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Wisconsin Farmer's Institutes : a hand-book of agriculture. A report of the thirteenth annual closing Farmers' Institute held at Sparta, March 14, 15, and 16, 1899. Bulletin No. 13 1899

Wisconsin Farmers' Institutes

Milwaukee, WI: Riverside Printing Co., 1899

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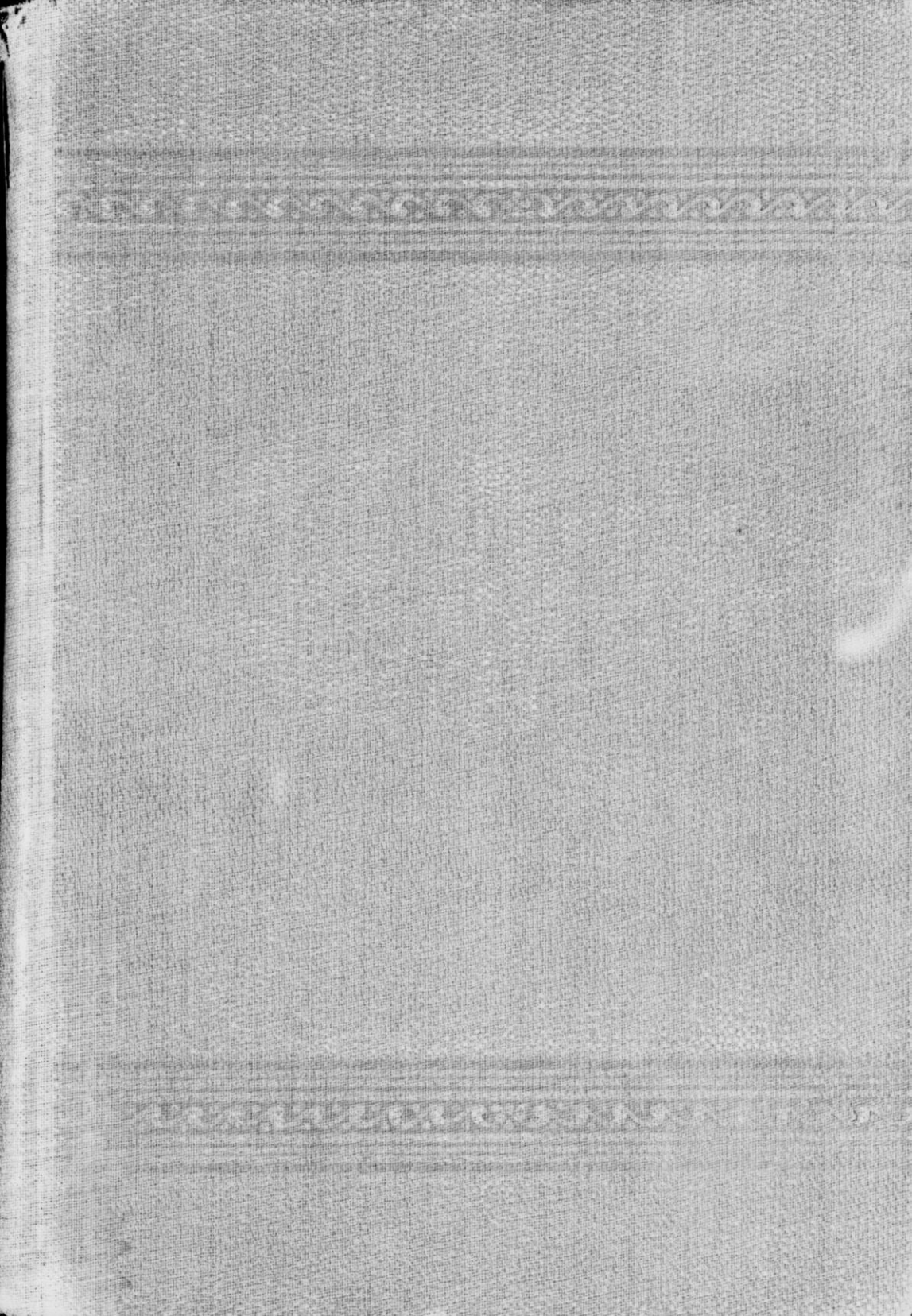
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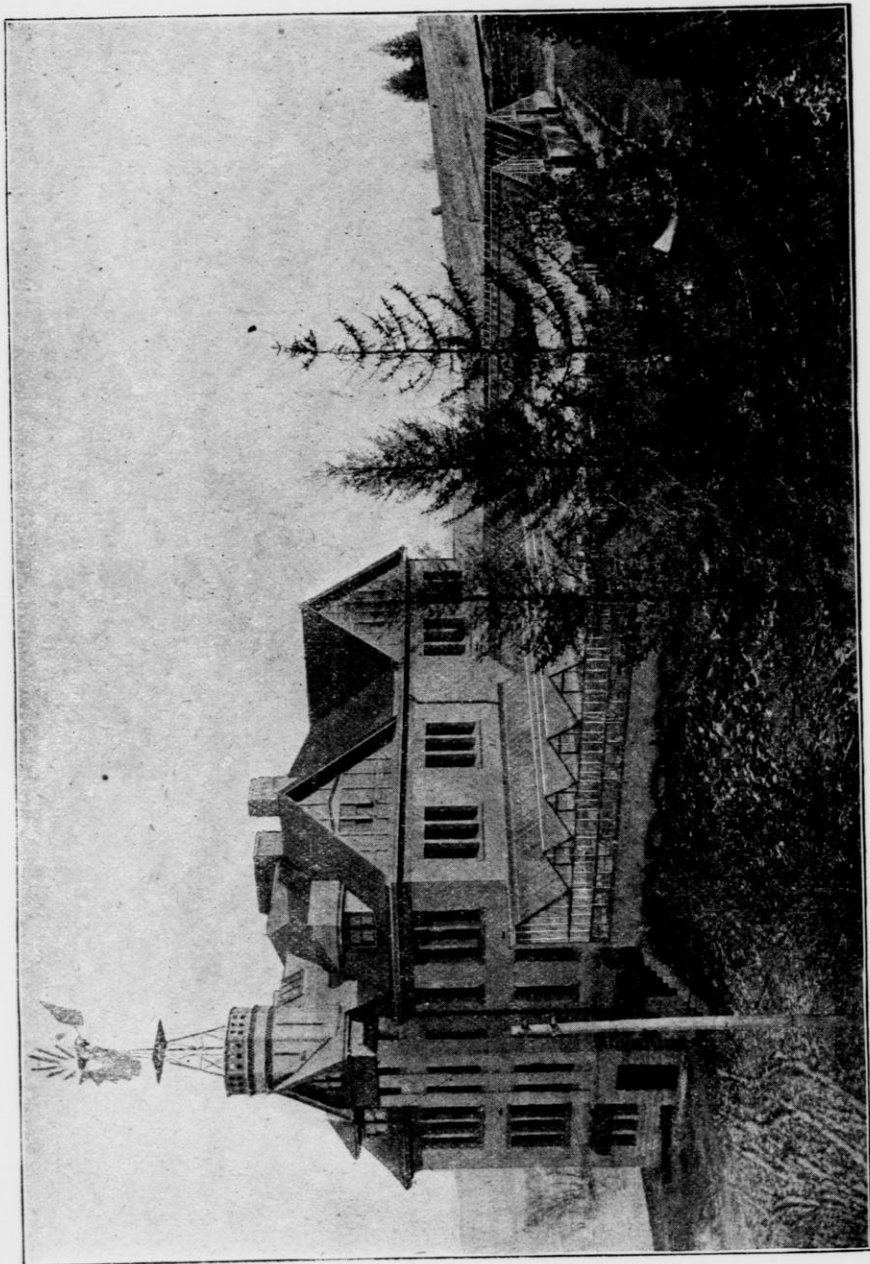


"Farmers' institutes have been a success from the day of their creation; they have accomplished, in nearly every case, and are still accomplishing, the mission for which they were created. They lead to better farming, clearer thinking, fuller social life, which means the moral and material advance of agriculture. Farmers' institutes have encouraged a firmer belief on the part of the farmer in the declaration of 'the father of his country,' that 'agriculture is the most healthful, most useful, and most noble employment of man.'"

Editor "Farmers' Voice," Oct. 14, '99.

"It is not all of farming to know how to do the work of the farm. There is a vast deal of knowledge and judgment that must come in play besides the work. There is a *science* in farming as well as in other things. And nowadays this science is discussed in books and papers constantly. Every successful farmer must learn somehow and somewhere the science of soil management, the science of cultivation of crops, of the science of live stock breeding, feeding and management. He must study the *how* and *why* somewhere, or else he is no farmer, no matter how well he can handle the tools. To study the *how* and *why*, in other words the right theory of farming in its many branches is what constitutes the science of farming. The foundation elements of this science is what we hope to see taught to every farmer's boy and girl in the common schools."

Editor "Hoard's Dairyman," Oct. 13, '99.



Horticultural and Physics Building at Agricultural College, University of Wisconsin, showing Green Houses where students work in winter in Horticulture and Soil Physics.

WISCONSIN FARMERS' INSTITUTES

A Hand-Book of Agriculture.

BULLETIN No. 13.

1899.

*A Report of the Thirteenth Annual Closing Farmers' Institute held at Sparta,
March 14, 15 and 16, 1899.*

"The effort to extend the dominions of man over nature, is the most healthy and most noble of all ambitions."—BACON.

Edited by GEORGE MCKERROW, Superintendent.



SIXTY THOUSAND COPIES ISSUED.

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

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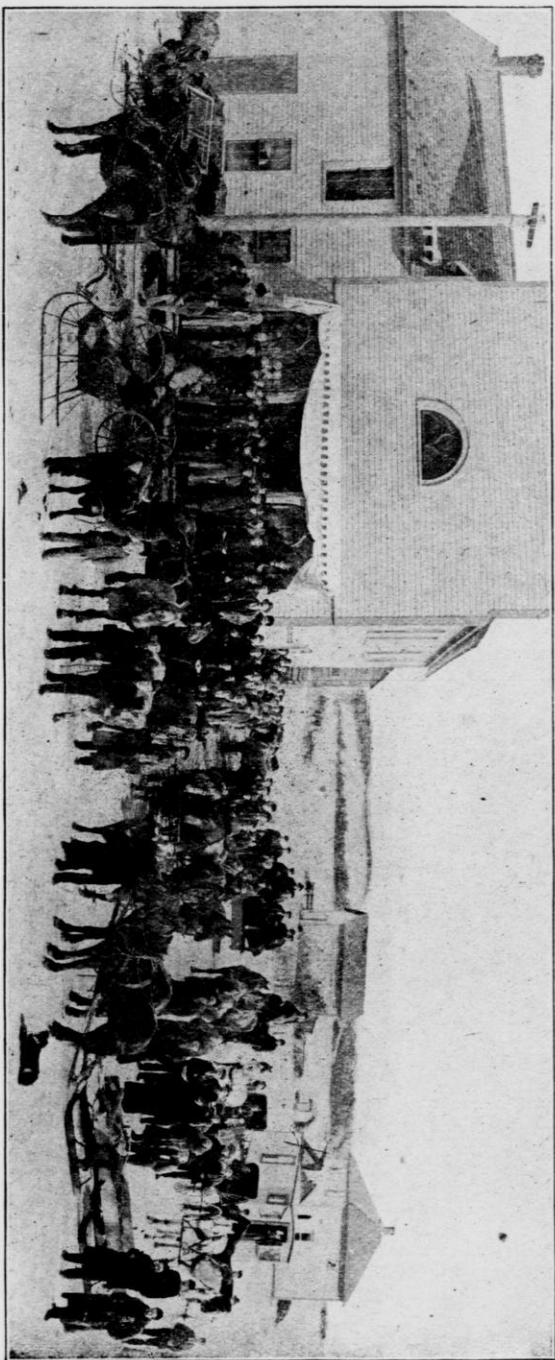
PRESS OF
RIVERSIDE PRINTING CO.,
MILWAUKEE, WIS.

TABLE OF CONTENTS.

	PAGE.
University of Wisconsin.....	8
College of Agriculture.....	12
List of Farmers' Institute for 1899-1900.....	14
FIRST DAY.	
Address of Welcome, Mayor D. W. Cheney.....	17
Response to Address of Welcome, Supt. Geo. McKerrow.....	18
Soil Fertility and Manures, H. A. Briggs.....	19
Crops to Grow, W. C. Bradley.....	25
Tile Drainage, H. E. Nicolai.....	34
Road Improvement, E. G. Harrison.....	42
Barn Building, J. E. Wing.....	56
Silo Building, Thos. Convey.....	62
Silo Filling, W. F. Stiles.....	66
Crops for Silage, H. A. Briggs.....	71
Feeding Silage, A. A. Arnold.....	73
Education of the Indian, Josiah Powlar.....	75
Floriculture, Miss Mariam Jewett.....	77
Gleanings, Mrs. F. H. Merrell.....	83
Education, Supt. L. D. Harvey.....	86
The Work of Women's Clubs, Mrs. A. C. Neville.....	94
SECOND DAY.	
Bee Keeping, N. E. France.....	100
Poultry for Farmers, C. E. Matteson.....	105
Truck Farming, N. E. Nicolai.....	116
Raising Pickles, Mr. Graves.....	121
Potato Growing, H. M. Culbertson.....	124
Swine Breeding, A. J. Lovejoy.....	132
Sheep Breeding, J. E. Wing.....	141
A Lesson in Feeding, W. A. Henry.....	146
The Lyceum, W. H. Schulz.....	154
Culture and Heroism on the Farm, Mrs. Frank Hawley.....	161
Teaching Domestic Economy, Mrs. Nellie S. Kedzie.....	165
The Dairy Industry, Snap-Shots by John W. Decker.....	175
THIRD DAY.	
Good Dairy Cows, F. H. Scribner.....	197
Butter-making on the Farm, Chas. Linse.....	207
The Co-operative Creamery, David Imrie.....	214
The Cheese Industry, E. L. Aderhold.....	221
The Horse, H. A. Briggs.....	227
Wisconsin's Fruit at Omaha, A. J. Philips.....	232
Apple Culture, Franklin Johnson.....	236
Resolutions.....	241
WOMEN'S DEPARTMENT.	
Cooking School—First Lesson.....	242
" " —Second Lesson.....	250
" " —Third Lesson.....	254
MISCELLANEOUS.	
Notice of Twelfth Census.....	262
Index to Advertisers.....	265

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Farmers' Institute and Mid-Winter Fair, held at Brackett, Eau Claire Co., Dec. 20-21, 1898.



LETTER OF TRANSMITTAL.

HON. GEO. H. NOYES,

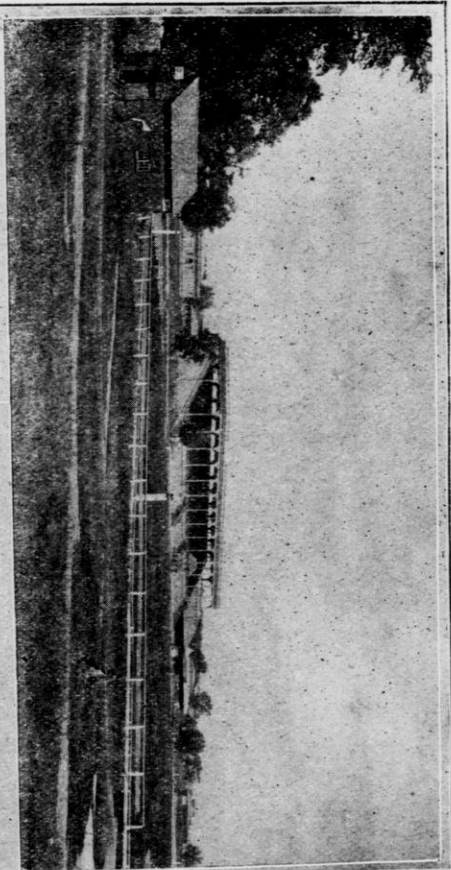
President of Board of Regents, University of Wisconsin:

SIR:—I have the honor herewith of presenting to you Bulletin No. 13,
of Wisconsin Farmers' Institutes.

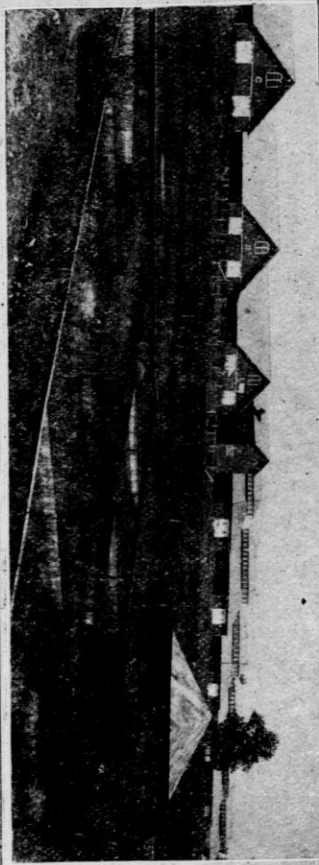
Most respectfully yours,

GEORGE MCKERROW, *Superintendent.*

MADISON, WIS., Nov. 15, 1899.



Grand Stand.



STATE FAIR BUILDINGS.



Cattle and Horse Barns.

UNIVERSITY OF WISCONSIN.

Board of Regents.

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

The President of the University, *ex-officio*.

State at Large, John Johnston.	6th District, C. A. Galloway.
State at Large, W. F. Vilas.	7th District, Byron A. Buffington.
1st District, Ogden H. Fethers.	8th District, Orlando E. Clark.
2nd District, B. J. Stevens.	9th District, J. A. Van Cleave.
3d District, J. E. Morgan.	10th District, J. H. Stout.
4th District, Geo. H. Noyes, President.	Secretary, E. F. Riley, Madison.
5th District, John R. Riess.	

Colleges.

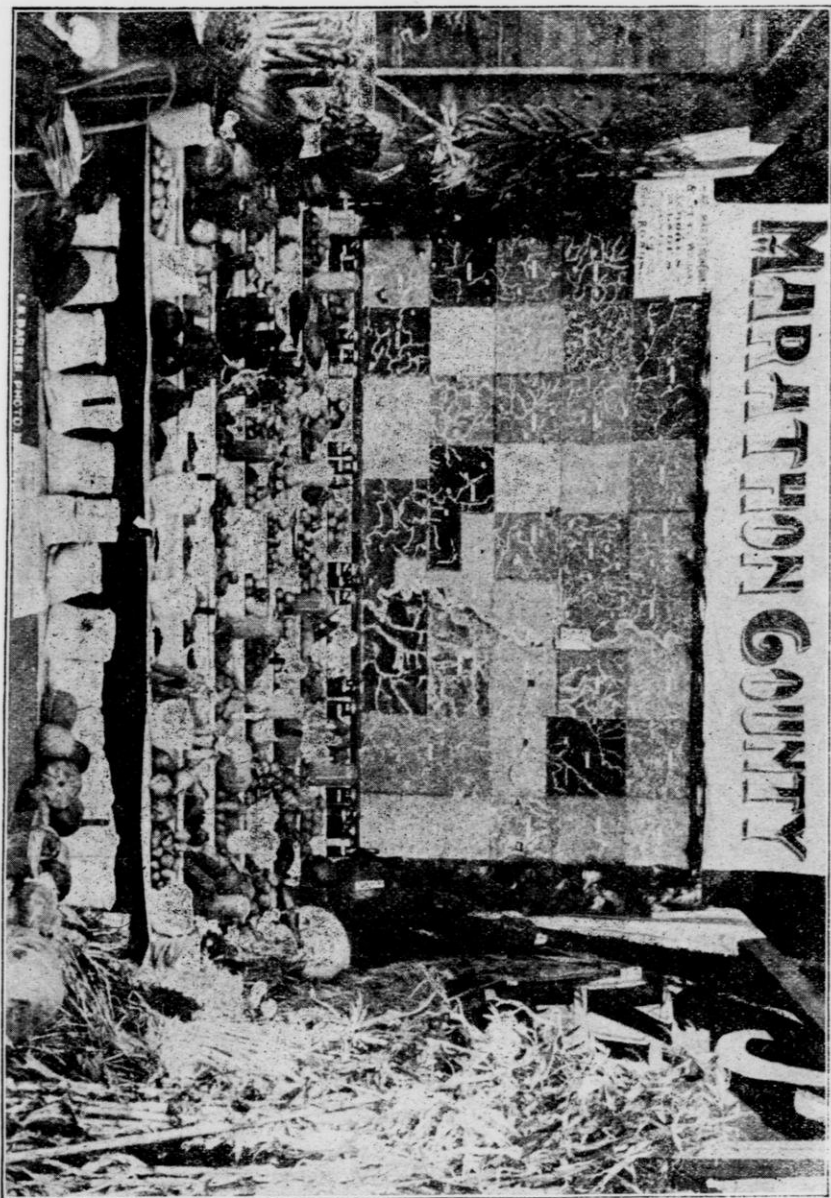
College of Letters and Science.	College of Agriculture.
College of Mechanics and Engineering.	College of Law.
School of Pharmacy.	School of Music.
School of Economics, Political Science, and History.	School of Education.

Courses.

Long Agricultural Course.	English Course.
Mechanical Engineering Course.	Civic Historical Course.
Electrical Engineering Course.	Courses in Economics and Political Science.
Law Course.	Special Science Course, antecedent to Medicine.
Ancient Classical Course.	Special Courses for Normal School Graduates.
General Science Course.	Collegiate and Academic Courses in Music.
Short Agricultural Course.	
Dairy Course.	
Civil Engineering Course.	
Pharmacy Course.	
Modern Classical 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-two special courses. Under the Sciences there are a variety of courses in each of the following: Astronomy, Physics, Chemistry, Geology, Mineralogy, Zoology, Botany, Bacteriology. In History there are twenty-two courses; in Civics, twenty; in Economics and Sociology, thirty; in Mental Sciences there are nineteen, embracing Psychology, Ethics, Aesthetics and Logic. There are twenty-three courses in Pedagogics, and eight courses in Music and two courses each in Military Drill, Gymnastics, and Music.



First Prize County Exhibit at Wisconsin State Fair, 1899. Made by Marathon Co. Township map made with grains and seeds grown in the county.

Physical Culture:—The Armory and Gymnasium is one of the largest buildings for its purposes connected with any institution of learning in the Country. It is provided with rooms for lectures on Physiology and Hygiene, and for class and individual exercise in all the forms of gymnastic practice. There are also the most abundant and approved facilities for shower, sponge, and swimming baths.

Adequate accommodations are provided for the woman's gymnastics by the construction of an addition to Ladies' 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.

