, will always be an inherent and uplifting element of life upon the farm. The rich blessing of unconscious health, the joy of wholesome work, that brings wholesome rest and wholesome appetite, are the natural rewards of this out-door occupation. Nearness to nature, nearness to God, a truer philosophy, a keener human sympathy, higher ideals, greater individuality, will ever be stamped upon the life and character of the country home.

The new agriculture, the new edu-

cation, new inventions will give added interest, larger profits, greater certainty of success. They will lighten its burdens, widen its sphere, and ultimately make Agriculture the most desirable of all human avocations. A new day has already broken upon the tiller of the soil. The new life upon the farm will recognize, not only the material value and dignity of labor, but the increasing necessity for greater leisure and a larger measure of recreation. It will not be only a life of industrious independence, high intelligence, and great culture, but it will have time for the aesthetic and artistic side of human affairs. Under these influences every farm will become a beautiful country home, provided with every comfort, every convenience, every rational luxury,—in close touch with the world, yet happily apart from it.

Wisconsin has been a pioneer in this advancement of American Agriculture. Many of the distinguished leaders are here tonight. May their valued lives be spared yet many years to us to see the full measure of their great service to this noble industry and the fruition of our highest hopes for its future.

#### Practical Questions of Today.

But this day and this hour present some practical questions of vital importance to every citizen and taxpayer in the state. They are questions which deal with right and justice and equality as between men and interests in Wisconsin.

Agriculture has always furnished the bulwark of American citizenship. The farmers of Wisconsin furnish the majority of its voters and upon them rests the obligation of upholding constitutional rights, the responsibility of maintaining good government. Because they are in the majority, and because they own the major portion of the visible, tangible, taxable property reached by the assessor, they are most deeply interested in the subject of equal and just taxation.

### The Duty of the Last Legislature.

There is but one right attitude on this question. There is but one final outcome to it. The plain, explicit provision of the Constitution is that taxation shall be uniform. When it is demonstrated that it is not uniform; that there is gross inequality; that the burdens borne by real property are nearly twice as great as those of certain corporations, then there must follow a lawful adjustment. Procrastination, postponement, and delay is a denial of justice. The question of inequality has now been for years before the public. It has been fully discussed. It has passed the stage of doubt, misunderstanding, confusion, and uncertainty. It has found expression in platform pledges, in the selection of tax commissions, and in their plain, unequivocal recommendations. There is no longer just cause for delay where we have well-defined limitations and established facts upon which to base a course of action. We have these in reference to the most important subject of railway taxation. It was the plain duty of the last legislature to act. That duty was violated.

### Every Advance Always Opposed.

But that the legislature failed to perform its duty should not be a cause for discouragement. It should but quicken the interest and make firmer the determination of every citizen in the state. There should be no wavering and no delay.

Every advance step in legislation has much the same history. That the interest of the state's money should have been appropriated by any official in temporary custody of the same now seems an absurd proposition. Yet, the restoration of diverted interest was contested in the State Treasury cases with great bitterness and was the subject of a violated platform pledge.

The Australian ballot was adopted after a protracted struggle. The first experiment with it was unsatisfactory.

There was a movement for its repeal. What an epoch it marks in honest elections and the purity of the ballot!

The anti-pass legislation was resisted and fought as though the prohibiting and giving of these favors to public officials was the perpetration of a great public wrong. Its author was the subject of personal ridicule and abuse, but finally triumphed. Who would now dare to suggest that this statute be repealed? Who now questions, in spite of its imperfect enforcement and evasion, that it has in part removed a corrupting influence upon legislation and has raised the standard of official integrity.

### Equal Taxation Must Come.

Equal and just taxation must come. Selfish interests may resist every inch of ground, may threaten, malign, and corrupt, but they cannot escape the final issue. That which is so plain, so simple, and so just will surely triumph.

This contest would not be difficult. Its settlement would have admitted of no postponement, if the wishes of the majority of the people had been fairly expressed by their representatives in the legislature. That this would have been achieved except for the intervention of political bosses and machine politics does not admit of the slightest doubt.

It seems to me that as a good means to a good end, there is no question where the great body of the voters should stand upon the issue of primary elections. They have little leisure. They have no time to become trained politicians. Yet it is their interests that are at stake in state and local legislation and administration.

The simple, direct method of selecting all candidates for nomination at one time by one act on the part of the voter which will make those candidates directly responsible to the voter who names them is, if possible, even more an elementary necessity in representative government than the priv-

ilege of electing men by direct vote after they have been nominated.

If this power were now in the hands of the people, who questions what the last legislature would have done on the subject of taxation?

To the farmers especially, with their lack of leisure, their distaste for political intrigue, their habit of direct appeal, simpler methods are a necessity if they are to maintain interest in government and wield a wise and potent influence in legislation.

There is but one way for you to

meet and master the political situation as it exists today. There is much in awakened public conscience and a full expression of public sentiment, but it is not enough. You must make one supreme organized effort, you must directly participate in the work of nominating candidates who will be faithful to their trusts. Your interests are at stake. You are in the majority. Upon you rests the responsibility.

The Institute adjourned till 9:00 a. m. next day.



## THIRD DAY

The Institute met at 9 a. m. Meeting called to order by Supt. McKerrow.  
Invocation by Rev. S. Jolliffe. H. C. Taylor called to the chair.

## RICH LANDS AND HOW TO KEEP THEM SO.

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



C. P. Goodrich.

Every man who thinks of owning land wants rich land.

A great portion of the lands of Wisconsin, as well as other states, were rich before civilized man came to them and, in many cases, commenced a deliberate system of wasting the fertility.

Nature made the lands, in a great part of our state, rich and fertile. How did she do it? If we study Nature and note how she is doing to maintain the richness of the land and how she has been doing to build up the soil, then, possibly, we can, if we will, stop this waste.

For thousands of years where the

timber has grown on the land the annual crop of leaves has been deposited on the ground and the trunks and branches of the trees, one after another, have fallen on the ground and decayed, becoming vegetable mold. Occasionally a tree would turn up by the roots, thus bringing up a portion of the subsoil and setting it on edge so that the elements—the air, sun, frost and rain—could act on it and make soluble and available the plant food contained in it.

As this subsoil brought up by the overturning trees, is crumbled and leveled down through the processes of Nature, it buries up a large amount of the decaying leaves and wood that have fallen on the ground, and in this way the land is plowed and cultivated, sometimes very deeply, and decaying vegetable matter thoroughly mixed in so that the soil is filled with humus. Humus is not only plant food, but it enables the soil to hold much more water than it would without the humus.

The trees and shrubs and some plants that grow in the woods send their roots deep down in the earth, thus disintegrating the soil and letting air into it, and when these roots die, as they will in time, they add more humus to the soil.

On the steep hillsides the roots of trees, plants and shrubs form a perfect network, binding and holding the soil and preventing it in a great measure from being washed down by the rains and melting snows into the valleys and rivers below. Even these

steep hillsides are often kept very rich in thus having an abundance of humus in them and producing a heavy growth of timber and other vegetation.

On the prairie, although there are no trees, there are in the state of Nature innumerable shrubs and plants that send their tap roots down deep in the soil and perform the same work that trees do in timberland. The prairie grass has an almost solid mass of tough roots, so tough that it takes four or more strong horses and a very sharp plow to break it up. This sod and roots also hold the soil on the hillsides and often the soil on these hillsides, on the prairie, are rich in available plant food and has as much humus in it and produces as good crops when first broken up as the more level prairies.

#### Work of Man.

But what has man done? He has cut off the timber, killed out the shrubs and plants, and the prairies he has broken up, sidehills and all. The process of making soil has been stopped, and instead the farmer is raising crops of grain and taking off and selling the fertility of his soil as fast as he can. His soil grows poorer each year if he puts on nothing. The sidehills give out first, with no fibrous roots and but little humus, they are washed and seamed and gullied in a few years so that it is impossible to plow or cultivate them and if they could be cultivated they would produce nothing; the available plant food and humus have gone down into the creeks below and gone forever, and left nothing but, perhaps, a mass of stones and gravel; or it may be a mass of clay so cut up with water courses that no animal less agile than a dog could go over them.

The level lands hold out some longer, but even here the plant food and humus grow less and less with each succeeding year and it is affected more and more by drought, for the land can hold only about one-half as

much water as it could when it was new and full of humus. The farmer now tries sowing clover, but he fails to get a catch, but instead of laying the blame on himself, where it belongs, he blames the Almighty for it and says "we don't have rain enough and the clover dies," whereas, if the land had been seeded to clover when it was rich and full of humus there would have been no failure to have had a catch, except in one or two exceptional seasons. Then if it had been seeded every third year it could have produced good crops of small grain and corn two years out of three, and then if most of the grain and forage raised on the farm had been fed to some good stock and the manure spread on the land it would be just as rich and productive as it was when it came from the hand of Nature.

#### Nature a Good Example.

I have tried to define the first part of my subject, namely: "Rich Lands," and now if you have that I will try to tell "How to keep them so." We must follow Nature. We have cut off the trees and shrubs and destroyed with the plow, the plants whose roots penetrated deep in the ground. We must put on some plants that will do the same thing, that is, disintegrate the subsoil and make the plant food available and bring it to the top where our cultivated crops can feed on it. There is nothing better now known for this purpose than clover and alfalfa. I would not cultivate the steep sidehills. Let them grow to timber and let Nature keep on as she has been doing holding the soil from washing and raising a valuable crop. We need a great deal of timber and it will be more valuable year by year. There is land enough that is comparatively level to cultivate.

I would not wait long after the land was cleared or broken up before I sowed clover. It is very rare that there is a failure to get a catch on such land, but a great many men seem



to think it is wasteful to sow clover on land before it gets poor.

I remember that nearly forty years ago, when I had just commenced seeding to clover, I was sowing some seed on a field near a road when a neighbor came along and asked me what I was sowing. I told him "clover seed." "What!" he said, "sow clover on this land? This is new and rich and will raise a good many good crops before you will need to sow clover. I would not sow clover as long as the land would raise a good crop of grain."

He waited till his land got poor with the humus all taken out of it before he sowed clover, then he had several failures before he got a catch. Many farmers, judging by their actions, think as this man did.

Not long ago I saw a field, through the middle of which runs a strip where there had been a rail fence. This strip had never been plowed till last year, the fence having been built before the land was cultivated. Last year the whole field was plowed and sowed to small grain and clover seed. There is no clover on this field except where this fence row was, and there is a good stand. If the land is kept rich enough and kept full of humus, there will be no trouble in getting a catch of clover, unless it be in rare instances which have occurred but twice in southern Wisconsin during the fifty-five years I have lived here.

#### Manurial Value of Crops.

The farmer when contemplating selling off some of the products of the farm should consult the chemists' table of the manurial value of the different crops. He should keep at home and feed out on the farm those that have the most manurial value. For instance, clover hay has in a ton forty-one pounds of nitrogen, eight pounds of phosphoric acid, and forty-four pounds of potash, worth at the prices paid for commercial fertilizers in the market, \$7.26, while timothy hay has but \$4.31 worth of these elements of fertility.

If it should happen that you had both of these kinds of hay and wished to sell some, it would be the part of wisdom to sell the timothy and keep and feed the clover, which, besides having more manurial value, has more feeding value, especially for young and growing animals and milk cows, and does not sell so high in market.

I have mentioned this to make a comparison, but I do not advise raising hay of any kind, ordinarily, to sell off the farm. If the farmer is to keep his land rich, he should feed the forage and grain raised on the farm to some kind of stock and market them in a condensed form, such as butter, cheese, beef and mutton.

When we buy feeds we should take into account the manurial value of the feeds. You will notice that wheat bran and oil-meal have a high manurial value. The English farmer thinks he can afford to buy oil-meal in the United States, ship it to England to feed to beef cattle, although he hardly expects that the beef it will make will pay for the oil-meal. But he says it will make rich manure and that, he thinks, pays him.

The manure must be carefully saved and judiciously applied to the land if we are to get the full benefit of feeding out the products of the farm on the farm. On many farms nearly, if not quite half of the value of the manure is wasted. It is either thrown out under the eaves or is wheeled out and dumped in the yard, one wheelbarrowful in a place. Here the rains wash it and much of the valuable part goes off into some hollow or ditch.

On a farm where a rotation of crops is practiced, and it certainly should be if we are to take the easiest way of keeping up the fertility of the land, I am thoroughly convinced that the best place to apply manure is on grass land, either meadows or pastures. The land should be in grass or clover at least two-thirds of the time. The chemist tells us that there is about as much value in the liquid manure as

in the solid. Therefore we should have tight gutters in our stables and use absorbents, such as butts of cut up corn fodder, straw, land plaster, manure from the horse stable, etc.

The best way is to haul the manure out every day and spread from the wagon or sleigh when the weather will permit. Now, if it is on grass or clover, go on with a harrow, as soon as it will do, in the early spring, before the lumps of manure get dry and hard, and give it a good harrowing. This will make the manure fine, scratch up the ground a little and mix some of the manure with the soil.

Done in this way it does no hurt in the hay, the yield of hay is increased, it makes a thick, heavy sod and the humus in the soil will be greatly increased, so that in this way we seem to get the benefit of the manure twice over, first in the increased yield of hay, and, second, by the increased richness of the soil as a result of the heavy root growth which adds an extra amount of humus to the soil.

#### American People Soil Robbers.

That ends my paper. To relieve my mind I have got to talk a little. I cannot put my feelings upon paper, but sometimes I can let them out with my voice.

I believe that our great American people are the greatest soil robbers on earth. They came some hundreds of years ago, to the Atlantic coast and they commenced to rob the soil there of its fertility, and the soil robbers have been slowly marching westward until they have invaded Wisconsin.

This week, in coming from Watertown and going through my own county, over land that I had surveyed myself when it was sold for \$125.00 an acre a few years ago, I noticed that the land is getting poor. They have been raising grain on it year after year and selling it off. The farmer will say: "I want to get something for my children." He is selling off the fertility of his soil and putting it in a bank, where, when he dies, his

children will have it and they can squander it and lead riotous lives in cities. The best bank in the world for him to put his money into is a rich soil.

I am led to this sort of feeling by a visit to my old home in the state of New York. Last summer and fall I went over that state where I lived as a boy. Down in central New York, where my grandfather had a splendid farm ninety years ago (in 1816 he came there), what is the land worth now? It was somewhat rolling land and those sidehills are seamed and gullied and washed so that you could not drive a cart across them. I went to my old home, where I came from in 1846, in the Genesee district of New York, that famous, rich country. I went onto the farm where I worked when I was a boy fifteen years old, fifty-five years ago. I walked all over that farm. I knew every knoll, every hollow. I picked out the place where I piled up stone. What did I find there? I did not find anything growing but wild carrots and daisies and Canada thistles—and these were stunted—and a little piece of corn which had been planted that I knew was never going to produce any ears. The man that owned that farm had raised wheat—year after year wheat. He put the money in his pocket and he sent off his sons, one to be a lawyer, another an insurance agent and another a railroad man, but where are they now? I made diligent inquiries to know what had become of them. Every one of them had gone into the cities and had become all but lost to the world. This farm, I doubt not, could be bought for \$15.00 an acre, but that is more than it is worth; it is a ruined farm.

I went to another farm, only a mile from where this was, where I had worked when I was fourteen years old. It was no better farm in those days than the other. When I got there I saw splendid crops. I went to the sidehills on that land; they were not washed or gullied. The farm

was owned by a "boy" seventy-one years old now, and that "boy" said: "I have been offered \$150.00 an acre and would not take it." So you see rich land is worth something there as well as it is here. And, by the way, he has been able to keep his son on the farm, and he was the only one of my old acquaintances who had done so. He had kept his boy on the farm, and sent him to the agricultural college, and he had come back a scientific and enthusiastic farmer. That farm is richer, I believe, than when it was new. And this was done by raising crops that were turned back into the soil,—by raising clover and other forage crops, and putting it back onto the land, by feeding it to fine stock which had brought him a good income.

#### Commercial Fertilizers.

By the way, they are selling commercial fertilizers there. I might use a commercial fertilizer to grow something that I can turn under and have some humus in the soil. You know I have talked humus so much at the Farmers' Institutes that they call me "Old Humus," but I am proud of the name.

#### The Best Legacy for Future Generations.

It has made me feel sad to travel over the state of New York and the state of Michigan and note the deterioration in the fertility of the land. I tell you the farmers have been leaving a desert in their tracks and the country cannot afford it. The population of this country has been doubling once in thirty years since the government was first formed, and if it keeps on at that rate, there are young men in this audience who will see in the United States a population of one hundred and fifty millions, and they must all be fed out of the soil. We have but little more new lands, and we will have to feed them out of the soils that have already been broken.

A man who leaves to his children a farm that is rich in fertility is leaving to them the best legacy possible. I talked this down in New York; I have talked the same thing here.

I say: You old, grizzly fellows, you say you are working to get something for your children, and yet you are depleting the fertility of your soil just as rapidly as you can; robbing your children of the means of subsistence after you are gone. Oh, yes, some of you walk around and talk big about the land that you own. "My land!" "I have got a thousand acres of land!" You do not own an acre of land. There is not a man that owns an acre of land. It is not yours. It is God's earth, placed here to feed his children, and it is loaned to you to use for a little while, and you are certainly in duty bound to turn it over to the next generation just as good as it was when you took it. It is a trust, a sacred trust that you should keep. You have no more right to rob it of its fertility,—to rob the next generation of its means of subsistence, than you have to go and rob a bank.

#### DISCUSSION.

Question—I want to ask Mr. Goodrich if it would be a profitable proposition to buy that New York farm for \$15.00 an acre and make a farm out of it.

Mr. Goodrich—No, I think not. In the first place, where there are sloping hillsides it is washed all down to the stones and gravel. It is gullied up with gullies within two rods of each other.

Question—Would you go up into northern Wisconsin?

Mr. Goodrich—There is good land here. If you will stop robbing the soil we will keep southern Wisconsin a Garden of Eden. I tell you, when you get up here and say that you cannot get a catch of clover late years, I know it is a farm where you have had plenty of humus in the soil, just as there is now in the northern part of

the state. There have only been two seasons that would prevent getting a catch of clover if you had kept the soil filled with humus.

Prof. Woods—On that Jefferson county farm you spoke of, do I understand that there is no more fertile land?

Mr. Goodrich—No, sir.

Prof. Woods—No more land with humus?

Mr. Goodrich—I did not say that. I said there was a strip eight feet wide, along the line of an old fence.

Question—What was the fertilizer you spoke about, the commercial fertilizer?

Mr. Goodrich—I don't know much about a commercial fertilizer. My proposition was not to build up land that had gone down. I am talking about "rich land and how to keep it so."

Mr. Beaumont—What about the man that has a farm that is not rich? What is the fertilizer that I want to help that catch of clover? I have put four or five hundred pounds of seed on my farm and I got nothing from it.

Mr. Goodrich—I would be glad to help you, but I think it is past that. Of course, you can sow soy beans and cowpeas and rye,—anything that will make a growth that will turn under and help bring back the humus. I know there are commercial fertilizers that do good if you have the moisture. They do not furnish any moisture.

Prof. Henry—If the gentleman will send to the experiment station we will send him a bulletin and a list of the licensed fertilizers sold in this state.

Mr. Ezra Goodrich—I have agitated among our class of farmers applying manures, but last year top dressing in the spring upon timothy meadow was really what I call a failure, it was an injury, but not on account of the manner in which it was applied. It was a dry season; we did not have any rains, and the only way I can explain it is that the heat absorbed by the straw and stuff in the manure was so

great that it dried up the plant. It was the only time I had my neighbors say theirs was a failure. I didn't get the amount of hay off that ground where the top dressing was applied in the spring.

Mr. Coe—When did you apply that manure?

Mr. Ezra Goodrich—I put it on about this time of the year, and some even just before corn planting. We had stable manure that we did not need for the corn ground.

Mr. Goodrich—Did you have any hauled out in the fall?

Mr. Ezra Goodrich—Yes.

Mr. Goodrich—How was that?

Mr. Ezra Goodrich—It was better. We have also practiced putting stable manures on plowed ground and work it in, in sowing oats and barley and other grain.

The Chairmān—On fall plowing?

Mr. Ezra Goodrich—Yes:

Mr. Goodrich—I like to put it on the meadow or pasture the best.

Mr. Nicolai—What success have you had, Mr. Goodrich, with alfalfa in comparison with clover?

Mr. Goodrich—I have not raised alfalfa myself, but I have watched it considerably. It furnishes a great amount of good feed for dairy cows. It is my opinion that it has the same effect as clover does, or anything else that sends its roots deep into the soil.

Question—Did you ever apply mud out of a marsh, spreading it on the soil.

Mr. Goodrich—We have hauled peat from a marsh. It did some good, but there didn't seem to be much fertility in it.

Prof. Henry—I know that what Mr. Goodrich has said this morning has sunk deep into the hearts of this audience. There is no other man in the state of Wisconsin who is today such a leader in this line as Mr. Goodrich. I know that the farmers will go home from this meeting glad to have heard him once more, and glad to follow, as far as they can, his words of advice. In his preachment he was a

little severe, but it was all right. We Wisconsin farmers do not as a rule need much scolding. Wisconsin lands still have more fertility than they do right across Lake Michigan. Last year the governor of Michigan called attention to this fact in his message. He called attention to the conditions of the two states, to the disparagement of Michigan.

We are doing pretty well in Wisconsin. We need to be encouraged. We need a word of encouragement rather than a word of censure. I am not finding fault with Mr. Goodrich, understand me.

Farmers, all of you are anxious to bring up your soils. Listen to this man's advice. He travels, he watches, and he observes, and if you follow what he says, you cannot fail to make your farms better. Your farms have value. You can get lands cheaper in Michigan than you can in Wisconsin, because we have followed in Wisconsin a better system of farming. Our farmers are anxious to plant clover. We must have the humus,—the legumes and the humus. If you want a commercial fertilizer to help you out, write to us at the experiment station and we will give you a list of those which are licensed to be sold in this state. But do not rely on commercial fertilizers. The farmers of North Carolina pay six millions dollars per year for fertilizers. We buy them just as we do plows and harvesters.

There is \$13.00 worth of fertilizer in a ton of bran, in addition to the feeding value in it. But bran is too high this year to preach about much. Do you know that the whole northwest,—Minnesota, Dakota, Manitoba,—in that whole territory the farmers are robbing their soil of its nitrogen, potash and phosphoric acid. When that wheat is ground up into flour there is a hundred dollars' worth of fertility to every carload of bran. The wheat stops in Minneapolis at the mills and the products go down into Ohio and New York.

If you and I were living on a river

in which there were logs floating down past our town to another town, we would be inclined to stop those logs and manufacture them in our own town. But here we are sending down to New York and buying commercial fertilizers and shipping them a thousand miles into Wisconsin, when there is one hundred dollars worth of fertilizer in a carload of bran which is available to us near at hand.

My friends, the reason that Wisconsin is where she is today is because we have been putting ten thousand carloads of Minneapolis bran over our farms. Do not worry about buying a carload of bran. Davenport, down in Iowa, does not think it a disgrace to buy saw logs and make lumber out of them. If you can make three, or five, or ten dollars on a ton of bran; if you can have some butter to sell and about \$13.00 worth of fertility for every ton you buy, you are ahead of the game. If those people want to go on raising wheat and taking millions of dollars worth of fertility out of their lands, let us be wise enough to take advantage of it to enrich our lands. Let us take advantage of it as long as they are willing to let us. Let us stop that bran in Wisconsin, stop the middlings and the Iowa corn and send our butter, cheese and eggs on east.

A Member—I do not want to criticize my superior, Professor Henry, but when he started he said he would hardly agitate the question of bran this year on account of its price. I think that at the price bran has been selling for this year, there is no cheaper feed for the farmer to buy and feed economically than bran at \$22.00, when you get oil-meal at \$30.00 and corn meal in the same proportion.

Mrs. Tilson—They are having Institutes in the south of Minnesota and they are in hopes that you will continue to pay as high a price for your bran and get less of it. They are also learning something in Minnesota.

Mr. Beaumont—I do not want Mr.

Goodrich to think my farm is so very poor. I bought a farm about thirty years ago and raised my first crop with seven bushels of wheat and ten bushels of oats to the acre. I kept that farm for twenty years and before I sold it the enumerator of that town told me I had the best crops and raised the most on the land I owned of any man in the town, so I have had some experience in renovating. But if there is anything to help this wornout land, I want to know it.

Mr. Goodrich—Professor Henry has answered that.

Question—Do you advise applying manure in the winter time to steep hillsides?

Mr. Goodrich—My practice on my own farm, some of which is hilly and some level, was to haul it onto the level land and then, later, after the ground was beginning to thaw out, I put some on the hills, but ordinarily I do not think there is much fertility washed down the hillsides. There are certain times when the ground is covered with ice and a thaw comes and heavy rains when it will wash. I like to apply it on the grass land and the grass and stubble help to hold it.

There is one other thing. Professor Henry wants to encourage the Wisconsin farmers. That is right. In my hurry I neglected to say that I believed that Wisconsin farmers are doing very much better than they are in the east. I have traveled over the state of Michigan two winters in the Farmers' Institute work, and I can buy land, just as good as the farming lands between here and Watertown (as they were once), for \$40.00 an

acre, located within half a mile of the station. It is because the farmers there have been robbing the soil of its fertility. I was down in the state of New Jersey at the meeting of the State Board of Agriculture, and they told me that the little state of New Jersey paid \$3,000,000.00 a year for commercial fertilizers, and you can buy land within sixty miles of New York city or Philadelphia that was once good land for \$40.00 an acre. So, because they have robbed their soil of its fertility, they are relying upon commercial fertilizers and nothing else to grow a crop, and they set up the howl: "It is so dry," when the statistics show that the average rainfall for the last twenty years was just as much as for twenty years before. They won't believe it.

Mr. Convey—I would like to ask, Mr. Goodrich, would you recommend a young man to go east and grow up with the country?

Mr. Goodrich—I advise him to stay in Wisconsin.

Supt. McKerrow—According to Mr. Goodrich, the young man better go up north and grow up with the country.

The Chairman—I hope every farmer in this audience will be eager to get the report of this meeting and read what has been said on this subject; that we may be enabled, by a proper rotation of crops, to bring up the fertility of our farms so that they may be for the next hundred years independent of commercial fertilizers. Let us see to it that our farms are more and more fertile year after year, and leave that splendid inheritance to our children and the next generation.

## DAIRY PRODUCTS COMPARED WITH OTHER FOOD MATERIALS.

CHAS. D. WOODS, Director Maine Agricultural Experiment Station.

The farmer should be well nourished. He grows a considerable part of his own food, and can with little expenditure of labor and money have an healthful variety. The farmers of this state, and, indeed of this Nation, have all they need to eat, and in general more than they need, but unfortunately their selection of food is not nearly as good as it might be. This will be more readily understood after we see how it is that the food nourishes the body; how much nutriment there is in the different food materials; what are the different kinds of nutritive ingredients or nutrients the food materials contain; what are the demands of the body and what kinds and amounts of food materials will best meet these demands.

This means a lesson in physiological chemistry, a lesson which begins with the rudiments of the science of nutrition. These rudiments have to do with protein, fats and carbohydrates, with flesh formers, fuel values, dietary standards and the like. When these are put together, we shall be talking of the different food materials as meat and potatoes, and bread and milk, of properly balanced diet, of combinations of food to meet the demands of different people of different ages, sex, and occupation.

### Flesh Formers—Protein.

For breakfast this morning we had beef steak and potatoes. With these were bread and butter and one or two cups of coffee with some sugar in it. Now this food has its use, namely, to build and repair the bodily machine and keep it running. The bodily machine is made of blood and muscle and bone and brain. The frame work

of the body we will call its tissues, of which the chief is flesh, meaning by this, lean flesh, muscle, tendon and so-called animal matter of bone and the like. In the growing body they are being built up and in both the adult and the child they are being constantly worn out and repaired. The materials in the food which build up the body and repair its waste we will here call flesh formers, although more common names in scientific treatises are protein, proteids or albuminoids.

Now we can live on bread, meat, milk and a great many other materials. These must therefore contain the flesh forming substances. Chemical analysis shows us very clearly what those flesh forming substances are, and how much of them there is in a pound or a quart of milk. Today we have tables of the composition of food materials which show the percentages of flesh formers in all of our ordinary food materials.

But what are the flesh forming substances in food? One kind is found in the lean part of meat and makes the basis of muscle. Chemists call this substance myosin. If we take the white of eggs and dry out the water, the residue, which is called albumen, is a flesh forming substance. If we put rennet in milk and separate out the curd from water, sugar and fat, the residue consists mainly of a flesh forming substance which is known as casein. Make wheat flour into dough, knead it for a long while with water and then remove the starch and sugar and there will remain the gluten with a little oil and some other substances. This gluten is the flesh forming substance of wheat. Compounds similar

to gluten occur in rye and barley and corn and rice and potatoes, and in our vegetable foods generally. If these materials did not contain flesh formers, they would have very little value by themselves alone for food. We could not live upon them unless we used with them some other substance to supply flesh formers. Certain classes of people, including many tribes of negroes in Africa, and indeed a large number of the negroes and the poor whites in our own southern states, subsist upon a diet which contains very little of the flesh formers. They live on a low nutritive plane. One thing that is needed for their elevation is a better balanced diet.

Chemists have devoted a great deal of study to these flesh forming substances, and find that they all contain a certain list of chemical elements which we call nitrogen, carbon, oxygen, hydrogen and sulphur. The characteristic element of them all is nitrogen. They are nitrogenous substances. In the laboratory we call them all protein compounds. Because of the similarity of many of them to the albumen of egg, they are sometimes called albuminoids. Another name which is frequently given to them is proteids; a more common one is protein, but for our present purpose we will simply call them flesh formers. They are the materials which build up the frame work of the body and repair its wastes. From them muscle and sinew, blood and bone are formed.

#### Fuel Ingredients of Food—Fats and Carbohydrates.

It is one thing to build a machine and keep it in repair. It is another thing to keep it running. For this it must have power. A steam engine gets its power from its fuel, coal or wood, as the case may be. The bodily machine derives its power from the fuel ingredients of its food. The chief fuel ingredients are fats and oils, starches and sugars. The beef-

steak we had for breakfast contained flesh forming substances, but it also had more or less fat. The bread contained some gluten, but it had also starch and a little oil. The butter which we put on the bread is a fatty substance. The sugar with which we sweetened our coffee was a substance allied to starch.

The fats and oils, the sugars and starches are burned in our bodies just as truly as coal and wood are burned under the boiler of the engine. The men who deal in abstract science tell us that all of these substances contain energy; potential energy it is called. When the coal is burned in the furnace or the food is burned in the body their potential energy is changed into other forms called heat and mechanical power. When the coal is burned in the furnace, its potential energy is transformed into heat, and part of that is changed into the expansive power of steam which moves the engine, draws the railway train and keeps the wheels of the factory in motion. When the fuel is burned in the body, its potential energy is transformed into the animal heat which keeps the body warm, and into muscular power with which muscular work is done. The fats of meat, the fat of milk, which makes butter, the oil which is abundant in the olive and in the cotton seed, and which occurs in smaller proportions in wheat and corn and particularly in nearly all of our food materials, are fuel ingredients of food. The starch which makes up the bulk of the nutritive material of wheat and rice and corn and potatoes, and the sugars, of which there is a little in wheat, considerable in milk and a large amount in the sugar cane and sugar beet, are, likewise, fuel ingredients. Chemists group sugars and starches together and call them carbohydrates.

The carbohydrates and the fats or oils are the chief fuel ingredients of the food. They all consist of three chemical elements, carbon, hydrogen and oxygen. The chief of these is



carbon, and hence the fats and carbohydrates are called carbonaceous food materials. The carbonaceous food ingredients then are the ones that serve for fuel while the nitrogenous ingredients are the flesh formers. This is not the whole of the story; indeed, it is only a small part of it, but it is the most essential part. The flesh formers can also serve as fuel. A dog can live on lean meat and get from it what is needed, not only to build his body and keep it in repair, but can also burn it and utilize its potential energy. For that matter we do the same thing with all the flesh formers of food. When we get through with them for building material, and, indeed, without using them for building material, we burn them in the body, and they supply us with heat and strength. In other words, the flesh formers can fulfill the two great purposes of nutrition, the building of tissue and the yielding of energy. But the fats and the carbohydrates cannot build tissue. The carbohydrates can be changed to fats in the body and can with the fats be stored in the body in the fatty tissues, i. e., the tissues which hold fat, but the fat is stored there for fuel. It is the reserve fuel which the body keeps for its needs. From this fact, namely, that the flesh formers can also serve as fuel, but the fats and carbohydrates, or fuel ingredients, cannot serve as building material, there is one very important inference. We need, and for proper nutrition, must have a large enough proportion of flesh formers in our food.

#### Fuel Values of Food.

The values of the different food materials and of their several ingredients for serving the body as fuel may be measured by their ability to furnish heat when burned. Their fuel value is readily learned by burning the materials in an apparatus called a calorimeter and measuring the heat produced. In this process of measur-

ing the fuel value of different substances, advantage is taken of the fact that it requires a definite amount of heat to raise a pound of water one degree. The heat unit used in these measurements is very nearly the amount of heat necessary to raise one pound of water four degrees Fahrenheit. This unit of fuel value is called the calorie. Instead of a heat unit we might use a unit of mechanical power, as a foot ton, which is the power that would raise a ton one foot. One calorie equals 1.52 foot tons nearly. In other words the heat which would raise the temperature of one pound of water four degrees Fahrenheit would, if transformed into mechanical power, suffice to lift 1.52 tons one foot. The fuel value of a pound of starch or sugar (carbohydrates) is very nearly one thousand eight hundred and sixty calories. The fuel value of a pound of fat is about four thousand two hundred and twenty calories, or two and one-fourth times that of the same weight of carbohydrates. A pound of flesh formers (protein) has about the same fuel value as a pound of starch or sugar.

#### Ingredients of Different Classes of Food Materials.

Usually foods contain both flesh formers and the materials which serve as fuel. Olive oil, butter, lard, starch, sugar, and a few other materials consist almost entirely of fuel ingredients and serve almost wholly to yield energy in the form of animal power and heat. A few foods, such as cod fish and white of eggs, consist almost entirely of flesh formers with little or none of the materials which yield only energy. Obviously a food which contains none of the flesh formers will not meet the demands of the body, for while it might furnish the needed energy for muscular work, provide fuel to keep the body warm, it would not in any way meet the needs of the body in building new and repairing old tissues. In general, the vegetable foods consist largely of

the fuel ingredients and contain relatively large quantities of the flesh formers. A marked exception to this occurs in the legumes or pulse family of plants. The common members of this family contain relatively large quantities of the flesh formers. Familiar illustrations are found in such valuable foods as peas, beans, peanuts, lentils, etc., some of which are spoken of in detail beyond. Seeds, including nuts, usually contain relatively more of the flesh formers than do the other parts of plants. The vegetable oils are also most abundant in seeds.

The animal foods generally contain relatively large amounts of flesh formers. The fuel constituents of animal foods are chiefly fats. With the exception of milk, animal foods contain almost none of the carbohydrates. The large amount of flesh formers (protein) which the animal foods contain admirably adapts them for the construction and maintenance of the body. The energy needed to maintain the temperature of the body and yield muscular power might possibly be furnished by the flesh formers themselves, but it is much better furnished by the non-nitrogenous materials. The fat (fuel constituents) of animal foods may be so combined with the protein (flesh formers) as to meet the requirements of the body without waste, but vegetable foods are especially adapted to supply the food needed for fuel.

Some of the very fat meats, as fat pork, contain little else than fat, and hence have little or no value as flesh formers, but serve as very concentrated fuel. Fat pork, butter, lard suet and oils, such as olive and cotton seed oils, have the highest fuel value of all the more common food materials.

#### Digestibility of Food.

In general, the animal foods are somewhat more digestible than the vegetable foods. The protein of or-

dinary meats, for instance, is practically all digested when it is eaten in moderate quantities by healthy persons, but the same persons might digest only nine-tenths of the protein of wheat flour made into bread and not more than three-fourths of that of potatoes. The fat of meats is less completely digested. The sugar and starch of vegetable foods, properly cooked, is very easily digested.

#### The Fitting of Foods to the Needs of the Body.

Different people have different needs for nutriment. All are alike in that they must have protein for the building and repair of the bodily machine, and fuel ingredients for warmth and work. But they differ widely in the amounts and proportions they require, and even among those in good health, there are many who are obliged to avoid certain kinds of food, while invalids and people with weak digestion must often have special diet.

For people in good health and with good digestion, there are two important rules to be observed in the regulation of the diet. The first is to choose the things which "agree" with them, and to avoid those which they cannot digest and assimilate without harm. The second is to use such kinds and amounts of food as will supply all the nutrients the body needs, and at the same time avoid burdening it with superfluous material to be disposed of at the cost of health and strength.

For guidance in this selection, nature provides us with instinct, taste and experience. Physiological chemistry adds to these the knowledge—still new and far from adequate—of the composition of food, and the laws of nutrition. In our actual practice of eating, we are apt to be influenced too much by taste, that is, by the dictates of the palate; we are prone to let natural instinct be overruled by acquired appetite; and we neglect the

teachings of experience. We need to observe our diet and its effects more carefully, and regulate appetite by reason. In doing this we may be greatly aided by the knowledge of what our food contains, and how it serves its purpose in nutrition.

**Standards for Daily Dieteries.**

Physiologists have attempted to estimate how much of nutriment is needed per day by people of different classes and occupations. These estimates are based upon (1) weighings and analyses of the food actually consumed by people supposed to be well nourished, and (2) actual experiments in which persons receive different kinds and amounts of food and the effects are noted. The estimates thus made of the demands of people of different age, sex and occupation are expressed in terms of nutrients and energy. The standards correspond to those that have come into common use for calculating rations for domestic animals. But unfortunately the number of experiments and observations made thus far with men, women and children are much less numerous than those with horses, cows, sheep, swine, dogs and other animals. Still the data at hand will suffice for general estimates. Assuming that the body requires enough of flesh formers (protein) to make up for that consumed in the body, and enough energy to supply the demands for heat and muscular work, the following proportions of flesh formers and fuel values have been suggested by Prof. Atwater for the daily food of a man.

**Standards for Daily Dieteries—(Atwater).**

	Protein lbs.	Fuel value, calories
Man with light muscular work .....	.25	3,000
Man with moderately hard muscular work .....	.28	3,500
Man with hard muscular work .....	.33	4,500

Of course these figures do not represent a rule or receipt to follow close-

ly. It is not expected that any man will take a table of the amounts of nutriments and potential energy in different food materials and regulate his diet so as to eat just enough to give him just the amounts called for in these standards. The standards are useful, however, in showing what the best information of today, collated in this country and Europe, indicates as to the general needs of the body for diet.

The fundamental principle of the subject may be stated in a few words:

(1) Food is that, which when taken into the body, builds up its tissues and keeps them in repair, or which is consumed in the body to yield energy in the form of heat to keep it warm and create strength for its work.

(2) The most healthful food is that which is best fitted to the wants of the user. To be adapted to his wants, the food must supply the different nutritive ingredients, or nutrients, in the kinds and amounts needed by the body to build up its separate parts, to repair them as they are consumed by constant use, and to yield energy in the form of heat and muscular power. The ingredients should also be supplied in forms which the person can easily digest, and which will "agree" with him. If the nutrients are not supplied in the right proportions, or if they are not in easily digestible forms, or if they yield material which does not agree with the user, injury to the health will result.

(3) The cheapest food is that which furnishes the most nutriment at the least cost.

(4) The most economical food is that which is both most healthful and cheapest.

**Nutriment in Foods and Advantageous Combinations for Diet.**

The limits of this article do not allow a full discussion of all these topics. We may, however, consider briefly the amounts of nutriment in some of the more common food ma-

terials, and some of the ways in which they may be combined in a fitting diet.