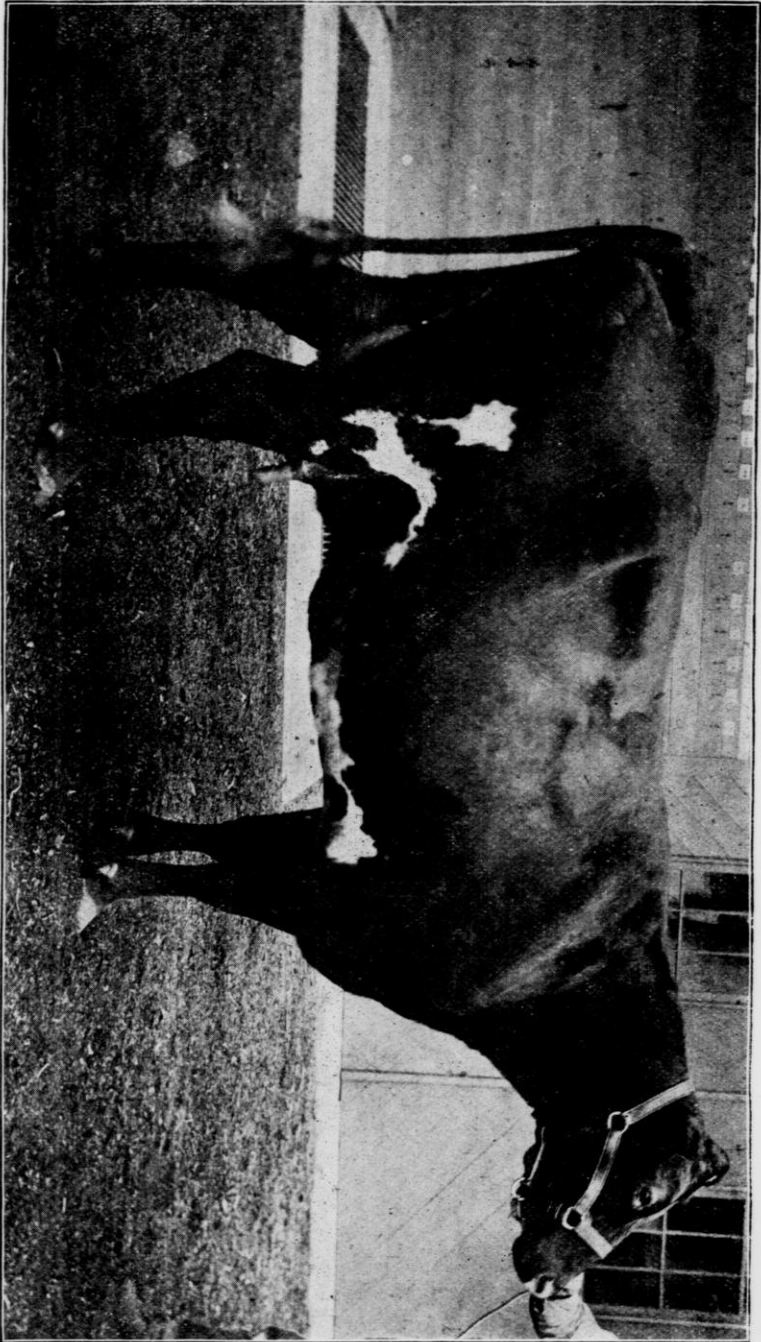
In Pharmacy:—Courses in Practical Pharmacy, Pharmaceutical Chemistry, Materia Medica, Pharmaceutical Botany, and Practical Laboratory Work.

General Facilities:—The faculty embraces upward of 115 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, 51,000 volumes; of the State Historical Society, 204,000 volumes, including pamphlets; of the State Law Department, 32,000 volumes; of the city, 16,000 volumes, besides special professional and technical libraries, making in all more than 303,600 volumes, thus affording very exceptional opportunities for reading and special research.

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

C. K. ADAMS, *President.*



Grade Shorthorn Cow, owned by Wisconsin Experiment Station, has a yearly record of 10,163 lbs. of milk, and 433.8 lbs. of butter fat, the equivalent of 605.89 lbs. of butter. Cost of feed for year \$65.06, giving a profit over cost of feed of \$79.73.

UNIVERSITY OF WISCONSIN.
COLLEGE OF AGRICULTURE.

Agricultural Committee.

Hon. O. E. Clark, Chairman,	Appleton.
Hon. J. H. Stout,	Menomonie.
Hon. Ogden H. Fethers,	Janesville.
Hon. John R. Riess,	Sheboygan.
Hon. J. E. Morgan,	Spring Green.
Hon. C. K. Adams,	Madison.

Officers and Instructors.

THE PRESIDENT OF THE UNIVERSITY.

W. A. HENRY,	Dean and Director.
S. M. BABCOCK,	Chief Chemist.
F. W. WOLL,	Chemist.
F. H. KING,	Physicist.
E. S. GOFF,	Horticulturist.
W. L. CARLYLE,	Animal Husbandry.
H. L. RUSSELL,	Bacteriologist.
E. H. FARRINGTON,	Asst. Professor of Dairy Husbandry.
A. G. HOPKINS,	Instructor in Veterinary.
A. R. WHITSON,	Assistant Agricultural Physicist.
U. S. BAER,	Cheese Instructor.
R. A. MOORE,	Assistant to Dean.
ALFRED VIVIAN,	Assistant Chemist.
L. H. ADAMS,	Farm Superintendent.
IDA HERFURTH,	Clerk and Stenographer.
EFFIE M. CLOSE,	Librarian.

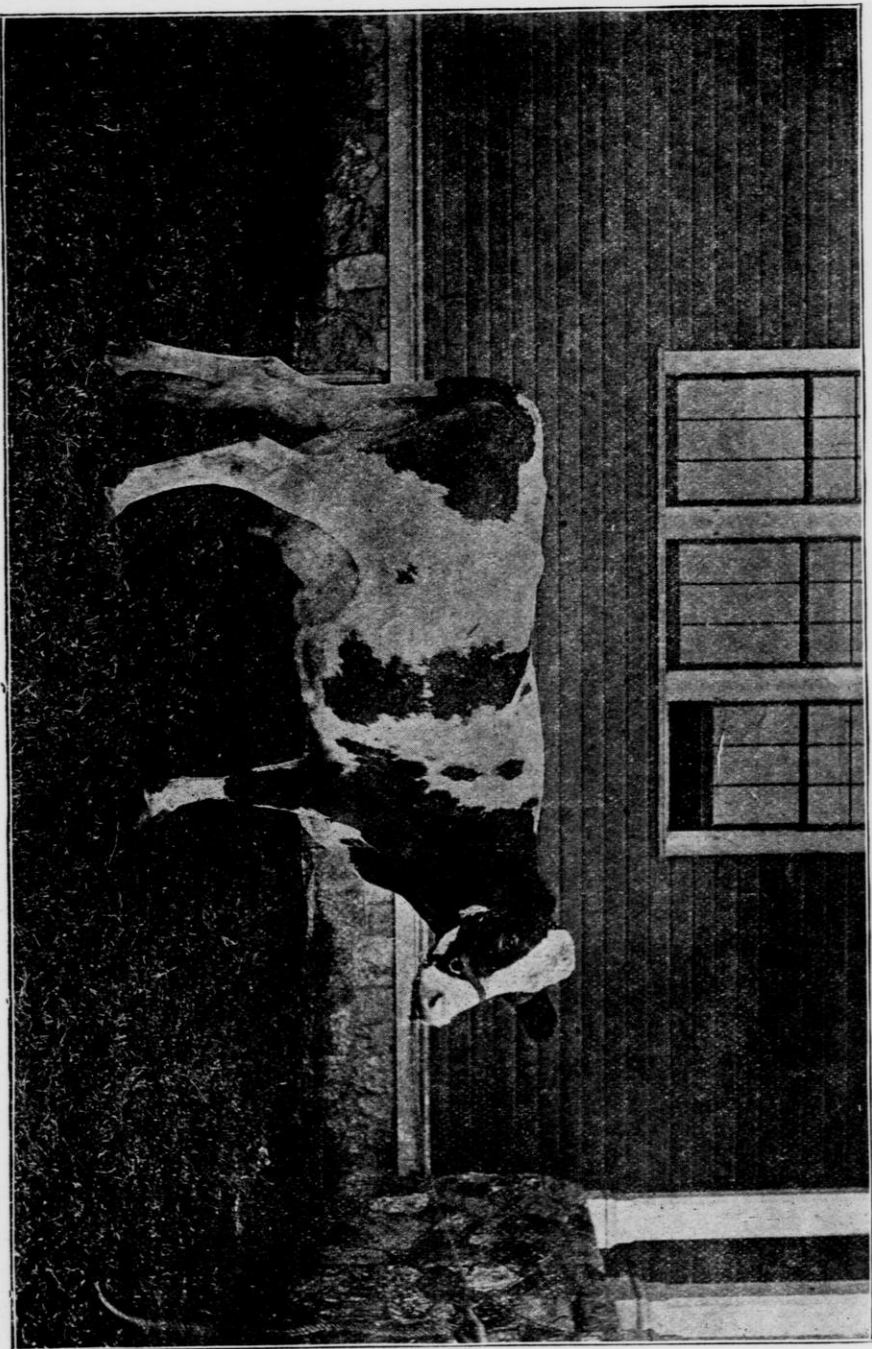
Farmers' Institutes.

GEO. McKERROW,	Superintendent.
HARRIET V. STOUT,	Clerk and Stenographer.

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

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

III. The Farmers' Institute. Each year this practical school for the farmer holds more than a hundred two-day meetings in the farming districts of our commonwealth. These 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 Farm Institute Bulletin are distributed annually. Any community can secure an institute upon early application to the Superintendent. For further particulars concerning this school for the farmer, write to *Geo. McKerrow, Supt., Madison, Wis.*



Grade Guernsey Cow, owned by Wisconsin Experiment Station, has a yearly record of 7890.5 lbs. of milk and 362.06 lbs. of butter fat, the equivalent to 422.37 lbs. of butter. Cost of feed for year, \$32.25, giving a profit over cost of feed of \$63.18.

WISCONSIN FARMERS' INSTITUTE.

WISCONSIN FARMERS' INSTITUTES FOR 1899-1900.

DATE.	THOS. CONVEY, Conductor.	A. A. ARNOLD, Conductor.	CHAS. THORP, Conductor.	W. C. BRADLEY, Conductor.	L. E. SCOTT, Conductor.
December.					
12-13.....	Amherst Junction.	Milladore.....	Colby.....	Sand Creek.....	Fall Creek.
14-15.....	Wausau.....	Medford.....	Stanley.....	Caryville.....	Elk Mound.
19-20.....	Roberts.....	Durand.....	Humbird.....	Barron.....	Luck.
21-22.....	Spring Valley.....	Modena.....	York.....	Prairie Farm.....	Trade Lake.
January.					
2-3.....	Seymour.....	Antigo.....	Bondel.....	Wayside.....	New London.
4-5.....	Ogdensburg.....	Wittenberg.....	Hickory.....	Sobieski.....	Harmony Corners.
9-10.....	Pilsen.....	Mishicot.....	Howard.....	Glenbeulah.....	Hilbert.
11-12.....	Pine Grove.....	Bolt.....	School Hill.....	Cleveland.....	Marytown.
16-17.....	Augusta.....	Bangor.....	Tomah.....	Centerville.....	White Creek.
18-19.....	Neillsville.....	Cashot.....	Grand Rapids.....	Fountain City.....	Strong's Prairie.
23-24.....	Hustisford.....	Doylestown.....	Ontario.....	Warrens.....	*Black River Falls.
25-26.....	Kingston.....	Briggsville.....	Valton.....	Lyndon Station.....	*North Freedom.
30-31.....	Mt. Vernon.....	*Albany.....	Cuba City.....	Burton.....	Woodford.
February.					
1-2.....	Monroe.....	*Platteville.....	Linden.....	Bagley.....	Hollandale.
20-21.....	*Sun Prairie.....	Readstown.....	Mazomanie.....	Mt. Sterling.....	Boscobel.
22-23.....	*Spring Green.....	LaFarge.....	Hub City.....	Excelsior.....	Waunakee.
27-28.....	Kirchayn.....	Hingham.....	*Mukwonago.....	Brandon.....	Wayne.
March.					
1-2.....	Beechwood.....	Fredonia.....	*South Milwaukee.....	Winneconne.....	Saxeville.
6-7.....	Albion.....	Iron Ridge.....	Franksville.....	*Jefferson.....	Wales.
8-9.....	Brookfield.....	Stone Bank.....	Salem.....	*Beloit.....	Sullivan.

* Cooking School will be held in connection with Institute.

Fourteenth Annual Closing Institute, Delavan, March 13, 14 and 15, 1900.

All inquiries with reference to the Institutes will be promptly answered.

GEO. MCKERROW, *Superintendent*,
MADISON, WIS.

Each cheese in this lot was made from 100 pounds of a patron's milk delivered at the Wisconsin Dairy School. The per cent of FAT in each milk and pounds of cheese obtained is marked on each cheese.

The QUALITY of the cheese improves with the increase of fat.

3.3% Fat
Wt. 10.1

4% Fat
Wt. 11.4

5% Fat
Wt. 13.1

The cheese shown here were made by Prof. Decker to demonstrate the value of fat in the milk for cheese. The weights here given were as taken from the press and the cheese were made soft for a local market, so that these figures are somewhat higher than for cured cheese for the ordinary market. The point to be noticed is that rich milk makes more cheese than poor milk.



Wisconsin's Fruit Exhibition at the Trans-Mississippi Exposition, Omaha, 1898.

PROCEEDINGS
OF THE
THIRTEENTH ANNUAL
Closing Farmers' Institute

HELD AT
SPARTA, WIS., MARCH 14-15-16, 1899.

The meeting was called to order by W. H. Hanchett, after which Mr. C. P. Goodrich was called to the Chair by Superintendent McKerrow.

Prayer by Rev. William Crawford, of Sparta.
Piano Solo, Mrs. Mary Jones.



D. W. CHENEY.

ADDRESS OF WELCOME.

Mayor D. W. Cheney, Sparta, Wis.

Mr. Chairman, Ladies and Gentlemen:—From the small number of our own citizens who are present at this session of the Institute, I take it that they have learned who was to make the opening remarks and have escaped, so that you who are strangers must take your medicine and look pleasant. However, I will not occupy the time with any long, drawnout address of welcome; in fact, I desire to make it entirely informal, that you may feel that it is all the more hearty. And so, in as few words as possible, let me say on behalf of our people that we were really glad when you decided to close this Institute work in our city. While at all times we are pleased to entertain strangers, conventions, public gatherings of all kinds, in this instance we are more than pleased, because we

have learned from experience the benefits to be derived from these Institutes, and in this connection let me call your attention to one or two things.

Within the past two or three years, and I believe primarily through the influence of the Farmers' Institutes, Sparta has nearly doubled its inhabitants. We have erected new churches, school houses and other buildings, have established an electric lighting system, sewerage, and have commenced paving the streets. Acre property around town has increased in value nearly seventy-five per cent., and I understand it was through the Farmers' Institute that our people have gone largely into the small fruit business and diversified farming has taken the place of the old methods. This has been of much benefit to our citizens. Last year our growers received for their products \$36,000 in round numbers, while in this immediate vicinity \$13,000 were paid. Our one creamery in the city paid out to its patrons last year \$37,000, and I speak from a knowledge of the facts, gentlemen, when I say to you that of the four hundred thousand dollars now in deposit in our city banks, considerably over one half belongs to the farmers and the wage-earners. Being situated in an agricultural community, that which affects the farmer, directly or indirectly, affects the city, and so I say to you gentlemen that Farmers' Institutes are doubly welcome, partially perhaps from a selfish motive in that we expect to get considerably more benefit than we give.

For some time past our townspeople and the farmers have been working hand in hand for bettering conditions, and among other things our people

have just closed a contract for the erection of a salting station, and our farmers this year will cultivate about three hundred acres of cucumber pickles. I trust the advantages and disadvantages of this business will be thoroughly discussed.

I am unable, Mr. Chairman, and Gentlemen, to place in the hands of this association the keys of the city, because last summer I turned them over to the Sunday School picnic and somehow we have never been able to find them since, so we have adopted the "open door" system. So, gentlemen, likewise ladies, during your stay in Sparta, if you see anything you need, take it.

RESPONSE TO ADDRESS OF WELCOME.

Supt. George McKerrow.

In response to this hearty welcome, let me say that we are thankful that the keys are lost and cannot be found, and after the proposition that your Mayor has made, I would advise the citizens to see that there is nothing left on the clothes-line after dark.

We are here to hold this Closing Institute; we are here to benefit the farmers in attendance in the vicinity of Sparta, as much as possible. We are here for the other purpose of bringing together some of the best discussions along certain agricultural lines that we can make up a good Farmers' Institute Bulletin for 1899. We trust that in these discussions every farmer in the audience will take part; it is your meeting and the success of it must depend upon you.

Thanking you again, Mr. Mayor, for the hospitality extended to us, we will now open this meeting for business.

SOIL FERTILITY AND MANURES.

H. A. BRIGGS, Elkhorn, Wis.

Mr. Chairman, Ladies and Gentlemen:—As has been said, this subject of soil fertility and manures is a most important one for farmers to consider, not only in Wisconsin, but all through the United States, and the more I have traveled with the Farmers' Institutes and have heard discussions on this subject, the more I am convinced that it cannot be enforced too much.

twenty or fifty years? I think we can all do it if we run our farms intelligently and grow such crops as we can grow to advantage, and feed them out on the farm intelligently.

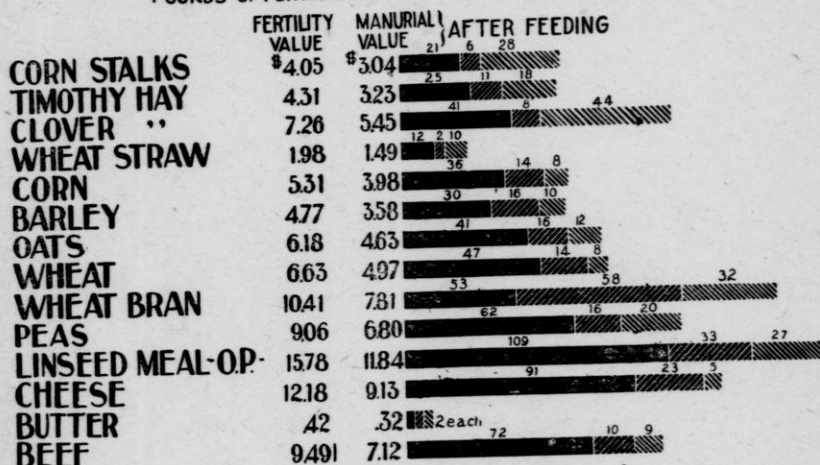
Manurial Value of Different Feeds.

When we speak of fertility from a farmer's standpoint, we generally

MANURIAL VALUE OF FEED STUFFS.

NITROGEN COST-----12¢ PHOSPHORIC ACID 4 1/2¢ POTASH 4 1/2¢ per lb.

POUNDS OF FERTILIZING INGREDIENTS PER TON—



Now, the chemist will tell us that the fertility in our soil will certainly become exhausted if we crop it continually, thus using all the available fertility that there is in it. Now, how can we manage our farms so as to get the most money out of them and still leave them to our children in better shape for the next generation after we have handled the land for ten, fifteen,

and speak of his barnyard manures, such as he is accumulating from day to day on his farm. These vary in quality a great deal according to the quality of the feed. For instance, corn fodder has not nearly the fertility in it that clover hay has; clover hay has not as much as wheat bran. Charts giving the relative value of different feeds appear from time to time in our

bulletins, and should be carefully studied.

How can we handle the manure on our farms to the best advantage and save all the fertility, or nearly all the fertility, that there is in it? When a man starts to build a barn he should always have this matter in mind and should build so as to save all the liquids as well as the solids; he should build for the convenience of his stock as well as for convenience in getting this fertility on the land.

My Method.

Since I have given this matter careful attention, my plan has been to take the manure from the barn to the field every day, as nearly as possible. Of course there are some scatterings in the yard that we cannot get every morning, but five-sixths of all the manure that is made on the farm goes direct from the barn to the fields. I know there are a great many farmers who say that it goes to waste in the field, that it ought to be decomposed beforehand. Well, now, the chemist tells us that we can add nothing to its fertility by decomposing it; it is never better than when it is first made, and by getting it on our land, especially on our grass land, there is but little waste, not any, in comparison to what it will be if left in our yards or in piles back of the barn to heat and mould. I was considerably interested about a month ago in going into a barnyard in Southern Wisconsin, where I supposed every farmer took the best care of his manures, to find that his cow manure was piled in a great pile back of the barn, as high as he could pitch it, and that the liquid manure was running off in little rivulets. His horse manure was piled up back of his horse barns and was steaming and heating, and the ammo-

nia passing off into the air. Now, if he had piled his horse and cow manure together, there would have been moisture enough in the cow manure to retain the ammonia in the horse manure, and kept it from heating; but he was only looking at the one thing of getting it out of his barn, regardless of saving the fertility that was in it.

Absorbents.

If you are not situated so as to be able to get the manure right from the barn to the field, then you should provide a good shed for it, with a tight floor, which may be of plank, cement, or solid clay—anything that will prevent it from leaching away. It should be covered so that it will not get an excessive amount of rain. In that way we can save the fertility in it, but we must have moisture enough to keep it from heating and going off in ammonia. Another thing; in order to save the fertility in our barns, we want to be sure to have some kind of absorbent to take up all the liquid manure. Nearly all the farms in Wisconsin are using straw or corn fodder for this purpose. If you will run your corn fodder through a corn cutter or shredder, that makes the best kind of an absorbent. It will take it up like a sponge. I like it much better than straw; I have noticed where we have used the corn fodder that the floor would be perfectly dry in the morning.

Now, I spoke of feeding our stock on the farm with a view to the manurial value. We should make that more of a study that we may get the best returns out of such feeds, and I know of no kind of stock that is better for keeping up the fertility on the farm than the dairy cow or the mutton sheep. They are the two classes of live stock that are paying the farmer, as a general thing, better than any

other kinds of live stock, and also putting fertility in the very best shape possible, where we can get the best results from it.

A Good Plan.

My method of handling the manure is to spread it on grass land. I prefer grass land because the clover or the timothy stubble and roots retain all of the liquid that there would be in case of a rain. The objection often comes up that so much of it will run away when a little rain or snow comes. Now, a person who has watched that very closely will find that it runs but a very little distance from the place where it is first spread. I have talked with farmers who have made experiments in top dressing on grass on a side hill, and have watched the effects. In many cases where it has been observed, this running off has not been noticeable more than eight or ten feet from where the manure was spread.

Another great advantage in this system is that it helps to get a catch of seeding, which is quite difficult in much of the land in Wisconsin, particularly on our sandy farms. You can nearly always get a catch by sowing fall grain and top dressing it with stable manure, or even dry straw, or anything you have about; then sow grass seed in the spring and you will seldom have a failure. The manure acts as a mulch; and all the fertility that there is in it goes in the ground; rain coming in the fall and winter, and the snow, breaks down the solids in the manure and gets it just where the plant life can get a good hold of it early in the spring.

DISCUSSION.

Mr. Kellogg—Would you advise putting manure on side hills if there was ice there, as at the present time?

Mr. Briggs—I haven't seen any ice that I thought would do any damage. Of course, if there was very much ice I should keep it until the ice was gone.

Mr. Hanchett—What would be the effect this year where the ground is frozen six or seven feet deep, if we should have heavy rains?

Mr. Briggs—If it is put on grass land, on clover sod, when there is moisture enough and heat enough, so that the surface will be thawed out, the liquid manure will filter through the grass roots, and there will very little fertility run away.

Mr. Scott—What would be the loss if the manure is allowed to remain in the yard?