The quantities of nutrients in a few food materials of different classes are stated in the table which follows. They are taken from a compilation of several thousand analyses of American food materials.\* The figures show the amount of refuse (bone, etc.,) flesh formers, and the fuel values in one pound of each. It is understood, of course, that the figures for each material represent the average composition, and that the different specimens of the same material may vary considerably in composition. These variations are wider in meats than in most vegetable foods.

Meats.—Meats vary greatly in composition with the kind, breed, age,

fatness and other conditions of the animals: There is also a very great difference in the chemical compositions of the different "cuts" or portions of meat from the same animal. One important variation is in the proportion of bone. This is practically inedible, except as it may be utilized in making soups or gelatin.

Beef.—This is the most important kind of meat. It ranks, however, among the more expensive of the animal foods. It is an especially valuable source of flesh formers.

Veal and Mutton.—In general, veal is leaner and mutton fatter than beef. Comparing market prices with nutritive value, the cost of the nutrients in veal or mutton is not greatly different from those in beef.

Pork.—Pork is the fattest of all

Chemical Composition of a Few Common Food Materials as Found in the Markets.

Food Materials.	Refuse.	Water.	Protein.	Fat.	Carbo- hydrates.	Ash.	Fuel value per lb
	Per cent	Per cent	Per cent.	Per cent.	Per cent.	Per cent.	Calories.
Whole milk.....	87.0		3.3	4.0	5.0	.7	325
Skimmed milk.....	90.5		3.4	.3	5.1	.7	170
Butter.....				82.4			3475
Cheese, whole milk.....		34.8	26.1	33.5	2.3	3.8	1340
Cheese, skimmed milk.....		45.7	31.5	16.4	2.2	4.2	1320
Beef chuck, medium fat.....	16.8	56.1	15.8	10.5		.8	735
Beef loin, medium fat.....	13.1	58.2	16.7	11.1		.9	780
Beef ribs, medium fat.....	20.8	43.8	13.5	21.2		.7	1145
Beef round, medium fat.....	7.2	60.7	18.3	12.8		1.0	888
Veal cutlet.....	4.0	65.6	20.9	9.5		.9	775
Veal loin.....	17.3	57.2	16.0	8.6		.9	660
Veal shoulder.....	19.5	56.8	16.2	6.5		1.0	575
Mutton leg, medium fat.....	18.4	51.2	14.9	14.7		.8	900
Mutton loin.....	16.0	42.0	13.0	23.3		.7	1435
Mutton shoulder.....	22.5	47.9	13.4	15.5		.7	995
Pork loin, fresh, medium fat.....	16.3	42.8	14.0	26.2		.7	1365
Smoked ham, medium fat.....	14.4	34.9	13.3	33.4		4.0	1655
Chicken and fowl.....	26.6	47.2	14.0	11.5		.7	745
Eggs.....	11.2	64.8	13.3	9.8		.9	660
Blue fish.....	48.6	40.3	9.8	.6		.7	205
Cod fish (fresh).....	29.9	58.5	10.6	.2		.8	205
Oysters, out of shell.....		88.3	6.0	1.3	3.3	1.1	230
Corn meal, bolted.....		12.4	9.3	2.4	74.9	1.0	1665
Rolled oats.....		7.2	16.6	7.2	66.9	2.1	1855
Wheat flour.....		12.0	11.4	1.1	75.1	.4	1655
Wheat bread.....		35.3	9.4	1.2	53.0	1.1	1210
Potatoes.....	15.0	86.3	1.9	.1	16.0	.7	395

\*Bulletin 28 of the Office of Experiments U. S. Department of Agriculture: "The Chemical Composition of American Food Materials," by W. O. Atwater and Chas. D. Woods.

meats. Salt pork, backs and other fat cuts, contain very little else than fat. The fat of these makes on the average eighty-seven per cent. of the weight, the remainder being chiefly water and ash, with very little protein; the latter being in narrow "streaks" of lean and the rind. Ham is leaner but it contains a good deal of fat. Shoulder is much like ham, except that it has relatively a little more bone. Fresh spare rib contains a good deal of lean meat but it is still a very fat food. Pork is generally the cheapest of meats, but it must be noticed that it contains relatively little of the flesh formers, and in consequence can not take the place of lean meat, fish, skim milk, beans and peas.

Fish.—The ingredients of the flesh of fish are essentially the same in kind as those of beef or mutton. The chief difference is that flesh of fish contains relatively less fat and more water than ordinary meats. The fatter kinds of fish, as herring, mackerel, salmon and shad, approach quite nearly to medium fat beef. As found in the markets, fish generally contains more bone and other inedible material than do most other meats. Canned salmon compare favorably with meats in composition.

Poultry.—The flesh of chicken, fowl, goose, duck and turkey contains considerable amounts of flesh formers and a fair amount of fat. They are valuable because of their protein as well as their flavor and tenderness, and when the market price is not too high, are desirable sources of animal flesh formers.

Eggs.—The eggs produced on the farm are easily turned into money and hence do not form a very large part of the farm dietary. Eggs contain large amounts of flesh formers, and in the seasons in which they are abundant and of low market value, are economical kinds of food.

Vegetable Foods.—So far as the

proportions of actual nutriment are concerned, the vegetable foods differ from the animal foods mainly in two respects: (1) The vegetable foods generally, though not always, contain less of the flesh formers and more of the fuel ingredients; (2) the vegetable foods are generally not as completely digested as the animal foods. There are, however, exceptions to these rules. The brief discussion of a few of the more important of the vegetable foods herewith is followed by a table showing the comparative values of one pound of the different vegetable foods.

Wheat Flour and Bread—Flours differ greatly in their chemical composition and their nutritive value according to the kind of wheat and the process of milling. Bread flours made from spring wheat are usually richer in flesh formers (gluten and other protein compounds) than pastry flour from winter wheat. Wheats grown in the northwest are richer in flesh formers than those grown in California and the east.

A pound of average bread flour contains .113 pounds of flesh formers, and has a fuel value of one thousand six hundred and forty calories. A pound of bread made from this flour in the usual way would have about .095 pounds of flesh formers and a fuel value of one thousand two hundred calories. The bread contains more water than the flour; a pound of flour will make a pound and a third of bread. This accounts for the higher nutritive value of the flour as compared with bread, weight for weight. Bread is a material of relatively high food value. One pound of bread has as many calories of fuel value as seven pounds of skim milk, but it has less flesh formers than three pounds of skim milk. Three pounds of ordinary wheat bread would furnish .285 pounds of flesh formers, and have a fuel value of three thousand six hundred calories, practically the flesh formers and fuel value needed for a

day by a man at moderately hard work.

**Corn Meal, Oat Meal and Rice.**—Corn meal contains less flesh formers and more starch, weight for weight, than wheat flour. Rice and rice flour have much more of starch and less of flesh formers than wheat flour. Oat meal has also a higher fuel value, while corn meal has practically the same fuel value as wheat flour. Rice and rice flour have much more of starch and less of flesh formers than wheat flour or corn and oat meal.

**Beans and Peas.**—These vegetable foods contain relatively large amounts of flesh formers, and serve admirably as sources of these most important nutrients. Larger amounts of these seeds should be grown and consumed on the farm.

**Potatoes.**—Like nearly all of the vegetables, potatoes have more or less inedible portion or refuse, as the skin, adhering soil, etc. The amount of this refuse varies greatly. The refuse is greatest in amount in small, scabby potatoes, and decreases with the increase in size and smoothness. In a number of observations made in dietary studies, on the average about one-seventh of the weight of raw potatoes was thrown away in preparing them for the table. Potatoes are a staple article of food. They are about three-fourths water and contain relatively little of protein compounds, but the starch gives them a fairly large fuel value. The fuel value of a pound of potatoes is about the same as that of one pound of whole milk or two pounds of skim milk. It would, however, take about two pounds of potatoes to furnish the same amount of flesh formers as a pound of whole or skim milk. To furnish .28 pounds of flesh formers for a day's food, a man at moderately hard work would require fifteen pounds of potatoes. This amount of potatoes would furnish four thousand eight hundred and seventy-five calories of fuel value or one-half more than the above cited

standard calls for. Mixing mashed potatoes with cream or butter makes a palatable dish, but from the standpoint of nutritive economy it is not advantageous, since the potatoes have too much fuel ingredients and too little of the flesh formers. On the other hand, the typical New England dish of cod fish and potatoes is one of the most rational that could be devised, because the nutrients of cod fish are almost entirely flesh formers and supply exactly what the potatoes lack to make a well-balanced diet. For the same reason meat and potatoes go well together, especially when the meat is reasonably lean.

But fat meat, especially fat pork, is not a proper material to be eaten with potatoes, unless the flesh formers are supplied in some other way.

**Beets, Turnips, Cabbage, etc.**—All of these vegetables are important, both from their food value and from the fact that they afford that change of diet which is so desirable for proper assimilation of food and the maintenance of good health. They deserve to be grown in much greater abundance on the farm, and should constitute a much more important part of the daily diet than they do in many farmers' families.

**Fruits.**—The chief value of fruits is not in their nutritive ingredients, for the importance of these are very small. They contain considerable quantities of vegetable acids and salts. It is the common belief that these, and especially the vegetable acids, are very useful, though their value is more on account of their indirect action than on account of the nutriment which they supply. Just what this indirect action is, no one can state with any certainty, though a great deal has been written about it. Fruits of all kinds, from small fruits to apples and pears, deserve to be freely grown and as freely used in the diet of the farmer.

**Butter, Cheese.**—Butter and cheese

both vary greatly in composition but on the average:

	Flesh formers, lbs.	Fuel value, Calories.
A pound of butter contains.....		3,475
A pound of full cream cheese contains.....	.260	1,965

Butter furnishes practically none of the flesh formers, but it has a very high fuel value, because of the fats which it contains. A pound of butter is probably of no greater value for nourishment than an equal weight of fat of beef or mutton, or pork, or olive oil, or other oils used for food.

Cheese, is in one sense, concentrated milk, for cheese made from whole milk contains the same ingredients as the milk from which it is made, although there is, of course, a loss in the manufacture. This loss consists largely of milk sugar; in other words, it is greater on the side of the fuel ingredients than on that of flesh formers. It would take eight pounds of whole milk to furnish the same weight of flesh formers as a pound of cheese, but six pounds of milk has as large fuel value as one pound of cheese.

Cheese does not enter into our dietaries nearly as much as is desirable and what cheese is eaten is for the most part eaten without being cooked. There are numerous ways in which cheese can be cooked. While almost any cheese will give a good result in cooked cheese dishes, there are some preparations in which it is particularly desirable to use skimmed milk cheese. Skim cheeses are as nutritious, except in fat, as whole milk cheese.

Old cheese can be grated and eaten with bread. It is also a good addition to mashed potatoes, to oat meal and wheat porridge and mushes, to rice, sago, tapioca, and other foods relatively rich in starch and poor in protein. A little grated cheese added to a clear soup improves it from the nutritive standpoint and to many it

improves the flavor as well. Its use in the "welsh rarebit," ranging from the simple toast and melted cheese to the complex "Golden buck," is not nearly so common as it should be.

Fondue is a famous foreign dish, and although it has many ingredients, is really not much trouble to make. Cheese cakes, cheese souffle, macaroni and cheese, and cheese omelets may be named as illustrations of the numerous ways in which cheese may be cooked. All cheese dishes should be served very hot.

Milk.—Cow's milk contains all of the nutritive ingredients needed for food. It also contains them in just about the proportions appropriate for proper nutrition. Add to this the fact that the nutrients of milk are very easily and completely digested, and we have the essential explanations of the familiar fact that milk is a "complete" or "perfect" food.

Cow's milk varies greatly in composition, but the average is such that a pound of milk contains:

Water .....	.870 lb.
Flesh formers (Protein) .....	.033 lb
Fuel ingredients:	
Fat .....	.040 lb.
Carbohydrates (milk sugar) ..	.050 lb.
Mineral matters (ash) .....	.007 lb.
Total .....	1.000 lb.

The protein (flesh formers) consist mainly of casein, which makes curd when it is treated with rennet, but it has also some albumen which is very similar to white of egg. With the fat we are very familiar, in the form of butter. The sugar of milk is less sweet, but has about the same nutritive value, weight for weight, as cane sugar.

The protein, fats and carbohydrates, in a pound of average milk will, when burned in the calorimeter or in the body, yield about three hundred and twenty-five calories. In short, one pound of average whole milk contains .033 pound of flesh formers, and has

a fuel value of three hundred and twenty-five calories. It contains rather more of the flesh formers in proportion to its fuel value than the standards above suggested call for. Eight pounds, or four quarts, of whole milk furnish about .26 pound of protein, and has a fuel value of two thousand six hundred calories, or a little more of the flesh formers and five-sixths of the fuel value which the above standard calls for in the day's food of a man at light muscular work.

Milk is generally the cheapest source of animal protein at the command of the farmer. The fat which it contains is, however, an expensive form of fat. A pound of butter fat in milk, which ought to make a pound and a fifth of butter, is worth to the producer from fifteen to thirty cents, according to the locality and season. As compared with the fat of meat the butter fat has a new flavor and brings a higher price, but for actual nutriment of people in good health and with good digestion, there is no physiological evidence to show that one is more valuable than the other, weight for weight.

The following table compares the digestible nutrients in a quart of milk and a few other food materials:

prising. Few people realize that a pound of whole milk contains as much nutriment as a pound of fish or a pound of oysters, and that a quart of whole milk equals in the amount of digestible solids, a pound of beef, a pound of veal or a pound of chicken.

It is a very common notion that eggs are a very concentrated food. One used to hear the statement frequently made that an egg was equal to a pound of beef. It takes seven or eight eggs to weigh a pound, and it takes a pound and an eighth, or eight or nine eggs to furnish the same weight of nutrients as a quart of whole milk.

Skim Milk. Even after average milk is skimmed it still contains nearly ten per cent. (one-tenth of its weight) of solids or nutritive ingredients. The amount of fat left in skim milk varies greatly with the method of skimming. Ordinary, open, shallow pan setting leaves anywhere from one-tenth to one-half of the original fat of the milk in the skim milk. Deep, closed setting removes the fat much more completely, so that Cooley skim milk has from a trace to three-tenths of five-tenths of one per cent. of fat. Separator skim milk has usually less fat than that from deep

Weights of different food materials which furnish the same amount of digestible nutrients (.26 lb.) as one quart (2.13 lbs.) of average whole milk.

Kind of food material.	Weight, lbs.	Kind of food material.	Weight, lbs.
Beef chuck.....	1.0	Smoked ham.....	.6
Beef loin.....	.8	Fowl.....	1.0
Beef ribs.....	.8	Eggs.....	1.1
Beef round.....	.9	Blue fish.....	2.5
Veal cutlet.....	.9	Cod fish.....	2.4
Veal loin.....	.9	Oysters (solids).....	2.5
Veal shoulder.....	1.2	Corn meal (bolted).....	.3
Mutton leg.....	.8	Rolled oats.....	.3
Mutton loin.....	.6	Wheat flour.....	.3
Mutton shoulder.....	.9	Wheat bread.....	.4
Pork loin.....	.7	Potatoes.....	1.5

To one who has been accustomed to look upon milk as a beverage such figures as those of the table are surprising. It is not far from an average to say that in a pound of average skim milk there are flesh



formers .034 pound; fuel value one hundred and seventy calories, or a little more of the flesh formers than in whole milk, and about one-half the fuel value. This assumes that average skim milk has three-tenths of a per cent. of fat. Skim milk with .01 per cent. of fat would have very nearly the same amount of flesh formers and a very slight lower fuel value, but the difference in the nutritive values of the two would be very small. Skim milk from ordinary shallow setting is, of course, worth more for nutriment because less of the milk fat is removed.

The value of skim milk as food on the farm is not generally appreciated. Taken by itself, it is rather "thin," and, as people say, "does not stay by." The reason for this is simple; one has to drink a large quantity to get the needed nourishment, and further, it is so readily disposed of that it does not satisfy the sense of hunger. But when eaten with bread, or used in cooking, it is a food material the value of which is not at all appreciated by the farmer. A pound of lean beef contains about one-fourth pound of flesh formers and has a fuel value of eight hundred and seventy calories. Two quarts and a half, or five pounds, of skim milk will furnish the same amount of flesh formers and have nearly the same fuel value as a pound of round steak. Two quarts of skim milk have a greater nutritive value than a quart of oysters; the skim milk has one-seventh pound of flesh formers and a fuel value of six hundred and eighty calories, while the oysters contain only one-eighth pound of flesh formers and have a fuel value of four hundred and seventy calories. The nutriment in the form of oysters would cost from thirty to forty cents, while two quarts of skim milk would have a market value of hardly more than two or three cents. An oyster stew made of one part oysters and two parts skim milk would owe its

value for nutriment more to the milk than to the oysters. Bread made with skim milk would have much more of the flesh formers than when made with water. A lunch of bread and skim milk is a very nutritious one.

Corn meal is deficient in flesh formers. Indian pudding, made of corn meal, sugar or molasses and skim milk, makes a nutritious and fairly well balanced food. The ways in which skim milk can be utilized in cooking are almost endless, and, as we shall see later, the flesh formers thus added to the daily rations are of the utmost importance.

There are especial reasons why whole or skimmed milk is more valuable than people ordinarily suppose. The diet of people in this country is apt to be one-sided. Our food generally has too much of fats, sugar and starch, and too little protein—too much fuel and too little flesh formers. To put it in another way, there is not enough material to build and repair the bodily machine, and too much fuel to run it. This seems to be the case in the food of farmers, although very few accurate studies of farmers' dietaries have been made. The following results of studies of the actual dietaries of farmers' families in Connecticut and Vermont are cases in point. "One swallow does not make a summer," nor do half a dozen. These dietaries do not show the average food consumption of farmers' families. But they are nevertheless interesting.

#### Flesh Formers and Fuel Values of Two Farmers' Dietaries.

	Flesh former,s lbs.	Fuel value, calories.
A Connecticut farmer's family.	.24	3,770
A Vermont farmer's family	.18	3,080

Farmers are learning about well balanced rations for their stock. They know that if they are going to feed their cows profitably, they must give plenty of protein. It is time they

understood that the same rule applies in the nutrition of themselves and their families. For the cattle they must buy wheat bran, gluten and oil meals, and grow clover and other legumes. For their own table they need more of nitrogenous foods like lean meat, fish, beans, peas, oat meal and especially milk. And one of the best things to furnish the needed protein is milk, either skimmed or whole. There are many ways of eating milk aside from drinking it. Cookery affords almost unlimited scope to utilize this most excellent source of flesh formers to the farmer.

A few of the ways in which skimmed milk may be used in cooking are:

In the preparation of soups such as potato, celery, tomato, green pea, and green corn, soups; fish, lobster, clam and oyster chowders, bisques and stews, skimmed milk will equally well replace the whole milk that the directions for preparing usually call for. Skimmed milk makes as good white soups as whole milk. Bread mixed with skimmed milk is more nutritious than that made with water. All kinds of quick biscuit, griddle cakes, etc., can be made with skimmed as well as with whole milk. In most kinds of cake skimmed milk will be found a perfect substitute for whole milk. If the skimmed milk is

sour so much the better for cake and quick bread making, as only half the cream of tartar called for in the recipe will be needed.

Sweet skimmed milk can be used to advantage in making rice and Indian puddings, custards, squash and pumpkin pies and the like, in the preparation of chocolate or cocoa as a drink, in the making of sherbets, and other ices, and in dozens of other ways which will readily occur to housekeepers.

There are many uses to which sour skimmed milk can be put so as to utilize it as a food for man. It helps the leavening of all "quick-raised" breads, griddle cakes, ginger bread, cookies and doughnuts, and at the same time adds materially to the nutrients of these foods. Bonny-clabber and cottage cheese are two common and favorite ways of using sour skimmed milk.

Many of the ways in which cheese can be used in cooking demands a "lean" or skimmed milk cheese. Very much of the waste skim milk should be made into skim cheese either by itself or, mixed with whole milk, made into half cream cheese.

In the following table skimmed milk is compared with a few other food materials as a source of protein

Weights of different food materials which furnish the same amount of digestible protein (.28 lb.) as one gallon (8.5 lbs.) of skimmed milk.

Kind of food material.	Weight, lbs.	Kind of food material.	Weight, lbs.
Beef chuck.....	1.8	Blue fish.....	2.9
Beef loin.....	1.8	Cod fish.....	2.7
Beef ribs.....	2.1	Oysters, solids.....	4.8
Beef round.....	1.6	Corn meal, bolted.....	3.5
Veal cutlet.....	1.4	Rolled oats.....	2.0
Veal loin.....	1.8	Wheat flour.....	2.9
Veal shoulder.....	1.8	Wheat bread.....	3.5
Mutton leg.....	1.9	Potatoes.....	18.7
Mutton loin.....	2.2	Cattle foods.....	
Mutton shoulder.....	2.1	Corn meal.....	4.8
Pork loin.....	2.0	Wheat bran.....	2.2
Smoked ham.....	2.2	Ground oats.....	3.1
Fowl.....	2.0	Cotton seed meal.....	.8
Eggs.....	2.2	Gluten meal.....	.9

### Skim Milk as a Food for Stock.

On a large dairy farm it will not be possible to use all of the skimmed milk as food for the family—much will remain to be otherwise cared for. Skimmed milk is an indispensable food for calves, an excellent food for pigs and poultry and a valuable food to use in connection with the foods produced on the farm, which, while rich in starchy matters, are for the most part very deficient in the flesh formers or proteid matters. Skimmed milk has about the same nutri-

linseed meal. The three rations which follow illustrate the ways that skimmed milk can be used as a part of the ration for a milch cow.

At ordinary prices milk is the cheapest animal food to be found in our markets. It is unwise for one practicing economy to scrimp on the milk supply. If this is true of the man in town who has to pay from six to eight or even ten cents a quart for him milk, it is doubly true of the farmer who rarely obtains more than three cents per quart for the milk

Three rations for milch cows per 1000 lbs. live weight, using skimmed milk as a source of part of the protein.

FOOD MATERIALS.		NUTRIENTS.		
Kinds.	Weights, pounds.	Protein, pounds.	Carbohydrates, pounds.	Fat, pounds.
Clover hay.....	10	.72	3.6	.18
Field corn silage.....	30	.54	4.1	.21
Corn meal.....	2	.12	1.2	.06
Wheat bran.....	4	.50	1.5	.12
Skimmed milk, 2 gallons.....	17	.56	.9	.05
		2.44	11.3	.62
Mixed hay.....	10	.47	4.3	.13
Sweet corn stover.....	10	.43	3.3	.10
Corn meal.....	4	.24	2.4	.12
Wheat bran.....	4	.50	1.5	.12
Skimmed milk, 3 gallons.....	25.5	.84	1.3	.08
		2.48	12.8	.55
Field corn silage.....	30	.54	4.1	.21
Timothy hay.....	10	.36	4.4	.16
Corn meal.....	3	.17	1.9	.08
Wheat bran.....	2	.25	.8	.06
Skimmed milk, 4 gallons.....	34	1.12	1.7	.10
		2.44	12.9	.62

tive ratio as gluten meal and can be used to add protein to a ration and make a well balanced ration. The table compares skimmed milk as a source of protein with several concentrated feeding stuffs. It will be seen that a gallon of skimmed milk furnishes as much protein as 4.8 lbs. corn meal, 2.2 lbs. wheat bran, 3.1 lbs. ground oats, .8 lb. cotton seed meal and .9 lb.

which he sells and who is often obliged to pay higher for his animal foods than people living in the cities. As has been pointed out, the farmer's dietary is apt to be too wide, to contain too much of the fuel ingredients, fats and carbohydrates. The fat of milk is that which determines its value very largely in the market. It consists of the elements, carbon,

hydrogen, and oxygen drawn by the plants from the air. Obviously, in selling butter fat the farmer is not robbing his land of valuable fertilizing ingredients. At some times and in some localities it may be advantageous to sell both protein and fat in cheese, but ordinarily this is not the most economical form of dairying. To sell butter fat, to use large quantities of whole or skimmed milk in his diet and utilize the remainder of the skimmed milk by feeding it to stock, preferably calves, hens or milch cows, is, under most conditions, the most rational way for the farmer to dispose of the products of the dairy.

#### DISCUSSION.

Mr. Convey—It seems to me that there has been a false standard established with reference to the relative heat value of the two articles, butter and cheese. The fuel value of one pound of butter, as represented by calories, is three thousand four hundred and seventy-five and the fuel value of cheese, represented by calories, is one thousand nine hundred and forty. The fat is given for butter 82.4 per cent. and for cheese 33.5 per cent. In actual use it seems to me that cheese will represent twice the value of butter. I would like the gentleman to explain if I am wrong.

Prof. Woods—There are two things to be taken into consideration: one, the flesh formers, and the other, the fuel constituents. When you come to measure a food you have to take these two things into account, and that is the reason I have called your attention to the dietary standard. For a man at moderate work, this calls for .28 pound of protein and three thousand five hundred calories. Butter alone will supply the calories, but not any of the protein. Cheese would give you the fuel value and protein, but not well balanced. Bread and milk are tolerably well balanced and either will give pretty near-

ly the required amount of protein and calories.

Mr. Convey—Does cooking have a deleterious effect upon the digestibility of the protein in cheese?

Prof. Woods—I recommended the cooking of cheese, and the reason for that was not to add to the nutritive value of the cheese. I doubt if cooked cheese is any more digestible, probably not so digestible, but we have to take other things into consideration,—palatability and flavor. This counts a good deal with animals and still more with man.

Mr. Convey—Is it not the tendency with us to overeat,—is there not an increasing tendency to overeat?

Prof. Woods—I do not think the tendency to overeat is so great as is sometimes thought. It has been taught that the average man overeats. That may be true of the city man, of the man of sedentary habits. We have made very few dietaries of men in active labors. I do not believe that there is a great danger of the average man overeating, provided he has control of himself in other directions.

Mr. Brigham—Does not palatability add to digestibility? Does it not increase the power to digest?

Prof. Woods—We like to think it does. I don't know.

Supt. McKerrow—When high grade patent flour is baked into bread, does it carry too much of the fuel constituents and too little protein?

Prof. Woods—Our ordinary flours are not starchy foods. Wheat flours made from wheat grown in this state and throughout the northwest and some of the varieties in Kansas are rich in nitrogenous materials and these constitute a fairly well-balanced ration.

One other thing in this connection. For the last six years quite a portion of my time has been devoted to studying the question: which has the greater amount of nutriment, the ordinary bread, entire wheat or graham

flour? We have gone into the markets and bought the very best kind of flours we could obtain, the ordinary bread flours, the ordinary entire wheat flour, and the ordinary graham flour. The ordinary bread flour contains more digestible nutrients than does the entire wheat and a great deal more than the graham. We have also been making experiments with the same wheat, specially ground into the three kinds of flours, with exactly the same results.

Supt. McKerrow—Now, the question I would raise is this: For the ordinary eater does the question of roughage or concentrates cut any figure as between the different classes of flour,—the nutritive ratios?

Prof. Woods—For a man of sedentary habits, as you are and as I am, probably he needs to stimulate the peristaltic action of the bowels. Entire wheat or graham flours are well adapted to this purpose. For the average man at hard work, he will get less nutriment out of black bread than from white bread.

Mrs. Tilson—I never buy a solid cheese; I always buy cheese with air-holes, crumbly cheese, and then it is open to the action of the digestive fluids. Am I correct?

Prof. Woods—I can digest the other kind also. I think very likely it may be so.

Mrs. Tilson—My idea was to save the cooking by buying the right kind of cheese.

Supt. McKerrow—A gentleman wishes to ask you, Prof. Woods, to speak a little about the value of fruits.

Prof. Woods—The function of fruit in the dietary is not well understood. We cannot give it exactly under the terms protein and fuel value. Fruit has a medicinal effect, just as there is something in beets and mangolds we feed to stock which we cannot estimate chemically.

Prof. Henry—This subject is appreciated by this audience, and it is

too bad we have not time to discuss it more thoroughly.

Yesterday I urged the farmers of this audience not to patronize the Milwaukee people by shipping their milk to them unless they got large returns for that milk, and not to compete with each other and cut the prices of the milk until they are cutting each others' throats. Do not continue to ship to Milwaukee unless you get a good price, but patronize creameries in this locality and take the skimmed milk home to use for your fowl, your pigs and your cows.

Mrs. Tilson—And your chickens.

Prof. Henry—Yes, and your chickens. It is the men that think they must get a dollar right off that become soil robbers. I am exercised to see this region kept back. It is so around New York and around Chicago, where they are sending the milk to Chicago. I know of farmers in Illinois that are getting \$700.00 a month for milk, and I declare they might as well be in the poor house or state's prison, so far as anything they get out of life is concerned,—they or their families,—getting up at four-thirty in the morning and working until seven o'clock at night seven days in the week, and all the time the farms running down, the buildings unclean. These things show the high value of milk. The city people can afford to pay high prices for their milk if they get it in good condition. You are only cutting each others' throats when you sell it cheap. Don't do it. Sell your cream to the local creamery and feed the skimmed milk to your farm stock, unless the city people pay you enough to buy plenty of feed to keep up the fertility of your farm. With butter production you have the fertility left.

At the experiment station at Madison we are feeding some cows on skimmed milk and we find that it saves part of the grain. We find it quite satisfactory as a temporary feed for dairy cows.

Mr. Culbertson—I would like to ask

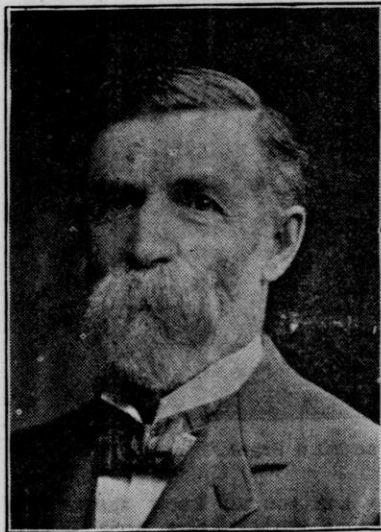
the name or title of some of the bulletins printed at Washington on this subject, Prof. Woods.

Prof. Woods—Possibly the best one to read first would be bulletin No. 142, "Principles of Nutrition and Nutritive Value of Food." And others entitled "Milk as Food," "Meat as Food," "Eggs as Food," one on "Bread" and

one on "Potatoes." Those of you who are not getting these bulletins should have your representatives send them to you. Each representative has five thousand copies of "Farmers' Bulletins" that he does not know what to do with, except to use to try to get votes. Your representative will send them to you.

## PAST, PRESENT AND FUTURE OF THE LIVE STOCK INDUSTRY.

GEO. B. VAN NORMAN, Union Stock Yards, Chicago, Ill.



Geo. B. Van Norman.

Mr. Chairman. Ladies and Gentlemen:—When I came here today and looked over the program and saw the many orators booked for a speech and every one a topic assigned to him, and a topic for everything, from a mustard seed up to the finest specimen of animal creation, I said to my-

self, after the language of General Lee when he made us a speech in our Live Stock Exchange in February; he said when he came into the hall that he thought no one but he and God knew what he intended to say,—and now,—he said,—"God only knows,"—and I feel the same. God only knows what I am up against and where I am at. I had prepared a speech, or rather a review of the past, present and future of the Live Stock Industry of our country. I have gone back fifty years and compared it with today.

Fifty years ago, the most of our stock in the United States was of the scrub breed,—with but few exceptions. The cattle of the whole country fifty years ago,—compared favorably with seventy-five per cent. of our Wisconsin cattle,—chiefly of the scrub breed. There is no state, with an area of fifty-six thousand and forty square miles that raises as many scrub steers as Wisconsin and no steers sell lower on the market than what are called by our cattle dealers "Wisconsin Knotheads." I do not mean by this that all Wisconsin cattle are scrubs. A remark of that kind would be unfair, for we all know that Wisconsin has some very fine herds of

Red Polls and Shorthorns and a few Herefords, and we will concede that Wisconsin has a fine lot of dairy breeds, but our Wisconsin mixed farming is so badly mixed with the native and the Jersey and the Holstein, that for stockers and feeders, our Wisconsin steers fall away below the average both in quality and size.

If you will take the Chicago reports from the Drovers' Journal or Chicago World, you will see stockers selling

tween the five hundred pound scrub as compared with a seven hundred pound grade. The five hundred pound scrub is worth three cents a pound, which would be \$15.00. The seven hundred pound grade is worth four and one-half cents or \$31.50, making a difference of \$16.50 more than the scrub, and both the same age.

Gentlemen! I can prove this by Mr. Jos. Adams and Thos. Blanchard and Aaron Blanchard, if they are



Geo. B. Van Norman on "Old Frank."

today, of five hundred to seven hundred pounds average, from \$3.00 to \$4.50 per hundred weight. The \$3.00 per hundred weight kind are the five hundred pound Wisconsin scrub and the \$4.50 are the good grades weighing around seven hundred pounds.

You can never get a beef grade from a Jersey cow. I don't care if you breed to a Shorthorn, the Jersey will show and no good feeder of beef steers will buy a Jersey or Holstein steer for beef. If you will stop and figure, you will see the difference be-

here, and you all know them,—they are your cattle buyers here. I have had the pleasure of selling stock for all of them and they have had this experience themselves. Of course, it does not come out of the buyer, as they buy their stock according to quality. I wish every farmer in Wisconsin could be at the Union Stock Yards, Chicago, for two days, say Tuesdays and Wednesdays when Wisconsin ships most of her stock, and see the difference. The first thing they would do would be to go home

and get up a stock company and buy some full blooded bulls.

I know what your argument will be. You will say: "We can't all buy full blooded animals," but the smaller farmers can pool their interests and four farmers buy one bull and cross with the native cow and you would see a great improvement in your stock.

I do not wish to be understood as opposing the Jersey or Holstein for dairy purposes. It would be assuming too much to come here and tell you what to do, but I do say and know it is better and more profitable to you, if you are bound to milk the Holstein and Jersey, to sell your steer calves for veal and raise the heifer calves for cows, but if you are doing a mixed farming business, as many of our farmers in northern Wisconsin do, I would recommend you to get rid of the Jersey and Holstein and invest in the Grade Shorthorn and cross with a good Shorthorn bull, and the result will be very gratifying.

Speaking of beef grades, I mean the Shorthorn or the Aberdeen Angus, the Red Poll, the Polled Durham, or the Hereford, but, as a general purpose animal for the average farmer for milk and butter and for beef, I am somewhat partial to the Shorthorn. They tell me the Red Polls and Polled Durhams are both good milkers. We all know the Angus is a poor milker, also the Herefords.

I have dwelt somewhat on this subject, as I have been prevailing upon my customers in northern Wisconsin to try to have them raise better stock, and last season we shipped nearly one hundred grades and full bloods to the northern part of Wisconsin and we will see good results.

I have no doubt the Farmers' Institute has been instrumental in getting better stock. Even so, we are away behind our sister states. Even Nebraska beats us for cattle. Our hogs are well up to the front. Our sheep are first-class. Our horses are

away below the average. You may drive for a whole week and it would bother you to find a first-class saddle horse or a number one driver. This is all wrong. We should have the best of everything, as there is no state in the Union with as many resources to draw from as Wisconsin. Our soil is well adapted to all grasses and roots and if you fertilize your land properly, we can and do raise as good corn as any other state. We all know our land is particularly adapted to grass.

I have no doubt that some of you are saying in your minds: "We all know the disease, but what is the remedy?"

I will tell you on my cross-examination.

As I said before,—every topic was represented by some able speaker, as I know is customary at all your meetings, therefore, I will not dwell upon the other speakers' topics, as I am sure each and every topic will be properly represented. I feel that the state of Wisconsin is very fortunate to have such a splendid experimental department and with Professor Henry at the head of the department and the good work the Farmers' Institute has done and is still doing, I believe Wisconsin in ten years will class with her sister states, Illinois and Iowa, second to none.

Your chairman allowed me to select my topic and I wrote him I would like the topic "The Past, Present and Future." I will go back only fifty years. Many of you remember how crude our farming was fifty years ago. All of you older men remember how we cut our wheat and oats with a cradle and raked it up with a hand rake and mowed our hay with a scythe and dropped our corn by hand. Those days our mothers would spin and weave and make Kentucky jeans coats and pants for the boys and woolen dresses for the girls. Our farming was so crude fifty years ago,

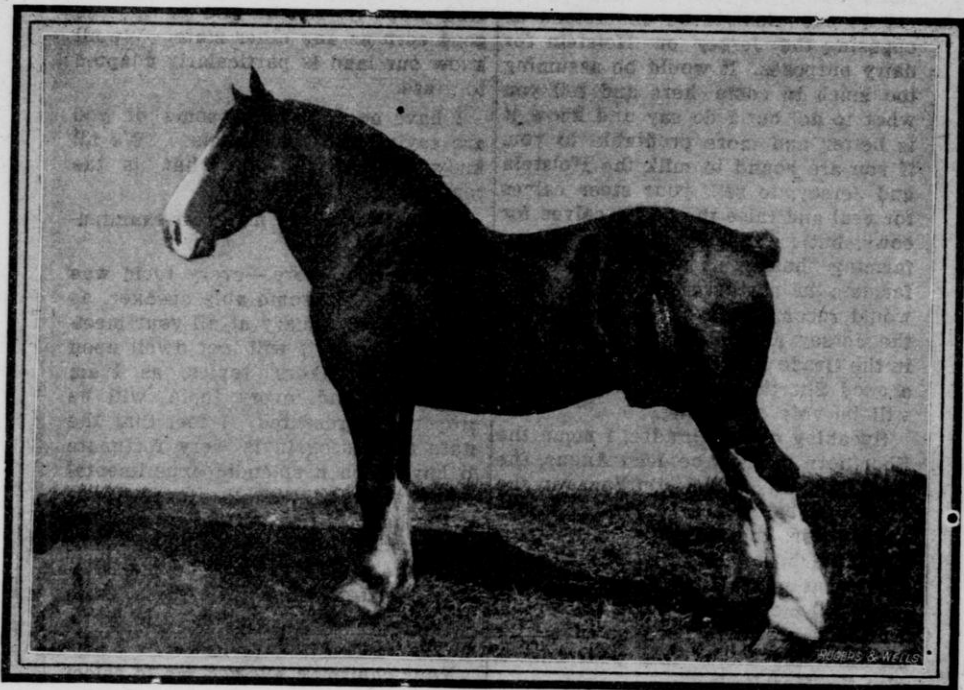


it is hardly worthy of mention compared with today.

Taking the statistics as figured out by Secretary Martin of the National Live Stock Association, who has done nothing except gather statistics as given by all the assessors of the United States and the Secretary of Agriculture, in 1850 the total value of

Also all our goats and hogs in addition to this.

Fifty years ago most of our stock, with few exceptions, was of the scrub breed. Today no finer or better blood can be found than in America. The live stock industry is sweepstakes over all other industries. When you stop to think how many people are depend-



Jim Corbett, Champion Shire Stallion International Exposition, 1900.

live stock in every state in the Union was \$1,200,000,000.00.

Today it is \$4,555,827,375.00, a sum incomprehensible to the mind of man.

In 1850 we had

17,000,000 cattle  
21,723,220 sheep  
4,896,050 horses and mules.

Today we have

50,602,414 cattle  
15,623,551 horses and mules, and  
51,203,000 sheep.

ent upon the live stock industry of America, you will be amazed. All stock yard companies, packing houses, commission exchanges, railroads, steamboats and ocean steamers, are merely incident to and dependent for success upon the efforts of the live stock growers and feeders, which, in turn, embraces every farmer in the United States. Live stock and cereals are the same as cash at hand. Were the live stock of the United States

converted into cash at present prices and value, there would not be money enough in the United States by \$2,000,000,000.00 to pay for it. It is estimated the cereal crop of the United States is worth over \$2,000,000,000.00, yet the live stock of the United States is worth more than all the cereals, all metal, cotton, tobacco and lumber combined, and, as I said before, the live stock interests represent the actual value of \$4,555,827,373.00. If the live stock men of the United States were to combine, we could control the markets of the world.