Mr. Briggs—It would depend a good deal upon the condition that it was left in. If it was spread out, as it is in many farmers' yards, from six inches to two or three feet, lying there all summer and the stock running through it, I should think there would be seventy-five per cent. of it go to waste. If it was piled up in good piles and taken care of, perhaps there would not be more than thirty or forty per cent. of it get away.

Mr. Scott—Would there be as much if you pile it in the fall?

Mr. Briggs—No, if you pile it in the fall, it freezes up and there is practically no waste, but what I am looking out for in all my farm work is to save work. Where a farmer has a whole lot of boys and girls, more than he knows what to do with, it may be an advantage to work as unhandily as is possible, but where you have to hire the work done, it makes extra cost every time you handle a forkful of manure. If a man has his barn built properly and the floor so he can drive through, he can put it onto a sled or wagon and take it into the field and

dump it cheaper than any other way that he can handle it.

The Chairman—When a man is selling off some of his crops from his farm and buying food for his stock, isn't it well to take into consideration the manurial value of these feeds?

Mr. Briggs—It certainly is. We find that bran, oil meal, and cotton-seed meal are not only richer in feeding value, but are much richer in manurial value. There is where the cow comes in as being an excellent animal for keeping up the fertility, because we have to feed her more of this protein food, and that supplies in the manure the nitrogen that we need in our land.

Mr. Arnold—The value of manure depends on the quality of the feed. The chemist tells us that sheep manure is worth twice as much as cow manure and horse manure, when fed upon the same article. Now, isn't there a good deal of truth in what the farmers generally believe, that if you keep a lot of sheep, you can enrich your farm to a larger extent than in any other way? Is there any method whereby the animal can add to the fertility of the food he consumes? If the sheep eats the same food as the cow, and the manure is worth twice as much, I would like to know why.

Mr. Briggs—I don't think it is worth twice as much. It is in a more condensed form, less water in it.

Mr. Arnold—Well, the liquid manure from the cow is worth more than the solids, so that does not explain it. We learn from the professors themselves that analyses show that sheep manure is worth twice as much as cow manure.

The Chairman—But there is only half as much of it.

Supt. McKerrow—It is in a more condensed form.

Mr. Bradley—Do you think that if you fed a bunch of sheep ten tons of

clover hay and ten tons of bran, and that if you fed a cow the same thing, and came to analyze the manures, that the sheep manure would be worth any more than the cow manure? If you are feeding to a dairy cow she will possibly take more out of it than the sheep will. If that is so, of course we get it back. It does not seem to me that the cow does get out of her food any more than the sheep, and certainly the manure would be just as valuable after all the products were taken into consideration.

Supt. McKerrow—Is it not a fact that the manurial value from a given amount of feed will vary with the same animal? For instance, if this is a young growing sheep, it will extract more nutriment from the same amount of feed than an older sheep. The same dairy cow will extract more out of her food at one time than at another. The conditions of the animal are to be taken into account as well as the feed.

Mr. Briggs—In feeding to our live stock, certain animals take out of that feed and put back onto the land less than others. You spoke of the dairy cow. She is giving large quantities of milk, and of course it takes more protein out of that feed and there is less to go back on the land. It is the same with a growing animal.

Question—What is the object of plowing under?

Mr. Briggs—In some kinds of soil it is of great benefit. You get the vegetable humus in the soil and it lightens it up, so that it will take and hold moisture better, and the roots can penetrate the soil to better advantage than they could where it is a very heavy clay soil. But the main thing is to get it so it will hold moisture better; for instance, in the State of Michigan I understand they have been cropping for a number of years and putting no

fertility back on the farms, except commercial fertilizers. They have had rainfall in the last year of something over eighteen inches of water and still they are complaining of drought. By experiments at the Experiment Station they found that the soil was destitute of humus and vegetable mould; they had plenty of fertility but they lacked humus, and that the soil with the proper amount of humus would hold fifty per cent. more water than the other. The humus holds the water in the soil so that the crops can get at it and feed on it, and also aids in breaking down the fertility.

Question—Did you ever try putting this coarse manure in new seeding of clover?

Mr. Briggs—Yes, if I hadn't any other crop to put it onto, I would either pasture it or cut a crop from it. By spreading it thin, not later than the first of April, the rains and snows come on during the winter and break it down, and by going over it with a brush or harrow there will be but little that will rake up, and it will do very little damage. You can put your hay into the hay mow with much more moisture in it if it has some of the coarse straw in it. I never have found it to be any disadvantage, but rather a benefit.

Question—How would it do to spread that coarse manure on fall plowing?

Mr. Briggs—That would do very well if we did not have any rains or snows to wash it off. But clover or grass land is superior to fall plowing, because the roots and fiber retain the fertility, whereas, if there is nothing to catch it, it is liable to be lost. However, I have a neighbor who practices after that method and I must say I never saw a man bring up land better

or quicker; you can see the difference in the corn just as far as you can see in the field. I will tell you of a little illustration of that which I noticed when I was quite small. My uncle lived on an adjoining farm to us a number of years ago, when they used to think that they must leave the manure in the yard until they cleaned house, about once a year. They drew it out and plowed it under immediately; his tenant commenced plowing around the field and had about two or three rods. In manuring that corner of the field he had nearly a load left and he spread it on this fall plowing. I happened to be present when my uncle came home, and as he drove along the road he saw what was going on, and he says, "Van, what did you put that manure on that fall plowing for? You might just as well have put it in the road. We shall get no benefit from it." That excited my boy curiosity, and I watched it; you could see better results from that fall plowing top dressed for three or four years longer, than you could where it was plowed under.

Mr. Arnold—It has been my custom to compost manure and put it on the land in the fall of the year, dragging it in with winter wheat, and always getting a catch of clover, but Prof. Roberts says where manures are composted, there is a loss of fifty per cent. Now I want to know where that goes to.

Mr. Briggs—It depends a great deal on how it is composted. The experiment you referred to is where it was piled up in heaps in the yard and left there for six months. If that manure had been composted under a shed and just heaped up, there would not have been nearly so much waste.

Supt. McKerrow—The manure in that experiment was piled two feet deep.

Mr. Arnold—What I want to get at

is whether this loss is by evaporation or drainage?

Mr. Briggs—Both. There is very little loss by evaporation unless there is some heating going on. Just as soon as the manure begins to heat, it loses fertility very rapidly, and if you have not a tight floor, it gets away by leaching, but it does not lose very much if it is just exposed so a very little water gets on to it.

Mr. Arnold—It seems to me there is no loss by leaching where the water doesn't go through the compost heap and whatever loss there is must be by evaporation. You said in your remarks that manure is of no value until it is composted, and if you want to get immediate results, decomposed manure is the best; in my opinion the fall of the year is the ideal time to put out manure; that is nature's time and it is better than when the ground is frozen. There is no action of the elements during the winter season until the spring opens, and, as you say, while we must economize, and it is best to instruct people to get out the manure at all the seasons of the year when it is most economical, I think the ideal time is the fall of the year.

Mr. Briggs—I will agree with you there, providing we have made all of our manure in the fall and could get it right from the barn to the field.

Mr. Scott—Cannot this decomposition go on in the soil just as much as in the compost heap?

Mr. Briggs—Certainly, and that is just where I want it.

Mr. Scott—And isn't there an advantage in having it go on in the soil? The scientists tell us that it is a good thing to have our soil well provided with humus, aerating it, helping the action of the oxygen and such action in the soil will tend to develop the nitrates

very rapidly, while the soil that has become depleted of humus, especially soils locked up so that the atmosphere cannot produce this action, will lose the nitrates very rapidly. I think we should have our soils well filled with humus so as to subject them to the action of the atmosphere.

Supt. McKerrow — Captain Arnold dwells on nature's plan. It is a pretty good thing to follow nature's plan, if it fits conditions, but nature's plan is to have all the fertilizing material right on the soil and not in the compost heap.

Mr. Scott—Following nature's plan, this great territory of the United States would only support two hundred thousand people. To-day it supports many millions. We have to improve on nature.

Mr. Arnold—Nature did not do any plowing. Nature furnished us with some pretty good farms.

Mr. Briggs—I want this manure to decompose—I want the plant life to feed on it just as rapidly as it is decomposing, and especially the clover plant, and then the roots will be left in the ground for humus, vegetable mould, and you will retain the proper condition in the soil; keep it there for the grain crop that is going to follow.

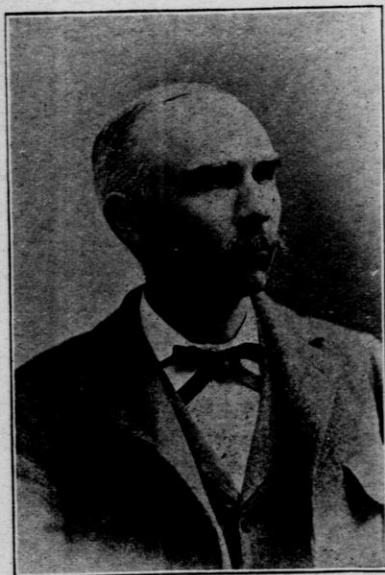
The Chairman—I think the farmers of Wisconsin are fortunate in having had this subject of fertility discussed at every Institute for the past ten years. I am sure that we have kept our soils in better condition than the farmers of other States on account of it.

I have been traveling around some for the last two or three years, especially in the State of Michigan. I have been attending Farmers' Institutes there, and I think that this winter I never saw that subject on any program but once, and the farming lands of Michigan need just this

treatment we have talked about, for the reason that they have been for years robbing that land of its fertility without one single thought of what the next generation was going to do. Let us keep ahead and keep up the fertility of our soil in this beautiful State of Wisconsin.

CROPS TO GROW.

W. C. Bradley, Hudson, Wis.



W. C. BRADLEY.

Ladies and Gentlemen:—At an Institute meeting the other day the question came up "What is the best crop to grow on a farm?" The minister, who was present, said that he thought a crop of boys was the best crop to grow on a farm. Some one in the back part of the audience improved on that by declaring that a crop of girls was the best thing to grow on a Wisconsin farm. The minister was too much for him, and he said, "Oh, the boys always embrace the girls, so it comes to the

same thing." I think you will all agree with the minister that the crop of boys and girls growing on Wisconsin farms to-day and being educated in our public schools, perhaps not to make farmers but to make intelligent, law-abiding citizens, are the best crop that we can grow on our farms.

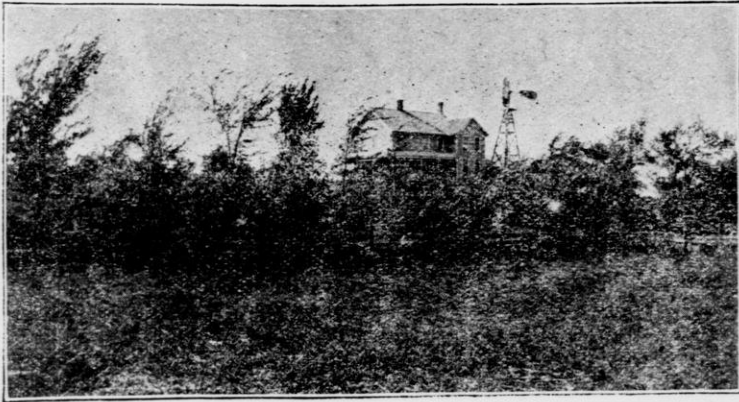
But there are other crops, and perhaps some of you are asking, What are the best of those other crops to grow on our farms? This will depend, first, on the farmer himself. Something depends on his family, then considerable in his location as regards distance to market. Then, something will depend on the condition of the surface of his farm, whether it is level or very rough. Then, on the condition of the soil, whether it is low, marshy, sandy, or heavy, clay soil. All of these things we must take into consideration in order to determine which are the best crops for us to grow on a Wisconsin farm.

The Stockman.

In the first place, the farmer himself will have to give these different things a good deal of thought and study in order to know what he is capable of growing. If he is a fairly intelligent, industrious, thoughtful man, who has a good deal of love of live stock feeding and the capacity for growing those different crops that he can turn into feed for his live stock, why the crops for him to grow will be such as will

give him the most feeding value. It does not make much difference where we find this man, whether it is near a market or many miles from a market, whether he is on sand, or sawdust, he is going to grow those crops that he can turn into food to carry live stock of some kind. Where we find these men, we find successful men almost always, because in growing the crops that can be turned into foods, we find he can keep up the fertility, as Mr. Briggs has just told us, by it. That land will produce more and more each year, and he is not selling off

according to the location he is in, is what crops he can sell from the farm, selling the least manurial value in the crop; to raise those crops that will take out of the farm the least fertility, and the ones that he can get the most money out of. A man's family has a good deal to do with the crops he should grow. If he has a large family and can depend upon them for a good deal of help, he can raise crops that a man with a small family, or a man whose family is detrimental to him in his farm work, would not grow successfully. If he is on rough land, his



MOUNTAIN FARM, HOME OF MR. BRADLEY.

his fertility by the bushel or the ton. His crops gradually become better and he can raise more and more each year.

The General Farmer.

But there are a great many farmers who are not given to live stock growing and these men do not want to grow crops for this special purpose. When we find men of this kind, we must allow them, perhaps, to take up a rotation of crops that would be objectionable to the live stock feeder, and the thing for this man to study

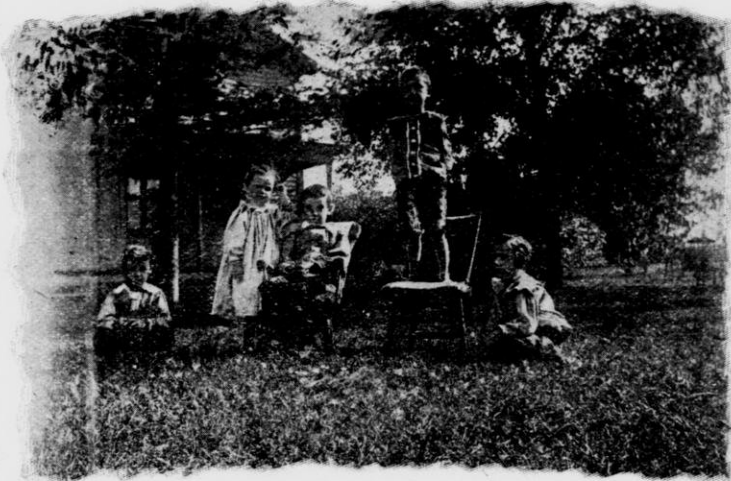
crop rotation must be of a different nature than if he is on smooth land, because his rotation on rough land must be a very limited one; most of the ground must be kept seeded into grass and only a limited number of acres plowed. If we plow rough land, we will soon exhaust the soil, as we have often seen, especially where grain has exhausted the soil of fertility, of humus, and then our land not only dries up very easily, but it is subject to washing in heavy rains. The ground must be allowed to stay in

grass a good deal of the time. My idea is that most of such land should be kept in pastures or grasses, and a limited amount in the smooth places can be used to grow such grains as will give us the best feeding value to supplement the grass feed or for winter feeding, a few acres of oats or barley, corn or potatoes, on the level portions of the land.

A Good Rotation.

On a level farm we could grow a larger variety and ought to do so. Our

would have to be of a different nature than on rich prairie soils. In some sections of the State there is scarcely any rotation of crops adopted at all. Where the principal crop has been potatoes, year after year, they tell us it is almost impossible in some sections, to get a rotation of crops; that is, that they cannot grow clover. We cannot depend on a rotation of crops without clover, and their soil in some places has become so exhausted of its vegetable humus, it has been cropped so many years with potatoes, that the



THE BEST CROP ON THE FARM.

rotation would be three or four years. We commence, perhaps our land is seeded with clover, then put on corn and potatoes, then sow again to grain of some kind, oats or barley. Then seed again with clover or timothy, making a three or four year rotation. In this way we distribute the fertility on the soil more equally, we distribute the work over the farm more evenly; we keep out the natural tendency for foul weeds or wild oats. If we are on light, sandy soil, perhaps our rotation

available potash in the soil has become so exhausted that it is almost impossible to get a stand of clover. For that reason they say they cannot use this rotation of crops.

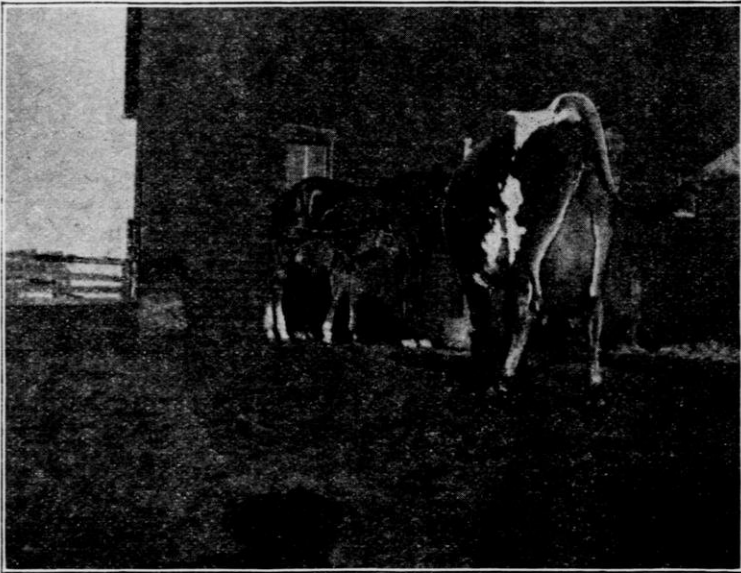
Rotation for Light Soils.

It seems to me where our soils are light that we ought to be very careful to save the fertility and secure, if possible, a rotation of crops that will put back in the soil the fertility, the humus, the nitrates and the potash that

are necessary, and use such a rotation as will take out of the soil the least of these elements, and furnish the soil with the successive crops which will help to put into it those elements that they lack most, and this should be the study of every farmer. It seems to me that in sections where it is hard to get a stand of clover, we will say a soil where the potash and vegetable humus has been exhausted by con-

often you can get a crop of clover in that way where otherwise it will be almost impossible.

Another way would be to sow a light seeding of oats in the spring, allow the sheep or calves to pasture on this, feeding down the crop and then leaving the land, it seems to me that clover would stand a good chance of getting a catch where it will live through. If the soil has been exhausted of the



MR. BRADLEY'S JERSEY COW, VITOTA EUROTA, No. 42884.
54 lbs. milk per day. 21 lbs. butter per week.

tinuous cropping, without returning anything to the soil in the shape of manure, with such a worn out field, let us sow rye on it in the fall. Almost any land will grow rye. Then, by sowing clover seed or timothy seed in the spring on the rye, and then a little later, when the rye is perhaps a foot high, mow that rye, allow it to fall back onto the ground, acting as a sort of mulch, a protection for the seed,

vegetable humus, a good idea would be to sow a crop of rye and then plow under that crop when the rye is about sixteen or eighteen inches high. Then sow a crop of buckwheat and plow that under, and then sow rye again in the fall. In that way we lose the use of the land for one year, but we fill it with a good deal of vegetable humus that will be valuable for storing up moisture the coming season and fur-

nishing plant food with some of the elements lacking in the soil before. Some of you will say that this plowing in of green manure will not add anything to the soil and that may be true, but we have changed the mechanical condition of the soil and furnished vegetable humus that was necessary in order to get a crop of clover.

Good Crops.

One of the best farmers I know grows on a 160-acre farm, 20 acres hay, 40 pasture, 20 wheat, 20 barley, 30 oats, 20 corn, 3 potatoes, 3 pop corn, 2 fruit and vegetable garden, and the rotation is complete in four years. He sows clover with all grain, which furnishes fall pasture for stock, and seldom even has a failure of any crop.

Farmers should study the tables of the composition of crops, of the composition of manures, read Thompson's Science in Farming, How Plants Grow, etc., and there would be fewer crop failures.

DISCUSSION.

Mr. Arnold—In studying crops to grow, there are two things to be considered, profits and condition of soil, and it seems to me that the farmer, everything else being equal, should raise a crop that will shade the soil during the heat of the season. Now, there is no evaporation unless there is heat and moisture, and in my experience these farms where they have been cropped short, where they have raised small grain and the ground has been left bare from the time this small grain is grown until the fall, those farms have gradually been growing poorer. We have been in the habit of laying it to the taking off of so much in the crop, but does not experience prove what I have said, that nature

naturally shades the ground and we must follow nature in this regard. That being so, should not we plant some crop in the ground and keep it growing and keep the ground shaded during the heat of the season?

Mr. Bradley—Yes, there may be parts of his farm where the farmer does not want to sow clover. He can sow rape and white turnips and use them as a feeding crop after he has cut off his barley and oats. It will not only shade the ground, but it will furnish us good fall feed at the same time. Then there is another crop that comes in here. Some of these crops will take out from the soil more rapidly than others, and the foods we buy ought to be taken into consideration, their prices, e.c. If we are growing wheat largely to sell, we will soon rob the soil of the phosphoric acid and nitric acid. There is nothing we can buy where we can get the phosphoric acid back so cheaply as bran. There are many farmers who seem to think that if they get manure enough on the farm that they can grow a crop successfully and yet there may be some of the elements that are lacking. You see we must study all these things, and the things we buy we should know the nature of their composition and what they can do in the soil, not only to keep it shaded, but to furnish the fertility that each crop needs.

Mr. Briggs—What season of the year would you sow rape and white turnips?

Mr. Bradley—We sow them at the same time as we sow the grain. If it was a very wet season, perhaps it would be well enough to sow the rape a few days after you have sown your oats or barley.

Mr. Wing—I want to speak of alfalfa. I do not mean to say you can

grow it all over Wisconsin, perhaps there is not a quarter of the State, perhaps not ten per cent., but I will say that if ten per cent. of you have succeeded with alfalfa, it will be worth a hundred dollars, yes, a hundred and fifty dollars an acre in the results yielded. I have studied your soils enough here and compared them with other soils, that I know will grow alfalfa, so that I know that you have lots of land that will grow it.

There are three things to consider in sowing it. If the soil is poor, it will do no good; it wants a rich soil and a soil where the water does not stand in the subsoil nearer than three feet from the surface; it wants a good, rich, deep soil, a soil underlaid with gravel, if you have it. If you have alfalfa you have a gold mine; you have a food that will make more milk and more growth on your animals than anything that I know of. I have grown it since 1886, and I know what I am talking about.

The second condition is to keep it mowed. Cut it off three times the first year and at least three or four times every year after that. Failure nearly always comes from sowing it on the wrong soil or else sowing it on the right soil and neglecting to mow it. There is a reason for this; it grows up six or eight inches tall and a fungus grows on it if it grows too long. Mow it off promptly close to the ground and it will spring right up and grow vigorously for another month; then it is packed together, but that doesn't hurt it for hay. Cut it off before the leaves drop off. I would like to see every farmer try an acre of it.

Supt. McKerrow—Do you leave what you cut off as a mulch?

Mr Wing—I would not mulch it as you would mulch strawberries but rake it off. Weeds are deadly to it, the mow-

ing will kill them. You simply run your mower through it, mowing as close as you can. Too many farmers let it get too high.

A Member—I have tried alfalfa to my satisfaction about a hundred and fifty miles east of here. I have cut it three times this summer and it is rather too ripe for my cattle, they don't like it.

Mr. Wing—Cut it early.