**National Live Stock Association.**

We have an association known as the National Live Stock Association. It is only five years old. It is not intended just for breeders and feeders, but for every man, woman and child interested in agricultural pursuits. We are looking after the interests of the farmer and the ranchman. Governor Scofield commissioned me as delegate-at-large one year ago from this state, to represent Wisconsin, to that Convention held at Salt Lake City, Utah, and I was glad of the honor.

I was honored at the first session by being chosen as one of the executive committee in honor of our state. After serving in Salt Lake City, I resigned in favor of Mr. Harding, of Waukesha, and placed James Martin, of Richland City, secretary of the Red Poll association, as his alternate. The Convention this season was held in Chicago December 3d to 7th, and I am glad to say Mr. Martin was in Chicago and Mr. Harding, from Waukesha, was there also, both taking an interest and an active part and I hope they did the state honor.

I tell you, gentlemen, Wisconsin must come out of her shell and make her strength known. We have the best of material if you will shove them along.

Every live stock man in the state and in the United States should be-

long to the National Live Stock Association. There are matters coming up every day in Congress and elsewhere that need watching. We want to see that there is proper legislation, particularly in the live stock interests and the general farming interests of our country. We want to see to it that Congress makes a place for another Secretary of Agriculture, known as the Secretary of the Live Stock Industry of America, that he may give his personal and individual attention to the welfare and interests of live stock. To show you the great necessity of a Secretary of Live Stock, I will read you a set of resolutions gotten up by the Leather League of Philadelphia, last October 18th.

**TO THE LEATHER TRADE OF THE UNITED STATES.**

November 7th, 1901.

Gentlemen:—

At a meeting of the Free Hides League held in Philadelphia on Oct. 18, 1901, representatives were present from the four branches of the League already organized, namely:—New England, New York, Philadelphia, and Central Western States branches.

At this meeting, the national organization of the Free Hides League of America was perfected.

It was voted that the officers and two members from each of the branches now organized, or that may hereafter be organized, together with such appointments at large as the president may make, shall constitute the National Executive Committee.

After a full discussion and free expression of opinion from the delegates present, it was unanimously resolved that the League devote its entire attention to the absolute repeal of the duty on hides.

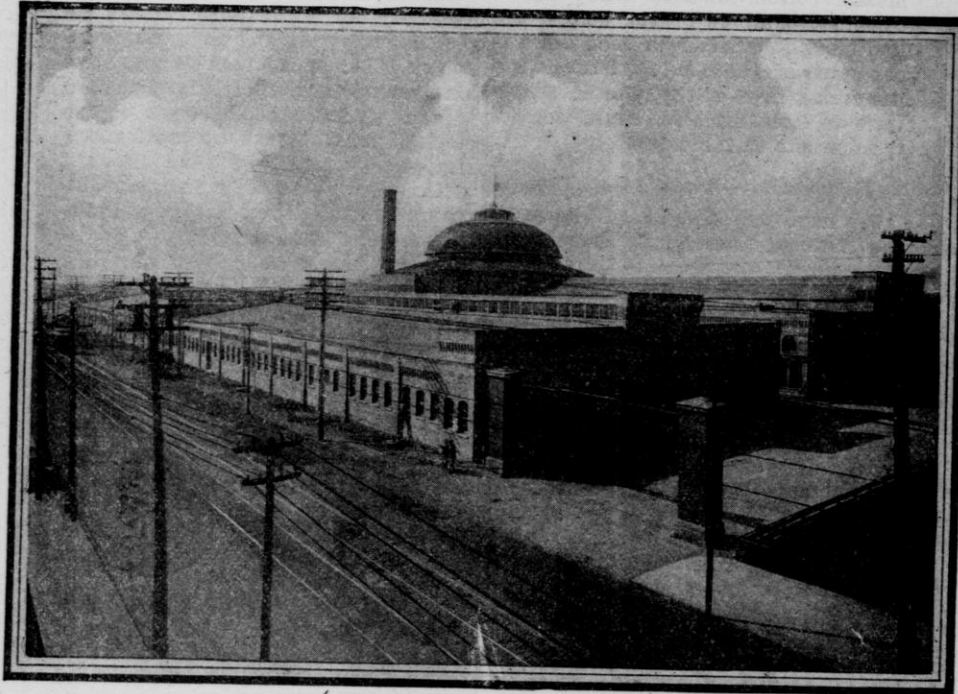
Reciprocity treaties with South America and other countries have been under discussion for many years and are apparently no nearer realiza-

tion than they were when first proposed by Mr. Blaine.

The possibilities of delay and defeat of reciprocity treaties with the South American countries sending us large quantities of hides, are too great to make it to our interest seriously to

sole purpose of speedily prosecuting the matter and accomplishing repeal.

To make the success of this movement requires the support and financial aid of all connected with the leather trade. We earnestly desire your cooperation and would be pleased



Amphitheatre Union Stock Yards.

consider reciprocity as a possible plan of relief. The leather trade is looking for immediate relief.

The prevailing opinion of the delegates present was, that for those burdened by the duty on hides to consent to reciprocity as against the absolute repeal of the tax, would be a great mistake and cause delay of action for such a length of time as to bring serious embarrassment and loss to the leather trade. Therefore, the national organization was perfected for the

if you would send your name to the general secretary for enrollment.

In order to prosecute this work in the most vigorous manner, it will be necessary to raise some funds for preliminary expenses of the national executive committee. If you have not already contributed for the above object to some one of the four branches, we earnestly hope you will contribute now by sending a check for \$10.00 to the general secretary in enclosed addressed envelope. This contribution

will constitute you a member of the league, and you will be advised of every important move made by the committee. Make the check payable to Henry J. McFarland, Treasurer.

If you have already contributed, no further call on you now is intended.

You will notice this set of resolutions is supposed to be gotten up by the Leather League.

Some one will ask: "Who is the Leather League and what is it?"

Gentlemen! I will tell you. They are nothing more than the Tanners' Trust. They appear to be anxious about the consumer getting his shoes cheap, but don't you know they bought up all the tanneries and closed them or run them as they saw fit and now they want free hides.

They don't say a word about taking off the duty on our manufactured product. Oh, no! they love the dear people, but they love the Tanners' Combination best.

I'll read you a set of resolutions passed at our last session of the National Live Stock Association. I presented them to be acted upon and the same to be sent to our representatives in Congress, and they were unanimously adopted.

#### Resolutions Presented to the National Live Stock Association.

An Association known as the Free Hides League has recently been formed. A meeting of the League was recently held in Philadelphia, at which delegates were present from four branches of the League, namely: New England, New York, Philadelphia, and the Central Western States branches.

At this meeting October 18, 1901, a National Executive Committee was organized and after full discussion and free expression of opinion from the delegates present, it was unanimously resolved that the League devote its entire attention to the absolute repeal of the duty on hides.

South American states were deemed too uncertain and too remote as to time to be relied upon to secure the object desired, and, hence, a short cut for the absolute repeal of the duty on hides, without waiting for any reciprocal benefits, which might result in our country generally, was declared to be the mission of the Free Hides League.

If our statesmen, in their wisdom, should determine to adopt the policy of reciprocity with foreign countries, the National Live Stock interests of the United States will not be so selfish or so unpatriotic as to refuse to bear their share in the reduction of such protective duties as affect their products and bring them into sharper competition with products from other countries, but they desire to enter their solemn protest against the selfish policy of the Free Hides League.

We agree with President Roosevelt in his recent message to Congress that we must find markets abroad for our surplus products. To secure these markets, the President said, we can utilize existing duties in any case where they are no longer needed for the purpose of protection, or, in any case where the article is not produced here and the duty is no longer necessary for revenue, as giving us something to offer in exchange for what we have.

To this kind of reciprocity, the cattle interests will most cordially consent, but we insist that the present duty on hides is now needed for the purpose of protection as much as it ever was in the past history of this country. It is the only protection that is enjoyed by the cattle interests and it is as essential to the cattle raisers as is the duty on wool to the sheep raisers.

Hides are produced in this country, but not in sufficient quantities for export and hence, the foreign hides, which come into our country come directly into competition with those produced in this country. If the protec-



The \$7,500.00 Hereford "Dale."

tion to home industry means anything at all, it means that such articles as hides and wool are now entitled to protection as much as they ever were heretofore in the country's history.

But for whose benefit are free hides demanded? For the benefit of the Free Hides League?

No! That name does not disclose the beneficiaries of free hides. Now, who are to be benefited by placing hides on the free list are the persons who have organized the Leather Trust, which already is powerful enough to control the output of leather products, and to fix their price on hides produced in this country. The Trust, which is already enjoying large protection on its finished products, and which is utilizing that protection to the fullest extent, by demanding of home consumers an increased price for their finished products. The proposition to secure free hides at this time means the robbery of cattlemen of that protection to which they are justly entitled and which the conditions of the industry imperatively demand, for the benefit of a Trust which is already exacting enormous tribute from the people.

Protection to home industries was established and has been maintained heretofore for the purpose of stimulating home production and cheapening domestic commodities by home competition. The Trust has been organized for the purpose of availing themselves of the benefits of the protection which the tariff of foreign competing products afford and to prevent home competition by combination.

The consumers of the country now demand their share of the protective system, which is, cheaper domestic products, brought about by stimulating home production.

The Trust demands all the protection but prevent competition and lower prices by their combinations.

The Leather Trust, which now mas-

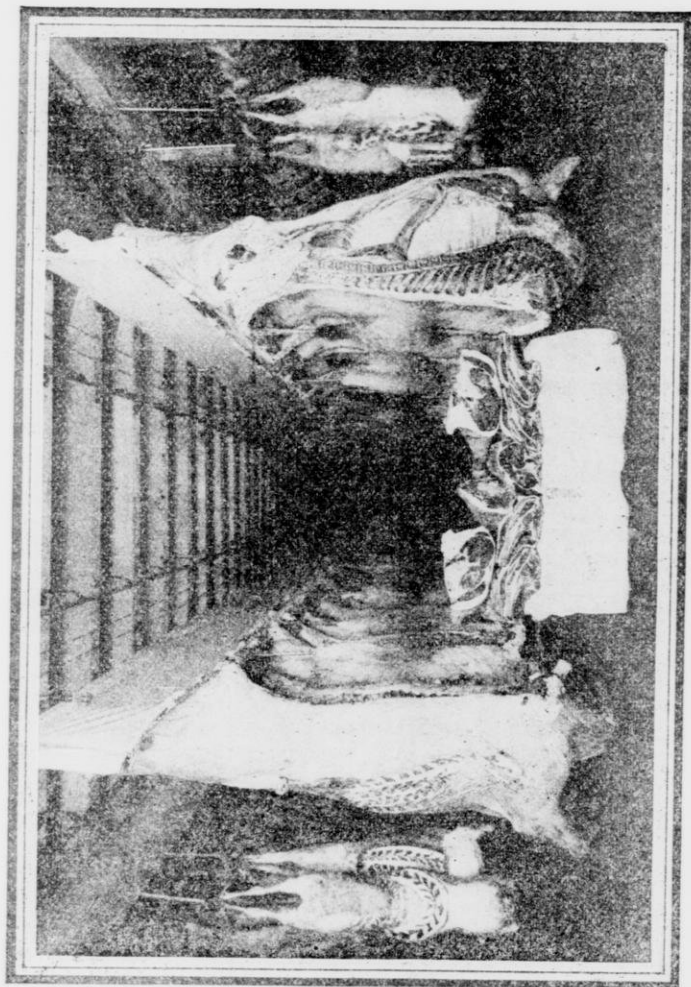
querades under the name of Free Hides League, is going even further than this. It is now endeavoring to rob the cattle industry of their share of the protective system in order to further gratify its selfish greed.

Gentlemen! I do not wish to be classed with the calamity howlers. I don't criticise the tanners for buying up all the tanneries and combining to protect themselves as to over-production and coming to an understanding as to prices so as to make a reasonable percentage upon their investment. Every American citizen should have a right to invest his money as he sees fit, but they should not ask Congress to legislate against the whole country for the benefit of the few. We, as farmers, are opposed to class legislation. When the whole country is in a prosperous and happy condition as it is now the less legislation we have the better it will be for the country.

What is needed most in this, the greatest country in the world, is to study economy and live within our means, and, above all other things, encourage better breeding of stock. Encourage your boys to stay on the farm. The land owners of this country are the happiest people on the earth. Too many boys have made the mistake of leaving the farm to live in the city, only to be sadly disappointed and wish themselves back on the farm.

With all the modern farming and improvements of today, it is a pleasure to farm. In former years I wonder that you could keep any smart boy on the farm. In those days he looked a lot of scrub stock in the face year round. How different you can and do have it today. Grades and full-bloods have taken the place of the scrub and it is becoming more so every day and will improve more in the next ten years than it has for the past twenty-five. Why?

Because the boys are beginning to demand better stock and with our experimental stations at the different



Carcasses of Champion Car Load, (Polled Angus) at International Exposition 1900.

state capitals in connection with our state universities farming is becoming attractive and a science. There is a strife between the farmer boys to see who can show the finest calf, the finest yearling and who can make the best beef.

What would we have thought twenty-five years ago if someone had told us that in 1900 we would show a yearling steer, ready for export, weighing eleven hundred or twelve hundred pounds, that would sell for \$1.50 per pound on foot? Whoever would have made this statement would have been called crazy.

Who would have thought that car loads of one and two year old steers would sell at twenty-one cents per pound in Pittsburgh in 1901 and many car loads at eight and twelve cents per pound?

Gentlemen! the live stock industry of our country is one of the greatest industries in the world. We are eight million in number, all engaged in the live stock business, so if we were to combine our strength we could not only control the near market of the world, but we could elect every officer in the United States from Postmaster to President.

We are and should be satisfied with the market at Chicago, which is the greatest live stock and horse market in the world. 1901 was a record breaker. We received more stock than ever before. During the year we received \$301,500,000.00 worth of live stock. Who got the benefit of it?

Nearly every dollar of that money went back to the country. The farmer has no grievances so far as prices are concerned. Hogs at six and six and one-half cents a pound; cattle at \$5.00 and \$7.00 per hundred for beef steers. If a farmer finds fault nowadays there

is something the matter with him and not the country.

I have endeavored to give you a short sketch of the past fifty years and have compared the past with the present. Never in the history of our country was the farmer in better circumstances and freer from debt than today. If we have accomplished so much in fifty years past, what will be the result of fifty years hence? If we keep on improving our stock and methods of farming as we have for the last twenty-five years, there will not be a scrub animal left. We are beginning to realize how much cheaper and better it is to raise a grade or full-blood than to raise a scrub. Our methods of farming are improving every day.

Farming is becoming a profession and our boys are beginning to wake up and educate themselves that they may keep pace with other professions. The agricultural student just out of the experimental college commands a good salary. Why? Because he has some knowledge as to the best methods of raising and caring for stock. Every man should give his son a course in the experimental college. Everybody should attend the Farmers' Institutes and I am sure every girl should attend the Institutes, as we often see the farmer's wife with as good judgment and sometimes better judgment than her husband and by attending the Institutes we all learn something new.

Ladies and gentlemen, I have enjoyed my visit with you very much and shall go away from here much wiser than when I came. We can always get some new ideas by attending the Farmers' Institutes. I am sorry I cannot be with you oftener.

I thank you.

Morning session adjourned.



## AFTERNOON SESSION.

Institute met at 1:30 p. m. Meeting called to order by Supt. McKERROW. THOS. CONVEY, of Ridgeway, called to the Chair.

## MILK FEVER.

Prof. A. S. ALEXANDER, Evanston, Ill.



Prof. A. S. Alexander.

Under the name of Milk Fever, that disease of cows, which is technically called Parturient Paresis or Parturient Apoplexy, is well known upon dairy and stock farms generally throughout the country and abroad.

It has been, until recently, one of the most mysterious, hence most interesting, diseases of domestic animals. All of those present, who are farmers and dairymen, are acquainted with the symptoms of the disease—most of your who own cows have had

a bovine funeral upon your farm as a result of this terrible malady.

## Symptoms.

In a few words the symptoms of the disease may be stated as follows:

The newly calved cow that has had three or four calves in previous seasons—for heifers very rarely suffer from the disease—and has had an easy labor and expelled her after-birth promptly, or “cleaned,” as most of you would say, suddenly becomes restless, sticks her tongue out of her mouth, refuses feed, steps up and down with her hind feet as if they pained her, gets a “kink” in her neck, “wabbles” in her gait when exercised, passes a few hard balls of mucous-covered manure, and finally goes down paralyzed, with milk, urine and manure suppressed, tucks her head into her side, snores loudly, becomes bloated, unconscious, and lies stretched out upon her side until death relieves her of her miseries in from three hours to three days. Some cows show delirium, indicated by wild struggles and pounding of the head upon the ground, often knocking their horns off, or otherwise injuring their heads. The majority of cases, however, are quiet—sadly quiet!—so that they appear dead from the first, and in my experience show no rise in temperature. They have no fever; the temperature is more often below normal. The term “milk fever” is therefore a misnomer.

**Causes.**

What is the cause? That indeed is the question! It is one that has for generations puzzled all peoples, in all languages! Heifers are rarely affected, but it almost invariably attacks and kills the best cow in the herd—the deep-milking cow at the age when she gives the greatest flow of milk. We seldom see it in cows of the “beef breeds.” It is peculiarly a disease of the dairy breeds and perhaps particularly of the pampered Jersey. It rarely follows abortion, easy parturition, or retention of the after-birth.

Some veterinarians have thought the cause was congestion of the brain; others depletion of blood-supply to the brain (cerebral anaemia). Poisonous matters in the womb have borne their share of blame, while some have imagined that a too speedy contraction of the womb was the cause. Examination, however, discloses the fact that the mouth of the womb is still partly open where the attack occurs during the first twenty-four hours after labor. The contraction in most cases treated does not exceed that of the womb under normal conditions. Delirium indicates excess of blood to the brain; coma (unconsciousness) the opposite condition.

There is no proof that the disease is due to poisonous matters in the womb being absorbed into the circulation, but Dr. J. Schmidt, a Danish veterinarian, points out that milk fever, so-called, may be due to poisonous products derived from tissue changes taking place in the udder. All of the symptoms of the disease indicate that it is produced by poisonous “toxic” substances taken into the blood, and the new theory is that these poisonous matters are developed in the udder from substances left there when the cow is “dried off” and which are set into action by the flow of new milk. Against this theory may be cited the fact that milk fever occurs in cows that have not dried off, but which

have had to be milked prior to calving.

Leaving out of the question scientific theories as to the probable cause of the trouble, it may be stated that experience teaches that certain conditions apparently make a cow of the proper age peculiarly susceptible to suffer from milk fever. A few of these aggravating causes are: hot, badly ventilated, filthy stables; heavy feeding upon grain foods (concentrates) right up to the time of calving; lack of exercise; sudden plethora induced by new grass in spring; heredity; too thorough removal of the first milk produced after calving, or immediate removal of the newborn calf.

**Natural Prevention.**

While treatment based upon the new Schmidt theory as to causation of the disease has been marvelously successful, prevention is of far greater importance, and I have little hesitation in asserting that the disease may be absolutely prevented by the adoption of simple, natural, methods. No man need have a case of milk fever, in my opinion, if he follows the following plan of prevention: Keep a record of dates of service, so that you may know definitely when to expect the calf. Start six weeks prior to calving and feed upon dry hay, bran mashes and a little flaxseed meal. but no corn, corn meal, shorts, middlings, oatmeal, gluten feed, malt sprouts, or any other concentrate. One month from calving increase the amount of flaxseed meal mixed in the bran mashes to insure keeping the bowels freely open. If there is a tendency to constipation, despite the increased amount of oilmeal, dissolve two ounces of epsom salts in the mash or drinking water twice daily. One week before calving double the amount of oilmeal daily, and give at calving, if the cow is costive, from one to two pounds of epsom salts, one ounce of ground ginger root, one ounce of saltpeter and a cupful of molasses in

two quarts of warm water, at one dose, slowly and carefully from a long-necked bottle. Great care must be taken to avoid choking the cow and in order to do this her head should be let down should she show an inclination to cough. During all this time the cow is to be given ample exercise daily to keep her blood in full circulation, all the organs of the body in proper order and her muscles full and strong. Mastication is not to be considered exercise sufficient to prevent milk fever. Exercise and oxygen are imperative. Open air life means health. The range cow never dreams of having milk fever!

This method of preventive treatment applies equally to the cow whose calf is expected when green grass is in its "spring flush." She is to be kept in a dry yard and there to have the same food and care given the cow about to calve prior to the advent of grass.

#### Medicinal Prevention.

Experiments have recently been conducted by myself and others with a view to preventing milk fever by administration of drugs. The results have been quite satisfactory as regards preventing the disease, but milk flow has been reduced, emaciation produced to a greater or less degree and death of the fetus caused in some instances. The drug used has been the iodide of potash in doses of from half to one drachm two or three times daily prior to calving. At first one drachm was given twice daily for a period of six weeks before the expected event, but this is altogether too severe in its action and unnecessary, as shown by loss of calves. Unless the cow has suffered a previous attack of the disease, and is consequently predisposed to a second attack, it will be found sufficient in average cases to give her as a preventive one-half drachm of iodide of potash twice daily for three days, then three times daily during the week preced-

ing parturition, and two drachms the moment it is observed that she is about to calve. Where the cow is fat she may also have two drachms immediately after parturition.

#### Treatment.

Should you be unfortunate enough to have a case of milk fever occur, first learn the "Don'ts" of treatment.

Don't knock her on the head or cut her throat; she may recover.

Don't split her tail and insert garlic, salt or pepper. There is no "wolf" in her tail, and no bounty offered for its scalp!

Don't saw her horns off. There is no such disease as "hollow horn;" the horns of all adult cattle are hollow.

Don't bleed her. The Creator knows how much a cow should have in her veins.

Don't tie a chunk of ice upon her head or hang a charm in a bag around her neck; and lastly,

Don't mix up a horrible dose of alleged physic and pour it into her mouth. When a cow is comatose she has lost the power of swallowing and although the medicine disappears in her gullet it may be going into the trachea (windpipe) and will in that case certainly cause pneumonia and death after otherwise good results have followed from the iodide treatment to be described.

Now as to the things to be done.

Place the cow in a box stall—where a cow should always calve—or in a shady place in summer time when out of doors.

Prop her up by means of bags filled with straw or hay so that she must lie upon her sternum (breast bone). Keep her head up in the same manner. She will soon bloat and die if allowed to lie upon her side. Tap the rumen with trocar and cannula if she is bloated when found. Now prepare the udder for the iodide of potash treatment. Strip away the milk; wash the udder clean with warm water and soap, adding zenoleum to

make a 5 per cent. solution. This done, place the udder upon a clean rubber sheet to prevent soiling. By means of a five-foot length of quarter-inch rubber hose, in one end of which has been inserted a large milking tube and the other a glass funnel, infuse into each teat in turn half a pint of a solution of milk-warm iodide of potash solution, viz.: two drachms of the iodide in one quart of freshly boiled, filtered water. When the solution has been introduced, all that remains to be done is to massage the udder well once an hour until the liquid has been absorbed.

In addition to this treatment syringe a gallon of soapy, warm water into the rectum every four hours; remove the urine by means of a catheter at least twice daily; repeat the infusion of iodide of potash solution if the cow is not up inside of twenty-four hours. Give by the mouth one drachm of fluid extract of nux vomica in a tablespoonful of water every six hours. Do not milk in less than twelve hours and then only if it is evident that the infusion will have to be repeated. Turn the cow partly every four hours so that the hind leg can be pulled forward and outwards to retain her on her chest. Let her drink when she can do so and feed a soft mash when she becomes conscious. Feed her carefully for a few days and as a rule this will be the last of the treatment necessary.

#### DISCUSSION.

**Mr. Brown**—Would you milk a cow with milk fever dry, or leave a little milk in the bag?

**Dr. Alexander**—Remove every particle of milk before you introduce into the udder the solution of iodide of potash.

**Mr. Brown**—Some people recommend leaving some of the milk in the udder.

**Dr. Alexander**—We do not leave any milk in when we are going to subject

the cow to this treatment. That is in case she has milk fever. It is not best to milk the cow dry immediately after parturition when she is at that age when she has had four calves, because there is more liable to be a sudden shock to the system.

**Question**—Would you recommend milking before calving?

**Dr. Alexander**—Yes, that is necessary; it is perfectly safe. We may conclude that the cow that makes a large flow of milk prior to parturition is the animal receiving such food as would usually form a large flow of milk. Where you give plenty of exercise and feed her only on dry hay plus bran and oilmeal, there is no such tendency to form a large flow, but, suppose the milk does form, it can be controlled by the use of the iodide of potash, given as a preventive, and where it is used there is no objection to milking; and I would say that it is beneficial to milk the cow, for the reason that if you do not she is more liable to suffer mammitis (garget).

**Mr. Brigham**—Is there any danger of the iodide of potash losing its strength?

**Dr. Alexander**—The solution would lose strength, but iodide of potash kept in a closely sealed bottle does not lose its strength. Otherwise, all the iodide that we use would be inert. Do not keep it in a little paper parcel on the top shelf, but keep it in a closely corked bottle.

**Mr. Hodgson**—I would like to ask the gentleman if milking the cow prior to parturition is also a preventive of milk fever? From whence does this poison come into the udder,—whence does it proceed?

**Dr. Alexander**—Granting that the poison be there, Schmidt claims that the source of the poison is the left-over matters in the udder in which chemical changes take place at the time of the inflow of new milk at the subsequent parturition. This is only theory. He never was in there to

look. There is no proof to any of us that the theory is correct. We know Schmidt in his treatment is successful, but we all have little theories of our own. I cannot say that he is correct in stating that there are left-over deleterious matters in the udder. We get lots of cases of milk fever in cows that have never dried up, in cows that milk right up to the time of calving; there is no time for any left-over matter in the udder. I have seen just as many cases of milk fever in cows that have failed to dry up, milked right along until the calf comes, and then go down with milk fever.

Mr. Solverson—In your experience what proportion of cows treated by the Schmidt method recover?

Dr. Alexander—That depends largely upon the way in which the Schmidt treatment is applied. If you leave the case to the effects of the iodide of potash, in my experience, 90 per cent. will recover; but if you think a little something else, or a big something else will help the Schmidt treatment, a great many cows will die. For instance, practitioners were so thoroughly possessed with the idea that the cow ought to have a physic when she had milk fever that they would give the Schmidt treatment and then pour two quarts of dope into her lungs. That was not fair to the Schmidt treatment or to the cow. The Schmidt treatment got in its work and the cow died because they poured medicine into her lungs. Schmidt advises in his original bulletin on the subject to give an aloes powder by the mouth. One might just as well put a corn cob down her gullet as give aloes plus some other things. Before it would act in a conscious cow, digestion would have to be going on in the stomach. Even that is dormant. An aloes powder would work after the cow got better and not before, and so it is with all physic. You cannot physic a cow when she is uncon-

scious; there is no absorption taking place.

I want to say in this connection, that, instead of a physic, copious injections are to be given per rectum, once in three hours, with one gallon of soapy, warm water and two to four ounces of glycerine.

Prof. Henry—Is there any need of giving a cow warmth in the winter time if the stable is cold?

Dr. Alexander—Animals were born into the world able to take care of themselves in cold weather, if properly treated. I believe that heated, ill-ventilated stables are conducive to the disease, and I believe that this is the point Prof. Henry wishes to bring out. One of the aggravating causes of milk fever is the lack of ventilation, and belongs with those I mentioned,—lack of exercise and overfeeding. Fresh air is absolutely requisite to the maintenance of a healthy circulation and a healthy systemic condition of the animal. The warmer you make the stable the more liable you make the cow to contract milk fever, beyond question.

Prof. Henry—Should the cow be blanketed when she is suffering, lying down in the stable, or have extra protection to her body at that time?

Dr. Alexander—As the cow is comatose or unconscious, you will find that there is no perspiration going on and she is not sensitive to chills, the same as is a cow suffering from other troubles. I do not think it has anything to do with her recovery, but it looks kind and humane and we all do it.

Mr. Convey—You would not recommend ice water or placing the cow where she would be subject to drafts?

Dr. Alexander—Every animal should at all times have a sufficient supply of fresh air in such a manner that it is not exposed to injurious drafts. There is an old and mistaken idea that a barn should be kept at seventy degrees, whereas forty-eight or fifty is

plenty in winter time, and the cows will do better and be less liable to such diseases as milk fever.

Question—How about ice water?

Dr. Alexander—Ice water causes a waste of food fuel, because any quantity of ice water has to be raised to the body temperature, and that cannot be done without a waste of fuel.

Question—Is it not dangerous to chill a cow by giving her ice water?

Dr. Alexander—I do not think there is anybody who would give her ice water at that time.

Mr. Foster—There are many people who are afraid to give a cow a drink after calving, for fear of chilling her. This is preached in the country districts by the old men. I think a word should be said in regard to her fever (?) even if she has not milk fever.

Dr. Alexander—The subject is a long one.

Mr. Foster—I think a cow should have what she wants to drink and it need not be very warm.

Dr. Alexander—Yes. A cow is very apt to be thirsty and she certainly ought to have a drink. One of the most practical men I know of gives a bucketful of water with the chill taken off plus oat meal or bran. I think it is better to add food of this sort than to give the water alone. A couple of quarts of bran in an ordinary bucket of water with the chill off cannot do the cow any harm.

Mr. Foster—Mr. Chairman, why should we give food when she wants drink?

Dr. Alexander—Why give her drink?

Mr. Foster—Because she wants it.

Dr. Alexander—I think if she wants one she wants the other.

Mr. Foster—Let her.

Dr. Alexander—If she does not want the water she will drink it for the food there is in it.

Mr. Foster—She will drink off the water.

Dr. Alexander—Then the food won't hurt her.

Question—Would you give her her own first milking?

Dr. Alexander—No, sir. That is one thing dairymen must protect themselves against,—cows drinking their own milk.

Mr. Jones—Does the Doctor think it good for a cow to eat the after-birth?

Dr. Alexander—No, I do not. A cow is not a carnivorous animal. In the domesticated, civilized state the cow cannot take care of such foreign bodies; there is every kind of difference between the cow on the plains and the dairy cow. What she can do on the range with impunity will kill the dairy cow in the civilized, pampered condition. I have seen it cause the death of many cows.

Mr. Hodgson—I would like to ask the Doctor if it is necessary that a cow should have heavy flesh, or will a cow take milk fever under any circumstances?

Dr. Alexander—Many things are said to be parturient apoplexy that are not. If a cow goes down after calving, no matter what her condition is, and shows symptoms which are apparently those of milk fever, it is common to call that trouble milk fever. It is not always so. The thin cow gets weak, frequently has too little strength to recuperate and straighten up, and will stay down two or three weeks. That is often called "drop." It is not parturient paresis. Again, a cow will go down after calving from injury to the pelvic bones, or a failure of the pelvic ligaments to contract and regain their normal tone. I am glad this point has come up. Iodide of potash would not save those cases, and it is often blamed for the failure, whereas the disease treated was not parturient apoplexy.

Prof. Henry—How may a farmer know when a cow has true milk fever?

Dr. Alexander—Exactly. First of all, milk fever is a misnomer. A cow down with parturient paresis has no

rise in temperature. On the contrary, we find that there is, in almost all cases, except in very hot weather, a fall in the normal temperature. Invariably, when a cow is down, paralyzed from injury to the pelvic bones, there is a systemic rise in temperature. Also where the disease is true parturient apoplexy the animal becomes unconscious. You may rub your fingers over the eyeballs and she shows no sensitiveness. She is comatose. That condition is not present in paralysis due to weakness,—paralysis due to mammitis, inflammation of the womb, or injury to the pelvic bones.

Question—Is milk fever contagious?

Dr. Alexander—No, sir, it is not.

Question—Is not a preventive better than a cure?

Dr. Alexander—I have already said so,—certainly, in everything.

Mr. Solveson—I understand that there have been four cases of milk fever at the Wisconsin Experiment Station, and of those three died. Will Prof. Henry explain this?

Prof. Henry—I cannot give you the explanation, sir.

Mr. Scott—How much water would you give a cow, ordinarily, after freshening?

Dr. Alexander—While I think she would get along without any, there is no objection to giving her four quarts with feed. Give her just a drink and a little later give her a bucketful. I do not believe that water has anything to do with the cause of parturient apoplexy. Where a cow gets a drink and then has parturient apoplexy, the apoplexy is due to the usual causes that produce it and not to the drink, but the water gets the blame for it.

Mr. Foster—Don't you think it is humane to give a drink?

Dr. Alexander—Certainly.

Mr. Foster—In humanity's name wouldn't you give her a drink of water?

Dr. Alexander—Certainly, water

is cheap and free, and nearly everybody give the cows a drink.

Mr. Foster—They do not. I know people in my neighborhood that withhold the water for a whole day.

Dr. Alexander—Well, they should not get a drink themselves.

Mr. Stiles—You spoke about giving dry feed and said it should be hay and corn fodder or bran. Would ensilage take the place of corn fodder and be all right?

Dr. Alexander—If you use ensilage you have got corn in it. I would not object to ensilage without corn in it.

Mr. Stiles—You say you would object if there was corn?

Dr. Alexander—I advised bran because it was a laxative, not because it is nutritive; it is a nutrient also. Bran physics the cow because it is irritating and indigestible. Bran mashes fed for two days will come through in the shape of bran mashes. Ensilage is nutritive.

Mr. Stiles—How is it that bran is worth \$15.00, \$18.00 and \$20.00 a ton when it is an indigestible food?

Dr. Alexander—If you have any such questions, ask Prof. Henry. For anything in my line question me. I would not like to spoil the sale of the Professor's book!

Mr. Stiles—Will roots take the place?

Dr. Alexander—They will not. I have seen lots of cases of milk fever where the cows have been fed roots. In Great Britain, for instance, that is the main diet for cows, plus straw and meals, and the disease is common where roots are used.

Mr. Foster—Does Dr. Alexander mean to tell us for one moment that there is more nutriment in ensilage than in bran, for the bulk fed? He has practically made the statement that there is more nutriment in ensilage than there is in bran.

Dr. Alexander—Yes, isn't that terrible! There are hundreds of cases of milk fever where ensilage is fed, and we do not get them where bran is fed.

If you want to know about the nutrients, ask Prof. Henry. If he were not here I would tell you all about it.

Mr. Hodgson—I would like to know if there is any disease immediately following milk fever, about which we have to be careful.

Dr. Alexander—Yes, there are two or three things. If you introduce iodide of potash solution into the udder of a cow carelessly, introducing dirt, not have all the apparatus perfectly clean, you will set up a bad attack of mammitis (garget). That is why there is so much necessity of observing cleanliness in performing this little operation. There is another disease. Where in milk fever the cow has retained the after-birth and gets on her feet as the result of the iodide of potash treatment, she is more liable to septic poisoning (metritis) than if she had not suffered from milk fever, because while unconscious that matter lies dormant in the womb; the fluids were not expelled; and we frequently find that this comes after the cow gets up following milk fever.

Mr. Hodgson—I want to corroborate the Doctor's statement. I had a cow that was taken with milk fever. She got up all right and seemed to be recovering, but something of that nature which the Doctor describes set in and she died in a couple of days.

Dr. Alexander—You see the subject is so large it cannot be covered in the time given us. I might say that where this condition is present and any suspicion that a portion of the membrane has been retained is held, an antiseptic injection should be given in addition to the Schmidt treatment,—a local antiseptics of the womb and vagina by the use of 1-1000 solution of chloride of zinc in water. If that had been used in your case, Mr. Hodgson, the cow would not have suffered a subsequent attack of metritis.

Question—Does it make any difference about the time the cow goes dry,

if she is milked up to the period of freshening or is dry six weeks to two months before hand?

Dr. Alexander—In most cases milk fever is most liable to attack a cow that has been dry for six weeks and fed corn and rich foods during the dry period, because she requires only enough food for maintenance plus the nourishment of the fetus, and not any overplus which would ordinarily go to the making of the milk.

Mr. Convey—Is the iodide of potash treatment good for any other disease? I ask for the sake of the report.

Dr. Alexander—Iodide of potash has been found a specific for lumpy jaw, but it should be remembered that it is also ruinous temporarily to the constitution of the animal, it will dry up the milk thoroughly, will cause abortion and some other things that I might mention. It is a specific in the treatment of what is called "wooden tongue" in cattle, that is, actinomycosis of the root of the tongue. The dose is one drachm twice daily until iodism is produced. Iodism means poisoning with iodide of potash and shows the following symptoms: loss of appetite, weeping eyes, discharge from the nose, emaciation, scurfiness of the skin, with suppression of the excreta as a rule. Two weeks is usually a sufficient period in which to give iodide of potash for the cure of lumpy jaw.

The Chairman—If there are any other questions we will entertain them for a few moments. We have given this subject a great deal more time than was assigned to it upon the program, but it is very important and the gentleman has given us such valuable information that I have disliked to close the discussion.

Mr. Jones—Does care, in feeding the cows have anything to do with preventing abortion?

Dr. Alexander—We are getting away from our subject.

The Chairman—You cannot expect a man to give away his entire prof-



sion at one dose, and I think we better close the subject.

Dr. Alexander—I do not want to

leave you with any wrong impression. When you feel like it, do not be afraid to give the cow a drink of water!

## CENTRAL WISCONSIN FARMS.

L. K. WRIGHT, Sec'y, Marathon Co. Agricultural Society, Wausau, Wis.



L. K. Wright.

Under this heading I am asked to speak of the southern part of that great section of the state, long known as northern Wisconsin. Geographically, it is central Wisconsin, but the people up there have for years worked for recognition in agricultural, educational and political lines, under the name of northern Wisconsin, and now that the natives "down below" have learned that we are on the map, we propose to stand with our tried friends further north and fight under the old banner of northern Wisconsin.

In order to distinguish the portion

of northern Wisconsin where agricultural pursuits have obtained a firm footing, from the section further north where agriculture is still an "infant industry," I will use the term "Central Wisconsin."

My definition of this term takes in my home county of Marathon and the neighboring parts of Clark, Taylor, Lincoln, Langlade and Shawano counties, a great hardwood timber district, where practically all the land is good agricultural land and which is destined to become one of the greatest agricultural districts in Wisconsin.

### Timber, Soil and Water.

Seventy-five per cent. of this district was once heavily timbered with forests of hardwood, principally birch, bass, elm, maple and hemlock. The soil is a clayey loam, the best soil found in the northern part of the state.

White pine forests covered perhaps twenty per cent. of the land. This timber was large, indicating a good soil, far different from the poor gravelly sand soil on which the Norway and jack pine grows.

This land makes good pasture, without any clearing, and is good potato and corn land.

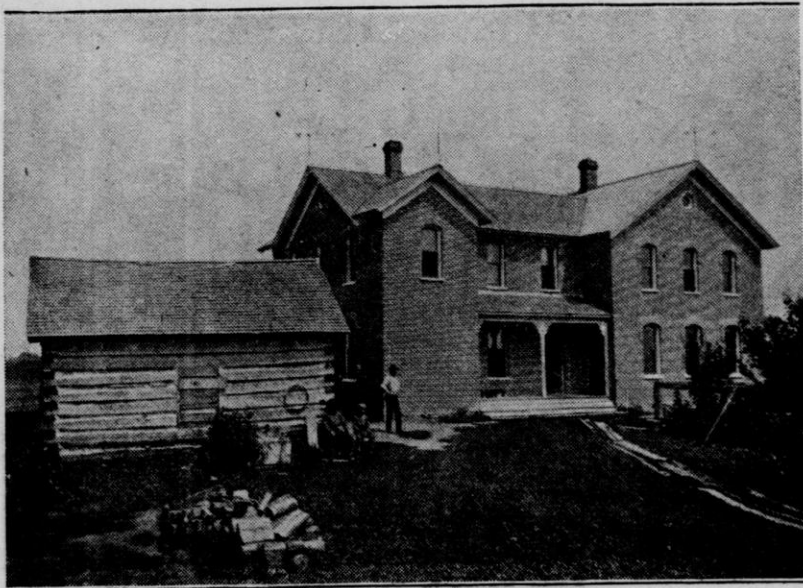
There is very little swamp land, what there is being of small extent, and often hemlock and other high land timber is found mixed with the usual swamp timber, conditions indicating swamps very easily reclaimed. There are none of the poor spruce swamps

found further north. The poorest lands we have are the narrow sand belts in the valleys of the larger streams.

The hardwood lands are often stony, generally small surface stone, easily removed. I have frequently seen farms where there was a good deal of this stone, while an adjoining farm would be nearly free from stone. I have been told that the con-

#### Early Settlement and Conditions.

Parts of Marathon county have been settled for nearly fifty years, and in these old settlements there are today some of the finest farms in the state, the farm buildings comparing favorably with any I have ever seen. Visitors to these sections, being told how long they have been settled, might conclude that it took fifty years to



The Old and the New, Town of Eastman.

ditions in this respect are very similar to those found in Manitowoc and Sheboygan counties.

All of this region is well watered, streams are numerous and springs are found on nearly every quarter section. Cisterns are unknown, as all the water is soft, and can generally be obtained at very little depth. A very noticeable thing about the water is its purity; all of our streams are clear, cool and sparkling, in marked contrast to the muddy waters I have seen further south.

make such farms, but we have other settlements in Marathon, Clark and Lincoln counties, twenty-five years younger, with just as good clearings and farms, but when it comes to farm buildings, I doubt if there is a township in the state which can compete with the old town of Berlin in Marathon county.

To understand why it took so long to clear up these old farms, compare the conditions which confronted the early settler with those that confront the home-seeker in this region today.

The German immigrants, who made these farms, came by rail to Berlin in Green Lake county. A journey of 100 miles by stage or ox team took them to the backwoods settlement at Big Bull Falls, where the city of Wausau now stands. The last forty miles of the journey from Stevens Point north, was made through a timber country, over almost impassable roads,

his wife, from their farm ten miles to Wausau after flour. There was none to be had there, so they walked forty miles further to Stevens Point and from there packed the flour to their home. It was a rich farmer who had more stock than a cow and a yoke of steers. Ox teams were in general use, until after the Wisconsin Valley Railroad was built into Wausau in



Farm House In Town of Berlin.

corduroy fillings making much of the road passable. This part of the journey was generally made by ox team, hand spikes being frequently called into use to get the wagons out of the bad places. At Wausau the pioneer took his supplies on his back and continued the journey to the woods where he had selected his home. Here the primitive log house was put up, and on the clearing thus made, the root crops were put in. His provisions he continued to pack on his back from Wausau. I know of one of these old settlers, who came, with

1876. At that time, and until recent years, there were no mills sawing hardwood and all the timber downed in clearing had to be piled up and burned. All the work of clearing was done with the ax, instead of the saw, as it is now done, and the old country Germans were anything but expert axemen. Another cause that made the work of clearing move slowly and which still operates to some extent, was the high demand for the settlers' services in the lumber camps.

As I said before, these farmers and their children now have fine farms;

most of them have money and they are all prosperous. Seven hundred thousand dollars deposited in the Wausau banks belong to farmers. They are at least one hundred per cent. better off than the men who left the Fatherland with them and cast their lot in the cities and villages.

In 1876 when the first settlers came into the northwestern part of Marathon county south of where the village of Athens now stands, they came by team from Wausau to Rib Falls. From that point W. N. Allen, of Wausau, and Fred Reitbrock, of Milwaukee,

tlers. The home-seeker has the benefit of neighbors, schools and churches. There are hundreds of sawmills where he can sell the logs which he cuts in clearing his land; he can also market the bass wood bolts, tie timber, pulp wood, bark and cord wood, which the pioneer had to burn. The saw has taken the place of the ax and stump pullers and other modern machinery have come into use, making the work of clearing much easier, and when not employed on his farm, the settler finds work at good wages in the country saw mills and in getting



Farm Buildings, Town of Settin, Marathon Co.

guided them through the forest six miles where they picked out their farms. Their supplies were packed on their backs. Today their clearings, free from stumps, are nearly as large as those in the old settlements.

#### Present Conditions.

What are the conditions which confront the settler of today in this part of the state? Three great systems of railroads, with their branch lines, put the settler down within a few miles of home; good wagon roads lead to the farm and good bridges span the streams which the early settler forded. There is not a township in the most remote part of this district without set-

out the raw material to stock them. Creameries are also within reach in most places. The climate, too, has changed as the country has been opened up and the winters are not nearly so long or severe.

#### A Great Dairy and Stock Country.

This part of the state is destined to become a great dairy and stock country. We are bountifully supplied with the first requisite, pure, cool and sparkling water. Clovers and grasses of all kinds grow luxuriantly, nearly two tons of hay to the acre is the rule where the land has received ordinary care. After this crop is in, a fine second crop of clover is cut and

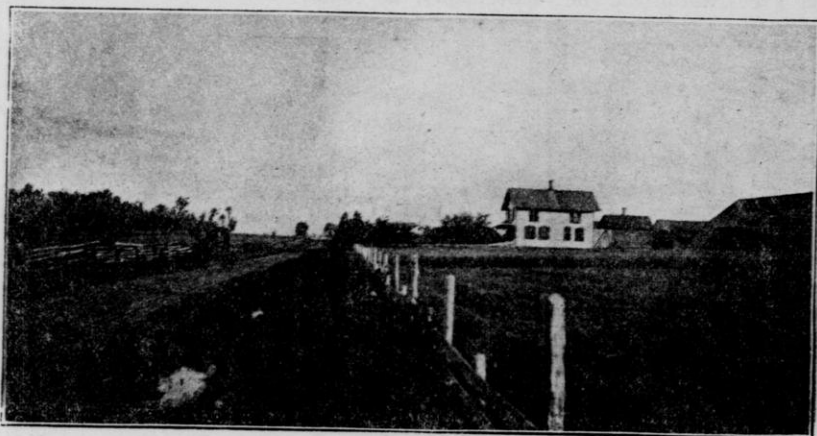
good pasturage at once springs up. Anywhere the timber has been cut, clover can be sown and grows rapidly among the stumps. All kinds of small grains have been staple crops for years, oats and barley being most generally grown. Wheat has a full kernel, but is soft. While every farmer grows more or less wheat, I think time will prove it the least profitable crop he can plant.

Root crops, peas, beans, squashes, pumpkins, and in fact all kinds of vegetables, do well.

Cremeries in Marathon county alone, and new ones are constantly being established.

The creameries, besides furnishing a market for the milk, have paid dividends on the stock of from ten to twenty per cent. right from the start.

At first they only ran a few months during the summer, now nearly all of them run the year round and the amount of milk handled by each creamery, month for month, has about doubled each year. I know this statement is true of a number of our



Graded Road Between Naugert and Taegeville.

Flint corn has always been a good crop, but for years there was a general idea that dent corn would not ripen. Experience has shown that this is a mistaken idea; any farmer who acclimates his seed and knows the first rudiments of growing corn, can raise good crops of dent corn. It is being grown more generally each year and will soon rank as one of the leading crops.

The advent of the creameries marked a new era in this district. In 1898, only four years ago, the first co-operative creameries were put in. I think there were one or two private ones before that, but am not sure. Today there are about fifteen co-opera-

cremeries and I think it will hold good for nearly all of them. Last summer during the drought, while the supply of milk at the creameries in the southern part of the state was falling off each month, the supply with us was constantly increasing.

In the territory within reach of creameries, the amount of stock is rapidly increasing and the land is receiving the benefit in additional fertilizers; the result is a marked improvement in crops.

Another change is taking place, but it is necessarily a slow one. The Babcock testers, in use at the creameries, are teaching the farmers that there is a difference in cows. They are

beginning to weed out their herds and some are buying pure bred sires.

For a country so peculiarly adapted for dairy purposes, the common run of stock is poor, but I know that an improvement has set in. In a very few years the cattle will be on a par with the fine pastures they feed on.

Notwithstanding the scrub stock and the fact that our farmers are novices in the care of milk, the butter from our creameries commands top prices in the Elgin and Chicago

sources of the great hardwood district under consideration. But to take such an article and apply it to the whole northern part of the state, with its great tracts of poor sand land, covered with scrub Norway and jack pine and its large swamps, many of them covered with stunted spruce, as is frequently done, is unfair to the people who are induced to buy these lands and must also retard the settlement of the good lands. While there is good land in all the counties of



Farm Scene, Berlin, Marathon Co.

markets. I have often heard the butter makers, nearly all of them from southern Wisconsin, express their surprise at the quality of the butter they turned out. It certainly is a high compliment to our water and pastures. Before leaving this subject, I want to add that there has never been anything approaching a crop failure from drought. Neither does grass or clover winter kill.

A great deal has been written about northern Wisconsin and its wonderful agricultural resources which is untrue, but I don't think I ever saw an article which exaggerated the agricultural re-

sources of the great hardwood district under consideration. But to take such an article and apply it to the whole northern part of the state, with its great tracts of poor sand land, covered with scrub Norway and jack pine and its large swamps, many of them covered with stunted spruce, as is frequently done, is unfair to the people who are induced to buy these lands and must also retard the settlement of the good lands. While there is good land in all the counties of

#### State and County Fair Exhibits.

For three years Marathon county has taken exhibits to the State Fair which have carried off first premiums in the county displays. The first year the allowance for distance enabled us to win over the southern counties. Our score was lower than it should have been, because the parties in

charge were green at the business and were competing with experienced exhibitors. The last two years we had the goods and we took the money, beating both Waukesha and Walworth counties on the merits of the exhibits, without any allowance for distance.

The best and largest display of agricultural products shown in the state

of in the wilted condition in which they have been shown at the State Fair, after a journey of two hundred miles in a closed box car. If you have families of boys and want farms for them, look over this district at the same time and pick out farms for the boys. In this way your trip will be not only instructive but profitable.



Harvest, Town of Easton, Marathon Co.

of Wisconsin, year for year, can be seen at the Marathon county fair every fall. As a general rule, the further north a product can be successfully grown, the better the flavor, and in this district we successfully grow every product which is grown in the state, except grapes and tobacco, and if we tried I think we could raise tobacco.

It may be that there are those present who think I have painted the agricultural resources of this district too brightly. If so, I invite them to visit the Marathon county fair, at Wausau on September 2-3-4 and 5 next, where they can see all the products I have spoken of, fresh from the field, instead

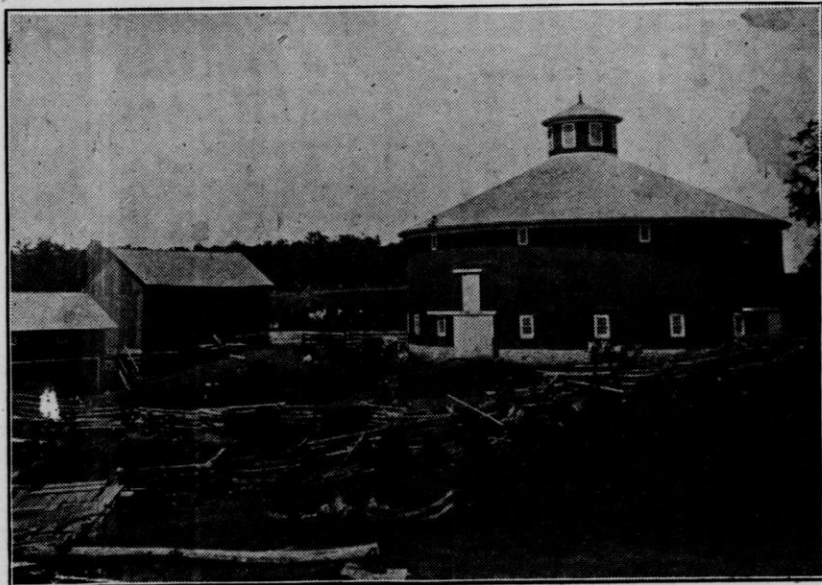
#### Prof. Henry's Prophecy Regarding this District.

If you cannot make this trip, read what a man of some reputation in agricultural matters says of this region:

"The writer makes the prediction that some day northern Wisconsin will rank as the foremost cheese district in America, if not in the world. No one who has carefully studied the subject and observed what has taken place in other countries, and what is occurring in a small way at present in the new north, will seriously deny this assertion. The fine cheese districts of Europe and America are not in the warm regions, but rather in those where the nights are cool, the

waters pure and cold and the grasses possess a high nutritious value. Such regions as these are found in the mountains of Switzerland and the cheese districts of Canada and northern New York and our lake shore counties, like Sheboygan, Manitowoc, also Fond du Lac, Outagamie, etc. While southern Minnesota, southern Wisconsin, northern Illinois and Iowa

affirmed with emphasis that northern Wisconsin can and will some day produce enormous amounts of cheese, which for quality cannot be equalled by that made further south. The most nutritious of grasses, the coolest of waters and the temperate sun of summer are all necessary for the production of milk which shall go to make cheese carrying the purest flavors,



Round Barn With Round Silo in Center, Town of Berlin.

will remain the great centers of butter production for this country, these districts cannot hope to compete with northern Wisconsin in the quality of the cheese which may be produced there, for the reason that in this great butter region the summer days are hot and the water which the cows must drink becomes quite warm; these conditions shut this region out forever from entering into serious competition with our new north in the manufacture of cheese of the highest grade. It is not asserted at this point that good cheese cannot be made in southern Wisconsin and even in Illinois; it is

and northern Wisconsin has all of these in a marked degree. This adaptation to the production of fine cheese is a heritage to this region from which it can never be parted. It is as valuable to our new north as are the gold mines to Colorado or the coal beds to Pennsylvania, and when northern Wisconsin shall have been occupied by an intelligent people and its cheese industry properly developed, there will millions of dollars flow into this section each year from the sales of this one line of dairy products." These are the words of Prof. Henry.

Another "ear mark," showing the



faith of a somewhat celebrated southern Wisconsin farmer, in this section, is the purchase of a large tract of cut over lands in the district I am speaking of by a company of southern Wisconsin men, headed by Hon. George McKefrow, of Waukesha county.

can sell the farm, and with the proceeds pay the mortgage, buy just as good land up north and have money enough left to hire the work of clearing done.

The man working for wages on the farm can put the earnings of one year into the first payment on a forty or



Texas Creamery.

#### Settlers Needed.

What we need in this part of the state is more settlers to help develop the country. Wild land can be bought for about ten or twelve dollars an acre. A payment of a few hundred dollars down is generally required, time being given for the balance.

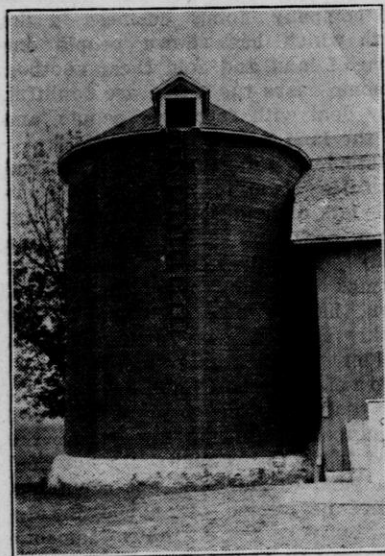
The farmer with a large family of sons, in a high-priced farming district, can here find good farms for all the boys. If the boy sticks to it and makes his own farm, it will generally do him more good than if he got a farm already cleared.

The farmer with a mortgage on high-priced land in southern Wisconsin,

eighty of hardwood stump land and will soon have a good farm of his own.

The southern Wisconsin farmer who buys hardwood stump land, will get a great deal of what will be timber in his eyes, enough to furnish fuel for a generation, including a vigorous growth of young trees. Hardwood stumps rot out very fast and after a few years can be easily removed, but during that time root crops, clover, grass and grain, will grow abundantly among the stumps, the greatest trouble being that labor saving machinery cannot be used in harvesting the crops. If clover is sown,

the stumps will be an actual benefit, furnishing room to spread the crop while it is being cured.



A Modern Silo.

#### DISCUSSION.

Mr. Nicolai—I believe the gentleman made the statement in his paper that since the country has been settled up the climate has changed. Are we to infer that the settlement has changed the climate?

Mr. Wright—I think it is cutting the timber off. Originally that whole country was covered with hardwood forests. Now the climate has changed materially. The winters are not nearly so long. When I first went up there, twenty years ago, we used to have sleighing in November and it would last until the first of April. We have plenty of snow on the fields, but it does not stay on the roads.

Mr. Nicolai—It seems to be a theory among a great many farmers that the cutting off of the timber and the draining of the marshes changes our

climate. I am one of those who differ, and I would like to hear from Prof. Henry in that regard. I will state my position briefly. In southern Iowa they never had much timber, and I believe on the whole there is more timber there now than when the country was first settled. They have open winters, great droughts, and no sleighing as we have, and it does not seem consistent to me that the cutting off of the timber in Wisconsin would change the climate in southern Iowa and Minnesota.

The Chairman—That question will be entertained by the next speaker, who has charge of the weather bureau in Wisconsin.

Prof. Henry—I have been an advocate of the agricultural possibilities of northern Wisconsin for some time. I risked my reputation some years ago, when it was a risk to say that I believed there were great possibilities in that country. I was led to make a thorough examination of that country and to the writing of a book, of which fifty thousand copies were distributed, by seeing the miserable condition of the settlers in western Nebraska, people who had pushed out to the great plateau where it is impossible to carry on a mixed agriculture, where the government should never have divided the land up into quarter sections, and where only cattlemen should reign supreme. In 1895 I saw poor, wretched human beings who had risked their all, and they had not much, and had tried to get a living on this plain. I saw one community that had not succeeded in raising anything for three long years. You can imagine such conditions. They had no wood; they had no water except that which they drew long distances, and not anything to eat if they had wood and water. I came back and made a thorough investigation of the northern part of the state, and then wrote the book.

I want to call your attention to two or three points in regard to that portion of our state. Northern Wisconsin

sin is extremely well adapted to the growth of grasses,—timothy, clover, red and white, and alsike; Kentucky blue grass grows as naturally there as in Kentucky. Root crops flourish in northern Wisconsin. The pea plant is another which I want to mention particularly in order to get it into the report. You cannot raise a good field of peas in the corn district of Illinois, yet there it is not uncommon to see all kinds of crops on one piece of soil. Now, while they cannot raise as large ears of corn as we can in southern Wisconsin, or nearly so large as in central Illinois, the pea vine flourishes in a directly inverse order. For illustration, the flowering pea which you buy of the seedsman, planted in the garden, will grow four feet high. Up where this gentleman lives that same seed will produce a plant six feet high. I could not touch the tops at Superior and Ashland. That same seed in Madison would not be five feet high. The pea is a legume and requires a rather cool temperature. It produces thirty bushels of seed per acre. It is a leguminous plant and there is much nitrogen in the seeds. It will do as a green food for cows and as a lean meat producer for pigs. So that pork production in the north is possible through the production of peas and corn and barley to some extent. I look for the production of bacon hogs to become very common in the north, also for the production of a high grade of mutton. Sheep flourish in northern Wisconsin and the mutton sheep will produce the finest of mutton; as good mutton cannot be grown in a warm climate; the fat is more greasy and is stronger. The mutton produced further north will be toothsome and highly palatable.

One word of caution. There is a boom up there in the northern part of the state that has got to break. There are always a lot of foolish people who

will run to a place because others do. They use no brains or judgment. They buy land of disreputable companies without seeing it. There is one company doing business in the north which has shown people one piece of land and sold them another. In some cases the titles are doubtful. Only deal with reputable people, and see the land before you buy it.

Outside of this, there is a good deal of useless land in northern Wisconsin,—lots of land you would not want at ten cents an acre, sand with a sandy subsoil,—heavy roads and swamps that can never be drained. Then, there is some good land that is thickly covered with drift boulders, boulders as thick as your head.

Do not go up north and buy land unless you have time to go over it, and examine it. Do not buy when the snow is on the ground. Do not deal with parties that are not reputable. Do not be guided by anybody's judgment but your own or that of someone in whom you have reason to have confidence. Take time; spend three or four weeks in looking over the land and quietly visit some other farms and see the crops on them. Do not buy gravel ridges and do not buy thickly boulder-covered areas. Do not buy swamps or sand with sand subsoil. Be careful and you will come out all right.

Mr. Wright—Hardwood lands are the best lands we have. Hardwood lands are a clay loam as a rule. Do not be afraid of white pine; there is some very good white pine land up there, but the jack pine and Norway pine generally grow on very poor land, although sometimes Norway pine is found on fair land.

I touched many points in a former article which I read at Madison, which I have not taken up here. This paper can be secured from J. M. True, Sec'y of the State Board of Agriculture, Madison, Wis.

## WORK OF THE WEATHER BUREAU.

Dr. W. M. WILSON, Section Director U. S. Weather Bureau, Milwaukee, Wis.

Nearly every person is sufficiently interested in the weather to read the forecasts published in the daily papers. The ice man looks for cold weather in January to make ice and hot weather in July to sell it; the coal man hopes for cold weather all the time; the housekeeper for fair weather

Weather Bureau are prepared, or upon what their claim to accuracy or utility to the various lines of industry is based.

Weather predictions have in the past been so closely associated in the minds of many with what have been termed "goosebone theories" and



Office of Section Director U. S. Weather Bureau, Milwaukee.

on wash-days and the farmer for rain nights and Sundays.

Some read the forecasts for profit; some from curiosity, and some for criticism—to see whether the predictions as published agree with the only true theory—of which he himself has the key—based upon the appearance of the groundhog on a certain day in February or the dip of the new moon's horn, but few of this present generation have any definite understanding of how the forecasts issued by the

there have lately arisen so many so-called weather prophets, like Hicks, Foster, Wiggins, and DeVoe, who lay claim to some occult method whereby they are able to read from the heavens the secret of terrestrial weather, that the general public can hardly be blamed for taking any man's statement of what the weather will be tomorrow with a grain or two of salt.

There is, however, no science today that comes in closer touch with the world's great industries, or that

has before it a larger possibility for the welfare and comfort of mankind than the science of the weather. It is a comparatively new science; nearly everything that is known about it has been developed and brought to light during the lifetime of the present generation. There are those present who can remember when weather lore was the undisputed province of witchcraft and astrology. Fifty years ago all knowledge of the laws which control the movements of the atmosphere was held by a few scientific men, the names of whom could almost be enumerated on the fingers of one hand. Thirty years ago there was not a single, solitary syllable in any of our school books bearing on the laws of storms, and as late as 1870 the erudite editor of one of Chicago's great dailies sneered at Dr. Lapham's idea of predicting the approach of those great storms which sweep over our lakes, leaving death and disaster in their wake. But rapid and substantial as the advancement has been we have not yet attained perfection. Prof. Moore aptly says: "Meteorology may never become an exact science; we may never be able to foretell the changing weather conditions with that wonderful accuracy with which the astronomer predicts the date of an eclipse, or the occurrence of other celestial events, but it is not conceivable that the Divine Hand that fashioned the worlds and placed them in their orbits to move on in endless cycles under laws of such infinite exactness, should have been any less exact in the creation of the many meteorological phenomena which so vitally affect His highest work, the human race."

We therefore believe that every breeze that fans a flower, every wind that fills a sail, every cloud that floats across the sky or rears its silvered mountain peaks on the western horizon is under the control of laws as exact and unchangeable as those "which govern the movements of the

spheres, and we confidently trust to the genius of man and the gradually developing process of time to discover their operation."

In the few moments at command at this time it is our purpose to give you, if possible, some idea of how the forecasts of the weather issued by the Weather Bureau, are prepared; how they can be obtained, and how you can make practical use of the information, for we have no secret methods which may not be easily comprehended by any person of average intelligence, and we are willing to take the public into the fullest confidence, believing that a better understanding of our work and a more definite knowledge of what we are able to do for the farmer, as well as what, in the present state of science, we are not able to accomplish, will tend to a better mutual appreciation and assist you to judge more intelligently of its merits and its utility to the great agricultural industry of our country.

Before we take up this part of the discussion, I desire to call your attention, very briefly, to two important questions which have been frequently exploited in the press, but upon which there appears to be some difference of opinion.

#### Change in Climate.

The first question—"Is our climate changing?"

A very general impression seems to prevail, not only in Wisconsin, but elsewhere, that our climate has changed appreciably within the past thirty or forty years; that the snows are less frequent and deep; that the summers are more liable to disastrous droughts, and that the annual rainfall is becoming less year by year. Some have even predicted that southern Wisconsin will at no distant day become a veritable desert and the only source of profitable agriculture will be through artificial irrigation. Many statements of this nature have recently appeared in the state press, and

were undoubtedly inspired by the almost unprecedented drought which prevailed over southern Wisconsin during the past season. That the writers are sincere and not only thoroughly believe what they say, but are convinced that they have made a new and important discovery destined to change the complexion of the agricultural industry of the state, is fully

period of centuries is not known, nor can they tell us the number of years since its disappearance. Geology reckons time by periods, and a century more or less counts for little. It is possible that the change in climate which caused these glaciers to recede northward is still in operation, but if so, the change since authentic records have been kept in this country is so



Observation Room.

evidenced by the tone of their writings. These impressions are generally based upon personal recollections, the evidence of the "oldest inhabitants," or insufficient data.

There is no doubt that the climate of Wisconsin has changed, for geologists tell us that southern Wisconsin once lay at the foot of an enormous glacier, while the northern part of the state was buried under a mountain of ice and snow. Whether the change in climate which caused this glacier to melt came suddenly or covered a

slight that with our present instruments and methods it is impossible of detection.

I have recently made a careful study of all the records of rainfall in this state, with a view to ascertaining, if possible, whether there was any reasonable foundation for such despairing predictions of Wisconsin's future as have lately appeared.

We have a record of rainfall at Beloit covering a period of thirty-six years. If we compare the average rainfall for the first ten years with the

average of the last ten years we find that over three inches more precipitation occurred annually during the last ten years than during the first ten years of this period, and this, notwithstanding the fact that during the past year only about ~~un~~eteen inches of rain fell at Beloit, which is the least annual precipitation for thirty-six years. The record at Manitowoc covers a period of thirty-nine years and is equally interesting. This record shows the same fluctuations in the annual precipitation as is shown by the Beloit record, but with this difference—that the average precipitation for the last ten years is about two inches less than the average for the first ten years, which is exactly the reverse of the conditions shown by the Beloit record. The average for both ten-year periods is, however, less than the average for the thirty-nine years. It is impossible from these records to infer that any permanent change in the amount of rainfall has taken place, and if a change in this respect cannot be detected from the daily records of nearly forty years little credence should be given to personal impressions.

It is claimed by some that the scanty rainfall over some of our western states, for instance western Kansas, Colorado, and western Nebraska, is due to the lack of vegetation and forests, and that by the propagation of vegetation and forests it might be possible to increase the rainfall and thus render our subarid regions capable of profitable agriculture. The situation is simply that they have placed the cart before the horse. The barren districts of our western plains are there for the simple reason that there is not sufficient rainfall to grow vegetation and forest, and probably never was, and certainly never will be so long as the Rocky Mountains stand between these districts and the Pacific ocean, to squeeze out on their western slopes the water from the

vapor-laden clouds which pass over their summits.

In order that you may more clearly understand the influence exerted by the mountains of our western coast upon the climatic conditions of the subarid districts, I may say that the moisture evaporated from the Pacific ocean is carried eastward toward the coast by the prevailing westerly winds. When these rain-bearing currents reach the mountains they are forced to ascend and by mingling with the colder atmosphere at the higher elevations the moisture which they contain is condensed and falls as rain or snow on the western slopes. We therefore have the well-watered, fertile valleys of California and the subarid districts of our western states.

The truth of the matter is that climate is the product of certain physical conditions, which so far as we know are among the most permanent. The heat from the sun is the one constant, dominating force in the production of climate. The operation of this force is modified by the topography of the earth's surface, as we have just seen, the mountains and plains, the oceans and the lakes and rivers. "We therefore have Nature's guarantee that so long as the sun shines with his accustomed vigor and the mountains and the seas abide in their places, just so long will the climate" of every country, state, county and township remain practically unaltered.

Wisconsin draws its water supply mainly from the Gulf of Mexico, through the action of the great cyclonic storms which move over the country, and so long as the Gulf remains and the storms follow their accustomed paths, just so long may we expect about thirty inches of rainfall in this state, distributed throughout the year.

#### Seasonal Forecasts.

The second question to which I wish to call attention is that of "Seasonal

Forecasts," or predictions of the weather for a month or a year in advance.

Previous to 1870 few people in the United States conceded the possibility of foreseeing the weather, even twenty-four hours in advance, with any greater certainty than that attained by the wisdom of the "oldest inhabitant," but during that year the public was awakened to the fact that the United States Government had established a department for this very purpose, and began dimly to comprehend that it was not only possible to predict the weather with a certain degree of accuracy, but that it could be done with very great benefit to the commercial and agricultural interests of the country. Since that time familiarity with daily accounts of the verification of the prediction of storms, cold waves, etc., has resulted in the public thought far outstripping the actual advance of the science in this respect, and the country now demands a forecast for a season or a year in advance, where it once considered it a wonderful achievement to predict the weather for twenty-four hours.

In pressing this demand it is said that after thirty years of observation and experience the Weather Bureau should be able to furnish a fairly accurate forecast for more than one or two days, and in truth it should, but let me say that we have not been negligent nor indifferent to this demand. We have attacked this problem of long-range forecasts from every conceivable standpoint, vigorously and at short range. We have carried our instruments to the highest mountain peaks on the continent; we have taken our lives in our hands and explored the upper atmosphere by means of balloons; we have placed observatories in kites and sent them up to the distance of a mile in the hope of finding something in the upper strata that would lead to a solution of the problem; we have studied the influence of

the moon and the planets and experimented with electricity and magnetism, but thus far we have found nothing to lead us to believe that there is a possibility at the present time of making even a useful, not to say accurate, forecast of the weather for a period much above forty-eight hours. I am aware that there are men in this country, like the Rev. Earl R. Hicks, of St. Louis, Forster, of St. Joe, DeVoe, and others, who claim to be able to make accurate predictions of the weather for a year in advance of their fulfillment, but so far as we are able to learn, their theories, which are usually based upon the very questionable influence of planetary and stellar bodies, have not commended themselves to a single reputable scientist. In this connection I am constrained to say that a foreknowledge of the weather for a month or a year in advance is not in possession of any living man at the present time, and any man who lays claim to such knowledge is simply deceiving or attempting to deceive the public for his own gain.

#### Obtaining Forecasts.

The method employed by the Weather Bureau in forecasting the weather depends upon the fact that electricity travels faster than the winds. If it were not for the electric telegraph the Weather Bureau as at present organized could not exist, for the forecaster must not only have before him the conditions as shown by his own instruments, but a broad view of the weather conditions over a large territory—the larger the better. We have under the control of the United States Weather Bureau about one hundred and eighty weather observatories in various portions of the United States and the West Indies, and by the courtesy of the governments concerned, daily reports are received from Canada on the north, Mexico on the south, the Azores, and the western coast of Europe, thus covering within our field of observation practically



the whole of the inhabited portions of the North American continent. Each of these observatories is manned by one or more trained observers, and exactly at 7 a. m. and 7 p. m. of each day an observation of the weather is made. This observation consists of a reading of the air pressure, or weight of the atmosphere in his locality, as shown by the barometer; the temperature of the air and the amount of moisture it contains; the direction and velocity of the wind; the clouds, kind and movement, and the rain or snow-fall. To this is added as occasion requires special information in regard to rapid changes in the conditions, local thunderstorms, frosts, etc. This observation is immediately telegraphed to the central offices at Washington and to other forecast centers and offices authorized to receive them. As soon as the reports come from the wires they are charted on a blank map prepared for the purpose, and when they are all in, which is usually about an hour after the observation has been taken, the forecaster has before him a birds-eye view of the weather conditions over a large portion of the western hemisphere. If there is a storm developing, like the great storm which destroyed Galveston, it is shown on this chart, and from his experience and knowledge he is able to determine its general character, the direction and rate of its movement, and it is therefore a simple problem in mathematics to calculate about when it will reach a certain point. In the same manner the trained weather forecaster is able to predict the cold waves which usually have their origin in the British Northwest and sweep southeastward over the western states.

When the forecaster has determined what in his judgment the weather will be in each state during the following thirty-six hours, based upon the conditions shown by the charted observations and his experience and study of similar types, he telegraphs his con-

clusions to a central office in each state, from which in turn it is distributed to the rural districts.

This is in brief an outline of the method employed by the Weather Bureau in the preparation of the forecasts of the weather, and it is the only rational method known. The forecasts are found to be correct about eighty-five times out of one hundred, even when verified under the strictest rules. We are free to admit that we make failures, and also free to admit that we have but an imperfect knowledge of the complex problems of atmospheric phenomena. The operation of the laws which result in development of storms or control their apparently erratic movements is not well understood. Neither do we yet fully understand or appreciate all the details of so common a phenomenon as rainfall. Enough has been accomplished, however, in the practical work of forecasting the weather to justify us in the statement that if the farmer could obtain each morning information of the probable weather for the succeeding twenty-four or thirty-six hours, it could be used to advantage in many ways.

#### Rural Delivery.

It has long been a problem how to reach the farmer, as he usually lives some distance from the telegraph, upon which we must mainly rely to distribute our forecasts, but since the telephone has begun to extend its network of wires to the rural districts, and the Rural Free Delivery mail service has been put into operation, we are beginning to be able to give the farmer the same benefit of the weather forecasts now enjoyed by the residents of our large centers of population.

The method of distributing the forecasts to the rural districts by the Rural Free Delivery service is, briefly stated, as follows:

The forecast for the state is telegraphed to the postmaster from whose

office the different rural routes radiate. The postmaster is supplied with a rubber stamp duplicating apparatus, by which he is enabled to quickly duplicate, on cards furnished for the purpose, sufficient copies of the forecast to supply the patrons of the various routes. These cards are taken by the carriers and delivered to the farmers along their respective routes, so that by noon or shortly after each farmer has in his hands an official forecast of the weather to be expected during the next twenty-four or thirty-six hours.

The drawback to this system lies in the fact that in many instances the carrier is obliged to leave before the postmaster can be reached with the forecasts and as the value of the information depends upon the promptness with which it is distributed, it is practically impossible to make use of the rural service where the carrier leaves much before 10 a. m.

The telephone service is much more satisfactory and has the advantage of being instantaneous. The forecasts will be telegraphed to the managers of rural telephone companies, free of charge, provided the information will be transmitted to the farmers daily or furnished when called for. A number of telephone companies in the state have already inaugurated this service for the benefit of their patrons, and it has been the means of extending their lines in several instances. Farmers have put in telephones for the special purpose of obtaining the forecasts of the weather, and consider it a good investment. Heretofore, the shipper of perishable goods has been most benefited by the weather service, while the producer has practically been left to take the weather as it comes, but if the farmers of Wisconsin will make an effort to get into closer touch with the weather service—and in this I assure them they will be met more than half-way—there is no reason why they cannot utilize the weather forecasts to the same extent

and with the same financial gain to themselves as is now being done by those who handle the products of their farms.

#### DISCUSSION.

Prof. Henry—I would like to ask Prof. Wilson if the springs which all over this region have dried up more or less, and the streams which have become more or less dry,—if we may expect a recurrence of moisture sufficient to start them up again; if this dryness is but a temporary matter.

Prof. Wilson—Prof. Henry's question involves a good deal. We can only guess the future by our records of the past. From what records we have in this country, I am inclined to the opinion that we will have an increased rainfall in the next few years, because it seems to me that we have reached the minimum point, but there has been a great deal of tiling, and artificial drainage has been so extensively employed, that it is possible that the springs and streams of this kind, even in the case of an increased rainfall, may never reach the point that they once had.

Prof. Henry—You practically made the statement, or led to the inference that our climate has not changed. You have based that upon the fact that we have had as many inches of rainfall in a given period as previously. It does not seem to me that such an answer satisfies us that the climate has not changed. It seems to me that we can have as many inches of rainfall in a given period and yet have the climate change. Rainfall does not mean climate. Formerly the farmers in Dodge and Columbia counties discussed whether they could grow corn; now that same question is being discussed in Forest and Marathon counties. I believe the climate has changed in the popular meaning.

Mr. Reitbrock—I might bring my own experience upon this very point, which has extended over a number

of years. Fifty years ago, perhaps fifty-five years ago, we considered Waterford, which is a point twenty-five miles south of Milwaukee, as being at the northern limit of the corn belt. I know men still living who were positive that corn never would succeed in the state of Wisconsin in the latitude lying north of Waterford. Nevertheless I have known corn to succeed on the Penokee range, that is, on the Lake Superior slope of the Penokee range of mountains. I agree with Mr. Wright that there has been a climatic change going on in this way. That territory that I have been familiar with for twenty-five years was all forest for one hundred miles in extent, east and west, and the sun could not get down to the ground to melt the ice and snow as rapidly as it can now, when it is interspersed with considerable areas of bare ground, that is to say, ground denuded of the forest. The snow goes off early in the spring, and my observation is that it warms up more rapidly in the southern part of the state since the timber has been all cut off on certain areas. I really believe in the matter of a slight change going on in the climate, irrespective of the precipitation.

Prof. Wilson—My remarks were directed more particularly to those who have been trying to make us believe that the state was drying up. These local changes of climate are undoubtedly going on. The influence of the forest is great, especially in the matter of frost and even to a certain extent in the matter of annual temperature. But as far as its influence upon the annual amount of rainfall is concerned, I do not believe that it has any influence. I directed my remarks to that point more particularly than to the local changes which are shown by the different vegetations.

Prof. Henry—The value of rainfall does not depend upon the mere question of total inches in twelve months. It depends upon seasonal distribution

and frequency of the showers. A few inches of moisture in the summer, properly distributed, may raise a crop, where twice the amount in one or two beating storms may leave us with no crop. Do you have any evidence that our rainstorms are less useful than in the early times as to times of distribution?

Prof. Wilson—I really have not gone into that question. Prof. Henry's remarks are undoubtedly true that an average rainfall at opportune times is worth double the amount at inopportune times, but whether there is a tendency to a less useful rainfall, I would not say. I know we have not had as great an annual rainfall in the last few years as we did in the sixties and seventies, but it does not argue anything for the future.

Supt. McKerrow—We would like to go into this matter deeper, but our time is limited.

Mr. Scott—While the rainfall may be the same, is it not a fact, Professor, that the cropping out of the humus in our long-cultivated fields creates a greater evaporation and we suffer more from droughts than we did twenty years ago?

Prof. Wilson—Ask Prof. Henry that question.

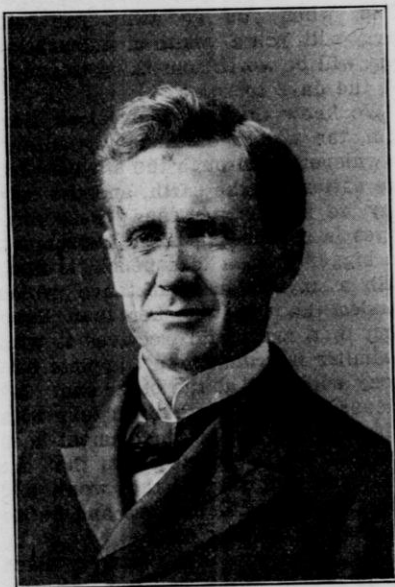
Mr. Nicolai—I would like to ask this question in regard to the temperature. You have kept the temperature the same as you have the amount of rainfall and the two will virtually settle the climate question. Now, has the temperature changed much within the last ten years?

Prof. Wilson—I have not gone into that question thoroughly enough to make a positive answer. I do not think that our records are sufficiently refined to show any change. If there is a change (and I do not say there is not) it is not to be found upon our records.