The Member—I cut it as early as there is anything to cut; it grows rank on the land where I sowed it. I have tried it on low ground, deep, black soil. Alsike will grow there but I have no success with alfalfa. I would like to ask Brother Bradley if it is desirable to tramp the ground in the spring when you seed your clover?

Mr. Bradley—Three years ago I sowed three or four acres and used it as a calf pasture, sowing clover in the spring and harrowing it in, and found it was all right. I did not expect when I put the calves in there that the clover was going to live, but it did live, and the tramping seemed to be all right. Perhaps it wouldn't do to put in heavy stock, but I think that calves or sheep, where we take them off after allowing them to eat down some and let it grow up a little, then put them back again, do not hurt it. I think there are many places in Wisconsin where the land is light and ought to have some packing, especially in these sandy soils where it is so light that it will drift. I think in such a location, by putting in sheep or calves on the seeding, of either rye or oats, it would be beneficial for the stand of clover.

Mr. Wing—But they must not forget to take them off before it is too long.

The Chairman—It has been stated here that the ground must not be left bare during the summer. You know some of us old fellows used summer fallowing in the east and we found that

the ground was very much more productive after it had been kept bare all summer. Now, how do you reconcile that?

Mr. Bradley—Well, in the old way of summer fallowing, the way they did out in Minnesota and do to-day, they plow under a crop, usually weeds, in June, perhaps, allowing that ground to stay bare. Now, the ground would no doubt be better with some crop sown upon it as soon as the first plowing was made. I think the land will be in better condition for a crop next season. The fact that the Chairman got a better crop was because he gave the land a rest and then turned under the first growth of that land, which was in fine condition.

Question—Suppose I should summer fallow a small plat of ground and my neighbors had very rich land around it, with a very perfect soil in good condition. Should I get any benefit by summer fallowing on account of my neighbors having so much better ground than myself? Would not the nitrogen inoculate my land from my neighbors?

Mr. Briggs—Wouldn't that be robbing your neighbors?

Mr. Bradley—No, I don't think so. There is plenty of nitrogen in the air if you have the right kind of crop to put it into the soil, and perhaps the clover crop or the pea crop, or perhaps a bean crop will act in that way.

There is another thing farmers can do that they do not do in order to keep their land in better condition, and that is, in sowing with the last cultivation of your corn. Go through it and sow rye or barley in your standing corn with your last cultivation, that will furnish you fall feed and it will also keep the land shaded to help keep the fertility in the soil, and it will not be any detriment to the corn.

Mr. Scott—The term "rest" does not

quite answer Mr. Goodrich's question to my satisfaction. There must be some process going on while this land is resting. I can remember when it was the practice in our part of the State when wheat growing was the great interest there, to summer fallow, and invariably we got a better crop. I must say that as yet I have not been able to find any evidence that plants gain from the ground being shaded. The gain in my judgment is in the development of the nitrates there that are breaking down, also the mineral elements, rendering them favorable for plant life by this process of cultivation, and also in the development of the nitrates.

Supt. McKerrow—There is a gain in the sense that you get a better crop following, but while we are fallowing, the processes of nature are going on, refining and making available those elements that are there. Now, the nitrates, when made available for plant food, are inclined to escape quite rapidly; they become volatile and go off in the air. If there is a growing crop there to catch and hold them, then they are saved. So in the summer fallowing we are simply changing the form of the elements in that soil by allowing the air to work in it more freely.

Mr. Scott—But it would lose the nitrates by that process.

Supt. McKerrow—That is what the scientists tell us, that they escape when there are no plants to hold them.

Mr. Scott—Many years ago when we had saltpetre beds for the manufacture of gunpowder, they simply incorporated horse manure in the soil and put it with the requisite amount of moisture, and they found that the nitrates developed very much more rapidly by stirring and rubbing it, while where the air is excluded they lose very rapidly.

Mr. Arnold—Then if that is true, cultivation means manure.

Supt. McKerrow—It is said, you know, by some of the old writers, though the new writers do not believe it, and of course it is not technically true, but in a certain sense cultivation does develop the elements in the soil. We have on our farm many spots that have been summer fallowed every year where foul weeds are growing, and we know that the next crop that grows there starts off very rank, showing that there is an excess of nitrogen, it is a very rich green color, but usually there is a failure in that particular spot to develop that crop, and ripen it properly, showing that the other elements are lacking—have not kept pace with the nitrogen.

Mr. Bradley—There are places in the State where they have been keeping up this cultivation of crops year after year until it is all fallowed, they have got to do something else.

Supt. McKerrow—They have cultivated out the vegetable humus. Provided that that soil is supplied with the requisite amount of humus, there can be no loss in its cultivation.

Mr. Wing—I think you are all right. I think summer fallowing undoubtedly renders the nitrates available, but all experiments, I think, show that those are subject to leaching out. If your plant is to take them up you must have the plant there. It is like money, it must be in somebody's pocket, or else it is going to be lost. You must have it in the pocket of the plants before it is safe. I cannot let this question of alfalfa drop as it has. The gentleman over here says his alfalfa grew too rank. I do not see that this is a charge against Wisconsin. A neighbor of mine was talking alfalfa. He says, "I raise it, it is no good." "Why not?" "It has no leaves on it." "When did you mow it?" "At the usual haying time." "How did it look six weeks after that?"

"Why it looked good." "Why didn't you mow it?" "It was not haying time." That was what was the matter, he was six weeks too late.

A Member—One great disadvantage I find with alfalfa in this climate is its rank growth. It is harder to handle than Mammoth clover. In an ordinary Wisconsin season we cannot cure it. If we leave it as long as our red clover, it is too rank, stocky, woody, and if we cut it early, it is the same as when we cut Mammoth clover before it blossoms, it is impossible to cure it. It does not thrive in our soils as it does in soils further South or West. I have helped grow alfalfa in Western States, on the Pacific coast, and I have tried, I think, four different times, getting a good stand in Waukesha County, and I have not been successful.

The Chairman—It thrives at Fort Atkinson just the same as almost everything else does.

Mr. Wing—This first crop may be used as a soiling crop, and your second, third, and fourth crops, I think you would have no difficulty in curing.

Supt. McKerrow—There are some men growing a little alfalfa in Waukesha County that are thoroughly successful. I have a neighbor who cut three crops last year from a high clay knoll. I took a great deal of interest in those crops, because I am trying to grow some myself. These crops were all mowed and cured out nicely. Probably the poorer soils in Waukesha County will fit the best conditions in Ohio, but this crop was very good. I have seen it growing in the country two different places for the last eight years and I have been very well pleased with the results there, and the climate and soil are very much like a large portion of Wisconsin. Now, we would not advise Wisconsin farmers to go into growing alfalfa in a wholesale way, but

still if you think you have land so situated that you might experiment in a small way, you can easily satisfy yourself whether you want it or not. Out around Sun Prairie, in Dane County, they have been growing it with pretty good success.

Question—What is the best way of sowing this alfalfa?

Mr. Wing—If your land is free from weeds I would say to run about fifteen pounds to the acre after the danger of frost has gone by. I don't know when that would be around here, perhaps after the first of May. If the land is foul with weeds, I would say that about when the oats are in bloom, cut it all down. There is nothing so good for horses and sheep or cows, but, of course, you must use your judgment about the quantity, or they will bloat.

Mr. Taylor—We have confined our remarks a good deal to keeping the ground covered in the summer time. The object of summer fallowing these fields has been for the purpose of putting on a fall crop. You notice this covers up the soil in the fall of the year and takes up the nitrates that have been accumulating. As a matter of

fact, soils do accumulate largely of nitrates when they are dry. It seems to me that it is important to cover up this soil in the fall, keeping it covered in the winter, and in order to keep our corn fields covered up in the winter, for a number of years I have practiced sowing rye in the corn field at the last cultivation, letting it come up and get quite a good start before the winter in these bare corn fields, and it seems to me that must have saved some of the fertility. I would recommend to the farmers of this State, especially those in the dairy business, after cutting up all their corn, that they sow some kind of fall grain in their corn field, furnishing a covering for the ground in the fall and early spring.

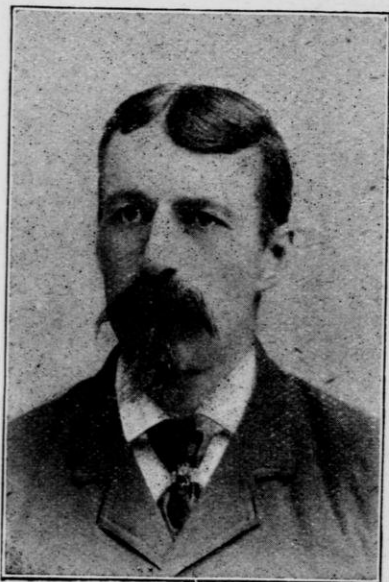
Mr. Scott—It seems to me that the advantage that Mr. Taylor speaks of is simply to prevent the leaching in the fall and spring rains, but leaching is one thing and evaporation is another.

The Chairman—This morning we have been worrying ourselves about how to keep the water in the soil. We have that fixed pretty well, and now we are going to discuss the question of how to get the water out of the soil where it has too much of it in.



TILE DRAINAGE.

H. E. Nicolai, Big Bend, Wis.



H. E. NICOLAI.

To lay down a specific rule for tiling would be an impossibility for anyone, as different lands and conditions would vary the cost of draining, both as to the number of drains required, the amount of labor expended in digging, and also the size of the tiles used.

Different Treatment for Different Lands.

I have one piece of border land containing fifteen acres, in which the drains are from four to five rods apart, and the drainage is perfect, while in another piece of only half the size, the drains were put four rods apart and proved to be insufficient to drain the land thoroughly. The former piece is

a black sandy loam, underlaid with sand and clay, while the latter was a boggy marsh, full of small springs. The top soil was muck underlaid with clay and gravel. The drains had to be doubled wherever the ground was springy, making them only two rods apart, and the depth of the tiles is about four feet. The cost of this piece was about \$30 per acre, while the former was only about \$10 per acre. Both pieces have been in cultivation ever since they were drained ten years ago, and have produced wonderful crops. The average cost per acre of tiling a wet marsh is about \$20.

The most profit in tile-draining is derived in fields that have small basins in them on the elevated parts of the fields, which fill with water during the spring and keep the lower levels of the fields wet and cold until the water evaporates in the basins. One drain with a few laterals in the basins will usually be enough in fields of this kind, and the cost will be very small when compared with the benefits derived from them.

The benefits to be derived from tile-drainage depend largely on the location, the value of the land, and what crops the land is used for. As no two fields present the same condition except level marshes, one must rely upon his own judgment according to the conditions and location of the land.

How to Tile Drain.

First ascertain how much fall there is in the piece to be tiled, from the upper end to the outlet. If there is a gradual fall from source to outlet, no survey is necessary; but if the land is nearly level, or if there are depres-

sions or basins so that it is hard to determine the amount of fall, obtain the services of a competent surveyor to determine the fall from the upper end to the outlet. This fall should be divided up by setting stakes every hundred feet and drawing a level line on these stakes. The stakes should be driven close to one side of where the ditch is to be dug. The fall can then be divided by measuring from this line to the bottom of the ditch. From $\frac{1}{4}$ to $\frac{1}{2}$ inch of fall to the rod is enough, and in large tiles less fall will do.

Digging the Ditch.

Commence at the outlet to dig the ditch. If the banks of the ditch have a tendency to cave, the tiles should be put in as fast as the ditch is dug; but if the banks stand firm, it is better to commence laying the tiles at the upper end, after the whole ditch is completed. The lower part of the ditch should be dug with a tile-spade, the bottom cleaned out with a tile scoop, and the tiles laid with a tile hook.

The tiles should be covered with loose soil to the depth of twelve inches. This can be done by breaking down the top of the bank on both sides of the ditch, after which the filling of the ditch can be done with the horses and plow, care being taken not to let the horses get into the ditch and disturb the tiles.

Cost of Tiling.

I will give you a description of a piece of land which I tiled eleven years ago, and also the expense of tiling it at that time. The piece in question consisted of about an acre, covered with water the greater part of the time. Surrounding this water were about four acres of land grown to

willows and rushes, also under water during wet seasons. Surrounding this last strip were about four acres of what is usually known as border land (too wet to plow and not wet enough to be called marsh), making about nine acres in all. It was worth, for grazing purposes, at the outside figures, not more than \$40 per acre. The expense for draining it was as follows:

2960—2½ in. tiles at \$10 per M.....	\$ 29.60
1136—3 in. tiles at 12.50 per M.....	14.20
432—4 in. tiles at 16 per M.....	6.91
512—6 in. tiles at 25 per M.....	12.80

Total.....	\$ 63.51
10 per cent. discount for cash.....	6.35

Leaving the total amount paid for tiles..	\$ 57.16
315 rods of ditch at 30 cts. per rod.....	94.50
Hauling tiles from factory.....	15.00
For making dike and open ditch.....	10.00

Total cost for 9 acres.....	\$176.66
Cost of 1 acre.....	19.62

This land worth \$40 per acre, and costing \$19.62 per acre for draining, cost \$59.62 per acre. The real value of the land now is \$100 per acre.

This basin was the receptacle of a great deal of surface water from a neighbor's farm, and to prevent it from being flooded during the heavy rains, I dug an open ditch on the upper side to a point beyond the natural outlet of the basin, putting the dirt from the ditch on the lower side for a dike. It requires a little repairing every spring, but aside from that it has worked to perfection.

The crops raised on this piece of land the past few years have been the admiration of the whole neighborhood. The crop this last year was a fair yield of Early Ohio potatoes, followed by a heavy crop of fodder corn, which in turn was followed by winter wheat. At the first of the year the wheat was in good condition, but of course it is now killed, owing to the severe winter.

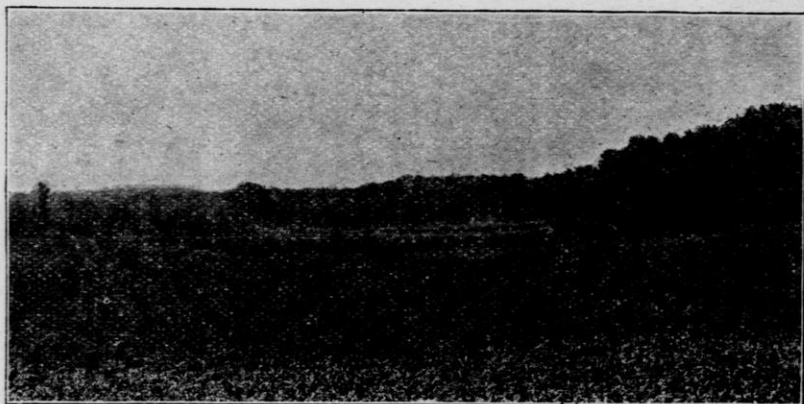
Another Experiment.

My last experiment was on 15 acres of border land, along the Fox River. It was too low to admit of any fall to the river, except when the river was very low. I dug an open ditch six feet wide at the top, two feet at the bottom, and three feet deep, along the lower side of the piece to be drained, to receive the water from the tile drains. The dirt was all put on the river side of the ditch for a dike to prevent the water from the river overflowing the land in case of high water. I also dug

reclaimed and it need not cost more than \$25 per acre. The larger the piece drained, the less the expense per acre for diking and pumping. The following hints will be useful to those inexperienced in tiling.

Practical Suggestions.

First get the fall of the land and then lay out the drains in a systematic way. Never lay the tile less than three feet deep; four feet is better. If tiling is let by the job, see to it that it is done according to agreement and al-



TILE DRAINED LAND ON FARM OF MR. NICOLAI.

Tomatoes in the foreground, potatoes and currants in the distance.

an open ditch from the river to the dike, connecting it with the first open ditch by means of a flume which passes under the dike and can be opened or closed as the case may require. When the river is low I keep the flume open; when it rises so as to set back into the open ditch, I close the flume to prevent its filling the ditch, and what water collects in the ditch from the tiles can be pumped out over the dike.

In this way any level marsh can be

ways inspect the work before the tiles are covered.

Put a wooden box at the end of each tile drain where it discharges into an open ditch, but have as few open ditches as possible.

Use 2½-inch tiles in all laterals for the first six or eight rods, and for a longer distance if there be plenty of fall. Half an inch of fall to the rod in the laterals, and one-quarter of an inch in the main ditch is sufficient, although more fall would be better, as smaller

tiles could be used. The main ditch should be dug a little deeper than the laterals, so as to join the laterals near the upper side of the tiles in the main ditch.

Later Treatment.

If your land should not produce anything the first or second year, do not get discouraged, but give it a coat of wood ashes or barnyard manure, and you will be astonished to see what crops it will produce.

If your drains will discharge its water on a neighbor's land below yours, get his consent first, as you have no right to flow any more water on to his land than there is naturally flowing over the surface. Remembering this fact will save hard feelings, and sometimes a lawsuit.

DISCUSSION.

Question—How do you pump at that place?

Mr. Nicolai—I have a tread power, but the seasons have been so dry and there is so little surface water falls on the land, that there are very few seasons that you need to pump; in fact, I never have had any pumping to do since the first year that I put in the tile, and I have taken out the pump and use it for other purposes. When you have to do permanent pumping, a good large windmill, or two of them, would be the cheapest.

The Chairman—I did some tile draining on my farm about fourteen years ago, I think. When I commenced working at it, a neighbor was going by, and he says, "What are you doing?" I answered, "I am putting some tile drains in the ground." And he says, "That costs money. If you have money so plenty that you can afford to bury it in the ground, you

better let me have it, I can make good use of it." But the next year and the next year after, when he went by there and found magnificent crops of corn, such as he had never seen on my farm before, he went to tiling, and he has buried four times as much money as I did.

Mr. Briggs—In a very heavy, clay soil, how close together would you have to put the tile and how deep?

Mr. Nicolai—Where it is very stiff clay, I would put them down two rods apart and four feet deep, if you can get them down so deep—if they have fall enough.

Mr. Briggs—Will the water ever soak down to them?

Mr. Nicolai—Yes, if they are covered with loose soil first.

Question—Don't you put something over before you put on the loose soil?

Mr. Nicolai—No. If it is quicksand, I put marsh hay or straw over it, simply to keep the sand from coming in after I have covered it. Quicksand won't run unless there is some water. I have taken up tiles that were laid in quicksand where I put them in trenches where it was too wet, and in all the trenches I have taken up I never found a tile filled with sand. If they are laid properly, so there is a gradual fall, what little sediment there is runs in at the joints, the water will continually carry out at the outlet.

Question—Can you explain how tiling will take the water out of land which is blue clay and almost impervious to water?

Mr. Nicolai—It won't take it out. I have tried it and the water would stand over the tiles for a week at a time until the sun and wind would evaporate it.

Question—Suppose the land is blue clay. Would you put the tile down four feet?

Mr. Nicolai—No, I don't think it would be any advantage.

Mr. Arnold—It would not be worth draining if it was blue clay, would it?

The Chairman—Yes, it would. I know of some land that is blue clay land with a little black soil on top of it.

Mr. Nicolai—I would take that little black soil and shove it down on top of the tile and fill the trench up with mixed blue clay and black soil, that will drain it off in good shape. It is the black soil that furnishes the good drainage above the tile.

The Chairman—Many people are skeptical about this thing just as I was. I had read a great deal about tile draining, about how much good it would do to the land, and when I commenced digging a ditch through some blue clay, I said, "I don't see how it is possible for the water to get through that. It is no use, it can't draw from each side." But it did, but not until the ground had once been frozen, and after it had been frozen twice it did still better. I looked at it like this, that the land is not so impervious but that it gets full of water, and when it freezes it expands. It commences to thaw out from below, making little channels through the clay, and the clay being released, it doesn't pack down so solid as it did before, so it is much better each year.

Question—Do you understand that the soil thaws out from underneath?

The Chairman—Yes, sir.

Mr. Nicolai—It thaws out from both sides. But I will give another explanation in regard to loosening the clay soil. You all know that angleworms will not work in water, but just as soon as you dry out the water and give them a chance, they will work over the soil to the depth of the water, and in that way I think the clay soil is helped very much.

Mr. Wing—I am glad to hear you speak of this angleworm, because we have what we called exhausted soils in Ohio. They have become tough and hard, and in those soils the angleworms help us out after we put on some manure. Of course we do not find them in the clay, but after the manure is put on and the humus gets down they work through.

Question—Do you think there is any truth in the theory that high gravelly ground can be benefited by drainage in dry seasons?

Mr. Nicolai—It depends on what your high ground is. In land where the surface soil is underlaid with sand or gravel, as natural drainage, you cannot benefit by tiling, but heavy clay soil can be benefited by drainage. It depends on where your land is located, what the value of it is, etc., as to whether it is profitable.

Mr. Wing—You would not think it necessary to give a quarter of an inch fall to the rod, if you don't have that much?

Mr. Nicolai—No, I stated that; less fall may do.

The Chairman—One inch to the hundred feet will do, if you have fine work enough.

Mr. Arnold—In tiling will the siphon principle work; is it tight enough.

Mr. Nicolai—Yes, in clay land, you can get it tight enough to draw out water, but it won't do you any good. You let in the air and it will spoil your crop before you can get the water out. I have seen it worked in tiling with clay.

Question—Didn't you find it essential to lay the tile so that there will not be any depression where the water will fill up?

Mr. Nicolai—I never laid any where I had any depression in the tile.

Mr. Wing—In Ohio, when we trusted

to the colored brother to lay tile, he would have a low place in the ditch and the water would stand clear up; if you don't see it in time you will have to dig it out. It does not hurt so much where there is a strong current, but where there is just a little shower that will carry in a little earth, after awhile it will harden there and fill it up full.

Mr. Briggs—What effect have clover roots and alfalfa roots upon tiling?

Mr. Nicolai—I never had any experience, but I should think it would bind it up.

The Chairman—I have known alfalfa roots to get into tiles.

Mr. Wing—That will not happen unless you have running water. I saw it in one case where the alfalfa roots completely blocked the tile.

The Chairman—You don't want any willow, cottonwood, or elm trees growing near your tile. They will get in through the small openings and obstruct it.

Mr. Nicolai—Hadn't you better include all trees?

The Chairman—Maybe, but oaks won't bother.

Mr. Arnold—Is not underdraining just as good where it is made out of stone as out of tile?

Mr. Nicolai—Yes, but it is a great deal more expensive. The first drainage I did was stone, and it cost me about a dollar a rod, but it was done in a good, workmanlike manner, so it is a good drain today, and I think it was put in eighteen years ago, before we had any tile factories in our section.

Mr. Wing—Hasn't that drain got lots of fall?

Mr. Nicolai—No, it has no more fall than my tile. I don't think more than half an inch to the rod, and some places not that much, but I can tell

you how to put it in. It was a low, boggy marsh; I dug a ditch four feet deep and a little over a foot wide at the bottom, so that I could get two good sized stones, one on each side; then I covered it with large stones on top, and filled in with gravel, chinking it on the side for about a foot, making it tight; then I used boards in the bottom to put my stones on so they would not slip in the mud, and after the ground got thawed it run a nice stream of water. During the dry season this winter it has run a nice stream of water.

Supt. McKerrow—Do your tiles run water in cold weather?

Mr. Nicolai—Yes, sir, most of my tiles are running water now. Of course most of my ground is springy. On most land there is no water run only in the spring of the year.