Supt. McKerrow—Before the report of the committees and the reading of the prize list, I had intended to call upon some gentlemen in the room,

several outside men and several local men, and the first I expected to call on was Mr. Hughes, whom I find is attending the cooking school as a delegate. I will call upon Attorney General Hicks, who is also a farmer.

## REMARKS BY ATTORNEY GENERAL HICKS.



Attorney Gen. Hicks.

I feel that my namesake has been sufficiently and successfully and perhaps rightly discredited. Before this audience it would be unfair to set out with such a tremendous handicap, I, therefore, disclaim any relationship to this celebrated weather prophet by the name of Hicks. While I disclaim any relationship to the celebrated Hicks, perhaps I ought to be introduced to this audience, to whom I am a comparative stranger. Still, I have chased up Farmers' Institutes for many years and have absorbed much valuable information. I am here now with my small dish to catch what I can, and I confess that it is

always running over before I have been very long in these Institutes.

I have an idea that the chairman felt himself in about the position of the clerk of the Brown Palace Hotel in the city of Denver, when a rather forbidding old fellow came in just at the edge of the evening and walked up to the desk and asked the clerk for a match to light his pipe. The clerk very courteously passed out the matches, and the man lighted his pipe and went on his way. The next night he came again and asked for another match to light his pipe, and the clerk again courteously passed out the matches. This was repeated for several days until one night there was a congestion of traffic at the desk and the clerk was irritated. He replied to the request that he did not have any matches. The fellow straightened up in his offended dignity and said: "Perhaps you don't know who I am." "Well, now," the clerk thought, "I venture this fellow is an old prospector from the mountains and I have offended him." "Well, no, I don't know who you are. Kindly tell us who you are."

"Well, I am the man that comes here every day to get a match to light my pipe."

That is all I am here for. I have come to absorb something from this Institute.

My countrymen, this is your Institute. Your taxes pay for it. Do you get anything out of it? If you do not, it is your own fault. If you come here with the right disposition, with the right purpose of heart, you will go away loaded full of suggestions. Do not feel that these men are "book

farmers and therefore no good. They come from the experiences of life in every direction and you should gladly and cheerfully take advantage of their experience and their superior information. These men have spent the best years of their lives in this work and are bringing to you the small part of their experience that can be crowded into these few days, to make your lives better, and to make better citizens out of all of us. If you do not profit by it, it will be because your eyes are not opened, nor your ears opened, nor your thought quickened to grasp the opportunities that are afforded in this wonderful age. Many of us are standing in a waking dream of wonder at the realization of things at our finger's end,—the meteorological data which is of such untold value, the wonderful means of communication which has come to us in this age in which we live. Do you know that the means of communication between man and man has so quickened in these later days that we literally read at our tables in the morning of what happened upon the streets of London the very day before we hear from our own streets? No wonder that we can learn before we start out to the hay field in the morning that a storm is on

the way from the Gulf, and we better get our hay in. And so I say to you that these wonderful revelations that have come to us in these quickening moments of this new century are enough to stimulate the activities of every man and make him alive to the opportunities which these Institutes afford. Is your disposition right? If it is, when you go away you will carry with you a wealth of information that will be worth something to you in all the days to come.

We know that this marvelous Marconi, the wizard of the new century, is whispering through the air, between the nations of the earth, and the only way he is able to send these messages is because his little instrument, no bigger than a lead pencil, is filled with a mysterious substance which carries the word quicker than lightning to a man who receives it with a similar instrument, in complete harmony with that at the other end. My friends, if you come here in tune with this Institute, if your instrument is in harmony with the messages that are sent, you will receive the word, and you will be better farmers and better citizens for having come.

I beg your pardon for having talked so long.

## RESOLUTIONS.

Submitted by the Committee on Resolutions and Adopted by the Institute.

Resolved, by the farmers in the Sixteenth Annual Closing Institute assembled, That we express our sincere gratitude to the people of Oconomowoc and vicinity for their patronage by way of a full attendance at all sessions, and the marked interest and good will which have prevailed.

Knowing full well that the success

of any Farmers' Institute depends in a large degree upon thorough preliminary work and the hearty co-operation of the local committee with the state organization, we would especially commend the committee of arrangements for their systematic organization and their most thorough attention to every detail; their cordial re-

ception of workers and guests; their artistic decorations of city and halls; their personal attentions and solicitude for the comfort and enjoyment of their guests, are all marks of respect to our calling which we cannot fail to note and which we fully appreciate and thank them for.

Recognizing true merit wherever found, and, barring varying local conditions, placing as high a value upon the experience of our neighbors as upon that of our own, we would extend our thanks to Prof. Chas. D. Woods, Prof. W. M. Wilson, Dr. A. S. Alexander, Messrs. W. H. Stevenson, Geo. B. Van Norman, and others from neighboring states, for their valuable contributions to the success of this meeting and assure them that they will always find Wisconsin's proverbial latch-string hangs well out over the threshold

Whereas, The last legislature of the state of Wisconsin appropriated the sum of twenty-five thousand dollars for the purpose of making an exhibit of Wisconsin products at the coming Louisiana Purchase exposition to be held in St. Louis

Resolved, That live stock and agricultural products should receive their proportionate share of such appropriation.

Resolved, That the farmers of Wisconsin in this Closing Farmers' Institute of 1902 most emphatically approve the bill now pending in the United States Senate placing an internal revenue tax of ten cents per pound upon oleomargarine colored in imitation of yellow butter. Butter has a right to its own color. A counterfeit made of animal fats is a fraud upon consumers and a fraud upon producers of an honest and more valuable product.

We commend the action of Senators Spooner and Quarles in fighting the bogus butter fraud. We do not ask for class legislation, but we do ask that the great dairy interests of Wisconsin and of the nation be made free

from this deadly competition of a fraudulent counterfeit.

The rural delivery service of the Postal department of the federal government has been a great boon to the farmers of this state. It has given the farmers quicker communication with the markets and brought them in quicker and closer touch with the outside world.

We appreciate the value of this service. We thank our representatives in congress who have helped establish it, and we ask that they continue their efforts to broaden and improve the same until every farmer in this state shall receive its benefits.

Whereas, There is now pending in congress a bill to provide from the money derived from the sale of public lands an income to each agricultural and mechanical college for the purpose of maintaining instruction in mining, geology, agriculture, engineering, roadmaking, irrigation and forestry; and

Whereas, A portion of the moneys derived from the sale of public lands can be well and wisely used for such purpose, since the public domain is the property of the people and all the people would be benefited by the class of instruction provided in the bill; therefore, be it

Resolved by the Wisconsin farmers in annual session assembled, That we favor said bill and urge its passage.

Resolved, That the superintendent of Institutes be instructed to forward a copy of these resolutions to each of our representatives in both houses of congress now assembled.

Whereas, The United States Department of Agriculture, Washington, is the highest exponent of scientific agriculture in the world, accumulating through its efforts data and information of the highest usefulness to the farmers throughout the land; and

Whereas, The Department now has no connection in recognized form with the Farmers' Institutes of the several states, which Institutes offer

the most direct and potent means of directly reaching the farmers;

Resolved, That we urge the secretary of agriculture to establish a division or department of Institute work, by which the department may be brought in direct touch with state Farmers' Institutes throughout the United States.

Resolved, That we favor the department sending out trained men to represent the department in Institute meetings held in the several states, that the farmers may learn by personal presentation of the work and discoveries of the department and in turn they may know of the wishes and needs of the farming people.

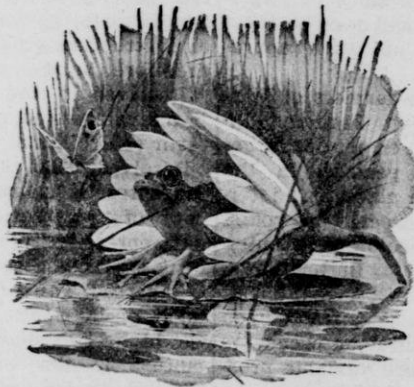
Resolved, That the superintendent of the Wisconsin Farmers' Institutes be directed to forward a copy of these resolutions to each and all of our representatives in congress, urging

them to support legislation which will aid the secretary of agriculture in this important matter.

#### Closing Remarks.

Supt. McKerrow—Mr. Chairman, owing to the lateness of the hour I shall not make any extended remarks, but will say that I am in hearty accord with the resolutions thanking the citizens of Oconomowoc for all they have done in attending so completely to the necessities of this Institute. And at this time I want to thank you all individually for your presence here and for the interest that each one has taken in this meeting. We hope it may be of benefit to this portion of Wisconsin, and we also hope that a great deal of benefit may be received from the Bulletin which will be published of these proceedings.

Adjourned.



## WOMAN'S DEPARTMENT.

## COOKING SCHOOL.

Heid at Oconomowoc in Connection with the Closing Farmers' Institute,  
March 18, 19 and 20, 1902.

Conducted by MRS. JENNIE A. JAMISON, Neenah, Wis.

Assisted by MRS. A. M. GLENN, Janesville, Wis., and MRS. IDA E. TILSON, West Salem, Wis.

Stenographic Report by MISS EFFIE M. CLOSE, Madison, Wis.

## FIRST LESSON.

Tuesday Afternoon, March 18.

Mrs. Jamison—It is probably not necessary for me to tell the ladies of Oconomowoc the object of this Cooking School, in connection with the Farmers' Institute, because I know Mrs. Armstrong was here last year and told you all about it. There are only eleven places in the state to which the Cooking School is sent each season, so that Oconomowoc is having a little more than its share in having two in two successive years. It is evident that it was greatly appreciated last year or you would not have asked for its return this year.

It is with some diffidence that I address an audience who have heard Mrs. Armstrong, and I do not want to dissipate the good impression made by her. I hope, however, I may be able to interest you also.

The program and recipes for this afternoon are printed on slips, and I will ask some of the ladies to pass them as we begin the lesson. The dishes to be prepared are Pot Roast, Stuffed Potatoes, Scalloped Cabbage and Cereal Coffee.

## Pot Roast.

## Recipe.

Recipe—A shoulder roast of beef weighing five or six pounds makes an



Mrs. Jamison.



excellent pot roast. Sponge the meat and brown it all over in some of the tried-out fat. Cover with boiling water and simmer gently three or four hours or until tender. Salt when half done. Thicken part of the liquid for gravy.

In discussing the pot roast I will talk about meat in general, speaking of this as one of the kinds or classes of meat.

Meat may be divided into two general classes, the tough and tender meat, and the dish I am preparing to-day is a demonstration of the cooking of tough meat. The tough and tender meat may come from the same animal, the difference being in the part of the animal from which it is taken. The tough meat consists of the muscles that have the most exercise; the tender meat comes from the back, principally, where the muscles are not very greatly used. The tough meat contains, as far as nutriment is concerned, rather more than the tender meat, for according to chemical analysis it has rather more protein. This is illustrated on the chart. As you see, sirloin steak, which comes from the back, does not contain so much protein; there is more fat usually, but not so much of the muscle-making material. What we want of the meat essentially is the muscle-making material, muscle food, or protein.

The price of the tender meat is usually higher than the tougher meat. There are two reasons for this: First, because there is a greater demand for tender meat and the supply is less; and second, because it can be cooked more quickly and by means that render it more generally palatable. It has no more value in the body as building material than the tougher meat. It is of more value for people of weak digestion because it can be prepared without the long cooking that the tough meat needs.

Meat fiber, the substance of the meat, is digestible raw; that is the digestive fluids of the stomach have

power to digest raw meat, and it is sometimes given to invalids because it is easy of digestion. This being the case, we naturally expect to find the best results from the slightest cooking possible to develop the flavor and put it in the best condition.

In broiled and roasted meats we get these results by the application of a high degree of heat, either in the oven, the hot air over coals, or by direct contact with a hot iron surface, as in the case of pan-broiling; in this the meat is put in the hot frying pan without any fat, and the results are almost as good as broiling over coals, which is not always convenient. Any meat that is tender can be prepared by these methods and it does not take a great deal of art or science to prepare a palatable dish of meat that is already tender, but to make a palatable, attractive and economical dish out of the cheaper and less tender meats is where the science and art of the cook finds best exercise.

This piece for the pot roast is commonly called shoulder roast. It may be cut from either of the two sides of the shoulder and it will contain the long bone, as this does, which is a piece of the shoulder blade, and also perhaps a part of the ribs; or it may be cut across the other way where it would contain a piece of the round bone of the fore leg. The round bone piece has a larger proportion of meat to the bone than this does, and with plenty of time it is just as good a piece to cook.

The principle of which I have spoken that governs the cooking of tender meat applies altogether to the development of flavor; but in cooking tough meat the object is also to soften the fibers of the meat, and we find this can be done most satisfactorily and perfectly by long, slow cooking in water, and it retains the juice best if put into water heated to the boiling point. By rapid cooking the fibers are sometimes disconnected so that they fall apart, and some people think

the meat must be tender when it falls apart when taken from the kettle, but this is no indication of tenderness. The fibers may not have been softened but the gelatinous connective tissue has been dissolved. The test of tenderness is to be able to cut across the fiber with a silver knife, but in the meat that falls apart, if you try to cut across it with a silver knife the fiber will follow the knife and cannot be cut through easily. This is a small point but something that all do not understand.

For this pot roast, for the sake of flavor, we brown it, either before or after cooking. Some housekeepers cover the meat with boiling water, which hardens the outside so the juices will stay in the meat fiber, simmer till tender, then "brown it down." As a matter of convenience, I prefer to brown the meat first and do the simmering afterwards. This does not affect the flavor or nutriment, but is merely a matter of convenience. For that purpose I am trying out some of the suet in a thick iron frying pan; this meat did not have much fat, so I asked for a little piece of suet to brown it in. Most housekeepers have beef drippings to use for such purposes, and some like the flavor of salt pork with the beef, but whatever fat you use, do not use lard. The flavors do not combine well. Fat tries out better at a low temperature. The same principle applies as to cooking a soup bone, which is to put into cold water to extract the juice, but where you want to keep the juices in you use more heat. When you wish to use fat for frying purposes, it should be pretty hot, so that it will sear the outside and give the flavor without soaking into the meat or whatever is being fried.

The great objection to meat cooked in this way, either browning first and simmering afterwards, or simmering first and browning afterwards, is that it is not as digestible as it is if cooked by quick heat and without the

fat; and this is one reason why these meats are not used so much as the tender meats; they are not so easily digested. We need to make that distinction. They are perfectly wholesome for people whose digestion is normal and if they can be made palatable they are to be recommended for their economy.

The directions for cooking this pot roast advise salting when half done. Salt draws out the juices and also toughens meat, and for this reason we usually add the salt when half done, or quite done. We salt steak when done. An exception to this rule is the salting of an oven roast; this is done at first because the meat would not get seasoned through otherwise, but in putting the salt outside of the roast we add flour, which holds the juices which the salt would draw out. The oven roast is supposed to be tender and salt does not toughen very greatly.

Meat is an albuminous substance, and the same rule of temperature which applies to meat applies also to eggs and other albuminous substances. The hardening of the surface of meat so that the juices will not escape, then rather a low temperature is best throughout the cooking. An egg that is cooked at the boiling point will be hard but the whites will also be tough, and the yolk pasty; but if put in boiling water and then set where it will not boil and kept hot for twenty to thirty minutes, the egg will also be hard, but tender; the white will be of jelly-like consistency and the yolk crumbly instead of pasty. Or, the egg can be put in cold water and brought to the boiling point and allowed to stand a few minutes or until the water cools.

In seasoning this pot roast I will add besides the salt a slice of onion and a bit of bay leaf. Other seasoning may be used, such as parsley. The flavor of the bay leaf and onion should not predominate. We sometimes lose sight of the object of seasoning, which

is to bring out the flavor of the article itself; the seasoning should not predominate, but just enough should be added to develop the flavor of the food.

Now the meat is browned all over; in putting it into this granite kettle I want to make a suggestion for the benefit of the housekeepers, and that is to always have your butcher cut this long bone of the shoulder. It would have been a benefit if I had done so.

Whether or not you add the fat in which the meat is cooked to the water depends upon how much fat you have, but it is always well to rinse out the frying pan with the water you are using for the pot roast, as you get the flavor and color from the frying pan. It is perfectly proper, if you have a suitable kettle, to brown your meat in the kettle in which you are going to cook it. If you have an iron kettle you can use that nicely, iron is heavy and clumsy and hard to handle, but you can brown in the kettle and then add the boiling water right to it. Of course the cover should fit down tight.

A word or two more about the meat. I can hardly serve it this afternoon as it will take too long to cook it, but I want to say that it will be done tomorrow afternoon and if you come again you shall have a taste of it then.

Question—In preparing the meat I noticed you sponged it instead of washing. Why did you do that?

Mrs. Jamison—It needs to be cleaned in some way, for however careful the butcher may be more or less dust will settle on meat, as well as everything else that stands in the air. If we put on much water we lose some of the juice, and we find it better to sponge hard with a little water. Some people prefer to use warm water to sponge the meat. This is all right if it is chicken, but it is not usually necessary for meat, unless it may be a soup bone or something quite dirty.

Question—How long does it take to cook?

Mrs. Jamison—A piece of meat of this sort should cook about half an hour to a pound, it depends somewhat on the shape as well as the number of pounds, but that is a fair general rule. So it is quite necessary, if a housekeeper wants this meat done for dinner, that she order the meat pretty early in the morning, or the day before if the butcher is not prompt in delivering.

#### Scalloped Cabbage.

Recipe—Put one and one-half cups coarsely chopped cabbage into a baking dish in layers with two cups white sauce and three-fourths cups cheese, finely crumbled. For the sauce melt four level tablespoons butter, add four level tablespoons flour, one-half teaspoon salt and a little pepper. Then take from the fire and add slowly two cups milk. Cook until thick and pour over layers of cabbage, sprinkling cheese over sauce. Over all sprinkle one cup of buttered crumbs and bake until hot and brown.

I am now going to prepare the raw cabbage for this dish of scalloped cabbage. This is supposed to be made from cabbage that has already been cooked and is to be cut fine and finished with a sauce, and because I want it cut fine after it is cooked I will cut it before, which is just as well.

The principles of the cooking of vegetables apply to almost all of them with few exceptions; that is most vegetables cook best if put into boiling water and kept at the boiling point throughout the cooking. In the case of potatoes we start the cooking with water that is boiling very rapidly and very hard; we want it as hot as we can get it so that when the potatoes are put in they will not cool it too much, but after it has started to boil again after the potatoes are in it, it is best not to let it boil too hard for it breaks the potatoes too much. In cooking underground vegetables like potatoes, etc., as well as cabbage,

where there is a strong, disagreeable flavor to be drawn out, it is not advisable to save the water for any other purpose. In cooking the more delicate vegetables, however, like celery, asparagus, green peas, etc., it is very wise to save the water in which they are cooked, either serving in the water or using the water for a soup. The first part of this season in the Cooking School I was making a scalloped celery for this first lesson and using the water in which the celery was cooked for a celery soup on the second afternoon. Here are the recipes:

#### Scalloped Celery.

Recipe—Cook one cup of celery cut in small pieces in three cups of boiling water until tender, adding one-half teaspoon of salt. Drain off the water and save it, and put the celery in a baking dish. Make a white sauce of three level tablespoons each of flour and butter, one and one-half cups milk, a scant one-half teaspoon of salt and a little pepper. When thick, add one beaten egg and pour it over the celery. Cover with one-half cup of buttered crumbs and bake about fifteen minutes, or until crumbs are brown.

#### Celery Soup.

Recipe—Use one pint of the water in which celery has been cooked and one pint of milk. Thicken with three level tablespoons of flour stirred smooth in three level tablespoons of butter. Cook ten minutes. Season with salt and pepper. A beaten egg may be added just before serving.

That illustrates two very economical dishes, not merely because you can use the same substance for both, but because you can get the full value of the celery. Cabbage, celery, asparagus, lettuce, and most vegetables are mainly valuable for the mineral salts they contain; they do not contain any great amount of nutriment that is of value in the building up of the body, but the mineral salts help in the diges-

tion of other foods and in keeping the system in good condition and in cooking them we lose in the water some of the mineral salts. There is besides the mineral salts an acrid matter in potatoes which is slightly poisonous and it is wise to throw the water away in which they have been cooked. It is really better to cook potatoes in their skins or jackets as the Irishman says because we retain more of the mineral of the potato that is one of its valuable constituents while we lose the disagreeable part.

It may not be possible in a room where the ceiling is low to cook the cabbage without any odor, but you will not be troubled very much with it. There is a little secret which may be of value to you when cooking cabbage, or any vegetable which gives off an odor when cooking, and that is to cook with the cover off and at a rather low temperature,—let it simmer rather than cook very rapidly. If cooked with the cover on the steam is condensed and when the cover is removed this steam escapes and carries all the odor possible with it.

#### Stuffed Potatoes.

Recipe—Bake large, smooth potatoes until soft. Take from the oven, cut a slice from the upper side of each potato and scoop out the soft part into a bowl. To six potatoes add one-half cup of cream, two rounding tablespoons of butter, one teaspoon of salt, one-eighth teaspoon of pepper. Fill this into the skins and set on the grate of the oven to brown.

The next thing I am going to start is the potatoes. I shall put them into the oven to cook and then see to the doughnuts and other things.

There is not much to say about baked potatoes. They should be put into a hot oven, and they require more time to bake than to boil; the reason probably is that they cook in their own steam and it takes some time for that steam to be developed. The principal point in baking potatoes is to be sure

that they are taken from the oven and served as soon as they are done. The reason we so seldom have good baked potatoes is that they are not served immediately. It is a good plan to pierce them as soon as they are taken from the oven to let the steam escape, it does no good to pierce or cut before putting in the oven, as they are soon seared over. If they cannot be served as soon as they are taken from the oven they should be broken apart. Of course they do not look very well, but it makes them less soggy. Baked potatoes are more digestible than boiled because the starch is cooked at a high temperature; the starch under the skin is almost caramalized, which makes it more easily digested,—in fact it is almost digested before going into the stomach. These potatoes when done will be finished according to the directions on the slips.

While the cabbage, potatoes and meat are cooking I will begin the doughnuts.

I do not expect to tell farmers' wives anything they do not already know about making doughnuts, but some points may be brought out and perhaps some of you can tell me something, for I have learned some things since making doughnuts at Farmers' Institutes. This recipe is a good one, because it was given me by a farmer's wife, and is to be recommended because of its economy and because the doughnuts made in this way are tender and not at all greasy. Cream is almost always in the farmer's home, it is not always in the home of the town housekeeper, but she can use melted butter in place of the cream, two table spoons measured after it is melted will do nicely in this recipe, using one full cup of sour milk.

#### Doughnuts.

Recipe—Beat one egg, add one-fourth cup thick cream, one cup sugar, three-fourths cup sour milk, one-half teaspoon lemon extract, one-fourth teaspoon salt, one-half teaspoon soda

dissolved in a little cold water, flour to make a soft dough. Take out only part of the dough at a time, knead as little as possible and cut out. Fry in deep fat.

I am sometimes asked if I like a Dover beater and I always answer in the affirmative. It is the nicest kind of a beater for whole eggs or yolks, but for whites I like a beater of the style of the Sunrise, or a whisk that beats more air into the eggs. Some people complain that the Dover beater does not last long, it gets cranky and does not go nicely, but I think I can make a little suggestion that will help in the use of the Dover beater. It is a piece of machinery and should be so treated. You would not put a sewing machine in the dish water and expect it to be uninjured. Occasionally the Dover beater should be oiled, and the nicest thing to use is a little lard. It should always be washed or cleansed, as soon as used, in cold water, dried and put away. I say cold water, as the hot water cooks the egg that is left on the beater and it can be cleansed more quickly and more perfectly with cold water.

It probably is not necessary to speak of the measuring cups, as you have them in your Cooking School, and you also have the cups in your local stores, so that I am sure you know all about them without any explanation from me as to their advantages. The measure is one-half pint, and it certainly makes cooking more perfect and more uniform if the measures are accurate.

I am very much interested in the work that is being done by the ladies here in Oconomowoc in teaching the children the principles of cooking. My work the greater part of the year is in the public schools, where I teach the children from the Seventh grade up to the High School, and in my own town, Neenah, the work has been carried on for about seven years with increasing favor. For several years it was under the management of a Woman's Club and at first it was only in-

roduced into the school by the courtesy of the Board, who allowed the children to go during school hours for the lessons, the ladies paying all the expenses of the school, with the exception of the fuel, which the Board furnished. After two years the Board took half of the work and paid half the expenses, the Club the other half, but at the end of six years the Board has taken it all and I think it is so well grounded that there is no question of its place in the school course. Neenah is not a very large city and the fact that it is in the school course in so small a place is due entirely to the determination and hearty work of a few ladies.

I am very much pleased to see that the ladies of Oconomowoc are interesting themselves in the same direction, and I hope you will have the same success in getting it into the school course here. It is one of the coming departments of the public school work of the future; it is already in many of the schools of the state, and, as Supt. Harvey says, it is no longer a fad but a thoroughly practical branch of education.

In adding the soda to the doughnuts, I take what we call an exact level measure, smoothing it with the edge of a knife even with the spoon. I use level measures almost altogether because of their more perfect accuracy. In using a rounding spoon it is difficult to round it accurately over the spoon. When we begin teaching the children we try to show them the importance of accurate measures. They sometimes say it is not necessary to measure; their mothers do not measure and they cook well, and we have to remind them that their mothers would not make measures without looking at them, that they measure with the eye, and that the eyes and judgment have been trained. One of the objects of teaching domestic science in the public schools is to train the eye and judgment.

Question—Do you use sour or sweet cream?

Mrs. Jamison—It makes no particular difference, I sometimes use sour cream and sometimes sweet. It might be supposed to make a slight difference in the measurement of the soda; it does perhaps make a little difference in the texture of the doughnuts, but no change is necessary in the ingredients, so use what you have, whether sweet or sour. It is just the same in using sour milk for your griddle cakes, or your brown bread, or doughnuts; a different degree of acidity gives, perhaps, a slightly different texture, yet you need about the same quantity of soda, one-half teaspoon to a cup of sour milk or cream.

For flavoring I use lemon extract, not because it is the only flavor, but for a change. Nutmeg is the old-fashioned flavoring. Cinnamon is a good flavor for doughnuts, but it darkens them unless put in the lard. One farmer's wife that I know puts cloves into the lard in which the doughnuts are to be cooked. I have not tried it, but I recommend it to you for investigation, when the lard is not used for frying anything else. It will undoubtedly give flavor to the doughnuts and not darken them as it would if put into the dough. Vanilla is not a flavor that blends well with articles cooked in deep fat.

For doughnuts we use more than three cups of flour because the sugar and egg count for liquid so that it requires about three and one-half or four cups of flour. We cannot tell exactly because flour itself varies and it is so easy, unless one is trained not to do it, to shake the cup of flour when measuring and in that way we sometimes get more into the mixture than is needed. The flour should always be sifted before measuring. It is wiser not to stir in all of the last flour but leave the dough floury on the outside, it is easier to handle than if all the flour is stirred in. I shall

take out only part of the dough at a time, because the working of the dough makes it tougher, and if the same dough was worked over and over until all the doughnuts were worked the last would be very tough.

I always like to use a small cutter. I know, however, that is open to objection from some points of view, for a farmer's wife told me she could not get her doughnuts any too big to suit her husband. I imagine that some of the experienced housekeepers are getting uneasy because I have proceeded so far with the doughnuts and have not begun to heat the fat. This is something I have learned only recently, though the method is not new to all. I work the doughnuts and cut them out and let them rise for a while before cooking. I heard this method mentioned several times and when I had an opportunity to try it myself I did so and was so pleased with the result that I have been trying it ever since. It is contrary to the old idea that soda mixtures should be cooked as soon as made.

Question—Do you do the same thing with baking powder?

Mrs. Jamison—No, I do, not think it so successful. Gas forms more rapidly with baking powder than with sour milk and soda.

Doughnuts made in this way are surprisingly fine grained and they are a little whiter than when they rise quickly in the fat, and they are not so likely to crack. Those points I think I have proved fairly well. There may be some other differences I have not yet discovered.

Question—What difference does it make if you put the sugar in the sour milk and let it stand and soak?

Mrs. Jamison—Some cooks prefer to do so. If sugar is coarse or you use brown sugar it is better to let the sugar dissolve, if of fine grain it will dissolve in the mixing. Coarse sugar will, if it dissolves in the cooking, make coarse grained doughnuts or cake. Light brown sugar is very nice

for doughnuts as it gives a nice flavor and it does not make them much if any darker.

While finishing the doughnuts I want to say a word about their digestibility. We read frequently in the papers that doughnuts are an indigestible food, and pastry and pork and baked beans and oatmeal also. Looking into this subject I have discovered that the objections to the use of these foods usually come from professional men. I have watched farmers eat, and sometimes questioned them, and found that they ate all sorts of fried things, and plenty of pork, doughnuts, griddle cakes, baked beans, oatmeal, and those things that are really rather difficult to digest and yet have almost perfect health. And it seems safe to conclude that a man who has plenty of exercise can use a larger amount of food that is difficult of digestion than a man who gets very little exercise, whose work is confined and especially who does not get very much oxygen from the outdoor air; and this opinion has been verified by the testimony of some of the Institute instructors, who have given me their experience without any solicitation on my part. One man said that when he was at home, working on his farm, he could make his breakfast wholly of buckwheat griddle cakes with plenty of butter and maple syrup on them and go out to his field and work hard all forenoon and never think of his breakfast and be ready for his dinner; but while living at a hotel and getting no more exercise than speaking at an Institute, such a breakfast worried him all morning and he did not want any dinner. I could not have a better illustration of this point of the digestibility of food, which depends largely on the occupation and the exercise and the amount of outdoor air. It seems to me in a family the mother should bear this fact in mind and should encourage an intelligent discrimination in the amount of foods used by the different members

of the family, guided largely by the amount of outdoor air and exercise each one gets. Or perhaps the mother herself finds she cannot eat as hearty food as the father who gets so much outdoor air and who breathes in such quantities of oxygen encouraged by his physical labor.

There are certain peculiarities of digestion to which different people are subject; one person cannot digest fish, another cannot eat cheese, another cannot take milk and another cannot eat strawberries without some disagreeable result; but as a rule this principle of which I have spoken applies more or less to everyone, and these individual peculiarities we have to discover for ourselves and act accordingly.

The cabbage now is nearly cooked and I am going to make the white sauce with which to put it together, and also grate the cheese. This dish of scalloped cabbage is a sort of balanced ration, not perfectly so but very nearly. The farmers talk about balanced rations for their stock and is it not time we were considering balanced rations for the family?

The amount of carbohydrates is small, as there is not a great deal of starchy material or sugar in this dish, but there is considerable fat in the butter and milk, in the white sauce and in the cheese, to furnish the necessary heat and energy; we also have muscle-making material in the casein of the milk and the cheese. A curious thing about it is that both the cheese and cabbage seem to be more digestible in this combination than alone. I do not say this proves a universal rule, but I have observed in many cases, and it is an old saying, that "cheese will digest anything but itself." It is a popular notion that cooked cheese is very indigestible, but it is not unless over-cooked. Cheese slightly cooked, that is, cooked just enough to melt it, is rather more digestible with most people than cheese not cooked at all.

Question—I suppose you had to have dry cheese to grate and use on anything like that.

Mrs. Jamison—To grate on a common grater you do; this is not very dry cheese, but as I am putting it through the meat grinder it does not make any difference.

Question—In cooking cabbage you said you left the cover off to prevent the odor. Have you ever put soda in the water to lessen the odor, and leave the cover on?

Mrs. Jamison—Yes, I have tried that way but I find this is just as satisfactory as far as lessening the odor and I have a strong dislike to using soda where I can avoid it. There is, however, an advantage in using soda in cooking any of these vegetables where hard water is used. Vegetables are preferably cooked in soft water, but in our hard water districts we cannot always do so and sometimes add a tiny pinch of soda.

Question—In using recipes in our Cooking School, taken from the Boston Cooking School, we are told to put soda in everything, onions, cabbage, etc., about the size of a pea.

Mrs. Jamison—Do you not think that is more to soften the water? For wholesomeness the water containing the soda should be poured off.

Question—Do you ever put soda in meat?

Mrs. Jamison—I do not know that I have used soda in cooking meat. Is the object to make the meat tender? I would rather use a little vinegar.

Question—Would you use charcoal to lessen the odor?

Mrs. Jamison—There is no special objection but it is not necessary.

Question—Do you advocate dissolving soda in hot water?

Mrs. Jamison—For leavening purposes I usually dissolve it in cold water; some of the soda is lost in using hot water and you have to take more than is necessary.

Question—Is there any difference if you put the soda in the flour?



Mrs. Jamison—It is all right to put the soda in the flour if you know you are using a soda that will dissolve in the mixture after it is wet. Some soda will do that and some will not. I always teach the children to dissolve in cold water and then they will be sure to have no specks of soda.

Question—Mrs. Armstrong said put all through dry and Mrs. Lincoln says sift soda with flour.

Mrs. Jamison—Yes, but Mrs. Lincoln grinds her soda very fine with a knife before putting it in the flour. It is a matter of convenience or individual preference.

Question—In cooking green peas and beans do you ever put soda in the water?

Mrs. Jamison—A little soda to soften the water in cooking green peas and beans is all right.

Question—Have you ever heard that in putting a little bit of soda in green beans that it will quicken their cooking?

Mrs. Jamison—It makes the beans more tender because it makes the water softer. In boiling dried beans I always use a little soda in the first water unless I am fortunate enough to have soft water.

#### White Sauce.

I am very sure that you must have had this sauce demonstrated to you last year, because cooking teachers use white sauce in almost every demonstration. It is what some people call milk gravy, but we make a distinction between the gravy and sauce. The gravy is a mixture thickened with flour stirred smooth in cold water, while for the sauce the flour is mixed with hot fat. The sauce is smoother and of finer texture than the gravy. If you make a milk gravy, using the same proportion as is given for white sauce, you will have, unless you cook it a long time, a gravy with some fat floating on top. Sauce that is ideal has no grease on it.

This sauce has so many uses that it is made often in demonstration work and in practical cooking; there is hardly a day when I am keeping house myself that I do not use it. It is useful in so many different ways. You can make a scalloped dish of cabbage, potatoes, celery, macaroni, etc., using the same ingredients I have used in this dish, merely changing the vegetable. You can make any of these dishes with the cheese if you like. And you can make various creamed dishes by cooking in white sauce, materials like cold chicken, veal, dried beef or codfish; it is also a nice sauce for fresh fish, for canned salmon as a scalloped dish, or merely with the sauce poured over it. A cup of white sauce with a beaten egg added to it served with baked potatoes makes a nice supper dish and one quite proper to serve to children. There is quite a little protein in the egg, enough if they have had meat for dinner.

Question—Is not the white sauce much the same as pastry? You do not object to the white sauce, then would you object to pastry? I think pastry is all right and I think white sauce is all right.

Mrs. Jamison—And I think you are all right. The objections to these things are made, as I said before, by people of weak digestion. For people of ordinary digestive powers white sauce is all right, and pastry is not objectionable if not taken in too large quantities or at unseasonable hours. The objection to pastry is, however, a very real one. The particles of starch being enveloped in a coating of fat cannot be acted upon by the saliva but must pass into the small intestines before the fatty covering is digested. The same is true of the starch in the white sauce, but the quantity is so small that the objection to that is correspondingly less.

We should take particular pains in putting the white sauce together. Let the butter and flour cook until they

have thickened and thinned again, then add milk. Take the butter and flour from the stove if you use milk cold, and stir in quite slowly at first. Some cooks always use the milk hot, and that is a good plan if it is convenient to heat the milk.

Question—Do you know any way to prevent the odor from sauer-kraut?

Mrs. Jamison—I do not. Sauer-kraut and Limberger cheese I have not learned to deaden the smell of, unless you keep away from them altogether.

Question—Have you ever tried doughing it and putting it in the oven?

Mrs. Jamison—No, I never have.

Question—Have you ever tried putting slices of bacon on top to prevent the smell?

Mrs. Jamison—No, I never have. The fact is, I never experimented in this direction but recommend these suggestions to those who are fond of sauer-kraut.

The cabbage and potatoes are about ready to attend to at the same time, so I will give the preference to the potatoes, as the cabbage will be just as good if allowed to cool a little bit, but the potatoes will not. Housekeepers do not always make this distinction. Potatoes should be given the choice. The cook will prepare the potatoes and have them cooked just right, then something else will need attention and she will give her attention to that and let the potatoes stand, and the result is a dish of soggy potatoes.

Question—Have you ever tried rolling baked potatoes and putting in the oven? They will keep for an hour and a half.

Mrs. Jamison—That is something I shall be glad to try. Does it change the flavor? I think it is a very good thing to know. I suppose it breaks up the potato and it does not have a chance to settle in the same way. I should imagine it would change the flavor.

I like to put the butter in while the

potatoes are hot and then add the pepper and salt and when quite well mixed put in the cream.

Question—If you have not plenty of cream can you use more butter?

Mrs. Jamison—Yes, you can use a little less milk if you have not plenty of cream and more butter. The measures of the ingredients in the mashed potatoes are only approximate, potatoes differ in size and also in dryness and the housekeeper must use her own judgment. We do not give a lesson on stuffed potatoes to the children in the first course, but after a year or two they can take these, as they have judgment enough to season without definite directions.

Question—How long will they keep good after being stuffed?

Mrs. Jamison—I think they will keep better than before being stuffed, just as mashed potatoes will keep better than plain boiled potatoes.

In putting this dish together I think it is a wise plan to put most of the cheese at the bottom or lower part, for in that way you are not so apt to over-cook it.

Question—Do you put in salt in cooking the cabbage?

Mrs. Jamison—I usually do, I did not get quite enough in this so I am adding more as I am putting it together.

It is advisable in cheese dishes to use the red pepper, either the cayenne or Hungarian red pepper, which is known under the name of Paprika. It is not quite so hot as plain black pepper, and it is considered very digestible, or rather it is said to make other foods digestible. I have even been told of persons using it on strawberries. It is not strawberry season yet, so I have not tried it, but some who have tried it say a little bit of paprika sprinkled on strawberries will help in digestion. It is not necessary to use enough to make it taste.

For the top of this I am going to use some buttered crumbs, they may be either bread crumbs or cracker

crumbs, and I am going to put them also through the meat grinder for two purposes, one is to crumb the crackers and the other is to clean the cheese out of the meat grinder. This is one of the nicest ways to clean anything from the meat grinder that sticks like cheese; of course it does not do away with the necessity of washing it, but it does make the washing easier and it is a wise plan to use a little bread to clean the meat grinder with if suet has been ground in it, or anything of that kind. There are so many uses for this little utensil it very soon pays for itself if a housekeeper's time is of any value at all. There are a few people, even in this age of the world, who seem to think a housekeeper's time is not of very much value. I heard of a farmer,—I do not think farmers are any worse than men in town in this particular,—who told about the length of time it took his wife to churn the butter and some one suggested that it was a waste of time and he said, "well, she might just as well be doing that as anything else." This does not speak very well for the farmer, or any other man who thinks his wife might as well be churning as doing anything else. She might very much better, instead of running the churn so long, have been reading a Farmers' Institute Bulletin, or some other publication, which would have taught her how to make butter without such long churning. And a housekeeper's time is of value, while it may not bring in dollars and cents, yet it may, if rightly used, bring what dollars and cents will not, that is, better health and stronger interest in the affairs of the world, which means more intelligence for the wife and mother and more intelligence for the whole family. So these utensils are not very expensive when you think of it in that way, and when a farmer has various labor-saving devices for his farm the housekeeper should have hers.

There are a great many uses for this

meat grinder, not only for meat as commonly used for sausage, but one housekeeper told me of using it for grinding sage she wanted for stuffing. I have never tried it for that but the idea commended itself to me at once, because it would be a much easier process than any other form of making it fine, and the herbs you raise yourself are much better than what you buy ground in the stores. Another person told me of using it for cutting the "leaf" for making lard. That idea will commend itself to a good many farmers' wives who make their own lard.