The Chairman—Now, we will suppose that there is some marsh land running by the side of the hill, highland, and we know that along next to the highland the marsh is apt to be the wettest. Now, how would you run your tile, parallel with the side of the hill, or run it right down through the marsh to the creek forty rods from there?

Mr. Nicolai—I would run it parallel with the hill.

The Chairman—That is the way I did, and it dried the land for twenty rods beyond it, just cut off that spring water.

Mr. Nicolai—Springs are frequently cut off in that way and it will save a great deal of tile; it will make dry land out of small fields which are kept wet by the seepage of these springs over the land.

The Chairman—I want to say just as Mr. Nicolai did, that if it is going to cost more to tile the land than the land is worth, of course it won't pay

to tile it, but even in such cases a man may have a wet spring running diagonally through a field and it may pay him a great profit to tile that. That was some of the first work I did; I had a field of twenty acres that was cut in two diagonally by a spring, resulting in all of five acres of wet land. I run a tile through the whole field, so I could plow it; it worked splendidly, and after one has commenced to tile some such place as that, he will see other places, and he will keep on tiling until he makes a garden of his whole farm.

Mr. Nicolai—I have had the same experience as Mr. Goodrich has, in regard to my neighbors accusing me of throwing away my money, and also in regard to the fact that after I commenced to tile I did not stop until every foot of my land that needed it was tiled. I have tiled about sixty acres now, and I have noticed that all the men in our section, after they have once commenced it, cannot find a stopping place until every foot is dry, and that is very good evidence that it pays.

Mr. Wing—I have a neighbor who began laying tiles and his father thought he was crazy. He came out from town afterwards and saw the crop of clover and the wheat growing on that land, and he turned the tables on the boy. He says, "Joe, this ought to have been done long ago."

Mr. Nicolai—There is one very great advantage with tiled land, and that is its early use in the spring. I notice that my tiled land is ready to work a great deal sooner than ordinary upland, because the tile is at work all winter where there is no frost underneath, and just as quick as the frost is out, your land is dry and you can go right to work on it and put in your crop.

Mr. Arnold—Have you ever had the water analyzed from these drains, to find out whether it is taking off any fertility or not?

Mr. Nicolai—I never have, but I am convinced that they do, in certain cases.

Mr. Arnold—How would you stop that?

Mr. Nicolai—I don't know that I could stop it, nor could I stop losing some of the fertility under any circumstances. I am one of those who believe in manuring in the fall or the winter, or any other time that it is convenient, to get it on the land as quick as possible, spread it on broadcast, and in that condition, I am going to lose some of the fertility anyhow.

Mr. Arnold—Don't you believe if you have a growing crop on the land there would be less than without any?

Mr. Nicolai—There wouldn't any crop grow just now. There is a chance as soon as the water gets out of the land. I know of one place where the basins were all filled up with water two weeks ago, and it has all sunk away, the land is dry, and if there was any manure scattered on the top and soaked up in the water, some of the fertility is gone, but I would rather lose a portion of it than be compelled to drag out my manure after the frost is out of the ground.

Mr. Thorp—This tile we are talking about is about four feet down in the ground. If there is any fertility in this water that floats on the soil, it is going to be filtered out before it reaches the tile, and be kept in the soil. I have been watching some people in my neighborhood who have been putting in quite a number of thousand feet of tile; two or three years ago, in fact, one young man put in 20,000 feet at one time, in one season. He hired a lot of men and they came and tile-

drained diagonally across eighty acres which was almost a worthless piece of land before he began. That slough ran down for miles and the water came coursing down through there in the spring on each side of the ditch. It was a boggy marsh, part of it he could mow, and part of it he couldn't. He put in 20,000 feet of tile and the result is that he plows the whole thing now, and that eighty acres of land is the most valuable he has on his farm. I asked him if he thought he would do any more, and he tells me that as soon as he can he is going to tile all of his land that needs it. Another man who lives along Horicon marsh I know of. The marsh extends in the shape of sloughs around up through his farm. He commenced tiling there and I guess he will never get done. He manages to get good crops where he does tile; so much better crops than he used to get that he buys his tile by the carload, and his neighbors are following suit and putting in carloads of tile in the same kind of places. So it seems to me there must be something in it, if we are unfortunate enough to have that kind of land. I am very glad I haven't that kind of land myself.

There is one point that the gentle-

man did not touch on, and that is in regard to the water flowing onto the other man's land. You had better get his consent. This last man I spoke of putting in so much tile, was troubled with the water in the spring, flowing over from his neighbor's land and down through his; he wanted him to go in with him and put in a ten-inch tile, and he wouldn't do it, he said he wouldn't have anything to do with tile, but when he put this ditch through there for his own benefit, he put a dam across and held the water back onto his neighbor's land, so it couldn't overflow his land, and all the water had to go down through that ten-inch tile, and if there was any surface water he held it back.

Mr. Arnold—The great German chemist, Liebig, demonstrated fifty years ago, that if you take liquid manure and run it through the earth covering tiles, that you will have pure water when it goes through. I would not be afraid to tile drain land on account of the loss of fertility, but I think you would lose less if you had a crop growing than without it, according to these experiments.

Adjourned to 1.30 P. M.

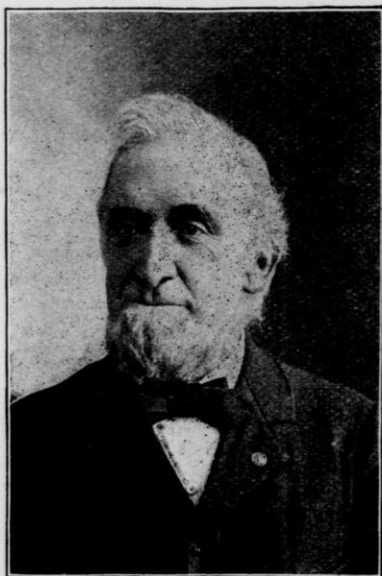


AFTERNOON SESSION.

The Institute met at 1:30 P. M. W. C. Bradley in the chair.

ROAD IMPROVEMENT.

E. G. HARRISON, Office of Road Inquiry, Washington, D. C.



E. G. HARRISON.

Mr. President, Ladies and Gentlemen:—As you have been told, I came here to represent not the National Government, nor even the Agricultural Department, but the Road Division of that Department, which I am sorry to say does not claim the attention of our Congressmen as it should. That will be evident to you when I tell you that all the appropriation we get for running this Department amounts to \$8,000 a year.

Good Roads—Business Men Want Them.

Now, I am not here to tell you what you ought to do or what you must do in Wisconsin, I can only make suggestions. The National Government does not propose to insist upon any of its plans, but merely to throw out suggestions for the benefit of the States. They must take up and do the work. Many suppose that this road question has assumed great importance, from the fact that wheelmen and those interested in the manufacture of bicycles have stirred up this matter, merely for the benefit of the wheelmen. I want to disabuse your mind on that. The wheelmen are good agitators, but it was not through them that congress was induced to take the small interest that it has taken in this matter. It came from the business men of this country, largely from the business men in the city of New York. The New York Board of Commerce in 1891 sent a memorial to congress asking them to take up this road question, and in that memorial they presented certain facts. They stated that the country was suffering largely for better means of transportation of farm products and for a distribution of commercial and manufactured products. It suffered in its competition with foreign countries for want of good roads similar to those they have there, that it was a financial problem

that needed the consideration of congress. Upon that representation the consuls of the different countries were asked to give information, so that congress could act intelligently on the subject in relation to the roads that were constructed in foreign countries, those that are more intimately related in their business matters, France, England, Germany, etc. The consuls made their reports and those reports have been published and sent through the country through your congressmen. To be brief on that subject, they showed that in foreign countries, about three or four times as much could be hauled with one horse as can be in this country in the movement of farm products. The next move was to have congress take up this matter, and make inquiries through the United States to see what it really cost here in the movement of farm products in primary transportation; that means from the place of production, which is your farm, to the nearest place of shipment; whether it be at the railroad, steamboat, canal, or wherever it may be. The road division was instituted for agricultural purposes to make these inquiries and to present these facts before you.

The Road Division—Its Work.

In that department we have three persons, Gen. Stone at the head of it; the clerk who attends to the correspondence, and myself, the Road Expert. You see there is not much left for the purpose of paying expenses after we get our salaries, but still we are going along and doing the best we can.

The inquiry started on this line. We first had to ascertain how far in miles the product had to be moved in order to have the approximate transportation. After careful inquiry and the sending out of 12,000 circulars, and from facts

gathered by several hundreds of thousands of men during the years, we find that the average haul is twelve miles.

The next thing was to find out what it cost to haul a ton one mile, and so inquiry went out all over the United States and of course the answers varied very much, the expense being very high in those hilly and mountainous countries of Virginia and Pennsylvania, while on flat prairie countries, the cost was much less; but the average of the whole country was found to be 25 cents per mile per ton. Now with a twelve-mile haul, the average haul cost about \$3 per ton for a two-horse load. It was found that the average load was 2,002 pounds.

Money Wasted.

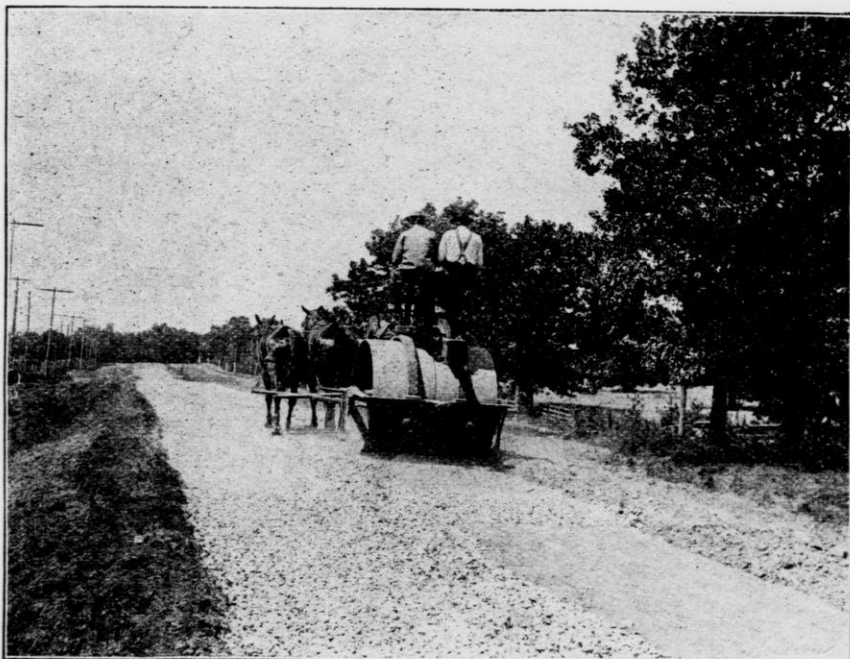
Now, the question is, can the business of farming stand that expense? Certainly no other business in the country can. Manufacturers, in locating, consider this question, and feel that they cannot afford it; they must save that primary hauling, and so they place themselves nearer the line of the railroad and use steam at a much greater expense than water power.

As a matter of curiosity we wanted to find out how much farm products were sold and shipped, and for this purpose we go to the census bureau, and find that, for the year 1895, there were 323,000,000 tons of farm produce hauled. We will call that three hundred millions in round numbers. At \$3 per ton you see the cost of this primary transportation was the enormous sum of nine hundred millions. As I told you the consuls found out that there was a saving in foreign countries of from one-third to one-fourth, and you see what an advantage that gives them over us in the matter of getting their products to the markets where they are sent out to the

world. You farmers know that not so very long ago we depended upon our products being consumed in this country, but now we raise too much. We must export much of our agricultural products to foreign countries. You have to come into competition with foreign countries and meet their demands on

What Good Roads Will Save.

Let us pursue this inquiry and see whether this thing can be solved in this country by our own people. Let us find how it has worked among intelligent farmers living along lines where they have good roads. Right here I might as well tell you what a good



Sample of stone road being built at Menomonie, Dunn Co., by Senator J. H. Stout, under supervision of Expert Harrison, on gravel foundation with four inch covering of stone. Road roller at work.

this matter where they have good, hard roads from their market towns to their farms. We have to cut down our expenses. Raising large quantities won't do it. We will have to save in the expenses somewhere. We have to meet the methods they have adopted in Europe.

road is. It is defined in the New Jersey law relating to state aid. It is the most concise definition I ever heard. The Act calls them "permanent roads," and there it means roads made of stone, materials that won't wear out so easily as other materials, where they will last for all time to come. So a

permanent road is defined as "one that is hard, smooth, and fit for use at all seasons of the year." If you can get a better definition for a good road I would like to have it, and would certainly use it. Along these kinds of roads we sent our circulars out to get information. We went to the old-fashioned turnpikes built in Kentucky in the time of Henry Clay, and some built in Pennsylvania, some in Ohio, some in New York; then we went to New Jersey, where they have their splendid system of free turnpikes, and to Massachusetts, Connecticut, and so on. We found that the cost of transportation there is very different from what it is on a common road. It is eight cents per ton per mile. In New Jersey it is only six, because the grades are much easier than in Pennsylvania in the hill country, so we take the average as we found it, eight cents. Now, there is considerable difference between eight cents and twenty-five, about two-thirds saving, and that is important, isn't it? If we apply this to the total cost of the primary transportation of farm products, it is a saving of six hundred million dollars. Only think of that! The cost of the National and all the State Governments combined just previous to the war with Spain, is what could be saved if we had good, hard roads.

Will it pay to undertake this? Of course we cannot do it in a few days, but we can make a beginning. That beginning has been made in a number of States in this Union, and you will be surprised to know how rapidly it is progressing, and the States that do not take hold of this work will surely "get left," as the boys say.

State Aid in New Jersey.

Now, I will refer to New Jersey. There it was the farmers themselves

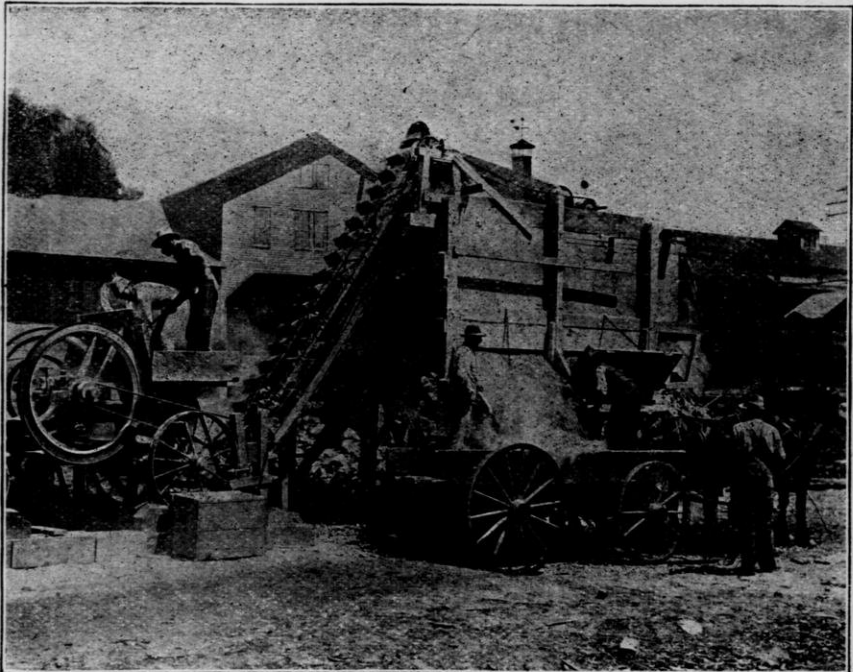
that demanded that action should be taken, not the bicycle men. The farmers and the State Board of Agriculture started this matter nearly ten years ago, and it was evolved out of their minds, this matter of State aid. They had seen that in the poorer farm districts it was impossible to build roads and pay for them. They wanted to get somebody else to pay for them. This was the principle, they wanted the cost of the distribution so placed that all who were benefited by the good roads should pay a certain portion of the cost, and having that in mind, they evolved this plan that the State should pay one-third of the cost, and the individuals benefited, along the line of road, should pay a certain percentage and the balance be paid by the county. That is the State Aid Law of New Jersey, and it is upon the principle that all who are benefited by the road shall help pay for it. This includes cities; that is, it taxes all the cities, for road purposes. In the State of New Jersey the railroads pay considerable taxes, and in addition to their regular State tax, they pay one-half of one mill and that amounts to one and a half million dollars for the purpose of carrying on these kinds of improvements. The railroads do not object to paying if they know that the money is going to be properly used; in fact, they were the main supporters of this idea. This makes a proper distribution of the cost, and we thought there in New Jersey that it was fair and right. There is no doubt that our cities are built up from the agricultural districts around them.

A Mistake Corrected.

At a meeting in Poughkeepsie, New York, I was speaking on this subject, and a legislator got up and said, "Mr.

Harrison, you propose that the city of Poughkeepsie shall help pay to build the roads in Poughkeepsie County. Now, where is the justice in this proposition? We in Poughkeepsie keep up our own streets. Why should we build roads for the farmers?" I thanked him for asking the question and I said, "Suppose to-night we build a wall

but you need the country to feed those factories and everybody else." They had never looked at it in that way. Besides it is a great mistake to suppose that the country people do not help to keep up the roads in the cities. They do. All express wagons, wagons of burden, hacks, the city railroads, all contribute to keep up these streets. It



Rock crushing machinery at work and loading wagon with small size of the crushed stone.

around this city of Poughkeepsie twenty feet high and twenty feet thick, no outlet except the river and the railroad, how long would you live in Poughkeepsie? How long would there be any Poughkeepsie to live in? Don't you know that Poughkeepsie was built up from the agricultural districts? You have some manufacturers, it is true,

has gotten so in Philadelphia that the street railroads pay for the whole street, from curb to curb, for the privilege of collecting their rates of carriage, that is, the five cent fare. It was found that they could carry passengers for three cents, and for the purpose of allowing them to maintain the five-cent rate, they agreed to maintain these

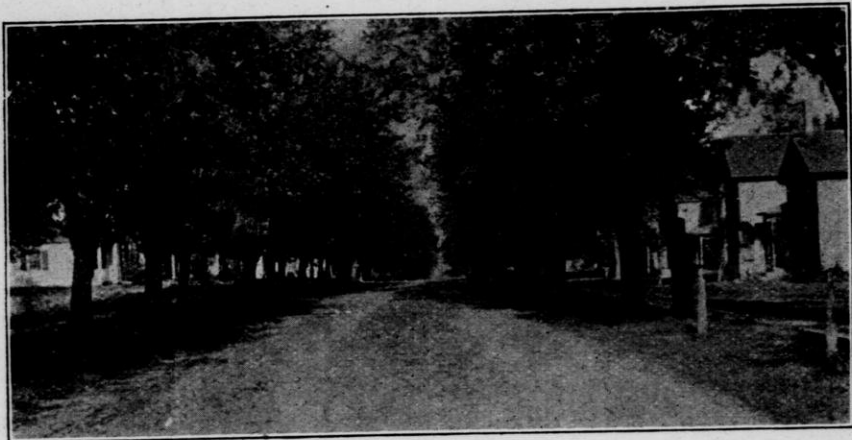
streets. Now, who pays for that? Every time you go into the city, don't you pay your fare on those cars, and every time you pay for an express package, don't you help pave the streets?

What Other States Are Doing.

What we are after is a proper distribution of the cost and this distribution can only be done through State Aid. The State Aid principle has been taken up in Connecticut, following the New Jersey law; then came Massachusetts,

Village Improvement.

I want to take up, for a few moments, a phase of this good roads matter, different from anything that has yet been suggested, and that is as it relates to village improvements. Our work is in the rural districts—the farmers are all interested and so are those in the villages. Good roads have become a necessity to the farmer and they are certainly a necessity in village improvements. When people begin to realize that "cleanliness is next to Godliness," then they begin to make improvements



First gravel road in Rock Co., Wis., from Milton to Milton Jct., $1\frac{1}{4}$ miles.

Built by special town appropriation of \$500.

From photograph furnished by Ezra Goodrich, Milton.

and then New York. In Massachusetts the State pays three-quarters of the expense, but the agricultural wealth in that State is very small compared to that of the cities. In New York the State pays one-half, and under that system there has been no raising of the taxes at all upon farm property. In many places in New Jersey the tax is now much less than it was before, on account of the small expense of maintaining the roads.

on the right line. We wish to get away from filth in our surroundings, and that is closely connected with the good roads movement; so we have to begin right down in the families, and I want to talk to the mothers, because there the foundation of the home is laid.

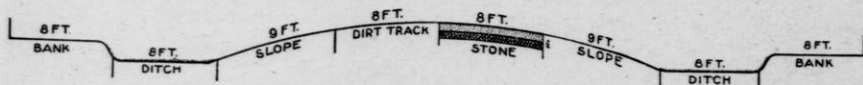
It appears to me that there is a misapprehension in one respect in regard to teaching neatness. The mother will educate the children, but there comes a

time in their lives when there seems to be a separation, the girls are still kept up to practical ideas of neatness, but the boys are allowed to drift, and they go as they please; they are not supposed to keep up these little niceties that make so much difference in the home. Now, we want our boys to be cleanly in their habits so that they will be interested as they grow up in making their surroundings nice and comfortable; they will take pride in making home beautiful, and the surroundings neat, sidewalks in good condition, fences and everything else kept up, and then, very naturally, follows the desire to have the roads in better condition.

never gets less than thirty cents a dozen for his eggs, and it is largely on account of his attractive way of putting them up.

Organization Necessary.

On this line of village improvement we find that the best method is to have an organization, in fact we cannot do anything without organization, and in this work the ladies have taken the principal part. In the Eastern states and some of the Northern states, as we call them, these village improvement associations are very important adjuncts in movements for the improvement and uplifting of the people in the



Section of permanent country road, with 8 ft. stone and 8 ft. dirt track. Stone can be placed in center with dirt track on each side, if preferred.



Section of permanent country road, with 12 ft. stone track and sloping shallow ditches for sled track in winter, when needed.

A friend of mine in Pennsylvania, an uneducated man, has this feeling so strong, that when he makes a bargain with a hired man, it is part of the bargain that during certain months the hired man must take a bath every day, and never less than once a week; he provides a room with hot and cold water for that purpose, and he thinks it pays him. The idea of cleanliness goes through everything on his farm. He is the father of six boys, who have grown up to be neat, and it is a pleasure to go to their place. I know a young man who carried this same rule of neatness and tidiness into his farm work, and he

way of better life and higher civilization. In passing through that country you can immediately tell a village which does not have one of these organizations. The first improvement that follows their effort is in the sidewalks, then the village is lit up, and then you see a general improvement in the yards, the planting of trees and shrubbery in the yards and along the sidewalks and they have had great influence on men all through that section of the country. The planting of trees not only helps to make a road look beautiful and attractive, but in many places it enhances the value of the

property and helps the road, because the trees absorb a great deal of the water that would otherwise be laying along the road. In some of those places they have obtained legislation, so that there is a bounty paid to taxpayers who improve their highways by planting trees along them and making sidewalks for the children to go to school upon. This work has been largely done through the influence of women in these local organizations. I have just come from Kentucky, and though it is a grand old state there are places in that country where the dirty, filthy villages are a disgrace, and the influence upon the people is very easy to see. Those people will not turn out to any kind of a public affair, such as a lecture or a talk which is likely to do them good, and you cannot blame them when you see the kind of roads they would have to walk or ride over. The streets were almost impassable by day, and no lights at night, even in towns of considerable size.