For the buttered crumbs I melt the butter and add the crumbs to it; sometimes the crumbs are put on dry and the butter put on in bits on top. Melting the butter is easier and quicker and does not take any more.

Now the scalloped cabbage is ready for the oven and I shall proceed to fry the doughnuts.

Question—Do you keep turning the doughnuts all the time or only once in a while?

Mrs. Jamison—I turn them as soon as they come to the top and frequently afterwards. Doughnuts made with yeast should cook on one side before being turned, those raised while cooking should be turned as soon as they come up.

The number put in at a time depends somewhat on the size of the dish and somewhat also on the heat of the fat, if the fat is very hot more can be put in than if it is not so hot, for each article as it is put in cools the fat somewhat.

I think I omitted to speak of the doughnuts soaking up grease. It is due either to their having too much shortening or insufficient egg, or else the fat is not hot enough or is of poor quality. Lard made wholly or partly of outside fat of the hog will soak in more than leaf lard will. If you have such a lard you can make it better by putting in a little beef suet, which is of course a harder fat than the lard it-

self, and a little added makes a better mixture.

Question—Should the lard be so hot that as soon as they are put in they will come to the top?

Mrs. Jamison—Almost as soon as they are put in they should come to the top.

Question—Do you put your doughnuts away when they are hot?

Mrs. Jamison—No food should be shut away from the air until cool.

Question—Do you always use lard for frying?

Mrs. Jamison—It is not exactly proper to talk to farmers' wives of any other fat than lard. But when food cooked in lard is found to be indigestible it may be desirable to fry in some other material. Cottolene is one of the best known, and one of the things, as it is made now, quite to be recommended. It is made of beef suet and cotton seed oil. At one time it was rather out of favor on account of its poor keeping qualities, but the manufacturers have remedied that. A fat that is going to be a popular one is made from nut oils. There are several brands on the market. One very great advantage that these have is that they can be heated so much hotter without burning; lard burns very quickly, so will cottolene, but the nut oil will stand a long time and not burn. It has an odor that is different from lard and it is disagreeable to some people because it is different. I think these vegetable oils will in time come to be used more by those who find the animal fats indigestible. Olive oil is excellent but at present too expensive.

The potatoes and cabbage will be ready to serve very soon now.

#### Cereal Coffee.

Recipe—Mix one cup of brown cereal preparation with one egg and one-half cup cold water. Put in a scalded coffee pot and add six cups of boiling water. Let it boil for twenty minutes or longer. Then let it stand a few minutes to settle and add one-

half cup cold water. Serve with cream.

I am not talking cereal coffee for the sake of advertising any coffee, but for the coffee itself. There are two reasons why it seemed wise to put cereal coffee into this year's Institute Cooking School. In the first place, the other demonstrators, Miss Clark and Mrs. Armstrong and myself, when I demonstrated several years ago for Farmers' Institutes, have talked coffee and made coffee; and our talks have been substantially the same, and there is not much that is new to give you in that line; and another reason is that a great many people cannot drink coffee without feeling some disagreeable effect, and for those it seemed quite proper to suggest one of the substitutes for coffee. It has met with greater favor than I anticipated.

Cereal coffee is not new; some of the older ladies in the audience doubtless remember cereal coffee or hearing about it in war times when coffee was very high. It was made by browning barley and wheat and rye and grinding them together, making a very fair substitute for coffee, which was used by many people until the price of coffee came down again.

Those interested in healthful living have been the ones to begin the manufacture of cereal coffee on a large scale, but they have merely taken advantage of the discovery of the housekeepers of war times. I presume that all the cereal coffees combine in varying proportions these different cereals browned and ground; some may have some other ingredients, but the difference in flavor is largely due to the difference in proportion of the various grains. These coffees can be made at home by getting these materials and browning and grinding them, and by proper blending and cooking a very palatable drink can be made. There are several different kinds on the market to suit different tastes.

The directions for the coffee as given here are the same as the direc-

tions for real coffee, with one exception, and that is the length of time of cooking. Real coffee should never be boiled more than five minutes, because of the tannin and caffeine it contains, but cereal coffee having no such objectionable qualities is made better by cooking longer; twenty minutes is not any too much time to cook it. Egg may be used in the cereal coffee and adds to the flavor, but one virtue of the cereal coffee is it is never muddy either with or without egg. The long cooking softens the grains so that they sink to the bottom and the coffee is clear whether egg is used or not, which is not always true of real coffee.

Question—In cooking do you ever put butter in to prevent boiling over?

Mrs. Jamison—Yes, a little butter helps to prevent its boiling over. That is one objection to cereal coffee,—it is apt to boil over.

There is one more point I wish to make about cereal, or any other coffee, and I do not mean to insinuate any untidiness, but if you value good coffee be sure to have the coffee pot clean. You cannot make coffee of nice flavor if the coffee pot is not kept clean; it should be washed and scalded. I am frequently asked why it is that coffee is good sometimes and not at other times. I dislike to ask if the coffee pot is washed every day, but it is a question that comes to my mind, because it does make so much difference. If you are not particular about flavor there is nothing untidy about using it two or three times without washing, but if you value the flavor of your coffee it is advisable to wash the coffee pot thoroughly every time it is used.

Question—Do you consider doughnuts more wholesome made from sweet milk or sour milk?

Mrs. Jamison—I really do not think that there is a bit of difference in the wholesomeness of the doughnuts. It is just the same as using soda or baking powder in other things, it is not so much a question of wholesomeness as convenience or cost. The baking powder is more expensive than the sour milk and soda. Doughnuts made with sour milk do not seem to dry as quickly and the flavor is preferred by many.

Question—Do you ever use cream of tartar?

Mrs. Jamison—Cream of tartar with soda makes baking powder, it is just the same only that some baking powders are not so pure as the cream of tartar you can buy. Some housekeepers make their own baking powder for that reason.

Question—What kind of baking powder do you use?

Mrs. Jamison—Any pure cream of tartar baking powder, I do not care what name it bears so long as it is composed of cream of tartar and soda and not alum and tartaric acid. The pure food laws of our state forbid the sale of baking powder containing alum unless marked outside and you buy at your own risk if it is thus marked; if not marked you are probably not getting alum. A good way to judge is by the price, as cream of tartar baking powder rarely ever sells for less than forty cents per pound. It can probably be made for less, though cream of tartar costs more than alum; but the manufacturers have to pay for advertising and we consumers have to help pay that cost. If you get a cheap baking powder there is probably something else than cream of tartar in it for the acid.

## SECOND SESSION.

WEDNESDAY AFTERNOON, MARCH 19, 1902.

## MATRIMONY, OR HOW TO MANAGE A MAN.

MRS. A. M. GLENN, Janesville, Wis.



Mrs. A. M. Glenn.

This being a Farmers' Institute it would be most natural to expect something along that line, but on thorough investigation I discover that more people are engaged in the business of matrimony than any other occupation and it's the hardest way on earth for a woman to get a living, unless she understands how to manage a man, and no woman should be married until she is thoroughly posted in this branch of her education.

After over thirty years of experience, it would be a dull scholar indeed that could not give some useful information.

## Helplessness of Man.

In the very beginning it was decided by the highest possible authority that it was not good for man to be alone, and we don't wonder at it when we look about us and see how much some men expect of their wives. We read somewhere recently that "Of all creatures in the world a man is the most helpless alone. A chicken two hours out of the shell can take better care of itself than a man can." Of course a woman wrote that and the next conclusion is that that woman has washed her husband's neck and ears ever since she has had him and has made him just the helpless creature that he is.

## Selecting a Husband.

As a rule husbands are just what you make them (of course it won't do to tell them this) and the better material you have to start on the better job you can perform with the same amount of labor. If you have a bump of cheerfulness developed in your nature, don't marry a tombstone. Altogether he is about as genial as an iceberg and you will go plodding through life with him to the dead march of his own leaden thoughts. You may be distant and dignified, you couldn't freeze him colder than he is; you may love and pet him, it's a waste of ammunition, he can't be thawed out, and, above all things, don't marry a dude. He is a weak-minded, contemptible apology for a man, but God created him a man, therefore let him pass for one, but one good, honest, in-

dustrious, young man is worth all the floating fops in the world and unless they can choose wisely, or learn to manage a man, girls had better set their affections on cats or poodles and let matrimony alone.

#### The Family.

The family is the oldest and most valuable institution on earth. It begins properly with the first offspring. In reality there is no family until the husband and wife can say to each other: "Two times one are two and one to carry makes three." And the little third party often brings the husband and wife nearer together than anything else could possibly do.

#### Mutual Helpfulness.

Every wife should be a helpmeet to her husband. For instance, if you have the pleasure of a large washing before you and he has the laborious task of going to the city, or taking a trip through the country, change work with him, let him help you wash in the forenoon and you help him ride in the afternoon. A good wife will deny herself to entertain her husband (especially on wash day). But some men will say: "When I come down to that I'll hire it done." We find no fault with hiring it done, but as to coming down to help a woman, my dear sir, who created you so far above a woman that you have to condescend to come down? I know the Bible says that "The husband shall be the head of the household," but it also says that "The wife shall be a crown to him," and you know the crown is a little higher and just above the head. Such being the case, come up, gentlemen, on a level with your wives and assist in the home whenever you can do so without infringing upon larger and more important duties.

#### Is Marriage a Failure?

The question is often asked "Is marriage a failure?" We say no, if you don't expect too much of it, but

don't run the risk of trying to reform a man after marriage. In all probability you will be disappointed if you do. If your husband used tobacco when you married him, the Bible forbids all curtain lectures afterward, for it says "He that is filthy, let him be filthy still." There is a bright side to everything, if you will only look till you find it. If your husband smokes, be thankful he doesn't chew; if he smokes and chews both, be thankful he doesn't drink; if he does all three, be thankful he won't live long.

It has been said best men are moulded out of faults, but it is not every one that has the ingredients in their make-up to do the moulding. The main difficulty is that people demand of marriage all of the universal virtues of a patent medicine, warranted to cure all infirmities. The marriage ceremony does not remove a woman's faults or a man's crooked disposition. They are exactly the same people they were before they were married, only a little more so. Do we not know this world? Haven't we measured it in the pint cup of our experience and found out many things which our youth and inexperience fondly disbelieved? Have you ever found perfection in literature, weather, climate, your friends, or anything in this world? Then why demand it of marriage more than of these other things? Behold the innocence of the young lady who told her father she was not particular in her choice of a husband, she only wanted one who used neither tobacco, strong drink nor profane language, who would spend his evenings at home and be wholly devoted to her. "My child," replied the father, "You're a stranger here, Heaven is your home."

#### The New Woman.

We hear much about the new woman of today and I am glad we have women who are not afraid to leave the beaten track of their grandmothers and step out on a new line for them-

selves. In former ages woman was little else than a cook and domestic of general housework, but she has added to these her personal liberty and higher education. It has taken the world eighteen hundred years to discover that a woman amounts to something and perhaps in eighteen hundred more they will be willing to give her the same privilege of the ignorant foreigner who can't tell the English language from a porous plaster. Although women may not care to vote, it's just a little humiliating to know the only ones denied the ballot are the criminal, the lunatic, idiots—and women. Whatever the all-wise creator gave woman ability and intelligence to do is positive proof to my mind that he intended she should do if she wanted to and when a man has toiled step by step up the ladder of fame he will be sure to find a woman at the top. As a rule women are not so very anxious to vote, but they do want the men to admit that they have intelligence enough to do so.

#### The Wife's Horse.

Another imposition that is often practiced on the woman (the farmer's wife especially), is, if there is an old, ringboned, spavined, crippled horse that is stove up generally and good for no earthly use, it is kept for the women to drive, while we argue that in these modern days a woman should demand a horse that when she starts for a given point her clothes won't get out of style before she gets there.

#### Training of Children.

If the hand that rocks the cradle is the hand that rules the world, how important that she cultivate those qualities that are noble and grand and lead to true happiness. Fifty years hence the cradled babies of today will be on deck of our great ship of State. Let them be well trained, for we are going to leave a big contract on their hands. In one of these homes the unconscious president of the future is per-

haps at this moment teething and howling in dead earnest and is perfectly justified too. In another the future renowned astronomer is winking and blinking with but languid interest in anything outside the "milky way," and in another perhaps, our future great historian is lying, and doubtless he will continue to lie till his earthly mission is ended.

#### Matrimonial Responsibilities.

When I see so many people rushing into matrimony and rushing out again, I think of that remarkable piece of scripture, "Many are called but few are chosen." Man is fearfully and wonderfully made, but with proper amount of wisdom you can study their dispositions. There are men if you want them to go forward, just give them a twitch backward and all creation couldn't keep them back. Every man has little infirmities of temper and disposition which require to be managed, prejudices that should be avoided, fixed opinions which should be handled with care, but by careful study you can know him as well as though you had gone through him with a lighted candle. The best of men have their failings and married life is not all sugar, but a wise mixture of love and kindness is an excellent remedy when properly applied, and every wife needs a good stock of love to start with. Love is a power which rules

"All men below and saints above,

For love is Heaven, and Heaven is love."

So if you would know the joys of Heaven start a branch establishment here on earth, yourself and husband as equal partners, and you will have a foretaste of the "sweet bye and bye."

Most men are like water, they boil or freeze according to the temperature they are in. So if you carry sunshine in your heart they will soon thaw out. Prove yourself a worthy and competent counselor and he'll ask your opinion every time; sometimes



straightforward and sometimes in a circle, but he'll ask it. A woman jumps at a conclusion at once, where a man would spend half a day reasoning it out, and her instinct is often truer than man's reason. Some men own it and some won't, but they all believe it like gospel.

If your husband has faults, be careful how you broach the subject; some things want doing gently, and telling a man his faults is one of them. You would not use a hatchet to break open an egg, or a sledge hammer to kill a fly on your baby's forehead, so you must not expect to mend your husband's faults by blowing him sky high. A cheerful wife never scolds. It is said a brain is worth little without a tongue, but deliver us from a tongue without a brain.

We admit that women have some faults, such as false hair, false teeth, false complexion, etc., but as a rule there are more good wives than the world gives credit for.

#### Finances.

Every woman should have complete knowledge of her husband's business transactions and although she may not wear the breeches she need not be ignorant of how they should be worn. If she knows the exact state of his financial affairs, she will know just exactly what she can and what she cannot afford. We often hear women complain of the humiliation it causes them to ask their husbands for money. You are not a beggar asking for charity! Are you not equal partners? Then do it with the dignity of a millionaire calling on his banker and not like a scared rabbit hunting for clover.

#### The Ideal Home.

The surest way to retain your husband's love is to make home happy. Pull up your shades and let God's sunshine into your homes and into your hearts. If you are not your husband's

equal, study and improve your mind until you can converse with him on any subject and he will respect you far more than if you spend your whole life toiling and drudging in the kitchen until there isn't cheerfulness enough about you to even smile at his coming. I know it is said the surest way of reaching a man's affections is by the way of his stomach, but I believe that plain living and high thinking are better than high living and low thinking.

There's a why for every wherefore and the why for family jars consists in not knowing how to manage. Now, we have got the best husband in the world, and I'll wager ten to one that if any other woman undertook to draw the matrimonial reins they wouldn't drive forty rods before he would kick over traces, smash up the whiffle-trees, and raise Ned in general. They don't understand the science of management. You must lead, not drive. The only way is to look humble and be desperately cunning, bait them with submission, then throw the noose over their will, walk round the bump of antagonism, and pat their bump of self-conceit. It's a great mistake to contend with the "Lords of Creation," what can't be had by force must be won by stratagem. Make a silken rein of love and lead them where you will, but under no consideration must you attempt to drive or they will at once canter off to the farthest limit of the matrimonial pasture.

Then let us have homes in which there shall be no searching blasts of passion, no polar storms of coldness and hate; homes refined by books and gladdened by song; homes in which wife and mother shall not lose all her attracting charms by unremitting toil and drudgery, nor the husband and father starve his brain and dwarf his soul by hours of overwork; homes in which happy children shall ever see the beauty of love and holiness; homes of culture and homes of love.

## EATING TO LIVE.

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

Once upon a time a little boy from a neighboring city was visiting us. Other visitors came from Illinois who took a great interest in him and asked him many questions, till the little fellow wearily sighed and said: "When I am home, everybody knows my name and age and all about me." That is the case with me. Alas, they even know my age in my town, because I was born there. Though I shall not begin with my age here, I will give a little personal history, which, believe me, I should not consider in good taste if it did not seem very necessary for elucidating my subject.

I am sure my mother never crowded me in my studies, but she did teach me that if I was well, I could learn, earn, be happy and be useful, that, in short, everything hinged on good health. And I never had a really sick day. I do not mean that I have always felt equally strong, but I either had them so lightly as not to be recognized, or else escaped the ills of childhood, like croup, mumps, whooping cough, etc. I taught in public schools eight years without missing a day, and have been a public speaker sixteen years without ever losing my voice. Have not such an education and such results given me a right to talk upon diet, even if there are people here who are older and have longer practiced eating?

## .Eating for a Purpose.

Some eat for pleasure and just what they fancy. Others eat from habit. They simply sit down, shovel in the food and arise filled. Let us consider eating for a purpose; and, as a common starting ground, permit me to review you on what you all know, that in foods are different elements suited to various needs. There is

protein, the builder of blood, muscle, skin, etc., which I liken to mahogany or oak. These woods will burn, so will protein, but any of the three is too expensive for fuel. The starches are our great fuel foods. By some constitutions they are entirely consumed in heat and energy. Others store them as fat or future fuel. The animal or vegetable fats we eat can also be stored or burned in our systems, but in the human, as in the metal machine, they are rather dangerous and expensive fuels and should only be eaten in the right proportion to lubricate our machinery. Generally speaking, adults, especially the lean, need more starches and fats, while the young, and adults of obese habits, need more protein. But my mother never heard of a "balanced ration." And Dr. Gilman Thompson, of Cornell, says that those managing navy and other large commissaries have often succeeded best who knew nothing about "food tables," but aimed for the greatest variety consistent with economy, or, that a varied diet is apt to be a balanced ration, though, of course, Dr. Thompson commends the study of food tables to those who have opportunity. A stockman noted in Minnesota, when asked for his balanced ration, said everything good he could get hold of for his cows, and all he could balance on a shovel.

My mother reasoned wisely that constant variety of food would develop every part of the digestive tract, but not overwork any portion, and would prepare one not to be "upset" by any new, strange food, either at home or abroad. She believed varied foods could do all the work required, and that stimulants were like a lash to a horse. Beating a horse gives him no strength, but causes him to put forth

an extra effort which only hastens his final exhaustion. She did not drink tea nor coffee, nor allow me. As an illustration of the fact that my system has been educated to meet changes successfully, will say I was speaking in a city whose water has a bad reputation for causing typhoid, etc. Some one must have reported me to the landlord, because he kindly took me aside and urged me to drink tea and coffee, or to allow him to provide me a little brandy. In the vestibule, as I passed on, a fellow-speaker argued likewise, while on the porch a popular divine waylaid me and begged me not to be stubborn, saying he was as strong temperance as I, but knew the difference between use and abuse of a thing. To all I explained I had years been training for just such an emergency. As time went on, you ought to have seen how sprightly I was, like a bantam, while those men grew pale and peaked, till, by careful inquiries, I found a reputable well in the suburbs, to which I escorted my companions, and its owner admitted if I was building him up a paying trade, he certainly should employ me as a commercial runner.

I will admit you may have idiosyncrasies, that some foods might disagree with you, but just because you fancy you do not like a thing is no reason you should not eat it. Nor ought the ill-considered prejudices and statements of others to influence you. Do not, without a well-grounded reason, throw any article out of your dietary. Friends of mine heard an eminent authority on dietetics, who presumably does not like strawberries, say "they are not fit to eat because they grow down where snakes crawl." But that objection, if valid, would hold against vegetables, cranberries, etc. The same authority frequently objects to desserts, because their attractive appearance tempts one, against his own good, to continue eating when he has already had enough of other courses. This is true. But when

desserts are composed of fruits, jellies and well-made puddings, we might better dispense with some other features. I keep no servant, and if, at table, I visit at all with my family or with company, must have my desert near. A very wealthy lady who visits me, says it is delightful to know, on the start, everything she is going to have and thus proportion her appetite accordingly. I visited her when she had three servants, who, doubtless, never let their poor mistress know what she was going to have for dinner. The first course consisted principally of olives, rather indigestible, and of cream tomato soup, to which I object because to prevent its cream curdling soda is usually put in the tomatoes, thus destroying their acid, which acid is a divinely-given liver medicine. But, my educated stomach can manage such things. Imagine my disappointment, however, when roast beef and mashed turnips came next, and me filled with that soup! Dr. Dio Lewis used to abuse tomatoes because they discolor silver spoons. Perhaps it did not occur to him that eggs and also the atmosphere tarnish silver.

#### Training Children to Eat.

Next, the question presents itself, How shall we teach children to eat a variety, and especially those things they dislike? Let me give examples how to do it and how not. A little boy and his mother were visiting us. Our meat was codfish in cream, which he refused. His mother said he did not like white sauce or gravy, but that was nonsense and he should learn then and there or go without his dinner. My mother, a woman of great tact, shook her head at such a positive declaration. But there was a scene, the boy cried, left the table for a while, and finally had his dinner without codfish in cream. Those parents often succeed best who, somewhat like "Bre'r Rabbitt" "He low and say nuffin!" A boy who worked for

me did not eat vegetables. I asked whether they disagreed with him. "No," he said, "I don't like the looks and taste of the mushy things." I replied that as he had his own way to make, he might sometimes board with families who would eat principally vegetables and he go hungry and I presumed he was willing to give every in this world a fair trial. Had I ridiculed or commanded, he would have said in his heart, "I will not be bossed by a woman, and a little one, at that." I made a show of caution; suggested he begin with a teaspoonful every time a vegetable was served, gradually increasing the quantity he ate; then, drawing myself up to all my inches, remarked that I had great force of character and could teach myself to do anything in no time, but didn't expect other people could be so strong. Of course, the boy said in his heart "I will not be outdone by a woman, and a little one, at that." When I thought he was equal only to a teaspoonful, he was ready for a tablespoonful, and when I consented to the latter, he was ready for more, being now a fair eater of vegetables and in better health.

#### Medicinal Properties of Vegetables.

Let me pause a moment to speak of that very medicinal and purifying root, asparagus. We had on our farm already three beds, one a large plot, but, last spring, my father set another, so we can be sure to have enough. The onion is a grand liver medicine. The reason why some cannot digest boiled onions is usually because they wish to bring the bulbs on the table retaining their pretty, round shape, and, therefore, perhaps, not done. Unlike corn, beets, etc., onions do not grow woody but tender by long cooking. The usual course, you know, is to start vegetables in hot water, because they are starchy, and, like baking biscuit and popping corn, we wish quickly to puff out the starch granules, breaking the latter's little

envelopes. Cook-books seem to make no exception for green peas, but peas contain considerable protein, especially in their skins, which some people cannot digest. My mother and I convinced ourselves, by repeated trials, that green peas are both more tender and digestible put over in cold water, thus cooking slower, after the proper fashion of protein. Fruit flavors are so fine, I do not like them disguised by much sugar. Our modern tasteless apple and pear are improved in sauce and pie by adding a little salt. While to every vegetable, even Irish potatoes, I add a trifle of sugar, because their flavors are cruder. I do not use enough that any one dreams of sugar, but enjoy hearing people say "You do raise such nice, sweet vegetables."

#### Avoid Too Much Variety.

Since fruits digest quicker than vegetables and meats are midway, too many kinds at one meal complicate digestion. Very lean people presumably have something the matter with their digestion and they, especially, better eat few sorts at one time, making each meal different, thus obtaining their variety. Mrs. E. H. Richards gives as one ideal meal, good bread and butter, meat stew seasoned with oysters, and chocolate with sugar and cream. I once visited two sisters, elegant cooks, but neither of them well. At the first dinner they had, so nearly as I can recollect, three kinds of pie, several kinds of cake, chicken pie, roast beef, vegetables, cold slaw, pickles and light biscuit. They expected me to partake of each. Whenever I praised their work, they said if I thought their table was liberal, I ought to see another sister's, and every time they added "But she is sicker than we are," yet they never saw the connection and joke, as I did.

#### Stimulants.

Concerning stimulants, I am willing to admit they may have a slight food value, but you know they are pre-

eminently stimulants, after all, and their increasing seductiveness is almost irresistible. I know a wealthy hospitable lady who had a large household and many visitors. She did her work and entertained her guests on coffee, till a slight stroke of paralysis came. The physicians declared that coffee had urged her on too far. She did not abandon her favorite beverage until a second stroke rendered her speechless. Do you think I would tamper with anything which might render me speechless?

Though I have no office and he is a high official under the United States government, I disagree with the man who said soda, pie and the frying pan did more harm than liquor. Probably he, like others, believes appendicitis is caused by soda, not berries. I have also heard there are sections where people's faces are as yellow as their biscuit, but, in this enlightened age, have never seen any.

Over forty years ago, a pinery cook told my mother she could not use enough sour milk properly to neutralize her soda and to take, besides, almost as much cream of tartar as soda. A physician's wife once told me she had seen, on her drives and visits with her husband, women pouring eggs they were about frying into cold grease. I believe that every woman

in this audience knows now she should fry with deep hot grease.

#### Recipe for Mince Pie.

There are so many great and important phases of this subject—"Eating to Live," I regret I had time only to treat this one matter of variety, and must now close with my recipe for mince pie, warranted to cure dyspepsia. This is for the gentlemen.

My father, seventy-five, chopped in the woods and split fifteen cords of wood last winter and ten this. We think he did it on the merit of those pies. Instead of using vinegar for my tartness, full of its poisonous sulphuric acid, I use canned rhubarb, a great liver medicine and digester. My spice is chiefly mustard, another great medicine and digester, which gives a delightful warmth and brightness, but is easily disguised by a sprinkling of cinnamon, etc. Too many mince pies have meat like leather. When boiling my meat, before chopping, I take it off while still pinky and not done to death, thus allowing for a little future cooking. If the crust is quickly baked and crispy, that digests easier than a soggy, falling crust.

Friends, try your medicine in a variety of good victuals.



## THE FAMILY TABLE.

MRS. JENNIE A. JAMISON, Neenah, Wis.

I can hardly expect to interest this audience in such a prosaic subject as the Family Table after the bright addresses they have just listened to, but I will be brief and my talk will be quite informal.

In speaking of the family table, I mean the general situation, environment and the appearance of the table and the daily gatherings of the family around the table. There is no part of the home life that is more sacred, no part of the home life that lingers longer in the memory. Happy indeed are those families where every member can be present at the family board three times a day. This is one of the ways in which the farmer's family are blessed more often than the city household, where the family cannot meet at every meal because of business engagements that break into the regular hours.

Wherever the table is set or whatever its surroundings, cheerfulness should pervade the atmosphere. Groans and grumbings should never be brought to the family table; cheerfulness and laughter, as we have been often told, are good digesters.

Whether the table is placed in the kitchen, or in the dining room provided for it, depends upon the size of the house and partly upon the taste and wishes of the family themselves. If the table is set in the kitchen it saves some steps, but I would make a plea for a separate room for the dining table as far as possible. While it may make a few more steps the housekeeper will almost always relish her meals better if it is set in a clean place and in a place that in summer will be cooler than the kitchen.

The situation of the table implies also something of the manner in which the table shall be laid, and

some of the rules of serving must be in accordance with the position of the table, as well as with the size of the family, the time they have for their meals and other considerations. I do not intend to speak of elaborate serving or elaborate tables, but just the plain, simple home table.

## Situation of the Table.

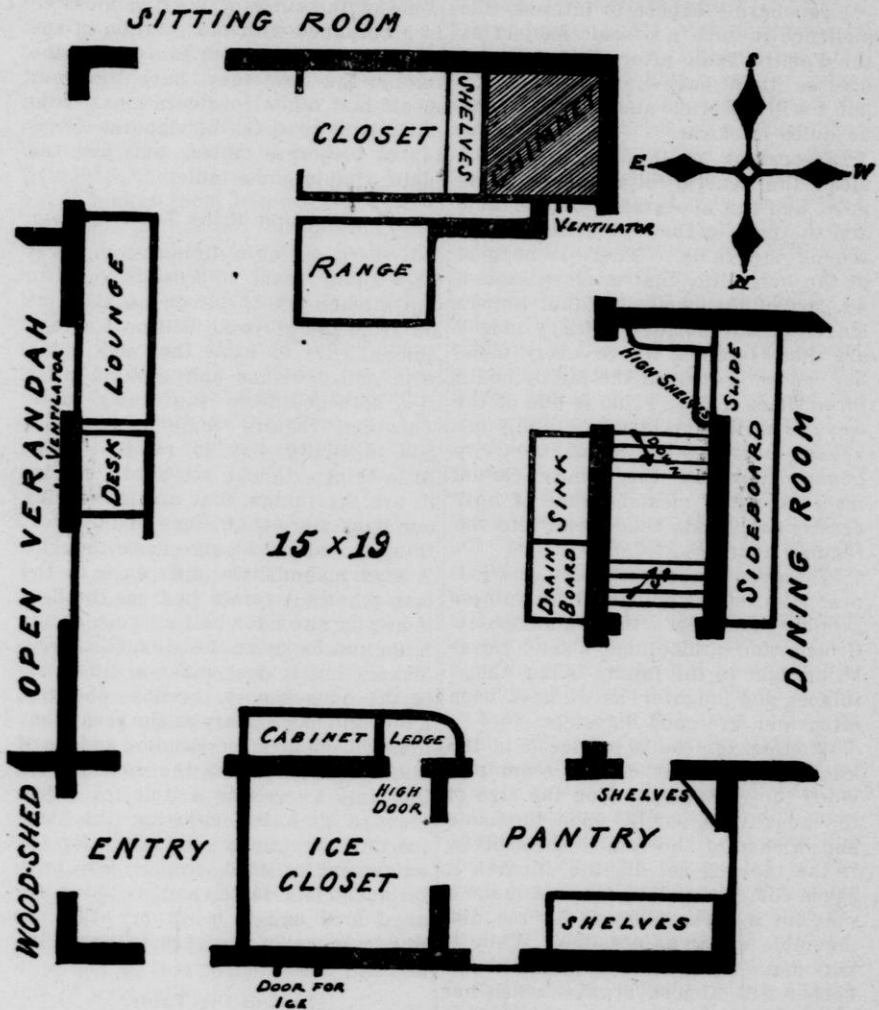
If there can be a dining room, let it be a sunny room if possible, or if in the kitchen try to have the table as far from the stove as will be comfortable, and try to have the sink, filled with soiled dishes and cooking utensils, screened from the dining table. This may require some management and ingenuity, but it pays. These little things, though we hardly realize it, are the things that are influencing our lives more than some of the great things to which we give more thought. It may make little difference to the man when he comes in from the field if he sits down for half an hour at the table and looks at the sink filled with dishes, but it does make a difference to the housekeeper, because she gets more and more weary as she sees what must be done after dinner, and so if possible try to make the meal a resting time as well as a time for enjoyment, a time for enjoying the company of the family and also for the enjoyment of good food. We have been given a taste and a liking for good food and it is proper that we find reasonable pleasure in partaking of it.

## Laying the Table.

In laying the table the first consideration is the cloth, the covering of the table, and if possible that should always be white. It really is not very great economy to cover with a red

cloth, and I do not know that it is very often done now-a-days. To a delicate child it certainly does make a difference whether the cloth is red or white, and even a well and healthy

asked him why he said "because there was a red cover on the table." The white cover gives a better background for the furnishing of the table, and is more pleasing to the eye.



Plan of Farm Kitchen.

adult is sometimes influenced by it. At a hotel recently I met a man who is in Institute work; he told me he had not enjoyed his meals at a certain place where he had been, and when I

If you have a dining room and the table laid there, you can probably keep the cloth on all day. This saves a great many steps and saves also the laundering of the table cloth, as it

does not need so much care as it would if taken off and folded each time. If you have a table that can remain covered, by all means have under the cover a silence cloth. This will prevent injury to the table from hot dishes; it is unnecessary to have mats, if the cloth is reasonably thick; it will also lessen the wear of the table cloth itself and give it a better appearance. It is better to have one, even if it is nothing but a partly worn, clean blanket, if you cannot afford something on purpose for it.

The laying of the table sometimes needs to be done in a hurry, but it should not be slighted, especially if in a room that is assigned to it. The table can be laid quite a time before the meal must be prepared and it need not be left until the last. This is one of the things the children can be taught to do, and they need not be very old to learn to carry in the plates and lay the knives and forks properly and straight, and to put the napkin in its proper place, and it helps the mother so much and at the same time teaches the children order and symmetry.

The plates, if they are hot, as they should be always for hot dishes, should be piled in one or two piles in front of the one who is to serve, preferably the man of the house, and the knives and forks should be laid on the table where the members of the family are to be seated.

While we do not want to be too stiff, still we do want our things straight and true on the table; the knives and forks should be laid at right angles to the edge of the table, the knife at the right with the sharp edge of the blade towards the plate, and the fork at the left with the tines up. Every housekeeper should know how they should be laid and should teach her children to do it properly. These little details seem unimportant, but they mean a great deal, and there are reasons for doing these things in this way. If the knife is laid with the

blade toward the plate, it is just as you wish to use it, while if it is turned the other way you have to turn the knife over to use it. The tines of the fork should be up so that they will not scratch the table cloth, and also to show the beauty of the engraving, if silver. There is a reason also for placing the spoons near the plate, that is the convenience, but just where will have to be regulated by the size of the table and the taste of the housekeeper. The spoons should be laid with the bowl up; this is the prettiest side of the spoon, which is reason enough for doing so. The tumbler should be placed top up at the end of the knife, and the butter plate at the end of the fork. The individual bread-and-butter plate, which is coming into general use and which finds advocates because of its general usefulness, should have the same place as the smaller butter plate would occupy. The napkin should be placed at the left beside the fork.

It is wise for every housekeeper, however simple and humble her dining arrangements may be, to know these things and work towards the proper laying of her table as far as possible, and have her children know what is proper.

Let me speak of a very beautiful custom of a busy family who on holidays have the table always set in the most elaborate fashion that their furnishings will allow, and they are served by one of the family as though they were being served by a trained waitress. I think it is a beautiful custom; it is one way they have of marking the holidays, and it accustoms the children to the serving that they may meet with in this country almost any time in their lives, and they will be more easy at the table where the serving is elaborate if they have been accustomed, even occasionally, to such things at home.

The other articles on the table should be placed with the same design of making the table look true and



symmetrical; the cups, saucers, sugar bowl, cream pitcher, stand for coffee or tea pot, should be placed near one end of the table where the mother sits to pour the coffee or tea, and the carving knife and fork, when needed, should be placed at the other end of the table. It is usually more convenient for the heads of the family to sit at opposite ends of the table, or opposite sides, and it adds to the symmetry of the table if the ends are balanced by the dishes for the heavier serving.

There is one point I want to emphasize that Mrs. Tilson brought out, and that is having too great variety at one meal. Do not have so many dishes that they will cover every square inch of the table cloth; let it show, it is put there for looks, and it is a pity to lose so much of it. Do not cover it up with so many plates of olives, pickles, jelly, cake, cookies, and such things, but leave it uncovered to show its beauty.

Perhaps I should have spoken of the laundering of the table cloth. It should be carefully ironed and the spots removed; a little oxalic acid will assist in removing spots and if used carefully there is little danger. You should have a saturated solution, and hot water poured on afterwards sometimes helps in removing the spots. Wash afterward with soap or ammonia water to counteract the acid.

The bread plate should be one of the attractions of the table, not merely because bread is one of the best foods and one of the most common, but it should be of the best quality and should be cut straight and the plate filled evenly. In working with the girls in the school we find that most of them cannot cut bread evenly and straight, they say at home mother would never let them cut the bread, but they should be allowed to learn to cut each slice straight and smooth and pile it on the plate evenly, with the top crusts all one way. This seems a small thing and some people

think it does not make any difference, but it does make a difference with some people at least. A gentleman was looking for a cook and he came to me to inquire if I knew of one. I asked what the trouble was with their previous cook and he said she was all right in some ways but she did not give enough attention to little details; his wife was ill and he had to look after those things, and he mentioned that she would bring a plate of cookies to the table with part of the cookies wrong side up. These are little things, but it is just as well to do things right. It takes no more time.

In setting the table, do not forget the centerpiece; a vase of flowers or a growing plant in the center of the table is attractive, even a pot of parsley that will furnish a garnish for some of the dishes will add to the looks of the table; or a plate of fruit; and I have seen a handsome empty plate on a worked centerpiece used with good effect. Not too much color, but something pretty to rest the eye upon as it is lifted from the plate.

#### Serving.

So much for the laying of the table, and symmetry and the white table cloth are two points I want to emphasize most. The serving must be done according to the circumstances of the family, their taste and work. There are not many families of the middle class who can take the time for serving in courses, for it must be done quickly and they have not the time for much formality. But I know of one family where the man goes to work at 7:00 o'clock and they get up early enough to have the breakfast served in courses; even the young children are up before 6:00 o'clock so they can serve in that formal way because they like it. The housekeeper in this home does not have as long hours as the man, and she has considerable help in the home, and so

does not have to count her time quite so closely as many do.

Please consider the suggestion I have made of teaching the children, at least on holidays, the more formal methods of serving; then for every day meals let one of the girls, or boys if they are more numerous, clear the table, lay the table, wash the dishes, and learn to do all properly. And even in the plainest serving, if possible, prevail upon the man of the house to serve the meal, even if he sits in his shirt sleeves. It does not take much longer than to pass things around and it is so much nicer to have him serve a portion to each member of the family on the plates in front of him; then teach them, as they pass back the plate for a second serving, what to do with the knife and fork. This is one of the little things that a great many people who have had good training in other ways are not conversant with. The knife and fork should be left on the plate at one side, because there is no other place for them, and to hold them in the hand looks and seems rather awkward.

For serving, as I said before, the plates should be hot for the hot things and on a cold winter morning it is not at all unpleasant to feel that the silver knives and forks have been warmed. In the summer time it is quite as important to have the dishes cold for the cold food, as salad and butter. These things require a little thought rather more than time, but habit goes a long way. I know of an old lady who is not at all strong much of the time, but she is just as particular to have every dish just as it should be as if she had some one to do these things for her, but from long habit she does it easily.

In bringing dishes containing food to the table, be sure they are clean; I mean dishes which may have become soiled in placing the food upon them. A little care will usually prevent this.

Sometimes the head of the house dislikes to carve, especially if he does

not know how. It may be done in the kitchen, but it seems to me a service which the man of the house owes to his home. The few simple rules that cover all ordinary carving are not difficult to learn.

#### Table Manners.

Then just a word or two about table manners. If manners ever "make the man," it is at the table. I should suppose it hardly necessary to speak about these simple rules, were it not for my experience with the children in the public schools. Sometimes perhaps the parents do not know, but oftener they are too indifferent to the importance of early training in these things. Such small points as resting the elbows on the table, toying with the hair, flourishing the handkerchief, blowing the nose, making a noise in eating or drinking, taking food on the knife, etc., need not be enlarged upon. There is a good reason for avoiding these things. Sometimes the children think the use of the knife and fork are rules of fashion merely, but they can quickly see when their attention is called to it that the fork, being shorter and curved, is a more graceful article to use in carrying food to the mouth. Knowing that it is improper to eat with the fingers, they sometimes make the mistake of attempting to help themselves to bread with a fork. Things that do not soil the fingers may with propriety be eaten from the fingers. Bread should be broken, not cut, and carried to the mouth in small portions, and should not, for obvious reasons, be laid upon the table cloth to be spread. Liquids should be taken from the side of the spoon, the spoon itself should be laid in the saucer when the cup is used to drink from, and only elderly people are ever permitted to drink from the saucer.