Let All Take Hold

Here in Wisconsin you will have no such difficulties as they have in that country, and when an improvement is once started it is appreciated. If you will only organize in your different villages, you will be surprised to see how many little things will come up for discussion in your meetings, from time to time. The beautiful Orange districts of New Jersey that are known all over the country have been brought to their present condition largely through the Village Improvement Associations, and people come from great distances and purchase property there, because of the advancement that has been made there by these organizations composed largely of the women of the town. This work will naturally spread into the country, and

the country homes be made more attractive. The plan of operation is published in a bulletin by our department, and we shall be glad to furnish them to any one interested in this matter. If you wish the bulletin send to the Office of Road Inquiry, Washington, D. C.

DISCUSSION.

Mr. Arnold—Give us the best practical way to build a good road.

Mr. Harrison—It depends altogether upon conditions. As an engineer I would have to know the conditions that would have to be met before I could give a recipe or a specification for the construction of a road. The conditions are very different in different parts of the country. On general principles we want to find out what it is that makes the road bad. It is the water which is the enemy of the road. If we had a roof over all of our roads, we would not be here discussing the road question. We must get rid of the storm water and the spring water. In Louisiana an enterprising man built ten miles of road by building a board roof over the roadway, at his own cost, but it was quite an expensive way. We make a roof over the road of such material that horses and wagons can pass over it with as little resistance to the wheels as possible. The main thing is to get rid of that enemy to the good road, water, in the best possible way; and he is a good enemy to fight because he will run from you every time you give him a chance. The reason he stays with you is because you will not let him run; you have your roads flat. Holes and ruts form which retain the water.

The first thing we want when we go to build a road is the proper foundation, and it is just as necessary for a road as for a building. Of course, the earth is the natural foundation, but

that is effected by water in two ways, by underground springs and by storm water. The underground springs are cut off by ditches, or in some cases by underground drains. The storm water has to be taken care of. If you are going to put an artificial surface over your road, stone or gravel, and you can make it water-tight, you will have no difficulty in turning the water off, but if your land is like that down in Louisiana, and you can't have gravel or stone, you can make the water run off, by putting drains in the center of the roadway that will carry off the surface water. When we construct an artificial road, after we get a foundation made perfectly hard by rolling and packing, and it is the foundation that bears the weight of the wagon—it is not the stone, it is not the gravel—the earth must be kept hard and dry, and we make the earth dry by drainage and roll it until perfectly hard. Then we put a roof over it, and construct it of gravel or stone, thoroughly packed so that it will wedge together and water will not go through it; unless we have done just that, we have not made a road. The old fashioned way of throwing loose stone or gravel on the road is not a thing that pays, the road is a failure. If you have stone in your town or county, it is best to have a stone crusher. The crusher is the cheapest form of handling stone to make a good road. The crushed stone should be put on in layers, kinds and sizes together as far as possible. Do not have a crusher unless you have a screen with it, which will separate it into sizes, putting the coarser material together, on the earth foundation. Small and large stones will not compact well. Put it down in layers and roll them thoroughly, compacting them until they are perfectly water-tight.

Mr. Briggs—In the experiments you

have been trying, have you tested putting oil on the road?

Mr. Harrison—Yes; we are working at that now. When we are ready to say that it is practical, we will issue a bulletin on that subject. I will tell you my experience and you may take it for what it is worth, though we are not recommending it, or saying it ought to be used. These experiments are being made by Maj. Meigs, of Keokuk, Iowa. He is a U. S. Civil Engineer and in charge of government grounds; the Standard Oil Company is furnishing him with crude oil. This is the second year of trial, and it arose from the fact that the Pennsylvania Railroad had been using oil on certain roads in a section of Pennsylvania where I used to live. They have been doing that three years, putting it on twice a year. Where the public roads cross the railroads, they receive the benefit of that oil. The oil seems to go down and percolate into the voids and then harden, and a second coat fills the voids up, and it makes the road surface perfectly water-tight.

Mr. Briggs—How will that act on sand?

Mr. Harrison—I don't know, we never made experiments on sand. We are going to experiment in Louisiana on a common dirt road.

Question—In some of the central portions of the State where we have a great deal of sand, we have put on gravel and cemented it with clay. What do you think of such a road?

Mr. Harrison—When you talk to me about gravel, I don't know what you mean. I must see the gravel before I can tell whether it is suitable for road surface. The proper proportion in twenty pounds should be ten pounds of pebbles not less than one-quarter inch nor over three quarters in diameter, and there should be six pounds of sand and

four pounds of clay. The pebbles come together like marbles, and as they only touch at one point, they easily move about under horses' feet and under the wheels. Those interstices can be filled by sand. Now, the sand don't turn water; it is nothing but an aggregation of little stones; there are still small voids left. In order to fill them up, we take just enough loam to do it. If the sand is not very coarse you had better have seven pounds of sand and three of loam. That will percolate down by heavy rolling, dampening it the night before rolling, and in that way you can get a fairly well-protected road; but it is not perfectly water-tight.

Mr. Briggs—Is the iron track practical for a country road?

Mr. Harrison—Last year I put down three steel tracks, one in Ohio, one at the State Experiment Station at St. Anthony Park near Minneapolis, and the other at the State College in Ames, Iowa. It was not what we wanted, but we got as near to it as we could; those samples can be seen by any one. We do not at this time recommend any money spent in this way, but we are putting down those samples and will continue to, wherever we can get the steel, in order that people may see them. Mr. Wilson, Secretary of Agriculture, is satisfied that it is the only road that will solve the road question on prairie lands. They can be put down at a cost for track of \$1,500 a mile. There was one put down at Omaha, which cost at the rate of \$250 a mile for putting down. Steel has gone up more than double in price, therefore it is not likely that we will put up any more steel roads until the present flurry in the price of steel, caused by the war, is over. I drove over a bit of such road in Pennsylvania, and the horses were always glad to get on it, in fact,

you hardly know you have a load when you are on a steel track. At Omaha we wanted to test these roads with reference to the horses' power to pull over them. I got the smallest horse I could find, one that weighed about a thousand pounds, and I had three Studebaker wagons, and from the Government I got a hundred and thirty Indians. In this way we put eleven tons on the wagons and after he started that little horse walked right along. The reason is, there is so little resistance in front from the wheels. A good road is simply one that is hard, and that means we have eliminated the obstructions that pile up in front of the wheels. The railroad is nothing more than an improved highway, improved by laying a steel track which offers very little resistance, and thousands of tons are hauled with comparatively little cost. Get your road as hard and smooth as possible; this removes the resistance and the power necessary to draw loads is greatly reduced.

Mr. Briggs—Do you think it would ever be possible for us in Wisconsin to get good highways under a path-master, or district or town system?

Mr. Harrison—My experience extends all over the United States and I have never known a place where such systems were successful.

Mr. Wing—You said that the pebbles should not be larger than three-quarters of an inch. Suppose that the pebbles at the gravel pit were larger.

Mr. Harrison—Screen them out.

Mr. Wing—How deep ought this gravel to be put on our roads?

Mr. Harrison—After the road beds have been rounded up and hardened by rolling, they should be four to six inches deep when finished by rolling. Gravel is not a typical road. The loam will wash out, the water will dissolve

it, and it wears out quickly. A gravel road is not nearly so economical as a stone road. The stone road will stand the abrasion of the wheels much longer. Therefore, we make it thicker on account of not having to repair so often. Many people think that the thicker the road is, the better it is, but there is nothing in that. Six inches will make a tight covering; we generally put it at eight. All over eight is spending money uselessly. Of course that means after it is thoroughly packed.

Question—We have here a great deal of what we call gravel, which runs all the way from coarse sand up to stone as big as a man's head. How would it do to run that through a stone crusher?

Mr. Harrison—Very well. We often use the largest stones from the gravel pits for making roads after crushing them.

Question—How fine will a crusher break?

Mr. Harrison—It will break in various sizes. You will find that some pretty large stones will go through the crusher and that is the reason it is necessary to have a screen. If stones come out too large, put them through again. We cannot set the crusher so as to make just one size. If I could have a crusher that would break the stones all up one size, I would like it, and would make them about one and a half inches in diameter, as nearly equal as possible, so that the sides would come together and they would fit close. In India they build macadam roads and the natives sit down and fit the stones together with their fingers. Our rollers do the same thing as they do by hand. The crusher breaks them into various sizes. Then, for the surface we use the size of an inch and a half.

Mr. Thorp—What is the proper width for a permanent country road?

Mr. Harrison—There is no rule on the subject. We build roads to suit the economical conditions and for the purpose for which they are to be used. A general country road is not traveled so very much. We have found out that for a farmer's road the average width is eleven feet. For economical reasons, we have built them in New Jersey, many of them about ten feet wide, and a great many only eight or nine feet. It is of more advantage to have more in the length of road than in the width. For instance, if you had \$10,000 to spend and you thought you could build five miles of road sixteen feet wide, wouldn't it be better to have ten miles of road eight feet wide? That is simply a question for you to solve yourselves.

Question—What about the width of tire?

Mr. Harrison—That is a very important question. A narrow tire is a road destroyer, a wide tire is a road preserver. All of these systems of roads are generally followed up by a general encouragement of the use of wide tires. The encouragement is done by allowing a rebate on the road taxes, and in some places they get as much as one dollar a wheel for wagons carrying a ton or more the first year. Where this encouragement is given we find a great number of wide tires are used. Then, there is another thing I want to call your attention to in this connection. Having the wide tire, if you put your horse to the wagon right, you will help your roads. Have your evener extend right out until the center of the single tree is on a line with the wagon wheels and you will have the horses walking right in front of the wheels. As horses will not walk in a rut the wagon wheels will not go into the rut but follow the horses' steps. This keeps the road comparatively smooth and entirely free from ruts.

I want to make it more clearly understood as to what the position of the Government is in regard to this road movement. It finds out facts in relation to public road matters and publishes them through bulletins, which you can all receive by sending for them.

The work is broadening. I am now engaged most of my time, going to the Legislatures of the various States to explain the laws that have already been adopted, which give good results. Legislators are not supposed to know all the details connected with road matters, and they often make great mistakes and pass objectionable laws. We are also working through the Agricultural Colleges and Experiment Stations, which are supported largely by the National Government. I think we are doing our greatest work there. We reach the young men of the country and instruct them in the most modern way of constructing roads, which can be built at the least possible expense.

Mr. Briggs—Will you please explain the difference in the expense in making a road around a hill or going over it.

Mr. Harrison—That is an important question, and its importance is enhanced here in the West, where your lines have been laid out according to the section lines, and are generally adopted as roads. Very often they run right over hills, regardless of the contour of the country, and put the people to great expense in drawing their loads over the hills when they might go around. They would often be surprised to see how little the difference in expense would be to go around, while, of course, the difference in expense of hauling would be largely saved. I know of such a road in Pennsylvania where there is a rise of eight feet to the hundred, and the farmers have been hauling over that hill for nearly a hundred

years and paying double toll. They brought extra teams ten miles just to pull the load over that hill, and they have been astonished since they inquired into the matter to find how much could be saved by going around that hill.

Under this State Aid Law, of which I have spoken, the State aids the counties in building roads. That is purely a local matter whether the counties shall take it up or not, but they are moved to do it by the petition of persons residing along a road that is asked to be improved. There are certain conditions attached to it. The road must be a leading road, leading from important points to the market towns or railroad depots. The State officer takes that into consideration before permission will be granted to receive State Aid. The petitioners agree to pay a certain amount of the cost of the road; in New Jersey it is ten per cent.; in New York it is fifteen per cent. In some places the petitioners petition in this way, that the township shall pay that fifteen per cent. The leading roads, then, are first improved. Under any system it will be many years before all the little local roads can be improved, as is provided for under these general State laws.

Supt. McKerrow—From your experience what has been the effect of having sample roads in a town or county?

Mr. Harrison—It is good. The government has no money for such experiments, but when an Experiment Station is willing to pay for the labor, the government sends an expert to build the road for the purpose of instructing the people as to the practical methods of constructing roads. The town and state officials having charge of roads are invited to come there and inspect them. The second sample road was built at Geneva, New York, at the

Experiment Station. The town voted \$4,000, individuals made up about \$3,000, and that paid to build a road out from Geneva to the Experiment Station. It was looked upon by many people as a wild, visionary scheme. They had some macadam roads, but they were made of soft limestone unfit to use for roads. Having this money to spend, they brought the surfacing stone from a distance of nearly four hundred miles and used the native stone for foundation. We had a hard time to get the city council to vote \$4,000 toward this road, but the next year they voted \$125,000 for the improvement of that city and the surrounding towns, and now they are building large numbers of roads. Wherever these sample roads are built, it is an incentive to others to start. We have built sample roads sometimes at places where there are no agricultural experiment stations, but it has been at the request of the officers of the State Agricultural College or the Experiment Station, to build in a certain section of the State in order to show them as a sample.

Supt. McKerrow—How would it answer in case the State was giving State aid, for you to build a sample piece of road in each township or each county?

Mr. Harrison—That is the Massachusetts plan. They are building sample roads, one in every county, the State paying three-quarters of it and the county or local authorities making up the balance. They propose to build them in such a way and on such roads as will eventually be connected and make long continuous lines.

Mr. Thorp—Will you give us the increase of value of farm property touched by these New Jersey permanent roads?

Mr. Harrison—It is a very hard matter to do that, but the increase of values in New Jersey, where they have

market farms, would be greater than it would be in a general farming country. There it was very important; they haul their truck out at a season of the year when the roads are the driest; in the summer time the sand is very dry and loose and the wagons plow it up. I have seen a pair of horses with a load of three-quarters of a ton, going on a level and stopping every one hundred yards to let the horses breathe. They could not haul more than thirty or forty baskets of truck. After building the new roads there, a wagon with two horses draws from a hundred and fifty to two hundred baskets of truck. There are places there where estates consisting of farm lands could not be settled; they could not get bidders for property that is now selling for over \$100 an acre, and rentals have gone up in consequence of these roads. Of course I do not want to say that the increase has been anything like that in all parts of the United States, but there is a general increase and improvement.

As I see so many ladies here I want to say something that will be particularly interesting to them. Where systems of Good Roads have been established it is found these sections of the country are much more desirable to live in. At all Farmers' Institutes we hear the question discussed, "How shall we keep our young people at home?" The answer is we must make our homes attractive, and unless we do we are not apt to keep them. I can tell you how it affects the social life in New Jersey. Large school houses have been put up at central points in place of the little school houses at the cross roads; wagons are sent out to gather up the children and it can be done at very small expense on good hard roads. It has been found cheaper to consolidate these schools and make them bet-

ter. There are more High Schools and better ones. The social conditons are very much improved; they have lectures and concerts. The mail is delivered twice a day, where it was with great difficulty that it was delivered once a day before. The Rural Free Delivery embraces twice the territory that can be covered on common dirt roads.

Mr. Kellogg—What was the cost per mile of the road at Geneva, where you had to bring the stone four hundred miles?

Mr. Harrison—I cannot give the exact cost, but it was about \$2,800 a mile, as near as I can recollect.

Mr. Briggs—What would be the cost of building that road if the stone were right on the side of the road?

Mr. Harrison—I believe a road of that kind in Pennsylvania costs about \$1,100 per mile, in round numbers. The stone were given by the Pennsylvania Railroad out of their gravel pit, and we hauled them about three-quarters of a mile. The labor was done in the old-fashioned way, working out the tax; the men would not get there with their teams until eight o'clock, and about 4 o'clock they would begin to hustle off. There seemed to be nobody in control; they were working out their taxes, you know.

Mr. Briggs—Don't you think if you had hired the teams and controlled the time, that you could have done it in half the time?

Mr. Harrison—I certainly could have done it cheaper. Roads of that kind have been built in Canandaigua for about \$700 a mile.

Mr. Goodrich—This \$700 per mile only just covers the expense of the stone, not for grading and fitting the roadbed?

Mr. Harrison—When the road was built, they borrowed the crusher and

crushed the stone which the farmers hauled. First, the farmers gave the stone out and out, to get the thing started. Then they were crushed and hauled and put on the road not in a very systematic manner, and that cost about \$700 a mile.

Mr. Goodrich—We built a little stone road down in the southern part of the State this year and paid 90 cents a yard for the crushed stone, delivered on the road. I haven't figured how many yards it would take to build a mile.

Mr. Harrison—A road eight feet wide and eight inches thick will take about 1,200 cubic yards to make a mile.

Dr. Porter—I live thirty miles south of here and we have lots of limestone. What would be the life of a road in a city like this with eight inches of that crushed limestone?

Mr. Harrison—I would have to see the stone, there is so much difference in limestone; some of it would make a sorry job. That was the condition of the limestone in Western New York; some roads made of it wore out in three years. There is a great deal of the soft limestone that it would be a worthless expenditure of money to use. There is some limestone that is exceedingly good; it has considerable silica in it, and it makes good roads. In some parts of Kentucky they have it; in Ohio and Pennsylvania, but the trap rock, or igneous stone are much better. Any stone that will pass through fire like the granites or syenites or trap rocks, will stand the abrasion of the wheels much better.

Mr. Arnold—What kind of soils require the greatest depth of stone, sand, or clay?

Mr. Harrison—A sandy soil is one of the best kinds to put a stone road on. The trouble is to get the sand to stand still while you put it on.

Mr. Arnold—At Portage City they

have three inches of Montello granite, and it makes very good streets on that sandy soil.

Mr. Harrison—Of course, that would not be enough on clay; sand is the best foundation if you can keep it steady. I know of a place in Massachusetts on the sand near the ocean, where they laid down cheese cloth on the sand and

put the stone on that; the object was to keep the sand in place till the work could be done. In New Jersey I have used pine needles and coarse sea grass to keep the sand in place while we put the stone over it. Sand makes a good, dry foundation, as no water will interfere with it. The road should be about six inches deep on the sand.

BARN BUILDING.

J. E. WING, Mechanicsburg, Ohio.



J. E. WING.

Mr. Chairman, Ladies and Gentlemen:—I did not come up here from Ohio to boast to you about our barns, for really we have not as large a proportion of good barns in Ohio as you have in Wisconsin. Down there we live on the dividing line between the

North and South, and we are always in hopes it will be the South, but often it turns out to be North. This winter we had it thirty degrees below zero and thousands of cattle shivered around barbed wire fences; but some of us have learned that we cannot farm without barns. I have come up here to discuss this thing with you, not to tell you that any certain type of barn is necessary for you, because our barns, to be model barns, must fit our conditions. You must consider the crops you grow and the kind of stock you keep, and the kind of a man you are. Some men wouldn't have a barn unless it had four cupolas, and other men, like myself, wouldn't have a cupola as a gift.

Essentials for a Good Barn.

I think we will get a better understanding of this subject if we take up certain features that I consider essential in every barn, looking at it from a business standpoint. I am not talking for the benefit of the man who has a great deal of money and wants a very fine looking barn, a little better than anybody else's, without regard to whether it will pay him or not.

In the first place I think a barn should have a good stone foundation under it, set below the reach of frost. In Wisconsin I don't know but that might be impossible, but put them down, anyway, so that the chickens won't scratch out the earth from under them. In my opinion a man should not have any sills next the ground, or any wooden floor in the basement, first, because they are unnecessary; next, because they are sure to decay; and last, because the rats harbor under them. Put your posts right on good stone and then lay a cement floor; or if it is a sheep farm, like mine, good hard earth is all you need. For horses, a good earth floor is all right. Of course you must bed properly so that the horse will not rest directly on the soil, but cement is the next best thing, and for the dairy farmer, cement is all right.

Cement Floors.

Since I came here some have objected to me that cement is not practical for Wisconsin, and that the cattle would slide around upon it. I thought that might be true until I saw cement floors in several of your best barns, and they meet all of your conditions. The stable at the Experiment Station should be referred to, because it is a model, not only in the cement floor, but in the fine provision made for sunlight to come in and for foul air to be taken off. The cement floor costs more to begin with than the wooden floor, but if you use good Portland cement it will be all right for all time. I think the cement will last fully as long as your native limestone rock, and certainly as long as sandstone rock. If you are afraid that the cattle will slip on the cement, perhaps near the door where the snow is liable to blow in, do not leave it as smooth; use very fine

gravel or sharp sand in those places where you think the cattle might slip, make shallow groves in the cement with a fork handle. If you have any objection to the cattle lying on the floor, put a wooden floor on the cement under your cows. They will then sleep on the wood and it is cheaper than to put sleepers and all the wooden frame work beneath it.

Necessity of Sunlight.

Another point that is essential in a barn is that the entire lower story be fitted for stock. You may not have enough stock to fill it when you build your barn, but we are a growing people, our farmers are developing in their stock breeding and dairying, and you want to build that barn large enough for a little growth. I think this basement should not have a stone wall. I know that many of you will not agree with me, but I don't like to put stock against a stone wall. If I build a stone wall around this basement, I will not carry it up to the top of the lower story, I will only carry it up four or five feet, and then wood above. I will have plenty of openings all around to let in the light and air. I prefer a wooden wall, because it is dryer and warmer, and because there is so much better chance to let the light through. You can hardly put too much glass in on the south side. Sunlight is really the source of all life on this globe, and the sun shining down upon animals has a powerful effect. It not only does good to the animals, but it is a source of death to all unhealthful germs. You will not find tuberculous cows coming out of sunshiny, well ventilated stables. I have seen some very sad cases of farmers putting a lot of cows in a stable where they thought they were perfectly comfortable be-

cause they were warm, but they did not let in the air or the sunlight and by and by they would have to call in a veterinarian and find out that the cows had tuberculosis, and a large number of them had to be slaughtered.

The Hay Mow.

The next thing is the mow floor. I think the mow should have depth. I want a barn high, and I want at least a twenty foot mow. This will contain three times as much hay as a ten foot mow, on account of the extra pressure packing the hay together, and that ex-

Improved Ideas in Barn Building.

It used to be supposed that a barn must have two or three cross ties to keep the roof from spreading, but in those days hay was pitched from one man to the other and it did not make any difference if we did have all of those cross-ties; but this is the day of machinery and there should be no cross-ties at all at the level of the eaves. The cross-tie comes at the level of the basement floor and unless you pull in two this tie, or crumble up this brace, there will be no trouble.

One reason why you must not have



WOODLAND FARM, HOME OF MR. WING.

tra depth costs very little in proportion. I made a careful estimate once when I was building a barn and I found that the ten feet extra height in a barn 40x60 would cost not over \$50, and so I felt that I could not afford *not* to build the additional ten feet of height, because the roof and the foundations cost just as much, although it seemed at first that I had too much storage room; but I found that it came in very well after awhile.

the cross tie is that you must not make it necessary to raise all your hay or grain above the cross tie in order to carry it in. You must have it so that you can use the modern hay machinery that merely lifts the hay above the level of the floor and then lets it slide back. You must have it so you can use a sling and a modern carrier, so you need not carry it so high, and you thereby save an enormous amount of labor in lifting that hay, to drop it,

both for your horse and yourself, and it is better for your hay, too. I want to put it in just moist enough to pack a little. Where it is put in from a height, it will damage just where it is dropped.