One point more is the guest at the table, and here is one reason for this care in the every day serving, and in having our every day table manners

such that when a guest comes the children will not feel ill at ease but behave in the way we wish them to. We do not want to put on for our guest anything more than we can do every day. I remember when I was a child being in the family of a friend at the time of a calamity in our own family, and "the teacher" was invited as a guest. The table was set for the family as usual with the plain stoneware dishes, etc., but for the guest there was gold and china and silver fork, and these things made a great impression on the children, and I vowed it should never be so at my table. It is no unusual thing to see children trying to put on better manners when there is a guest than they do every day and it is just as noticeable to the guest as it is to the family. And the guest will feel more at home if the meal is served in the same way we are accustomed to when alone. No people are better than our own, there are none more deserving than the people in our own home, and why should we put on more for the occasional guest.

Then when the child goes out into the world, and in this country there

is no telling when that child from the farm may preside at the table in the White House, she goes with an ease and assurance won by years of right training that make it much easier for her. Of course we cannot teach and we do not need all the rules of Washington etiquette, but the ease of manners that results from years of training in the every day affairs are a great help when the surroundings are more elaborate.

There is after all no point perhaps in small things in which a person is more quickly judged or in which his home training shows more than in his manners at a strange table, so I make a plea for attention to these little details in the farmer's home and in the homes of the town's people also. No matter how simple or plain our surroundings, we can have a neat table, we can have food prepared carefully, and we can have it rightly served. Things need not be elaborate nor costly to enable us to teach at our own tables and in our own homes the ease of right manners which will be valuable to our children everywhere, even if they are called to appear in the very best society in the land.

### THIRD LESSON.

THURSDAY AFTERNOON, MARCH 20, 1901.

Mrs. Jamison—I feel sure that the ladies of Oconomowoc and vicinity are very much interested in domestic science, for no other reason than interest would bring so many out for three successive afternoons. I wish that you could have heard Prof. Woods' talk this morning on foods, the value of milk especially, I wish that all housekeepers might have had the benefit of it. I have brought down some of the leaflets he used to illustrate or explain his talk and they have been distributed, and while I perhaps

will not give you any chance to look at them this afternoon as we shall be too busy, you can carry them home and examine them at your leisure.

The question was asked this morning about the food bulletins issued by the government, and some of the ladies will be interested in this matter also. You can get them from the government at Washington by writing to the Secretary of Agriculture for the Farmers' Bulletins on Foods, which are free. One of the first issued was "Foods: Nutritive Value and Cost,"

and it is No. 23 of the Farmers' Bulletins. In writing to the Secretary of Agriculture Prof. Woods suggested that you write for the first one by number and ask the Secretary to send the other bulletins on food questions and you would probably receive five or six bulletins on allied subjects, as for instance one on "Milk as Food," No. 74; one on "Meats: Composition and Cooking," No. 34, also one on "Bread," No. 112, and one on "Eggs," No. 128. These are prepared under the direction of the Department of Agriculture and are reliable authority as far as any such study can be. Prof. Woods as well as our own State Chemist, Prof. Mitchell, are giving a great deal of their time to the study of foods, and they are not the only ones. It is only within a few years that experiments on the value of foods for people have been carried out scientifically and carefully by state and national Experiment Stations, and the information given in these bulletins is as reliable as anything can be that must be studied from the standpoint from which foods must be studied and under such necessary restrictions.

The program for this afternoon is as follows:

Oyster Stew.                      Meat Balls.  
Meat Pie.                              Rolls.  
Coffee Custard.                      Caramel Sauce.

The first thing I shall prepare is the rolls. This dough was sponged this morning about 9:00 o'clock and about half past eleven I kneaded the dough and now it has doubled in bulk and is ready to be shaped into rolls. This is made exactly according to the recipe given on the slips, with the exception that because the room was a little cold this morning (and of course I was very anxious to be sure of my bread) I used a larger quantity of yeast.

#### Rolls.

Recipe—Put into a bowl three level tablespoons of butter, two of sugar and

one teaspoon salt. Add two cups scalded milk. When lukewarm add one cake of compressed yeast that has been softened in one-fourth cup of tepid water and three cups of flour. Beat well and let rise until full of bubbles. Then add two and one-half or three cups more of flour and knead until it has lost its stickiness and is smooth and elastic. Let it rise until double in bulk. Knead again slightly, shape into rolls, let rise and bake in a quick oven.

#### The Value of Bread.

Bread is one of the most important of our foods, if not the most important. First, because it is so universally liked, and also because it furnishes to the body very nearly all that the body requires and in very nearly the proper proportion. The composition of bread is given on the leaflets by Prof. Woods that you have in your hands, and you will find that it is composed of protein, the tissue builder, and carbohydrate, the energy producer, the carbohydrate being represented by both starch and sugar. There is also some fat in the wheat and more in the bread if we use milk and butter in the making of it. You will see that two and a half pounds of bread will furnish very nearly the amount of protein and number of calories needed in one day.

Bread, perhaps, worries the housekeeper more than any other one thing she makes. So much depends upon it and it requires so much time in making, and she feels that she must have good bread whatever else may be lacking or inferior; and so from the time the bread is started until it is baked and put away it means care and attention on the part of the housekeeper.

I am sometimes asked what kind of flour I use and what I would recommend. I might say of flour as of baking powder and other manufactured products, that we cannot say that any one manufacturer makes the best of the kind, because there are several

brands of many food products on the market which are equally good. This is especially true of flour.

The test of good flour is, first, the color, which should be somewhat yellow or creamy. Second, it should be of such a texture that it feels grainy or sandy as you rub it between the fingers. If you rub corn starch through the fingers it feels smooth and leaves the impress of the finger, but good bread flour does not hold the mark as it is pressed with the hand, but will break and separate.

#### Yeast.

In making bread I prefer the compressed yeast for several reasons. It is, in the first place, more reliable than any other kind of yeast, and you may be reasonably sure if you set your bread with compressed yeast and give it at all a fair chance that you will have your bread raised in the time you expect, and have uniformly good results; hence it greatly lessens the care and worry. If haste is necessary or conditions unfavorable, the quantity of yeast may be increased without impairing the flavor of the bread, or if it is desirable to set the bread over night, a smaller quantity may be used, which will lessen the danger of souring. Another advantage of the compressed yeast is that it does not require as high a temperature for raising as the dry yeast does.

The active part of all yeast is a little germ of the vegetable order, which in growing produces in the bread the carbon dioxide gas, which renders the bread light and porous. It differs from the ordinary plants to which we are accustomed, in that it produces carbon dioxide gas instead of absorbing it from the air as plants that grow in the soil do. This little plant lives in the air in a wild state and it is because of this fact that I like the compressed yeast; the wild plants from the air are kept out of it by the chemists who manufacture it, while in the yeast we make ourselves they grow

and are the chief cause of unreliability.

Question—Is this true of the dry yeasts?

Mrs. Jamison—I have supposed it to be true of all dry yeasts that are manufactured with the care that is given to the compressed yeasts.

Question—How long will compressed yeast keep fresh?

Mrs. Jamison—It will keep fresh at least a week in cold weather. In summer time it will keep a week in the ice box. I speak from experience, for in making bread for my small family one yeast cake does for two bakings and makes as good bread the second baking as the first.

Question—If people do not live where they can buy as often as that they could not very well use it.

Mrs. Jamison—Very few live so far but that they get to market at least once a week and if they get it once a week it will last for two bakings. There is difficulty though in getting it in small places. (A lady in the audience volunteered the information that in small places arrangements can be made through the grocer by which even a few housekeepers that care for the compressed yeast may be supplied. If they will club together and deposit the money in advance the yeast will be sent them once or twice a week. It is also sometimes sent by mail.)

Question—Have you ever tried putting it in a fruit jar and putting it in a cold place to keep it?

Mrs. Jamison—I have never tried the plan but have heard it recommended.

Question—Is your bread dough different from rolls?

Mrs. Jamison—Yes, this is shortened and sweetened more than the bread. The only shortening in the bread is in the milk.

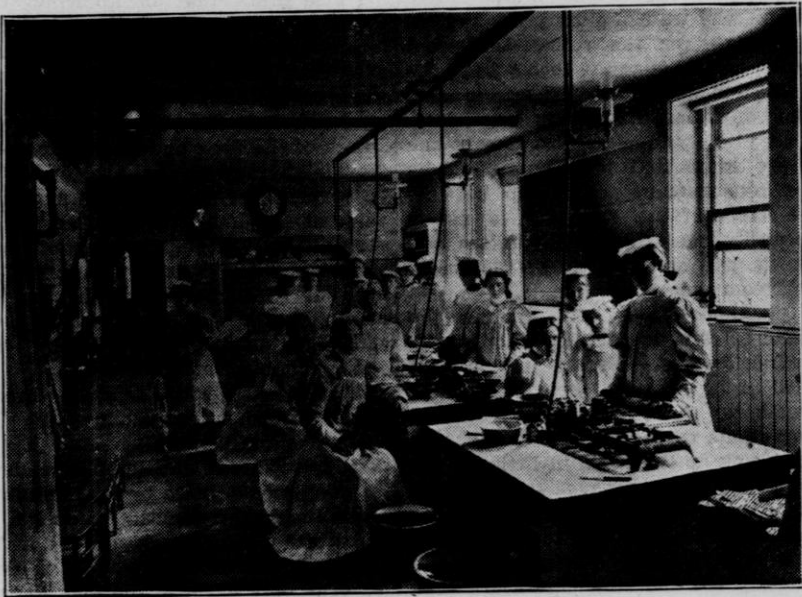
#### Plain Bread.

Recipe—One pint scalded milk, one pint water, one rounding teaspoon salt, one rounding tablespoon sugar,

one cake of yeast softened in one cup tepid water, about three quarts of flour. Put milk, water, salt and sugar in a bowl, and when lukewarm add the softened yeast. Add about half the flour and beat well, then add the remainder of the flour, or enough to make a soft dough, knead about twenty minutes. Let rise four hours, then shape into loaves; let rise again and bake about one hour.

them a bread lesson to have the water of such a temperature that they do not feel it when they put the finger in, that is, to have the temperature of the water just about the temperature of the finger.

Beat the batter smooth and then add more flour to make a dough that can be turned out on the board and worked. It is difficult to make the measure of flour perfectly accurate,



Making Doughnuts in a Public School Kitchen.

Tables supplied with gas plates on which most of the cooking, except baking, is done. Pantry beyond furnished with cupboards and swinging flour bins. Shelf over sink used for aprons of class because of over-crowded condition of curtained boxes at the left. The three little girls are from the deaf school learning by observation. A full class.

For plain bread I recommend the method of working hard at the beginning, as it saves time and trouble and gives a fine-grained, nutty-flavored bread. It is better that the water in which the yeast is soaked be rather cold than too warm; if warm the bread is more likely to taste of the yeast, and I tell the children when giving

as the flour varies and the cooks vary, but usually it requires about three times as much flour as liquid for bread. Then the bread should be kneaded until it has lost its stickiness, is smooth and elastic, and covered with blisters on the outside. This requires about twenty minutes, sometimes less if the flour is of very good

quality. This kneading makes the bread even and fine-grained and is really all the labor that is necessary in making bread.

Question—May I ask why it is some cooking school teachers object to sugar in bread? Mrs. Rorer does.

Mrs. Jamison—There are several reasons. The sugar and the shortening retard somewhat the action of the yeast if put in in considerable quantity—that is cane sugar—which is one reason why we use more yeast and set a sponge for the rolls;—the yeast works on the sugar it forms from the starch in the flour. There is also some objection to sugar in bread from a dietetic standpoint, but this is one of the things that must be studied by the housekeeper. Some do not like the flavor of the sugar, it is not a necessity, nor is the salt, unless you like it, and salt retards the action of the yeast also.

Question—When you sponge the bread or rolls do you beat very much?

Mrs. Jamison—Yes, I like to beat until it is perfectly smooth, beating breaks up the yeast and scatters the tiny plants throughout the dough. I do not break up the yeast in little bits as some do, simply because I do not like to handle it. I put it in tepid water to soften it, then put it in the dough and in working the dough it breaks up sufficiently so that the plants are scattered through the mass and do their work of growth in that way. Oxygen hastens the growth of the yeast. Beating and kneading expose the whole mass to the oxygen of the air.

Question—When you soak the yeast do you let it come to the top of the water?

Mrs. Jamison—No, not always. I let it stand until it softens and spreads out a little perhaps, as is convenient.

Before speaking of the baking of bread, I want to speak of my reason for letting the bread rise only twice instead of sponging it and allowing it to rise three or four times. The reason some sponge their bread and allow it

to rise several times is that it will be whiter. When raised only twice less of the flour has been used in the fermentation and the flavor of the bread is much more like the flavor of the wheat than if the fermentation is repeated several times, because in that case the flour loses much of its rich, nutty flavor. This is an experiment within the reach of all and I would suggest that you try it.

I also think that in allowing the bread to rise so many times and the fermentation to be repeated over and over that more of the nutritive properties of the flour are lost. Of course we know that the yeast feeds on the starch of the flour and that the carbon dioxide gas and alcohol are formed at the expense of some of the nutritive value of the flour. It is a very small amount and without wealth of food materials perhaps not worth considering, but when better results can be obtained with less work it is a good enough argument for working the dough out hard at first.

Question—Do you knead the bread very much when you put in tins?

Mrs. Jamison—Only enough to thoroughly break the bubbles caused in rising, about three or four minutes, according to the quantity of dough. I knead the whole "batch" quite a little, then each loaf enough to shape it nicely. The only harm in the long kneading is that it takes longer to rise if kneaded very much. For Parker House rolls I think it advisable not to knead the dough very much. The more quickly they rise the better they retain their shape.

Question—Do you ever put potatoes or potato water in your bread?

Mrs. Jamison—If you like the flavor of the potato and the texture it gives the bread there is no objection to using it. I do not advise the use of potato water, unless you are willing to take the pains to par-boil the potatoes and throw away the first water in which they are cooked which contains the poisonous, acid flavor, and then

putting on fresh boiling water finish cooking the potatoes. This water you can use in your bread if you like.

### Baking Bread.

There are several objects to be attained in the baking of the bread. First is the cooking of the starch of the flour, which, of course, is neither palatable nor digestible unless thoroughly cooked. Second is the driving off of the gases which are formed by the fermentation, the carbon dioxide gas and alcohol of which I have spoken. Third, the destruction of the yeast plant, the germ which has formed these gases, and fourth, but by no means least, the production of the crust of the loaf which makes the outside of the bread more easily digested than the inside. I spoke on Tuesday of the value of baked potatoes over the boiled potatoes from the fact that the starch was cooked at a higher temperature and that the slight caramalization of the outside of the potato rendered it more easy of digestion, and for the same reason the outside of the bread is more easily digested than the center. Toast is recommended where bread not toasted cannot be used.

To attain these results in baking, the bread should be baked at a high temperature at first; the oven should be hot enough to brown the bread in the first fifteen minutes, after that the heat should be decreased by lessening the fire or opening the oven door a little later in the baking, or by covering the bread with brown paper, as is often done, to finish at a lower temperature.

Question—Is that for bread in loaves?

Mrs. Jamison—Yes, for bread in loaves. Fair-sized loaves should bake at least an hour, rolls about thirty minutes.

I wish to make an appeal for bread baked in single tins where there is a crust on six sides, because of the more thorough baking of the bread. We

must get a high temperature to the center of the loaf to be sure that every germ has been destroyed.

Question—How do you test to find out if the bread is done?

Mrs. Jamison—I always bake by time myself, but there are tests which some housekeepers learn from experience. Some put the hand on the loaf and if they do not feel the steam escaping consider it done, others test by the singing sound which very nearly ceases when the bread is done, and there are some other tests, but there are none more practical than the time test, provided your fire is all right. In our modern ranges, with any reasonable amount of care, you can keep the fire exactly as you want it. I sometimes am led to make the statement that there is nothing but weather on which we can put the blame for poor success in cooking. We cannot talk about "luck," for with the high grade of materials, utensils, and stoves now on the market, we cannot blame materials, we cannot blame utensils or the stove.

Question—Do you prefer sheet iron or tin pans?

Mrs. Jamison—I prefer sheet iron pans, especially the smooth finished Russia sheet iron.

Question—What is the cause of cracks in the bread?

Mrs. Jamison—Probably uneven baking at the very first. It is usually wise to turn each loaf as it begins to bake.

We cannot give accurate rules for baking the bread. If we could bake with a thermometer in the oven it would simplify matters, but we cannot do this usually, though some ranges have an oven thermometer; still it is not difficult to learn from experience.

I spoke about destroying the yeast germ. It has been stated on good authority that if the yeast and other germs are not killed before they get into the stomach they find there just the conditions necessary for growth



and they produce there a fermentation and cause one form of indigestion. One chemist said more harm was done by yeast breads than baking powder breads, because of their being poorly baked. But there have been vast improvements in the baking of bread in the last eight or ten years. The bakers are making improvements as well as the housekeepers. This is evidenced by the method employed by the majority of bakers in kneading by machinery and baking in tins that give a crust on all sides. Of course bakers' bread is by no means ideal bread, but I speak of it because it is more nearly uniform than the home breads that we may take from here and there.

Question—Should the bread be covered after taking from the oven?

Mrs. Jamison—After taking from the oven it may be covered a little to keep off the dust, but it is not wise to wrap it, if wrapped the gases and steam do not escape as readily but are retained in the loaf and the bread does not keep so perfectly.

#### Care of the Bread After it is Baked.

It should not be put away until it is perfectly cold, and the best utensil in which to keep it is a stone jar or a tin box with a tight fitting cover, and in this the bread should not be wrapped. Of course it is not necessary to say that the jar or box should be washed and scalded frequently, and perhaps sunned too, to keep it sweet. There is no better sanitary agent than sunshine and none more free and easy to use.

Question—Do you wet the top of your loaves of bread before putting in the oven?

Mrs. Jamison—No, I do not. That, too, is a matter of personal preference only. If bread is moistened it makes the crust of a different texture. If you moisten before putting in the oven it makes the crust crisp, if you moisten after it is done it makes the crust soft.

Question—Do you pierce it to let the gas escape?

Mrs. Jamison—There is no virtue in piercing to let gases escape. If I were asked to take my choice of loaves of bread that stood side by side, one of which was pierced and one not, I would take that which had a smooth surface, for it is just as good and looks better.

Question—What do you think of graham bread?

Mrs. Jamison—We are being taught new things all the time by the experiment stations. The old idea was that there was more nutrition in graham bread than in the white bread, but this idea has been quite thoroughly exploded by scientific experiment on human beings, much to the gratification of the highest class of millers, who claimed they were putting the very best of the wheat in the white flour. Whole wheat may analyze more protein and more mineral than the white flour, but the system is not able to extract from the graham and whole wheat bread as large an amount of protein as from the white flour, so that in spite of the theories which we have urged, (I have talked whole wheat bread myself), we have learned, from experiments carefully made in several parts of the country, that the white bread is the best for nutriment, but the whole wheat is to be recommended for the larger proportion of phosphates.

#### Meat Pie.

Recipe—Use any cold meat except salt meat. Cut in small pieces, put in a baking dish and cover with a slightly thickened and seasoned gravy. Set it on the stove to heat while the crust is being prepared. To a pint of sifted flour add four level teaspoons of baking powder and one-half teaspoon of salt. Mix thoroughly and work in three tablespoons butter. Add about three-fourths cup of milk, or enough to make a very soft dough. Spread this over the hot meat and

bake it in a rather hot oven until the crust is done through and browned on top.

I will now start the crust for the meat pie. This meat pie crust is a type of baking powder doughs. I use baking powder in preference to the pastry dough because of its greater wholesomeness, it is more easy of digestion than the pastry crust and I think, if carefully made, so it is tender and light, it will be found generally as palatable as crust that is made with a larger amount of shortening and no baking powder. In using baking powder we find for plain doughs, which we sometimes call baking powder biscuit doughs, that a good proportion of baking powder is two level teaspoons to each half pint of flour. That proportion often astonishes the older housekeepers who are in the habit of using the rounding spoonful, but if they would measure they would find they are using as much baking powder themselves. It is quite proper though in using a large quantity to lessen the proportion of baking powder somewhat. Also in a dough in which eggs are used, a less quantity of baking powder is needed, about one and one-half teaspoons to one-half pint.

We find the best way to mix the flour and baking powder is to sift it; sift first into a bowl, then into a clean dish, then back again into the mixing bowl, then the bowl or dish that has been used for the flour may be merely wiped and is clean for other purposes.

Baking powders were discussed quite freely on Tuesday and I presume there need be little more said about them now.

This class of doughs, like the white sauce mixture of which I spoke on Tuesday, represents a variety of different dishes. You can make dumplings, either for meat stew, or fruit, baking powder biscuit, crust for meat pie, and various kinds of puddings, short-cake, etc., from the same ingredients, varying the amount of

liquid and shortening to suit the case. For baking powder biscuit the dough is just stiff enough to handle, or rather roll, it is better not to handle it at all, but merely turn the dough out on a floured board and pat it out sufficiently thin to cut out and not touch it with the fingers until the first lot has been cut.

Question—Do you object to lard in your pie crust?

Mrs. Jamison—Yes and no. Lard makes the pie crust more tender than if made wholly of butter, butter helps to make the crust flaky so that it is well to use part butter and part lard, the butter for crispness and flavor and the lard for whiteness and tenderness,—if you do not object to the flavor of the lard.

This shortening has been worked into the flour and in that condition it will be all right to leave and I will finish the dough later. You can do the same thing with baking powder biscuit and add the milk and roll out the dough after, perhaps, you have changed your dress and prepared some other parts of your meal.

Question—Have you ever tried letting baking powder biscuit stand before putting in the oven?

Mrs. Jamison—Some do. I do not know just the effect it has, but imagine the biscuit would not be of quite so fine a grain. You could do that better with the sour milk biscuit.

Question—How do you make dumplings so that they will not fall?

Mrs. Jamison—Make like baking powder biscuit without shortening, have the dough soft enough to dish out with a spoon and have the stew boiling when you put the dough on. Keep the cover down tight and do not cook too long. Some cooks are so afraid the dumplings will fall that they let them cook too long and then they are sure to be heavy. They should cook about twelve minutes tightly covered.

Question—Do you ever put an egg in the batter?

Mrs. Jamison—I sometimes do, it makes a little richer dumpling. You can use a little shortening with the egg. I shall let this stand until ready to bake it before adding the milk.

I am breaking the eggs now for the custard. It is a small thing to speak of, but I have found some of the eggs furnished for some of my demonstration work dirty on the outside. Those who send eggs to the market should take pains to send them clean, they bring better prices than if the shells are dirty. Who would not rather pay more for clean eggs than those that are soiled? They are more wholesome when clean. The shells are not impervious but porous and the dirt on the outside will taint the eggs. So for the sake both of appearance and healthfulness it is wiser to have the shells clean.

One object in presenting this custard is to show what can be done with coffee that is left over. If I were using cold coffee I should warm it slightly before making the custard, or if making the custard of milk I should warm the milk, as it makes a smoother custard if the liquid is warm. Re-heated coffee can be made palatable as a drink if in heating it the second time it is allowed to boil.

#### Coffee Custard.

Recipe—To three slightly beaten eggs add one-fourth cup sugar, one-fourth teaspoon salt and one cup each of strong coffee and cream. Strain into cups. Set in pan of hot water and bake in moderate oven. Serve cold.

Question—What is the object of putting coffee in the custard?

Mrs. Jamison—Merely for flavor, or to use up coffee "left over," or to save milk, or to furnish variety. Perhaps it is not to be recommended from the standpoint of health, but coffee in this way is not specially harmful if it is taken in small quantities.

This custard is to be strained into cups and baked. I shall put the cups

into this pan with hot water around them.

The time of serving a custard should be considered. It should not be served at the end of a hearty dinner. If your dinner has been made up of food that lacked protein or muscle-making material, for instance if your meat for dinner was salt pork, a desert containing eggs is very good to finish the dinner with; but it is not so advisable to follow a dinner of beef or other protein food. I prefer to strain the custard, though it is not necessary, and the time spent doing it might sometimes be put to better use.

Question—Do you recommend custard as a dish for supper?

Mrs. Jamison—Yes, it is good for supper if carefully made and carefully cooked. Eggs always require careful cooking. The albumen of the egg hardens very quickly in hot water and cooks better at a temperature below the boiling point. It is wiser to cook custard in water; if put in a hot oven it will cook too quickly and will be tough and probably will whey. An ideal custard is smooth and of fine grain. The ideals of these things sometimes vary, however, as a gentleman said to me not long ago that he liked the kind of custard that his mother used to make that had lots of nice "juice" around it.

Question—About how long would you cook the custard?

Mrs. Jamison—Cook until a knife can be inserted and comes out clean, or if it clings shows that the custard is not cooked.

In this recipe for custard more sugar is used than for a custard made entirely of milk, because the coffee needs more sweetening. The usual proportion is a rounding tablespoon of sugar to a cup of milk. If to be baked in one dish more eggs are required to thicken it sufficiently.

Question—Would you advise skim milk for custard?

Mrs. Jamison—Only as a matter of economy. It is better to make of cream

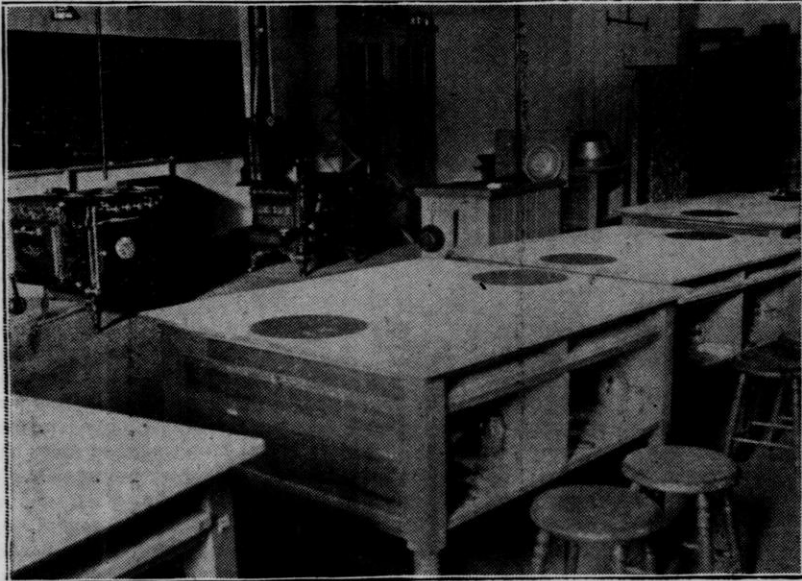
and coffee than milk and coffee, it makes a richer, more nutritious custard with a nicer flavor. But I should rather use skim milk than water in a good many places.

Question—Do you beat your eggs very much?

Mrs. Jamison—No, very little; if you beat very light the custard will not be as smooth.

morning there is no reason why meat fat is not as nutritious as butter fat, but to most of us it is not as palatable.

The gravy for the meat pie will be made with a flour thickening. The difference, as I stated Tuesday, between gravy and sauce is the gravy is made with flour stirred in water, and the sauce is made with flour cooked in fat. The former needs longer cook-



Interior View of a Public School Kitchen.

Showing table with zinc rounds to set hot dishes upon. Tables furnished with knives, forks, spoons, measuring cups, tin pans, salt and soap. Moulding and meat boards in upper part, wood and gas ranges, the latter with side broiler. Tin cupboard in corner; sink near middle of room for better light.

Question—Do you need a hot oven?

Mrs. Jamison—No, eggs cook best at moderate heat.

There was so much fat on this gravy that I am skimming part of it off, if not allowed to cool you can with care remove part of the fat with a table-spoon. We do not wish our gravy too rich, though Prof. Woods said this

ing. A word perhaps might be of interest on the making of thickening. Use a bowl with a round bottom, the spoon fits better. Do not add any more water than just enough to wet the flour, about the same quantity of water as flour at first. Stir this smooth and then add water to make thin enough to pour.

Question—In making gravy do you ever use milk?

Mrs. Jamison—Yes, milk is suitable for gravy with chicken or with veal, it is not so nice with beef.

The mixing of the gravy is one of the things taught young cooks in the schools quite early. Their attention is called to the fact that flour does not mix very readily with water but that it will mix more readily with a small quantity than with a large quantity. Then as they progress in their work they learn to make muffins, griddle cakes, and popovers, and their attention is directed to this same fact, and they are taught not to add the liquid in too large quantities at first, but to make a smooth mixture with a small quantity of liquid and then add the rest slowly.

Question—Do you make gravy for roast beef that way?

Mrs. Jamison—A better way to make gravy with roast beef is to reserve in your baking pan only enough of the fat which has dripped from the meat and put no water with it, but stir the flour into it the same as for white sauce, only allow the flour to brown after you have stirred it in, then add sufficient boiling water and seasoning.

Question—Do you ever brown flour and keep on hand to use for gravy?

Mrs. Jamison—I have not found it convenient for myself. Some like it very much, but brown flour does not thicken as much and I like better to brown the flour with the fat. For white sauce it is sometimes convenient to cook the flour and butter together and put it away, it will keep in that condition quite a while and will be all ready to use when wanted.

In cooking the gravy the flour should cook at least eight minutes when mixed with water, to make it digestible and palatable. In hot fat it cooks more quickly, because, of course, the fat is hotter.

This meat was prepared Tuesday in the pot roast. I usually make in this lesson meat cakes, recipe for which is

given on the slips, but as they are simple I shall omit them.

### Meat Cakes.

Recipe—Season two cups of finely chopped meat with salt, pepper, finely minced onion, sage, thyme and lemon juice if liked. Add one cup fine soft crumbs, one egg and water or stock to moisten. Shape into cakes and fry rather slowly until well browned on both sides. Use butter and lard mixed, or use beef drippings.

Just a word more about the meat pie, and that is to insure the thorough cooking of the crust have the meat and gravy hot before putting the crust over it. This is a little thing and some of these little things I would be quite reluctant to bring up but have been asked about them by cooks of experience and intelligence and I myself have learned from other cooks, so that I have gotten past the stage where I am ashamed to speak of the little details or ask questions about them. For example, a cook of considerable experience, employed in one of the nicest of homes, asked me what was the matter with her meat pie crusts, they were so often underdone. I asked her if she heated the meat before she put the crust over it. She had not and had never thought of it. It was just the suggestion she needed.

This gravy has in it onion and bay leaf put in for seasoning and probably there are bits of bone in it also so that it is advisable to strain it. I am going to add the milk to this mixture of flour, baking powder and shortening, stirring in quickly and stirring it as little as possible to blend the ingredients and I am sure that no one here who heard Prof. Woods' very eloquent appeal for milk would ask if we could use water. It would be good with water, but it would not be so nutritious. I am convinced that if you had heard him you would not think it extravagant to use milk in griddle

cakes or anywhere that it could be used, even if it was skimmed milk.

Question—What is the consistency of the dough you have?

Mrs. Jamison—You might call it a drop dough, it is too soft to handle and too stiff to stir easily. I shall spread it roughly over the meat and gravy and bake it at once.

This way of making meat pie crust may be new to some possibly, but it is not new for I learned it from my mother. I think you will find it more tender than the rolled baking powder crust. It is a good idea to have an opening in the meat pie crust, but when put on in this way it is not necessary as it is almost impossible to spread this all over. With a large amount of gravy the meat will not hold up the crust and it will sink under, but do not mind for if your baking powder is good it will come up. You see it looks rough now and not very inviting but it will look all right when it comes out of the oven.

#### Caramel Sauce.

Recipe—Melt one-half cup sugar in a frying pan, stirring to prevent burning. When melted add one-half cup hot water and simmer until dissolved.

For this I put into the frying pan a cup of sugar and stir the dry sugar over the fire until it melts. This is a true caramel and not the so-called caramel used for frosting and filling for cakes. After this is melted and it must be stirred constantly to prevent scorching, I will add an equal quantity of boiling water. It takes some time for this to melt and while I am stirring it I want to speak of a candy that can be made of this. I am always glad when I can give this talk to the school girls but the mothers here can take the message home. In a number of places where I have spoken this winter the teachers have sent the school girls to attend the cooking lectures, and I presume such an arrangement might have been made here but for the unsettled condition

due to your recent fires. I was glad to see a number of the High School pupils come in to hear Prof. Woods this morning. While I am speaking of school children I want to make a plea to the Oconomowoc people to work towards the introduction of Domestic Science and Manual Training in the High School when you erect your new building. It is always possible for the women to do these things. Persuade the Board at least to leave rooms that can be used for this purpose. Almost all of the new high school buildings in the state have made such an arrangement and where they are not prepared to occupy at present they are leaving a room to be used for Domestic Science and Manual Training in the future. Oconomowoc, I am sure, wants to fall into line with the other cities in the state. It is not confined to the larger cities, but the small ones as well are introducing it, Wausau, Grand Rapids, Marshfield, and others. In several places the Women's Clubs are working for these branches in connection with the school work, and the Woman's Club here, with their classes in housekeeping, sewing and cooking, has done more than enough to earn from the School Board a recognition of the value of the work for the children, and I hope it will not be long before the ladies succeed in influencing the Board to make room for this new branch of education which appears to have come to stay.

To return to the candy of which I spoke. In the course which I am pursuing in the schools at Neenah, beginning with the seventh grade, I give a lesson in candy making in each course just before Christmas. This nut candy made of the browned sugar and peanuts is the first candy the girls learn to make.

#### Peanut Candy.

Recipe—Crush three-fourths cup of shelled peanuts and have ready a buttered tin. Put into a clean frying

pan one cup of granulated sugar and stir over the fire until melted. Stir in the crushed nuts and pour out at once into the buttered tin. It may be cut into bars when partly cold.

We are learning lately that sugar is a food and a valuable one, the objection is it is taken at the wrong time or in too great quantities, or it is adulterated to such an extent sometimes that it is harmful. I have been told that there is being shipped from the northern part of this state a mineral earth by the carload to the Chicago candy factories. Comment is unnecessary.

Candy, or any sweet, should be taken with the meals and not between the meals, as it is not as harmful then.

Question—Are you using granulated sugar?

Mrs. Jamison—Yes, I am, but either brown or powdered sugar can be used, the brown does not work quite so satisfactorily, the powdered is very nice and makes lighter colored syrup or candy than the granulated because it melts more quickly.

This is full of lumps, but they will all dissolve. If you were working on it you might think there was something wrong, it clings to the pan and spoon, but it will be liquid when all melted. The frying pan must be scrupulously clean and free from grease or the syrup will not be clear.

Question—In making the peanut candy do you use just sugar and water?

Mrs. Jamison—No, just sugar and nuts, no water at all.

For the sauce or syrup I add water and I like to pour it directly from the tea kettle rather than measure it, for that cools it a little, and, even when poured from the kettle, it is not hot enough to prevent considerable commotion, the melted sugar being much hotter. You can make a syrup about the color and consistency of maple syrup and with good flavor that can be used for plain puddings, boiled

rice, and for griddle cakes. It does not candy in standing as the plain sugar syrup.

#### Oyster Stew.

Recipe—Put a pint of oysters in a colander and pour over them one-fourth cup cold water. Pick out the oysters with the fingers and put in a sauce pan. Heat three cups of milk over hot water; strain into it the liquor from oysters and add three level tablespoons butter, one-half teaspoon salt and a little pepper. Heat the oysters by themselves until they are plump and the edges curl; add the hot milk, bring to the boiling point and serve at once.

In preparing the oysters I find the most satisfactory way is to pour over the oysters, unless there is considerable liquid, a little cold water, and then after taking out the oysters, one at a time with the fingers, we are very sure there are no bits of shell, which are so disagreeable if found by the teeth. The girls in the Cooking School usually object to this proceeding and hang back until they are told that pearls are better before they are cooked, and it is a good illustration of the effect which our minds have on what we are doing. One thing, I think makes housework such hard work for some women is that they think too much about what they are doing that is disagreeable, while in another direction there is not enough thought put on the work. But the monotonous, every-day work can be done without much thought, as washing dishes, making beds, and such work as must be done regularly. When the habit has been formed, such things can be done with very little thought and our minds can be filled with something of a much pleasanter character, much more helpful and less depressing. My sister and myself learned many a poem over the ironing, and it is not a bad plan for a housekeeper to have something she can interest herself in as she goes about her work,

that perhaps will take a minute or two of her time, and a few minutes of pleasure will rest her and give her something to think about as she takes up her next mechanical duty. I heard once of a young housekeeper who disliked very much to mould bread, so much in fact that she rather slighted the operation and the consequence was she did not always have the best of bread. One day when she had some unusually good bread her husband asked her why it was so good. She said she did not know unless she forgot herself. She said "you know you brought me that beautiful rose this morning, and set it where I could look at it, and while I was making the bread I looked at the rose and thought of you and did not know how long I kneaded the bread." Perhaps here is a hint for the husband too.

The recipe suggests the cooking of the oysters and the milk separately. The reason for this is that neither the oysters nor the milk is over-cooked, but each cooked just as it should be. The milk should be heated over hot water, when possible, then we are sure it will not scorch. If made for a person of weak digestion, or, as it is often prescribed for an invalid or a convalescent, we should be careful not to allow it to boil, because for many people milk is more indigestible after it is boiled.

Question—Should milk be boiled in using for most purposes?

Mrs. Jamison—No, scalded. A good plan, if doubtful of the purity of the milk, is to sterilize it, or, more correctly speaking pasteurize it; that is, heat almost to the boiling point but not boil it, a temperature of 160 degrees to 170 degrees continued for twenty to thirty minutes will kill all active germs it may contain. But even then it should be used within a few hours.

Question—Do you advise scalding milk to drink?

Mrs. Jamison—Not if you are sure it is pure. Some people advocate

pasteurizing the milk, and if I were buying in the city and was not sure of the source, I should certainly do so for babies, but perhaps not for people of ordinary digestion.

To the milk I will add the butter and the pepper, but I will not add the salt until I am ready to serve the oysters. I always add to the milk the strained liquid from the oysters, straining it to get rid of all tiny bits of shell or fine sand. Oysters are one of the albuminous or protein foods that require to be cooked at rather a low temperature. By cooking the milk and oysters separately you are sure to get them both cooked just right, the milk heated enough and the oysters not too much. Hot milk with cold oysters in it is not very palatable, neither is a stew that has been slightly scorched. With care it is not always necessary to heat separately, but if the stew has to stand and you are not quite sure when you will be ready to serve it, it is safer to cook separately.

Oysters are a valuable food for the reason they furnish variety and are easy of digestion, but they are not an economical food. We were told this morning that a quart of oysters was equal to two quarts of milk and there is considerable difference in the cost.

Question—Do you put anything with the oysters?

Mrs. Jamison—In heating the oysters in the sauce-pan, I put in nothing but oysters, with just the little liquor that clings to them, and as they heat a little will exude and will prevent their sticking if shaken occasionally.

Question—Could you use water instead of milk?

Mrs. Jamison—There is no objection to using half water and half milk, or all water if you like it and are making it for taste and not for nutriment. It is more nutritious if you use all milk.

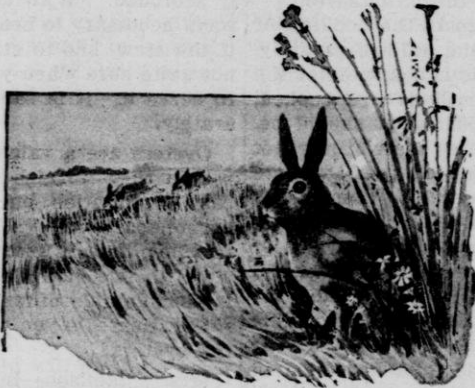
Now the oysters are ready to serve. I hope some of you do not like oysters,



for I fear there are not enough to serve even one apiece, but there is more of the broth.

Before the ladies begin the serving I wish to thank the audience for their manifest interest. The intelligent

questions asked show that the ladies of Oconomowoc, and especially those in charge of the local cooking school, are wide awake on domestic science topics.