The Roof.

Another thing that every good barn has is a good roof. There are two things I will call your attention to in a good roof; one is, it should have sufficient pitch, I like it to be at least forty-five degrees angle, and I like a curb roof with the steeper pitch below; it looks better and it contains fully as much. I mean the hip roof. Another thing, it must be covered with good shingles. At one time in Ohio a few years ago, every one had to have an iron roof on his barn. I don't think you will find one of our farmers putting them on nowadays. Part of the time you are painting them and the rest of the time you are dreading the painting of them.

Ventilation.

I have not spoken about ventilation much, but I think very few farmers realize how important it is that the basement floor should be sufficiently ventilated. I have ridden by some barns in your State that it seems to me were sufficiently ventilated, because I could see clear through them. I like the barn at your Experiment Station; the sun shone in brightly and helped to warm it. It was not at all cold in there and yet the air seemed pure enough for anyone to breathe. You have got to have a balanced ration of air just as much as of food, and when you get very much of this "second hand" breath in the barn, the balanced ration of air is gone. You must have this air taken off regularly and properly; you cannot depend upon knot holes for it;

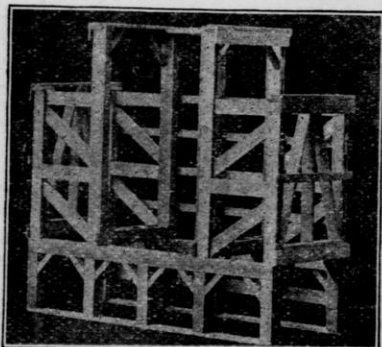
you must provide chutes, starting near the floor. In our sheep barns we can hardly give too much air. We have a basement practically like a covered barnyard. The entire side on each side is filled with doors twelve feet long. These doors are divided in the middle horizontally, and we can open the upper half and leave them open, and the sheep have all the benefit of being outside. We put 1,100 thin Mexican lambs in our barn and fed them as well as we could, giving them this pure, fresh air all the time, so they were really out of doors except when it was very cold or windy; we took all but six of these lambs out of this basement, every one fat, and I think that is something to boast of. I have a neighbor who has a barn that cost a great deal more money than ours, a good looking barn, but they neglected this one item of ventilation. He put 1,300 lambs in there, and he has never had any luck with them, and he cannot understand the reason.

The Joist Frame.

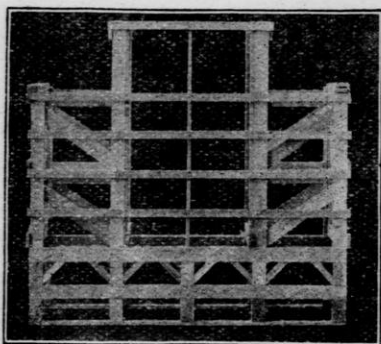
Now a word about the joist frame. The time has gone by to build the old-fashioned solid-timber frame. Frames built of 2-inch stuff are so far cheaper, stronger, too, better in every way. They can be framed and raised in the time that would be consumed in "laying off" the old timber frame and whittling the pins. Every stick is a 2-inch joist, either 6, 8, 10 or rarely 12 inches wide. These are so put together that they are spliced at any desired place, breaking joints in splicing. There is no patent on the joist frame. There are several forms; perhaps as simple and strong as any is shown in the illustration. There is no difficulty in the building; carpenters are often prejudiced against them, but this prejudice disappears with familiarity and the carpenters themselves

become the most enthusiastic advocates of the joist frame.

The saving is in buying the stuff, it need not be so costly a grade, in saving the use of long timbers, in time of building and the result is a far stronger and more durable building. Then by



Joist frame, showing open center.
2 bents.



Joist frame. End bent. Ready for
rafters.

the use of the open center and the sling carrier one can put in hay very rapidly, as fast as a load each ten or fifteen minutes, if he can get it dry and to the barn in that time. We have put in 20 large loads in an afternoon, and it was not hard work—not for me, I mean.

The other fellow did sweat a little, but he was in the mow. It took two big men to keep it back there.

DISCUSSION.

Question—You have not stated how you are going to get that hay scattered over the mow, when the thermometer is about 120 degrees.

Mr. Wing—I put three darkies in there.

Question—But if we haven't all got darkies?

Mr. Wing—I have a good many that I can spare.

Question—What is the object in having a cement floor in preference to a cedar block floor?

Mr. Wing—I haven't had any experience with cedar block floors. I should think it would cost more and be more difficult to put down.

Question—How long should the chute be to make a draft in the barn?

Mr. Wing—I should take it clear above the roof, but I would have one opening in the chute pretty near the floor to take off the lower strata of bad air, and another near the ceiling.

Mr. Goodrich—It is well enough, isn't it, to have a barn well enough ventilated so that the air is pure and so that it won't freeze in the night with the thermometer down below zero.

Mr. Wing—That is all right, but I cannot see the harm if it does freeze a little; better have cold air than impure air.

The Chairman—I want to call attention to Prof. King's article on barns, on page 50 of last year's Institute Bulletin, No. 12.

Question—Could you raise calves in such a basement as you describe when it goes down to 50 below zero?

Mr. Wing—I never lived up at the

North Pole and I don't know. I would have the calves warmer than 50 below zero, but I would see some way or other that they should have a balanced ration of air as well as of food.

Mr. Convey—In unloading hay from the outside wouldn't you have to lift it more than you speak of?

Mr. Wing—We have a door made reaching from the mow floor to the peak of the roof, three doors, each ten feet high, so we fill in and close the lower door; then the second one and almost never the top one. It turns to the southeast and lights the mow above.

Mr. Convey—Did you ever have any trouble with your cement floors by the cows slipping into the gutters?

Mr. Wing—No, sir, but I have seen that trouble where poor cement was used, but I do not think you would have that trouble with good cement.

Mr. Briggs—What is the advantage of having those braces pull instead of push?

Mr. Wing—A brace that resists the thrust by pushing has to be pretty large. It takes less power by using the pulling, and smaller timber.

Mr. Briggs—Do you say you use no sill?

Mr. Wing—At the bottom I would use no sill.

Mr. Briggs—How do you fasten the posts; wouldn't they slip off the foundation?

Mr. Wing—I have never had any trouble. I think the weight of the barn would hold it down.

Mr. Briggs—I think it would spread apart.

Mr. Wing—It can not pull apart—the tie is at the level of the mow floor and consists of 3 pieces of 2x2 timbers—you can't pull them in two. I think a barn should be forty feet wide, a few feet

wider or narrower, it don't matter much, but when you take hay in the barn and drop it from the middle, you have to carry it back to the sides, and it is better not to have to carry it further than twenty feet; the darkey gets tired. If you build it narrower than forty feet there is nothing saved; it will cost you very nearly as much in lumber to build a barn thirty feet wide as forty.

Question—Can you place that barn the long way, east and west?

Mr. Wing—That depends upon your location. I prefer to have the long way east and west.

Question—Don't you think that the germ that causes consumption will die in three or four hours in sunlight, where it will live thirty or forty days in the dark?

Mr. Wing—Yes.

The Chairman—There are a good many things that are essential in good barn building. One, of course, is a good covering outside. One of our dairymen, I believe, has discovered that skim milk is superior to linseed oil for paint. How is that, Mr. Thorp?

Mr. Thorp—I read in an agricultural paper about two years ago of a man painting his buildings, part of them, with Venetian red and skim milk, and part of them with oil and skim milk, and last year I did it myself. A year ago last fall I painted the end of a new shed to try it, and in the spring I wanted to wash it off with a force pump, and I couldn't do it, so I painted all my buildings at a cost of \$14.00. I don't know how long it is going to last, but the cheapness of the material will enable me to paint them several times and I find they hold their color a great deal better with skim milk and Venetian red than they did with oil and Venetian red.

Mr. Wing has given us some good

ideas, if we were going to build a new barn, but a great many of us have old barns. He is right about that point of the hay dropping so far to the mow. We all know that it is hard to move it from the spot it drops to; it seems to be so solid. Now, to overcome that, in my old-fashioned barn, we put a long

pole right on the first sill above, and in putting our hay in, it strikes on that pole and it throws it half way across to the side wall, and it is very easy to handle. We move the pole from place to place as we get the hay in, and carry it up with us as we go.

SILO BUILDING.

THOMAS CONVEY, Ridgeway, Wis.

The first thing we must take into consideration in building a silo is its location. Persons undertaking to handle silage will find that the nearer they have the silo to the stock, the more convenient it is. We can put it in the silo by horse power, but in the majority of cases we have to move it to the stock by hand power.

Another matter that must be taken into consideration in handling silage is, that there is a big advantage in placing your cutter so that you will have the least possible elevation. In some cases you can cut from the second floor of the barn and will require a very much shorter carrier. When you have a carrier twenty-five feet or longer, it will take fully as much power to run the carrier as to cut the silage. Sometimes it might be of advantage to have it in a hillside.

The Round Silo.

As to the form of the silo, all of us are of the opinion that we should prefer a round silo, or as nearly round as possible. The round silo is very much cheaper than the square or rectangular, owing to the fact that every piece of timber that you put in a round building tends to make it stronger, whereas in a square silo, you

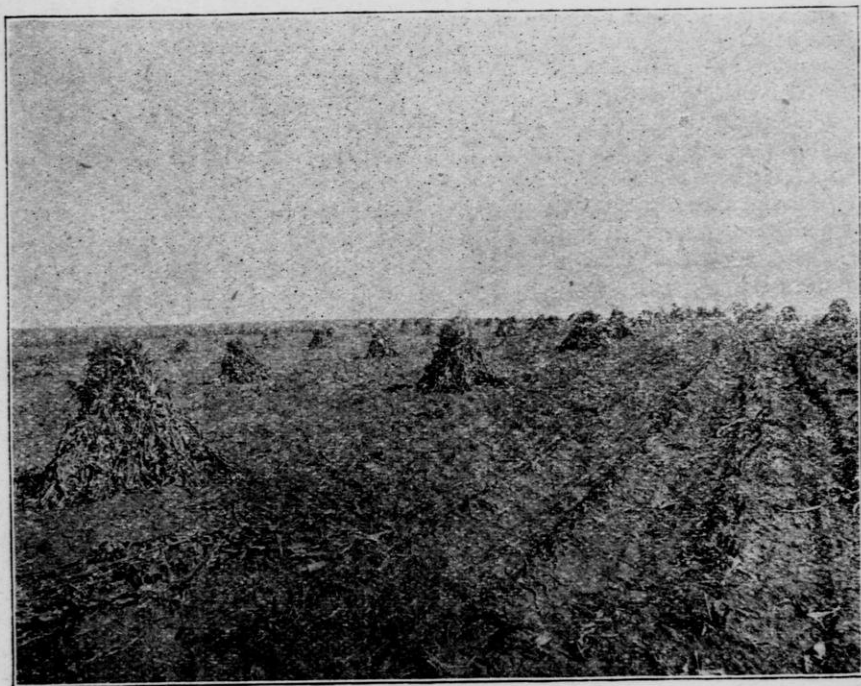
have to use very strong timbers. Again, the sharp angle in the corner of the square silo makes it difficult to pack the silage, and that is where the spoiled silage is always found, if anywhere. Where we have been using silos for several years, we are more inclined to take into consideration the durability of the silo than the cost of it, as we used to.

Location of Silo.

As to building it in the barn as compared with an outside building, of course there is less likelihood of decay in the outside building, unless you have your barn perfectly dry. I have found that people who have built stone silos, or a framework of timber and filled it with brick, as a rule are the best pleased with their work. I find that people who have built cheap buildings on poor foundations are very much dissatisfied. I know of several stave silos that are giving good satisfaction, but it is my opinion that they are giving more satisfaction inside of, than out of the barn. A great many of us have been very careful of having silage freeze, but I know of a case of a silo being burned down last year and the party fed the silage all winter long. In case of snow storms or rain, it didn't

seem to injure it much, so that if silage can be kept in the form of a stack, I do not think we need be so fearful about the frost as we have been. Silos are now being built in several localities with common piece stuff without bevels, and they say the building goes together just as well and gives just as good results as where they use the beveled material.

10 ft. overground, the latter being on a level with the top of basement under the barn, and the last 16 ft. of the silo good quality of 2x6 except four pieces 4x6 placed at equal distances, through which rods will run to hold the building together. All the timber will be treated with hot tar on all sides before being put up. The 4x6 pieces can support the plates on which rafters



Corn field on the farm of Mr. Convey. Not a weed in sight.

What We Shall Build.

We have filled a silo of the square form for the eleventh year; it has given fair satisfaction. Rats have damaged the building and silage to some extent the past two years. We shall build a round silo next year, 20 ft. in diameter and 36 ft. deep; a light wall 10 ft. underground, a heavy wall

can be placed, and the usual style of roof put on. We intend to fill the silo from the upper floor of the barn, as it will be just outside. We shall use hay carrier and overhead track to feed the silage, a box being attached to trip pulley. We can extend the track to the center of the silo if necessary, and hoist with a horse if we want to. A

serious objection to a very deep underground silo would be that a dangerous gas might accumulate there that would be dangerous to human life. This must be provided for by keeping the silo doors open until it is necessary to close them, and except in the case of deep underground silos there will be no danger.

DISCUSSION.

Mr. Briggs—How high ought a silo to be built?

Mr. Convey—The higher the better, provided you have power enough to run the carrier. There is no objection whatever, as far as I can see, to building at least a portion of the silo underground, at least eight or ten feet. If you have to carry it out and your silo is sixteen feet or more in diameter, you can rig up a plank with cleats on, or something to carry it out. To those of us who are depending on silage for summer feeding, it will keep better down there than above ground.

Mr. Thorp—I have built seven feet underground and I am going to try twenty feet. My men had rather get the silage out below seven feet than the seven feet off the top. One man gets in there and hands it up to the other and they have a couple of steps, so they can get it out by handling it only once, whereas, when they get it from above, it has to be handled twice.

Mr. Goodrich—I know of two silos that are entirely in the ground, or at least one is thirty feet down in the ground and eight feet above, and the other is twenty feet in the ground; the latter has been used for three or four years, and the owner thinks it is lots of work to lift it out, but of course it takes less work to fill it. He has it covered over with a floor, with a wide door through it, and he raises it with a gear and windlass; he puts it into a

box under which there are two pieces of 2x4 scantling; he puts enough into the box for one feed for sixteen cows. Then he raises it up with his windlass and shoves a plank under it, then he hitches his horse onto it and draws it in front of his cows.

Mr. Thorp—If he had an overhead track he could get it out very easily; that is what I am calculating to do for feeding steers. I expect to go twenty feet into the ground and ten feet above, and have the windlass, but I am going to put the silage in whole and use a swing for taking it up; wind it up with a windlass to an overhead track and drop it directly into the rack.

Mr. Taylor—I built my silo ten years ago and built it square. I am intending to build another one this year and build it round; I don't know yet how far I am going into the ground. I object to going into the ground at all, and I would like to keep on top of the ground as long as I can. A neighbor of mine who used to come to my place talked about it nine years before he built his, and we talked the matter over pretty carefully. He was something of a mason and he built a silo after his own ideas. He made it twenty feet across and thirty feet deep, of 2x4's he formed the frame, then he put a strip on each 2x4, two inches wide, so he had an open space and the upper part was five inches wide. Outside he put on two thicknesses of half-inch lumber, he didn't put any paper on between, because this was inside his barn. He went down into the ground eight feet. He put a temporary lining around inside, leaving a space of five inches, and he filled that with grouting and coarse sand, putting in just enough Portland cement to make it hard. It filled this space clear up; then he put on a coating of water lime;

then he took off the 2x4's and made it smooth and nice, and he has filled it now two years and it seems to be a perfect silo. He is a practical man, a keen observer, and knows a good thing when he sees it. A friend of mine in Indianapolis built a silo and as he stood and looked down into the hole, a friend said to him, "It will be pretty hard work to throw this stuff up out of that hole." "Oh, pshaw," he says, "let the hired man do it." Now, he has told me since that if he were going to build another, he wouldn't go more than six feet in the ground. At that distance you can reach it with a large barley fork and throw it up to the barn floor, but when you get below that, it is pretty hard work. So I have had the idea that I wouldn't build more than six feet in the ground.

Mr. Arnold—I can't see what a man can gain by going down four or five feet deep, because it is going right against the laws of nature to say that a man can get up with a load better than he can come down, and work in the dark better than in the light.

Question—Would you cement this down twenty feet, or would you put in a stone wall?

Mr. Thorp—I expect to cement it up with a layer of brick; back it good and tight. When I get within three or four feet of the surface, I will add another tier of brick, so there will be two tiers of brick all the way.

Supt. McKerrow—I would like to hear from some of the gentlemen who have used lath and plaster.

Mr. Hodgson—I have one side of my silo lathed and plastered. Two years ago there were two feet of decay. I examined the wall and I thought it was all right, but it was all gone, just the shell left, all gone with dry rot. Early in the spring I plastered it and let the plaster lay until it was thoroughly dry.

I examined it, I think, in July, anyhow, it was about two months before I put my silage in. There was a mistake made in putting the cement on. My mason said that one-third Portland cement would be sufficient, but that turned out to be wrong, it should have been one-half, and the silage is spoiled on that side the air passes through the cement. A silo must be perfectly air-tight; that is the first thing to look after. I visited a stone silo yesterday that was filled a year ago, and the silage is the best I ever saw. This silo is cemented inside.

Mr. Nicolai—I have lathed and plastered my silo, but it has not been on long enough to determine its value. I built my second silo fourteen years ago this coming summer. I put in twelve feet of mason work and then fourteen feet of frame on top. The mason work goes three feet below the level of the basement, which is nine feet high. Two years ago I cut off the corners, because the silage rotted in the corners. I commenced at the bottom with mason work; then I cut off the corners of the frame work, then I went over the frame work and lathed and plastered; the first coat was ordinary plastering; then two coats of water lime and cement. I found, when I commenced to look over my silo, that the boards were sound except the sappy part of the board. I concluded I would save it by lathing and plastering and I think it will stand. It is 2x4 studding, with inch boards nailed to them, tarred paper, matched fencing and then lathed and plastered; so far it works all right. There is about half an inch between the original wall and the lath.

Mr. Taylor—What kind of paint would you put on the inside of a silo?

Mr. Convey—For a wooden silo I prefer gas tar. Set fire to it and let it

burn until the blaze gets quite feeble. Smother the blaze and apply it while still hot. I treated a silo that way ten years ago and all parts of the work so treated are perfectly sound to-day. Gasoline and gas tar have been recommended, but neither is a substitute for hot tar, because it makes just a thin coating of the gas tar with poor results. There is another form of silo I would like to call your attention to. Some of you no doubt would like to build a silo in the barn, and it is not necessary that you should go to a great expense. Two courses of lumber with tarred paper between the two, breaking joints, will do. Arrange 2x8 pieces in the form of an octagon of the size of the silo, placing them on the foundation. Overlap the ends and spike together. Use 2x8 stuff every four feet, horizontally, of course. The

inch lumber should be of uniform width erected perpendicularly. A very few strips nailed on the outside of 2x8 stuff will hold them in place. Each side of the octagon should be of such length that the lumber will fit in snug. Another thing to consider is that if you are lathing and plastering, you must have a rigid wall so that the settling of the silage will make it compact right next to the wall.

Mr. Thorp—This building a silo in the barn is something I would not want to do and for this reason—we are adding to the capacity of our feed room and diminishing the capacity of our stable room; if we do that, we will find that we can keep so much more stock on that feed than we ever did before, that we will have to build an additional barn. We might as well save the room inside and build outside.

SILO FILLING.

W. F. STILES, Lake Mills, Wis.

Now that the silo is built and the crops grown, the next thing in order is filling. This time we will use corn, as this is one of the cheapest crops to grow for this purpose. It is best to have about three varieties. In this way the time of filling can be extended, and if the early variety becomes too mature, we can commence upon the next, which will be at the proper stage. It is a good thing to have one of the Southern varieties to cut in at last, as these keep green until frost, and thus we have the heaviest variety to put on the top to pack and preserve the rest.

The Corn Binder.

By properly planning the work and using the right machinery, the labor required can be greatly reduced. We can all remember the time when the only machine we had with which to cut our corn was the old style, fullswing, right hand, quick draw corn knife. This machine did not easily get out of repair, and it was very cheap. It worked too slow, however, and the power used in running it became scarcer and more expensive each year. Thus from necessity—and necessity is the mother of invention—the inventive

genius of the Yankee brain was put at work to construct a machine that could be operated by a much cheaper power. The result thus far is a corn binder, which works on much the same principle as the grain binder. These machines do not work to perfection in all cases, but they are a great help in filling a silo. The bound corn handles much easier than the loose, and the loads can be put on and taken off with much less labor.

keep them from rubbing against the load.

The Feed Cutter.

As we are intending to cut our silage, the next thing in order is the feed cutter. This should be placed on a platform which is about on a level with the platform of the wagon, and when possible in such a position that the loads can be drawn directly along side of it. The bundles can then be placed upon



Filling the Silo on farm of Mr. Stiles, showing engine, cutter and elevator with men at work.

The Best Rack.

Next in importance to the binder is a low wagon upon which to draw the corn. The truck wagons found upon many farms are very good if the proper rack is used. This can be made by using a long wood rack. Upon this rack should be built a solid floor six feet wide, extending to the hind wheels, over which a shield should be made to

the feeding table with the least amount of labor.

The Power.

Various kinds of power are used to run the feed cutter. Some prefer one kind and some another. Most farmers with small silos use some form of horse power, either the sweep or tread. A certain number of horses are needed to do the farm work, and it is just as well

to use them in filling the silo as to let them stand idle. In purchasing a power, be sure and get one that is large enough. The same advice may be given in regard to the feed cutter. When once started the large machines run nearly as easy as the smaller ones. A sudden jar, such as an extra amount of feed, will not affect a large machine as it will a smaller one. Another advantage in case of the feed cutter is that if you wish to get an engine and do the job up in a hurry, you have the machine with which to do it.

The Work of Filling.

The amount of help one has in filling the silo will determine the best method to be adopted in regard to the work. In case of a small silo, two men can do the work all right. A larger force properly placed can do the work to better advantage, as each man has his special task, and no time need be lost in going from one place to another. A good plan in some cases is to exchange work with a neighbor, and thus the proper number of hands can be secured. A force for a silo large enough for twenty-five cows is four men, and if a sweep power is used, some one to drive the teams. The corn for a day's run we will suppose has been cut with a binder by the boss, while the men are doing the chores and getting up the first load.

Placing the Men.