## THE STORY OF A PIG.

Prof. W. L. Carlyle.

The accompanying photographs illustrating a very interesting "side" experiment conducted at the Wisconsin Experiment Station will interest the younger readers of the Institute Bulletin. The accompanying photographs illustrating a very interesting "side" experiment conducted at the Wisconsin Experiment Station will interest the younger readers of the Institute Bulletin. mates did not survive the first night, the other three lingering for some time, were kept warm in a box by a stove and fed carefully on warm sweet cow's milk every few hours. At last only



"Ikey," six weeks old, Baby Helen 2 yrs.

tin, if it does not add materially to the knowledge of their elders.

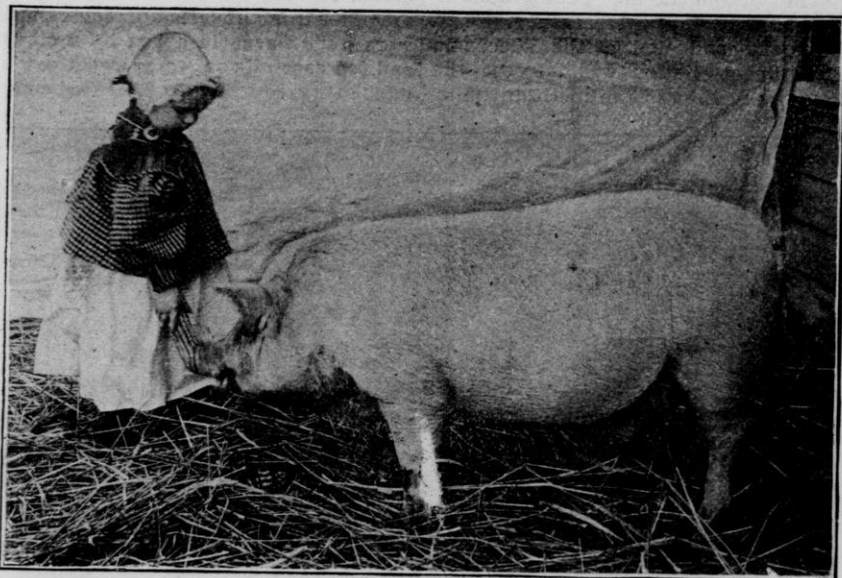
One of the photographs shows my small daughter, Helen, two years old feeding her pet pig his ration of milk from a nursing bottle. The pig is a pure bred Chester White, that with seven brothers and sisters were left orphans at birth. Four of his little

this one lonely little piggy was left in the box.

He was early given the name of "Ikey" and as he appeared to be well and bright and the little girl Helen very attentive in caring for him, the herdsman Mr. George Little, a true lover of stock as well as of children, asked to be allowed to care for him

and to oversee his feeding and education. It was surprising how much we all learned about pigs' habits in general from this wee youngster that weighed barely two pounds. He was not yet forty-eight hours old when he began to insist on being fed every two hours night or day. In this he persisted and when comfortably filled

the passages and alleys of the hog barn at will during the day and occupied a bed of straw in an inverted box into which he passed through a small door cut in its side. If he was in the box and heard steps approaching on the floor he would immediately come from his bed and approach the visitor with nose in the air until it



"Ikey," 7 mos. old.

would seem perfectly happy until another two hours rolled by when his voice might be heard in the night with a persistence and volume that would doubly discount an "intermittent" alarm clock. He soon grew very knowing and exhibited an intelligence that was perfectly astonishing in an animal so young. When about two weeks old he could recognize the herdsman and the baby girl from among a number of visitors. This he did mostly by his senses of smell and hearing. He was allowed to run about

came in contact with the shoes or clothing. He never failed to recognize the working shoes of the herdsman or the stockings and dress of the baby girl as only those two were allowed to feed him.

His feed for the first month consisted of cow's milk procured fresh each morning and evening and always fed sweet and carefully warmed while he was very young. An ordinary nursing bottle supplied with a rubber nipple was the means resorted to in feeding this milk and Ikey soon came to

recognize the bottle and manifested great interest in the preparation of his numerous "dinners." He very early learned to recognize his name and would respond with a cordial grunt and come running briskly when it was called. At four weeks of age he began to nibble at whole oats or ground corn that were occasionally scattered about the floor so that at this age his feed was changed to a thin slop made of oil meal, wheat shorts and skim-milk; to this in a few days were added finely ground peas and corn. When fourteen weeks of age he weighed forty-six pounds having gained as much as nine pounds in a single week. At this age he had consumed of new milk, 50 pounds; shorts 10 pounds; oil meal 10 pounds; ground peas 10 pounds; ground corn 10 pounds; skim-milk 91 pounds. From this time forward his growth and development were very rapid yet he always seemed to remember his early friends and they appeared equally fond of him.

The herdsman never grew impatient at the mischief Ikey did, though he became a veritable genius at getting into places that he should not be, while Helen came several times daily to rub his back and feed him a few kernels of corn. That he had perfect confidence in them I had ample proof. One day when he was about four months old on going into the hog-house I found Ikey in a large tub of water, he was resting his fore feet and chin on the edge of the tub, while the rear portions of his body were submerged in the water, his attendants meanwhile giving him a vigorous scrubbing with soap and brush. He seemed perfectly content and apparently enjoyed his bath quite as much as he did the reception he held the following day when attired with a nice silk cardinal ribbon and bow about his neck, and a smaller green ribbon with bow at his tail he grunted a welcome to several hundreds of farmers and their wives, who were

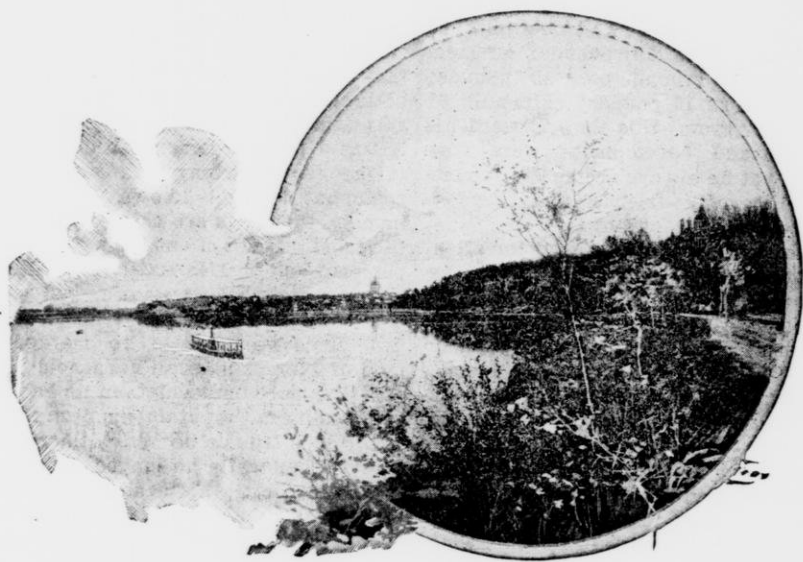
visiting the University on their annual picnic excursion.

The second photograph shows Ikey when he was about six months old and weighing 180 pounds. Shortly after this photograph was taken he became very cross and fretful, did not enjoy visitors and was frequently quite surly to his two old friends. No good reason could be found for this condition of affairs until some little time later he began to refuse his feed, then grew quite sick and finally died very quietly one evening. An autopsy disclosed the fact that he had been suffering from chronic digestive troubles.

In conclusion let me say for the benefit of all swine raisers that Ikey's career was a convincing demonstration to all who knew him that hogs, both old and young, are possessed of a surprising amount of intelligence and it was a perfect demonstration of the further fact that may be a surprise to some, but is well known to many, namely, that hogs are naturally one of the most cleanly of animals in their personal habits. No matter how filthy quarters may be, the hog's bed will always be found surprisingly clean and dry. This we found to be markedly true of Ikey, no small household pet could be more immaculate in its habits of cleanliness than this small orphan pig. It is true as he grew older and the weather warm he longed for some means of cooling his heated body and since nature had denied to him as to all others of his kind any sweat glands in his skin so that the temperature of his body might be lowered by evaporation he would enjoy a roll in a dirty pool of water and the more muddy the better as the coating of mud served to retain the moisture on his body for some time. Hogs do not frequent stagnant pools and filthy mud baths because they enjoy the filth and dirt, but only as a means of keeping their bodily temperature reduced by the evaporation of moisture from the surface of their bodies.

While Ikey has been dead for almost a year his memory is still very fresh in Helen's mind and she yet has a greater love for and interest in hogs of all ages than for any other play-

thing or class of stock. This we attribute largely to the impressions made on her mind by her associations with this small pig.



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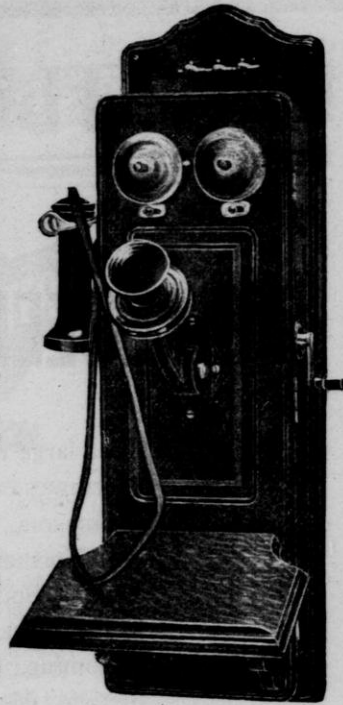
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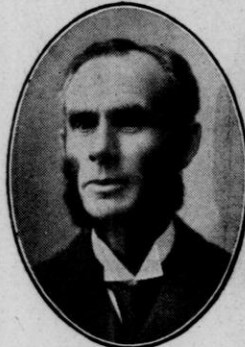
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It has been many years since such special inducements as are now being offered served to attract the people of limited means to leave the city, where expenses multiply on every hand, and make a place for their declining years in the country. Life in 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.

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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.

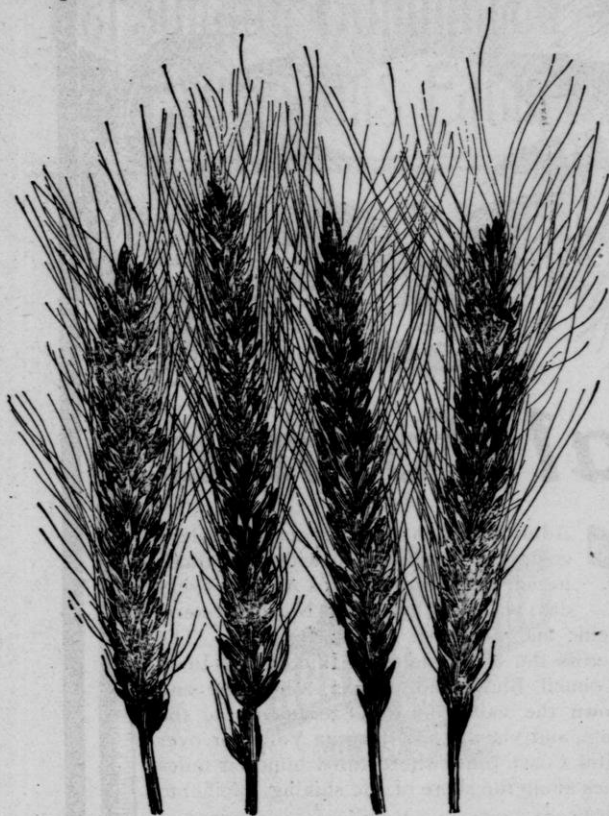
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Daily and Personally Conducted Tourist Sleeping Cars to

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Any ticket agent will tell you about these excursions and how comfortable they are and how inexpensive a means they form in reaching the Pacific Coast. Three through trains a day to San Francisco and two to Portland.

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# Rich Farm Lands

ON THE



## Minneapolis, St. Paul & Sault Ste. Marie Railway.

Excellent Hardwood Timber Lands, with  
Rich Soil, Clay Sub-Soil, Close to Sta-  
tions on a Trans-Continental Railway in

### Northern Wisconsin

At \$5.00 to \$12.00 per Acre on Easy Terms

These lands will produce as many dollars per acre as lands in older  
settled sections of the country valued at \$50.00  
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A Natural Grass Country Clover, Timothy  
and Blue Grass.

A Grand Dairy Country Well watered by streams,  
lakes and springs.

For Sheep This Region is Unexcelled Anywhere  
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All progressive Creameries and Cheese Factories now use some Commercial Starter to secure uniform ripening, perfect flavor and keeping quality.

**Chr. Hansen's Lactic Ferment** is the leader. Being a dry powder, it will keep indefinitely and is always safe to use.

**The Columbian Butter Color** is the strongest and cheapest in the market.

**Chr. Hansen's Danish Rennet Extract, Liquid Cheese Color, Butter Color, Rennet Tablets and Cheese Color Tablets, the Marshall Rennet Test.** all first-class articles, manufactured only by

**CHR. HANSEN'S LABORATORY, Box 1143, Little Falls, N. Y.**

# USE NITRATE OF SODA FOR Money Crops

**Sugar Beets, Oats, Grass, Corn, Truck, Wheat, Rye, Barley.**

You GET YOUR SHARE OF PROFIT when you use this ideal predigested Ammoniate as plant food. For formulas and other valuable information, write

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*Chilean Nitrate Works.*

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**DOUBLE CAM BRADLEY STEEL HAY PRESS**

One horse can operate it. Very easy for two. Send for circular.

NOT A COG NOR CHAIN ABOUT IT.

Simplest Press Made.

LOW BRIDGE

Lifting Jack goes with each Press. Powerful—puts full weight into box ear. Tracks with a wagon; 2 horses draw it on common roads.

Has an **AUTOMATIC PLUNGER DRAW.**

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MOST SERVICEABLE

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Barnyard Free from Posts. Load on wagon or dump in yard. 200 ft. run.

Turns curves & switches. Write for circular.

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They are four good books on cultivation and fertilization. We mail them free to any farmer who will send his name and address.

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# WISCONSIN CENTRAL RAILWAY

— BETWEEN —

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COAST  
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# SHEEP RAISING IN NORTHERN WISCONSIN

Prof. John A. Craig, Professor of Animal Husbandry in the Iowa State College of Agriculture, in writing of the possibilities of Northern Wisconsin makes the following statement:

"If I were a man of capital with a farm in Southern Wisconsin or in any of the corn growing states, I would buy as much of the cheap land in the Northern part of Wisconsin as I could and stock it with sheep for the purpose of raising feeders to be fed on the home farm. I cannot conceive of any business being more certain in its returns than the lamb feeding business conducted in this way."

THE ABOVE IS OF SPECIAL INTEREST TO FARMERS WHO  
WISH TO FIND OPENINGS FOR THEIR SONS, OR YOUNG MEN  
LOOKING FOR GOOD OPPORTUNITIES    

Do not hesitate to write for further information to

**W. H. KILLEN,**

Land and Industrial Commissioner Wisconsin Central Railway Co.,

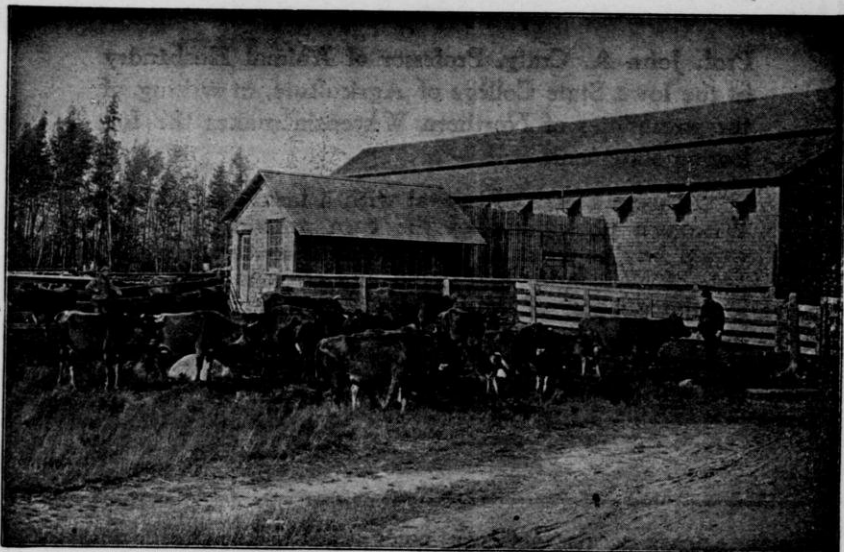
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## Dairy Products in Wisconsin.

**T**HE 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 today famed far and wide. For further information, address

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## 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.

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## Hardwood Farming Lands For Sale

### IN MARATHON COUNTY, WISCONSIN

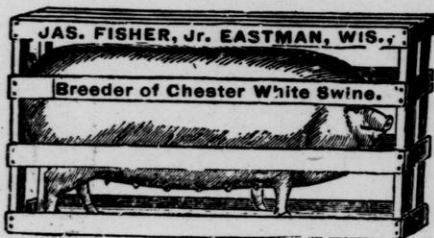
The soil is a fine clay loam extending down to soil water, which is found at a depth from twelve to twenty feet, and productive of every variety of grain, grass and vegetable common to Wisconsin. It is one of the best clover and blue grass sections in the middle west. The country is well opened up with good roads. There is a population of about 6,000 people in our settlement. Athens, in the geographical center of our territory, has a grist mill, three saw mills, heading and stave factory, four churches, good graded schools and about ten stores. Land from which the oldest log timber has been cut sells for from \$10 to \$15 an acre. We aim not to sell to speculators, it is actual settlers that we want.

**RIETBROCK LAND & LUMBER CO., ATHENS, WISCONSIN**

**J. FISHER,**

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BREEDER AND SHIPPER OF



### Chester White Swine

I make a specialty of breeding the Chester white hog, and feel that I have something of superior merits to offer you. I always try to keep pigs on hand for sale, and they are priced for what they are worth. Come and see them or write for description and catalogue.

## Eastside Stock Farm

GALESVILLE, WISCONSIN.

— REGISTERED —

### Shorthorn Cattle, Berkshire Hogs and Lincoln Sheep.

Also White Holland Turkeys and Barred Plymouth Rock Chickens  
of all Ages For Sale.

My cattle are fine milkers. This breed has the best record for crossing on common stock for the general farmer. My hogs weigh when one year old about 400 lbs. and when matured from 500 to 800 lbs., smooth and even fleshed, standing well on their feet. Prolific breeders and good mothers. The Lincolns are the largest and best woolled of the mutton breeds.

Correspondence solicited. Farm one mile from C. & N.-W. depot.

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It pays for itself on the first crop grown after its use.

# It Spreads Manure,



wet, dry, lumpy, caked, strawy, full of corn stalks, etc., better than it can possibly be done by hand, Spreads lime, ashes, salt, compost, etc.

## THE IMPROVED Kemp Manure Spreader

will save more hard labor, more time, more money and bring about better results than any other machine that can be employed on the farm. It trebles the value of even a small amount of manure. It is the only thing that can successfully top dress wheat in the spring, meadow lands, pastures, etc. Can be hauled onto any land easily and without injury to land, as wheels have broad tires. Can be turned on the ground it stands on, as front wheels turn entirely under. It is strong and durably made of good material and with ordinary care will last indefinitely. Greatly improved for 1902. Send for new illustrated catalogue and "How to Grow Big Crops"—Free.

Remember that the only original and genuine Kemp Manure Spreader is made by us  
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## Shorthorn Cattle.

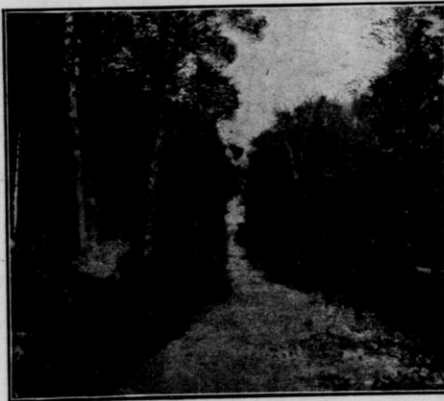
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 REGISTERED SHORT HORN CATTLE OF  
 THE BEST FAMILIES.



Lord William 44086 bred by Arthur Johnston, Greenwood, Ont., at head of herd. Choice young bulls and females for sale. Poland Chinas of the choicest strains. Stock well bred and good individually, for sale at prices that are right.

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The new town in Taylor County on the Athens branch of extension of W. C. Ry., offers the best inducements to settlers. Good clay loam soil, good climate, good water, good hardwood timber and good markets for everything. For particulars write

## RIB RIVER LAND CO.,

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Highway near Goodrich on Rib River Co.'s lands.

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*By its system of 8,903 miles of road reaches the finest sections of*

**Illinois, Wisconsin, Northern Michigan,  
Iowa, Minnesota, South and North  
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and by its traffic arrangements the entire territory of the West and Northwest. It has on its own line the greatest Water Powers, Iron Ore Ranges, Hard and Soft Lumber Districts, and Coal Fields, serving more industries than any other western railway.

**Manufacturers** contemplating moving or establishing branch factories in the west are solicited to inquire what inducements can be offered before locating elsewhere.

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Freight Traffic Manager.

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offers the best transportation facilities in reaching the stock markets. ❁ ❁ ❁ ❁

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## SHEEP RAISING

In Northern Wisconsin is growing rapidly. It is a profitable investment and the grazing lands are peculiarly adapted for this industry. ❁ ❁ ❁ ❁

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# THE HARDWOOD LANDS OF NORTHERN WISCONSIN ❁ ❁ ❁ A GREAT DAIRY SECTION ❁

The great adaptability of the soil for clover and grasses makes pasturage perfect.

The nights in summer are cool. The climate is bracing throughout the year and keeps animals in the best of health.

There is an excellent local market and proximity to St. Paul, Minneapolis, Milwaukee and Chicago; gives an ever constant and increasing demand for the entire product of every creamery and cheese factory located on the line of the Wisconsin Central Railway.

The snow protects the grass throughout the winter, giving early spring pasturage and the plentiful rainfall keeps grass green throughout the season, making a longer pasture period than in states further south.

Write for Pamphlets and Maps to

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Land and Industrial Commissioner Wisconsin Central Railway Co.,

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# WHAT AUTHORITIES SAY OF NORTHERN WISCONSIN

Prof. W. A. Henry, University of Wisconsin, says:

"Timothy and red clover flourish amazingly, oats yield as well as in the southern part of the state and field peas give much larger returns than further south."

Prof. John A. Craig, Iowa State College of Agriculture, says:

"It is naturally the best clover district that I have seen, and further, I do not know of any single fodder or grain crop that I would rather have for all kinds of stock than clover."

Prof. Thomas Shaw, University of Minnesota, says:

"In the timber which grows upon this land, and in the character of the soil and subsoil, we have in great part at least the explanation of the marvelous adaptation which it has to the production of timothy and clover, of blue grass and orchard grass, and indeed of almost every kind of grass that will grow in a northern country."

For further information write to

**W. H. KILLEN,**

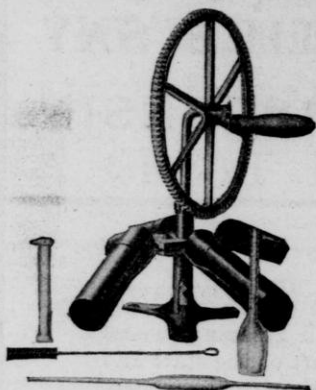
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# The "Sweepstake" Babcock Milk Tester



The Sweepstake is furnished with 2 or 4 tubes as desired.

Ball Bearings--The bottles are at the bottom--  
The most practical, highest speeded, easiest  
running tester made--We handle everything in  
the Creamery Line--Write us for Catalogue  
and descriptive matter. ❀ ❀ ❀ ❀ ❀

Used by dairymen, farmers, in hotels and restaurants, and  
in the laboratory. It does accurate work, and with the  
instructions furnished any one can do perfect testing. The  
Sweepstake is built on a new principle. The cans are  
placed on the bottom and the gear wheel above. This per-  
mits of great speed with no danger of the hand coming  
in contact with the cans as in the old style machine.

The Best Hand Tester in the World and  
Endorsed by Leading Dairymen as such

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Boilers and Engines. Rennet Extracts. Stearns' Style Spruce Tubs. Wells, Richardson & Co.'s  
Improved Butter Color. Climax Heaters. Fairchild's Creamery Cleaner. The Talcott Improved  
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CLOVERS,

RED, WHITE, ALSYKE, CRIMSON, ALFALFA,

TIMOTHY, HUNGARIAN, MILLETS, RED TOP

BLUE GRASS, LAWN GRASS,

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WEST TAYLOR ST., AND THE RIVER,

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# Stewart's Latest Patent Shearing Machine

A NEW AND PERFECT MECHANISM

Price Complete **\$18.50**

Superior to Anything Previously  
Manufactured for this Purpose.

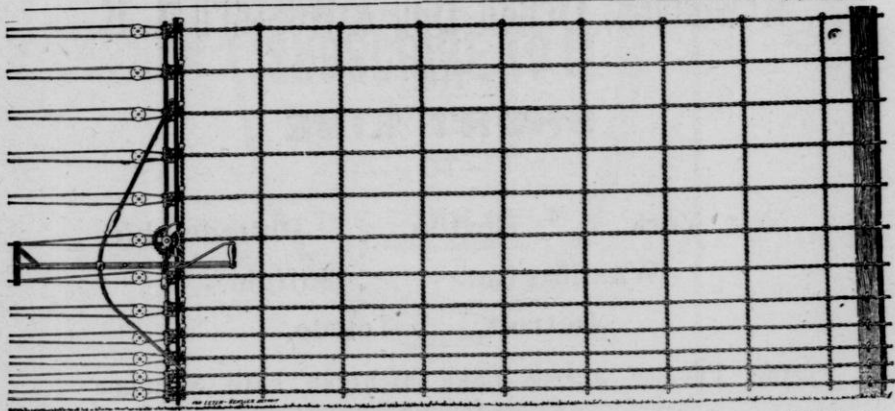


Each machine will be fitted with the wonderful Stuart Shear, same as supplied with the \$65.00 Power Machine. No owner of 10 sheep or more can afford to shear by hand, even though the work be done for nothing. Don't butcher your sheep. Shear with machine and get *one pound wool extra per head*. Will more than cover the whole cost of shearing. Send today for valuable book on shearing. It is free and will save you money.

**CHICAGO FLEXIBLE SHAFT CO.,**

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*The Largest Manufacturers of Sheep Shearing Machines in World.*



The Cyclone Fence as constructed by our method is put up where you want it, when you want it and as you want it, at the minimum cost for labor and material. An almost unlimited variety of designs, heights and styles of fence for farm, lawn and railroad or cemetery, in fact anywhere where a fence is needed. Our wire prices are always interesting. We can ship you promptly from Waukegan, Ill.

**Cyclone Woven Wire Fence Co.,**  
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THE  
**POPULAR ROUTE**

BETWEEN

Green Bay, Winona, La Crosse,  
Stevens Point, Grand Rapids,  
St. Paul, Minneapolis,  
And All Points in the West and Northwest.

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**Kewaunee, Green Bay & Western R. R.**

THE  
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TO

New York, Boston, Philadelphia,  
Washington, Buffalo,  
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Car Ferries Across Lake Michigan both Summer  
and Winter.

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**J. A. JORDAN,**  
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Is a sixteen-page illustrated monthly journal. Its aim is to furnish, in an interesting way, information about the agricultural resources of the West. Many renters of Eastern farms, many young men who wish to establish homes of their own, and in fact any farmer, will do well to

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- Abundant rain fall.
- 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.

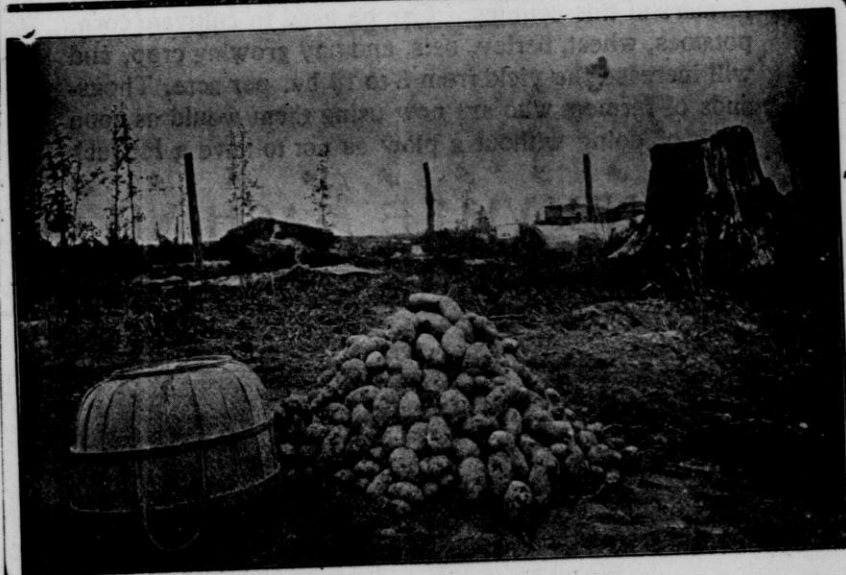
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# Wisconsin Homes

Are not to be had for the asking  
but they can be secured for e e e

## VERY LITTLE MONEY



Fine Climate, Fine Land, Fine People,  
Good Crops, Good Schools  
and Good Churches,

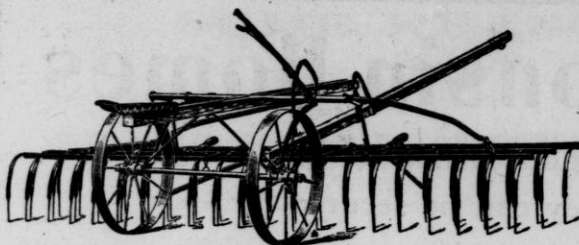
AND BEST REACHED BY THE LINES OF THE

### Chicago, Milwaukee & St. Paul Railway.

For information as to Lands, etc., address

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Sulky Weeder, width 12 feet. (We also make a Walker.)

# Hallock's Success Anti - Clog Weeder and Cultivator

The greatest labor-saving tool ever introduced to the farmers of this country. Can be used to cultivate corn, potatoes, wheat, barley, oats, and any growing crop, and will increase the yield from 5 to 10 bu. per acre. Thousands of farmers who are now using them would as soon think of doing without a plow as not to have a Hallock Weeder. \* \* \* \* \*

## THE JANESVILLE MACHINE CO., Janesville, Wisconsin.

WESTERN MANUFACTURERS.

Send for Prices and Circulars.

WISCONSIN GROWN.

120 ACRES.

TRUE TO NAME.



This shows a part of one block of our 3-year apple ready for delivery in spring of 1903.

### ANNOUNCEMENT.

THE three nursery firms formerly doing business here under the names of Coe & Converse, F. C. Edwards and J. M. Edwards & Son, are now incorporated into a stock company under the name of The Coe, Converse & Edwards Co.

We now have GROWING HERE, the largest and most complete stock of Fruit, Shade and Ornamental Trees, Evergreens, Shrubs, Vines, Small Fruit Plants, etc., of any nursery in Wisconsin. We want your order, and if honest goods at reasonable prices will get it we are entitled to it. Catalogue free. Good agents wanted. Write to

**The COE, CONVERSE & EDWARDS CO., Fort Atkinson, Wis.**

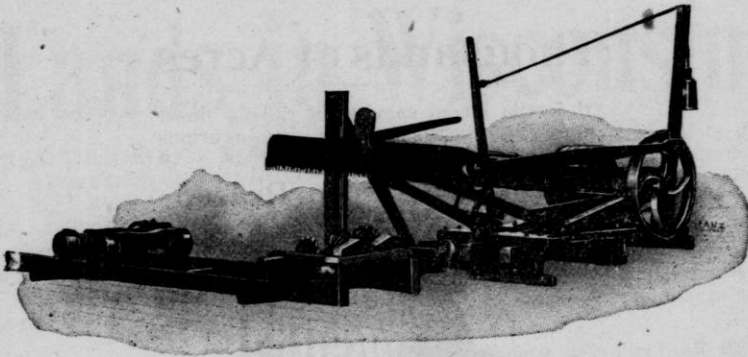
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# Smalley Drag Saws

are

# Money Makers

For the Farmer



We make more drag saws than all other firms combined. Seven sizes. Capacity from 25 to 75 cords per day. The present high price of Coal will make a great demand for wood, and machines will pay for themselves in ten days' cutting. We also make Sweep and Tread Horse Powers, Circular Saw Machines, and 12 sizes of Fodder Cutters. Snapping Rolls and Shredder Heads can be furnished on our larger machines. Thus a combination of three first-class machines can be had at the usual cost of one. Our shredders will work in any kind of corn, even in Silo filling. Send for catalogue and special introduction prices.

**Smalley Manufacturing Company,**

**Manitowoc, Wisconsin.**

*SOLE MAKERS SMALLEY GOODS*

Mention "Farmers' Institute Bulletin" when writing to advertisers.



# WHY PAY RENT?

## BETTER OWN A FARM

Start Now

### Thousands of Acres

Of fertile lands, capable of raising finest quality of farm products in luxurious abundance, ❁ ❁ ❁ ❁

Are for Sale Upon Reasonable Terms on . . . . .



In Northern Wisconsin, Minnesota, South Dakota, Iowa, Nebraska and Wyoming. Reference to reliable statistics will demonstrate the fact that the pursuits of agriculture, stock raising and dairying in these States are attended with profitable results. Correspondence solicited from intending settlers. Send for free copy of THE NORTH-WESTERN HOME SEEKER.

**H. R. McCULLOUGH,**

3rd Vice President.

**W. B. KNISKERN,**

Passenger Traffic Manager.

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FARM LANDS

TIMBER LANDS



# Lands in Wisconsin!

**T**HE CHICAGO & NORTHWESTERN RAILWAY COMPANY is offering a large tract of lands suitable for agricultural purposes, convenient to thriving cities and villages, heavily timbered with elm, basswood, hemlock, cedar, maple, birch and other timber.

The settler finds a ready cash market for all timber cut in clearing his farm, and for all farm produce, **enabling him to make a home with small capital.**

These lands are particularly well adapted to general farming. All grasses, oats, wheat, rye, barley and corn thrive; potatoes and all root crops yield large returns.

**Dairy, Sheep and all kinds of Stock Raising are carried on with success.**

Water is abundant and pure.

Railroads leading into the mining and lumber districts furnish a ready market for all products.

These lands are for sale on

## Long Time, Easy Terms and Low Rate of Interest

to actual settlers. School accommodation is good and ample; taxes low; climate healthful. Timber for manufacturing is unlimited and of the best quality for **Stave, Heading, Hoop, Veneer and Furniture Factories, Saw Mills, Pulp Mills and Tanneries.**

Apply to

J. F. CLEVELAND,  
*Land Commissioner, CHICAGO, ILL.*

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# FACTS CONCERNING LANDS OF THE WISCONSIN CENTRAL RAILWAY

Clover never freezes out but seeds itself from year to year.

All grasses grow luxuriantly.

Oats, wheat, rye, barley and peas give very large yields.  
While potatoes, beets and other root crops of the best  
quality are produced.

A plentiful rainfall keeps the pastures green throughout the  
season.

Everything points to Northern Wisconsin as the coming sheep  
and dairy section of the United States.

Don't forget to write for further information to

**W. H. KILLEN,**

Land and Industrial Commissioner Wisconsin Central Railway Co.,

MILWAUKEE, WIS.

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# NORTHERN WISCONSIN <sup>AN</sup> IDEAL SHEEP COUNTRY

Prof. W. A. Henry, Dean College of Agriculture, University of Wisconsin, Madison, says:

"No region on earth excels Northern Wisconsin for profitable sheep raising when proximity to markets, cheapness of land and the natural resources are considered."

"There are tens of thousands of acres of land in Northern Wisconsin more or less completely cleared by forest fires which can be purchased for a small sum, that can at once be seeded to tame grasses with no other cost than seed and sowing, and on these cheaply made pastures sheep will thrive from the beginning."

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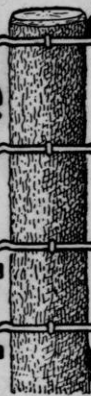
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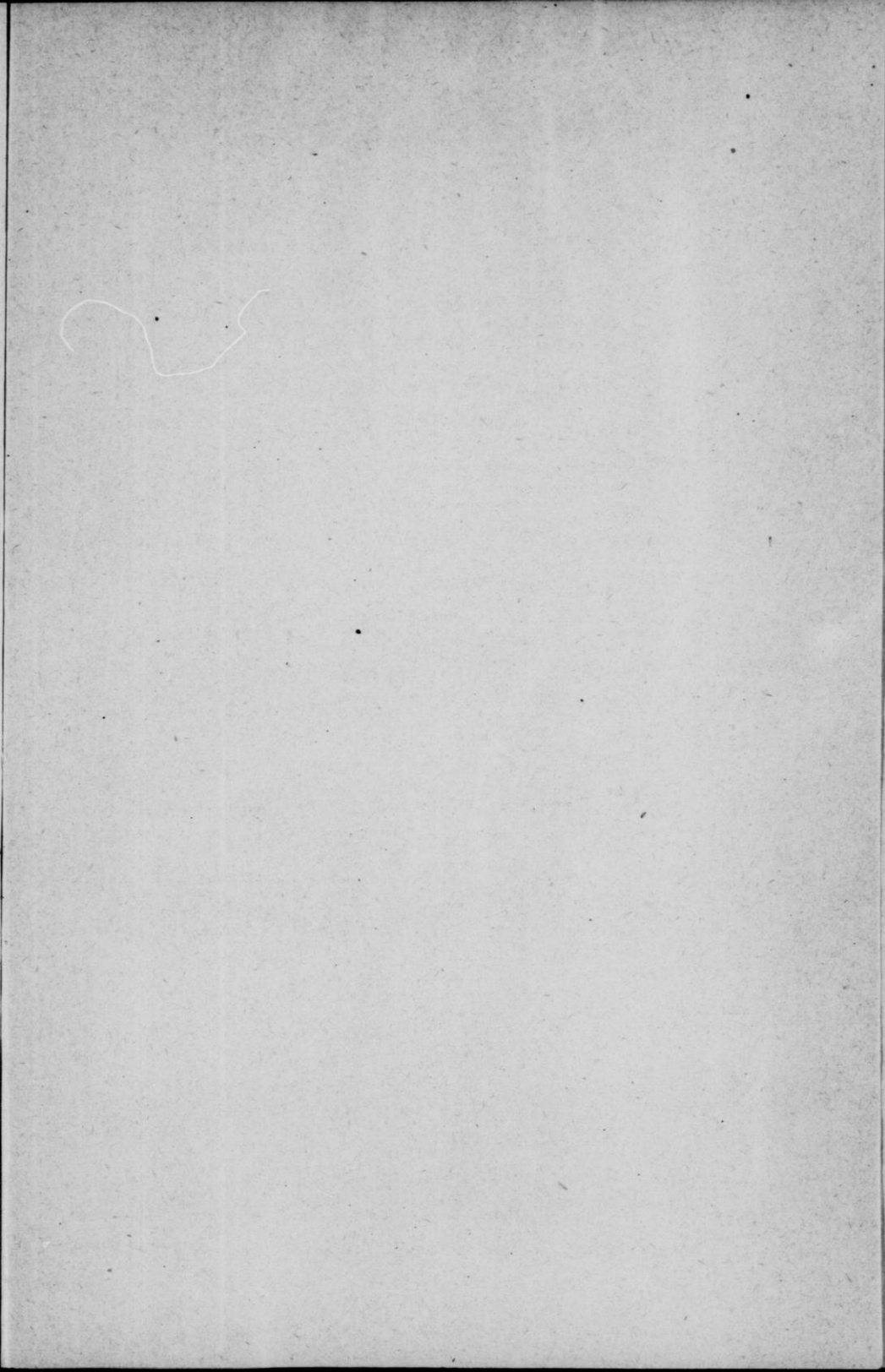
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