As men vary greatly in their ability to do certain kinds of work, the hands should be placed at the jobs for which they are best suited. To illustrate, suppose those four men we have on this program for the silo subject are the ones to do the work. As this is Mr. Convey's silo we will have him tend to the running and feeding of the cutter. The rate at which the work is done is

usually regulated by the time it takes to get a load through the cutter. As Mr. Convey will enjoy seeing the rest of us sweat, he will keep the knives sharp, and the machinery in good shape so that he can run as many loads through in a day as possible. As Mr. Briggs and myself are good husky fellows, we will each have a wagon to haul the corn from the field and put it upon the feeding table. I prefer to have each man take off his own load; then if there is any truth in the saying that "a change is a rest" he will have the benefit of it. If a man is to take off his own load he will put it on so that he can take it off in the easiest manner possible. In loading I prefer to commence at one end, building that as high as possible, and so gradually work to the other end. The load is then taken off in just the reverse of which it was put to. In this way there is no binding by one bundle overlapping another. The chief point to be sought for in the man who is to be in the silo is not that he is a big strong fellow, but that he is a man who can be depended upon, who understands the art of tramping well, and who has a good head and knows how to use it. Therefore I have reserved Mr. Arnold for this job. To lighten his work he will have at the end of the feed carrier, a swinging slide with which to deliver the silage to any part of the pit he desires. He prefers to use the forces of nature and lets gravity do much of the work of distribution. His work will then be to see that the ensilage is well mixed so that all places will settle evenly, and that when he comes to feed it out to his cattle they will not get all ears one day and all leaves the next. The ensilage at the sides should be kept a little higher than in the middle and tramped some, and in the rectangular silos the corners should be well packed.

Other Important Points.

The rate of filling does not seem to be of very great importance. Some fill in three days, while others take three weeks to put in the same amount. The chief point is to fill fast enough so that it will not spoil by heating. When the weather is quite warm it is not advisable to stop filling for more than two days.

The length to which the silage is cut varies all the way from one-fourth of an inch to two inches. The shorter cuts pack closer and more feed can be put into the silo, but when cut short it runs slower through the feed cutter. As in many other matters, it is best to strike a medium. The half or three-quarter inch usually give the best satisfaction.

In regard to cover, various kinds are used. Many remove the ears from the last few loads and cut as short as possible; some cover with oat chaff and then sow on oats and wet it down. Others cover with boards with paper between.

DISCUSSION.

Mr. Goodrich—If one is feeding corn right along to cows, as we all have to at that time of year, it needs no covering and none will be spoiled, for we are taking it off every day.

Mr. Stiles—In a warm time, if you are not feeding very fast, some will spoil. I know of some cases where they have two silos. They cover with boards and paper between, then around the edges they put sawdust; then wet it all down, and this is left until winter, when the second silo is opened.

Mr. Briggs—Did you ever practice putting corn in whole?

Mr. Stiles—I never have and I don't believe it would come out as good.

Mr. Taylor—One of my neighbors has

put it in uncut; he is a very good member of the church, and he told me that he wore out that part of the bible that tells about Job, and sometimes he had to read two chapters. After that he cut it.

Mr. Hodgson—I don't know how it is down Brother Taylor's way, but I have been taking it out of the silo, and I never have worn out a single chapter. After thirteen years' close observation I never have been able to find any good reason why we should cut our ensilage corn. Some of us may not like taking it out, but that does not affect the quality of uncut ensilage, it does not affect the principle. Certainly the cost of putting it in is much less. I can bind with the McCormick machine and down to that point it costs the same as it costs the man who is going to cut it.

It has been suggested that this ensilage should be cut in lengths, from a quarter of an inch to two inches long. I visited a silo two or three weeks ago, where the ensilage was cut a quarter of an inch long. The moment I went into the door of the barn I knew there was something wrong with the cattle. I examined them, and the stables, and in the bottom of the mangers I found about six inches of this sour ensilage, and the man didn't know what was the matter. His cattle wouldn't eat their meal, because it had been thrown in there with this poor ensilage. My first point in favor of the uncut silage is the cost; my second, the quality; and the third is the corn. I think your cattle like to have the husk on the corn. Then the acidity of the ensilage that is cut. We believe that just the moment the juice is exposed to the air, that the sugar will turn to acid. These are some of the reasons why I put it in whole, and I put it in in bundles. It has been suggested to me that it cannot be taken out in bundles, it takes so

long. We have various ways of getting it out. I have hired men using from different silos, and invariably they claim that they can take the uncut ensilage out of the pit so much quicker than the cut, because it is in bundles. We give one bundle to each cow. That weighs about twenty-five pounds, and the man hands out a bundle at a time.

Mr. Briggs—The fact that that man allowed that old ensilage to stand in the mangers, is no argument against the cutting of the ensilage.

A Member—In filling our silo this last fall, I broke my feed cutter. We had gotten to a stage in filling it that we had to keep on or spoil the lot. While I was making repairs I put it in whole. We fed that out about two weeks ago, and as far as my judgment goes there was not one particle of difference in the quality of the cut and the uncut.

Mr. Thorp—I want to ask Mr. Hodgson if he has had any experience with regard to whether cows digest this uncut ensilage any better than the cut?

Mr. Hodgson—My brother experimented on that line very largely and he found that a great part of the cut ensilage passed undigested.

Mr. Goodrich—I have examined the ensilage in a great many silos, and among others that one spoken of by Mr. Hodgson where the ensilage was uncut; it was the sweetest that I ever saw, but there was considerable damage next to the wall, apparently because it did not fit tight to the wall.

Mr. Stiles—I have visited a great many silos this winter and I find that where you put in green corn the ensilage comes out much more acid than where it is quite mature. Where they are putting in this big Southern corn, they have to cut it green and I found it quite sour, but where you use the Dent

varieties, it is quite mature before it is cut and the ensilage comes out sweeter.

Mr. Briggs—Has anybody ever put any corn in the silo after it was frosted?

Mr. Taylor—I have. We put in some one year; we put it in one day and the next day we found that it was quite dry, so we sprinkled it pretty thoroughly with an ordinary garden sprinkler. We didn't begin that way; at first we put about four pails of water on each load and watched the hired man get himself very wet while he handled that wet corn. We did that in the morning and in the afternoon we rigged up a platform with a barrel of water on it, and sprinkled it with the hose. I was surprised to find how little difference there was in it. I would rather not have it frosted, but I would not stop on that account. I will agree with Mr. Hodgson that if uncut ensilage is well packed, that you will get a sweeter ensilage, but the extra labor more than overcomes the difference. Then, again, where the stalks are so long you will find four or five cows eating at the same stalk.

Mr. Convey—I have seen Mr. Hodgson's silo containing his uncut silage. I would like to ask him if he thinks that he could manage his uncut silage with a round silo as well as with his rectangular or square silo.

Mr. Hodgson—I prefer a round silo. I have been asked how I would manage with a round silo, if I would commence in the center or at the outside to put the corn in. I have a round silo; I commence and lay the ends to the wall, leaving a certain space between the butts of the corn and the side of the wall. I go to the center, so I put it in going around, and the pressure will come so that you will have no air

chambers outside; the pressure is out all the time.

Supt. McKerrow—Your idea is to have the stalk laid round and round, the ends to the wall, and that will press towards the wall, and the next time your stalks would come in between the butts and the wall. In effect you would be laying your stalks lengthwise with the outside wall.

Mr. Hodgson—Yes. I kept it as level as I could. I make my tiers about two feet high. In taking it out you commence on top and work round and round, just reversing the action in putting it in, going round and taking the bunches up. I never cut the bands.

Mr. Taylor—The State Dairymen's Association asked Mr. Stiles to get up a silo census for them and he spent a lot of time and money in visiting them and making up a report. How many silos did you visit, Mr. Stiles?

Mr. Stiles—I visited thirty, and they were all filled with cut silage.

Supt. McKerrow—Thirty years ago how many silos would you have found to visit?

Mr. Stiles—I couldn't have found any.

Question—What length do these gentlemen find gives the best satisfaction in cutting silage?

The Chairman—I don't think there is any rule. I cut mine an inch; some cut it an inch and a half, others three quarters of an inch. I don't think it makes very much difference.

A Member—I have experimented in cutting from three quarters of an inch to two inches. There is no trouble in the cows raising and masticating it at two inches, and I think it makes a sweeter, better ensilage. I prefer it cut that length.

GROWING CROPS FOR FILLING THE SILO.

H. A. BRIGGS, Elkhorn, Wis.

Mr Chairman—I have never grown anything for the silo but corn, and it doesn't make much difference about what kind of corn you grow if you will only have enough of it to fill the silo well.

Varieties of Corn for Silage.

I have grown and filled a silo with Dent corn, something like Pride of the North, putting it in about the time it is fit to cut up, and had excellent silage. I have also put in Evergreen sweet corn, letting it get pretty ripe, and I have put in Dent corn when it was a little bit dry, and mixed it with Evergreen, half and half. I have now a va-

riety of corn that I like very much for the silo, and I do not know what to call it. It has always been called blue or black corn. It was one of the very few good things that I ever knew of coming from the Patent Office, out of the seed department. There is a little more sugar in it than in the ordinary field corn, and it grows something like the Flint corn and makes good ensilage. There are a great many suckers and a great deal of foliage, it will ear very heavily; it is difficult to husk, but it will grow, I think, from one-third to a half more fodder to the acre, than the Pride of the North does. The stock eat it as fodder corn well.

Look for Maturity.

I do not think it makes much difference what variety you use to fill a silo, only grow the largest variety that will mature properly. I have used B. & W. but it does not mature in our climate sufficiently but what there is too much water left in it for silage. I have been putting five or six loads on top of silos as much for weight as anything, but I do not get as good results in the feed as from more matured corn.

DISCUSSION.

Mr. Goodrich—Don't you find that Evergreen corn makes pretty sour ensilage?

Mr. Briggs—No, not putting it in the way I did. In growing corn for the silo, I like to have a variety, so that it will mature at different stages in case of accidents or storms.

Question—How do you plant your corn?

Mr. Briggs—I drill it in. I plant it twice as thick as though I was going to husk for ears. The ears will be smaller, but there will be more of them to the acre.

Question—Have you tried planting it ten or twelve inches apart and leaving about the same width that you would ordinarily plant?

Mr. Briggs—I have planted it that way, but you get larger ears. I don't think you get any more pounds of corn, and you don't get as much fodder.

Supt. McKerrow—Your drills are as far apart as in ordinary field culture, I understand. About how much do you get to the acre?

Mr. Briggs—That depends altogether upon the condition of the ground and the kind of corn. It will vary from ten to twelve up to twenty tons.

Question—How close in the row can you drill your corn?

Mr. Briggs—Oh, where it is of the Dent varieties, I should say from four to five or six inches. For this black blue corn I speak of, not quite so thick, because it suckers out so, perhaps one every seven or eight inches.

Supt. McKerrow—I drill twelve or fifteen inches and I easily get twelve to fifteen tons to the acre.

Mr. Taylor—Don't you want a big growth of corn?

Mr. Briggs—I don't want a coarse growth.

Mr. Taylor—We plant about four stalks every four feet in drills. I believe we want a stalk of corn to grow naturally and don't want it to be interfered with by other stalks, we want the sunshine upon it. We want a good dark green color in the stalk and then we will develop more sugar and starch in that stalk if it is not interfered with by some other growth, and we get a big ear on every stalk and many will grow two ears. If we don't have a good ear, it never fulfills its mission. I object to suckers on the ground, just as I object to suckers in any other community, and would prefer to grow a kind of corn that doesn't have any. You grow a large, healthy ear of corn and you have stalk enough to get along with, and if you put it in the silo, I would like it to grow a hundred baskets of ears to the acre.

Supt. McKerrow—You would not expect the stalks to grow as well where this large ear is not perfected?

Mr. Taylor—I want to get that ear pretty well developed. We don't raise it for the stalk, we raise it for the corn. I used to think the big corn was the best kind when I put it in the silo, but when I took it out and talked to the cows about it, they thought the smaller kinds were the best.

Mr. Goodrich—My idea is that I want

to raise all the corn I can and all the fodder I can to go with it. Instead of having one stalk that has an ear on it, I would rather have two stalks with two ears on each, weighing half as much. I get more fodder and just the same ear.

A Member—I planted Pride of the North, twenty-five quarts drilled to the acre, for about six years. I find that by having small stalks and getting a small developed ear and more of them, providing it is in the proper condition, that I like it better.

A Member—I think Mr. Taylor is correct, at least partly. At one time we used to sow corn with a common corn drill, and it would grow up about

four feet and be very yellow. The cows didn't like it. Then we planted it about eighteen inches apart, with a hand planter; I think it was not as sweet and nutritious as if it grew in its natural character.

Mr. Briggs—Mr. Taylor says he don't like suckers. This blue corn that I speak of nearly every sucker will have a good-sized ear upon it.

Mr. Taylor—Then it isn't a sucker.

Mr. Wing—For several years I have been in the habit of raising two crops, a crop of early Ohio potatoes, and after the last cultivating of the potatoes, go right through and plant corn with a hand planter. In order to do that the soil must be rich and deep.

FEEDING ENSILAGE.

ALEX. A. ARNOLD, Galesville, Wis.

Mr. Chairman, Ladies and Gentlemen:—Good silage can be fed at a profit to all kinds of cattle, and to sheep and horses in limited quantities. I say good silage; if I had to have a silage made out of immature corn, I would prefer not to have any. I think sometimes mistakes are made in feeding too much silage in early feeding. Nature's condition is that the animal should not have too much of that kind of laxative food. I think, therefore, that it is better not to feed to exceed forty pounds per day to a grown animal, to a dairy cow. I prefer thirty pounds with ten pounds of clover hay. I like to balance the ration, the ration of roughage, as it is called, and the ration of meal. Corn stalks being one to seventeen and the corn one to nine, would be the same as one to thirteen, and that you see is a wide ration which we can balance by

the use of some clover hay. Then, with this thirty pounds of ensilage and ten pounds of clover hay, feed ten pounds of meal, composed of four pounds of bran, two pounds of corn meal, and four pounds of oats, and there you have a pretty nearly balanced ration. I like oats for dairy cows or for growing animals, as a ground feed; it has lots of protein, lots of phosphoric acid, and that is what the animal needs to give it vitality.

The Cheapest Feed.

If I had to feed exclusively on ensilage, I should want to keep my cattle in the barn, and I do not believe any animal can thrive unless it has a certain amount of sunlight. Darkness means death and sunlight means vitality. It means that to the growing corn; you have got to have a good vig-

orous growth and a good green stalk; and you have got to develop a good ear, otherwise you don't have a good plant. I call that good ensilage, and when well matured, planted about as thick again as ordinary corn and growing about the same heft of ears as stalk, and fed in the way I have suggested, it is the cheapest ration we can give to our cattle.

DISCUSSION.

Mr. Hodgson—Do you feed your ensilage before milking, or after?

Mr. Arnold—After milking, for fear there should be anything wrong about it, and I like to feed the meal on top of the ensilage. I think the cow does better fed in that way.

Question—Will Shorthorn cattle eat ensilage?

Mr. Arnold—They will if they get a chance.

Question—How much ensilage would you feed a yearling steer?

Mr. Arnold—He would take pretty nearly as much as a cow. I don't think it is profitable to give him forty pounds a day. The steer should not be in a very warm stable and I do not believe it is good policy to feed too much of that kind of food to a fattening steer, especially in the finishing off.

Question—Why do you feed your ensilage after you milk?

Mr. Arnold—It is not necessary, if you are sure your ensilage is good.

Question—Do you feed ensilage twice a day or only once?

Mr. Arnold—Twice a day. I feed ensilage twice a day, hay twice a day, grain twice a day, and turn them out once a day to the sunlight and the straw pile. About twenty pounds of silage would be about as much as the yearling ought to get. It don't make so much difference about the size of the animal as the amount of food it takes;

it depends upon what the animal is doing.

Mr. Porter—There is something the matter with my silage. It is black, but perfectly sweet. It was not frosted. The cows don't eat much of it.

Mr. Goodrich—It has not water enough in it.

Mr. Porter—I think you are right. It was put in too mature.

Mr. Goodrich—Yes, it will turn out perfectly black.

Mr. Convey—Was it some of Mr. Brigg's black corn?

Mr. Porter—No, it was Evergreen corn.

Mr. Taylor—I think there is the difficulty. Evergreen corn develops too much sugar in it.

Mr. Arnold—I had a neighbor who had that same experience. I know how it was put in his silo and I think I know the reason. It was too mature, it dried, and when it came out of the silo, it was all turned black, burned.

Mr. Porter—Last year my corn was frosted. I gave it a wetting, but it was in the same condition, though not as bad.

Mr. Linse—I put in a lot of frozen corn this year and it was my best ensilage, but I wet it enough so that it had plenty of moisture. Seventeen years ago we thought ensilage had to go in perfectly green, and we commenced cutting when it was just tasseling out; that ensilage never kept any better so far as looks were concerned, but it was sour as vinegar. Now we are apt to go to the other extreme; we let it get too ripe and dry, so we must watch it. As much care must be used in making good ensilage as in making good hay; you must have moisture in it, and to have good, sweet silage, we want to carry on the ripening just far enough, and not too far.

The Institute adjourned till 7 o'clock, P. M.

EVENING SESSION.

The Institute met at 7 P. M. Supt. McKerrow in the chair.

Supt. McKerrow—Wisconsin always likes to be in the front rank, and particularly in agricultural matters. I believe that we can claim the first State system of Farmers' Institutes, and I believe we have the right to claim that we

held the first Farmers' Institute among the Indians. This past winter we held an Institute on the Oneida Reservation, and I believe we will now listen to the first paper ever read at a Farmers' Institute by an Indian.

EDUCATION OF THE INDIAN FROM AN INDUSTRIAL STANDPOINT.

JOSIAH POWLAR, Oneida, Wis.



JOSIAH POWLAR.

Mr. Chairman, Ladies and Gentlemen:—It is certainly a great pleasure to me to be present at this gathering,

and I appreciate very greatly the honor shown to both myself and the Oneida tribe, by the kind invitation of your Superintendent, to address you, on the subject of the industrial education of the Indian. I crave your kindly consideration for one of another race and tongue, who addresses for the first time such an audience as this.

Industrial Education Necessary.

The subject assigned to me is "The Education of the Indian From an Industrial Standpoint." Certainly industrial training is the most necessary education for the Indian farmer as well as the white farmer. You adopted Americans have learned the science of farming, and the art of every line of manual labor, and the Indian must have the same training if he is ever to be self-supporting and prosperous. The aboriginal American possesses the same mental and moral qualities as other races, but has not had the training necessary to make the best of these qualities. He is physically able to work, but is hindered by the lack of in-

terest, lack of perseverance and determination. To-day the Indian understands that he must work to live, but in many cases it is demanded of him to do that which is only accomplished by many years of careful industrial training.

The government has allotted lands to each member of the different tribes on a majority of the Indian reservations. This allotment is the starting point for industrial training, if the Indian will look at the subject in the right light. The Indian holds these lands for his sole benefit, but lacks the necessary training in soil cultivation to make them productive. Some of our people have stock, but they do not yet understand that they must take care of the same, and not allow it to roam about and make a living after the fashion of wild animals.

Progress We Are Making.

What the Indian now needs is training in all industrial lines, and to be made to understand that industrial training will advance him individually, and also aid tribal development. All human beings acquire civilization by learning to work with their hands, and as soon as the Indian becomes accustomed to the comforts of modern civilization, and learns that these comforts can only be obtained by work, he will soon find that work is necessary, and that it adds much to his general comfort and happiness. After he becomes comfortably situated he will take pride in his work, and become ambitious to have as good, or even a better farm than his neighbor.

I hope it will not seem like boasting when I say that since the allotment of land in severalty to the Oneida Indians they have made much progress in farm industry, and appreciate and are mak-

ing use of the industrial education offered by the government at the different industrial schools, such as Carlisle, Hampton and Haskell Institutes. Year by year the number of our children attending these schools is increasing, and a large part of the education received is industrial and manual training.

Have We Been Fairly Treated?

In addition to this education, the Indian requires your fraternal assistance in the uplifting and civilizing principles of responsibility and duty. He has been dependent too long, he must be trained to shoulder his own responsibilities, and in this he requires your kind assistance. Review briefly the history of the "Red Man" once roaming over the plains and mountains, living by hunting and fishing, yet independent and self-supporting. From the landing of the Pilgrims, in 1620, to the present time, the North American Indians have been wronged, crowded out, pushed to the wall, and murdered, as though they had no rights which the white man was bound to respect. They have been subdued, humbled and placed on reservations to be supported by the government, most of them in idleness, filth and degradation, until the spirit of true manhood and freedom has been crushed out of them. They have been regarded as savages, with no souls, ever the prey of the lust and greed of the white man, and their oppressors have had the support of the politician, and many United States senators and representatives in Congress. Christian friends of the Indian have done much to enlighten the world of these abuses. If, instead of the cold lead bullet as an educator, the government had earlier substituted industrial and manual training, in all probability we should not be wards of the Nation

to-day, but self-supporting citizens. We would have been able to show how false is the statement that "the only good Indian is the dead Indian." However, we do require more industrial activity if we are to reach the height of American civilization. I believe the time is not far distant, when

even the present generation of my race shall be made to compete with the white man, and add their support to the great industries of America. Then will the Red Man become a self-supporting member of society, with knowledge and appreciation of the duties of a full citizen of this great American Republic.

FLORICULTURE.

MARIAM JEWETT, Sparta, Wis.



HOME OF MISS JEWETT.

The art of floriculture has suffered much from its separation from its sister arts. Its devotees have kept their gaze so concentrated on the minute beauties of their productions that the greater have often been lost to sight. They have so devoted themselves to selecting and propagating innumerable varieties of geraniums and verbenas each with its peculiar markings that they have lost sight of the plant that produced the blossom and of that

plant's place in the world of plants and of nature and of man. By keeping the eye continuously at the microscope one may—one does become sensible of innumerable beauties unseen and undreamed of before, but one will inevitably lose all sense of perspective. The eye is no more constructed for being always focused on small objects than the mind is, and the eye or the mind so held to service will in time rebel. Something akin to this is what the or-

dinary mind feels about this long struggle of florists and gardeners to produce a new marking in a verbena or a new curl on the wings of a sweet pea. These things are, without doubt, well worth the struggle that has been necessary to bring them to their present high state of perfection. But is there not something else equally necessary? Our sense of the beautiful in nature is cramped and meager on account of this placing of the emphasis so generally on one and but one of the many beauties that should appeal to us. The blossom is without doubt nature's final and greatest effort to produce the beautiful, but the accessories of leaf and stem, of foreground and background, of atmosphere and motion are capable of giving much more satisfaction to our sense of the beautiful than the flower alone.

The Old-fashioned Garden.

We hear much about the "old-fashioned garden," but if we ask what this garden was, we shall find, I think, that it was generally a small enclosure between the house and the street, into which were crowded all possible varieties of plants whose roots the good wife had been allowed to slice off from her neighbors', or the seeds of which she had been able to gather from her neighbors'. If she were successful in her botanical collection the grass disappeared bit by bit and the flower beds increased in number and complexity and jostled each other for room more and more. Here a bed of variegated and variform poppies swayed in the wind, there a bed of rose-moss crept over the ground. Side by side you found the peculiar reddish-purple of the petunias and the lavender of the aster and both next door to the scarlet of the phlox. Hollyhocks, tiger lilies, dahlias, bleeding hearts, Johnny-jump-ups and the dear old pinks occupied every avail-

able corner. Were you ever favored with a bouquet from that garden and did you ever try to arrange that bouquet? If so you doubtless found that no satisfying or artistic result was possible. All that could be done was simply to bind the collection together in any way that might happen. Although each flower in itself was beautiful there were so many inharmonious colors and so many varieties of flowers their short stems brought each so close to its neighbor that no definite impressions were possible to us. The only thing the eye could perceive or the memory retain was a kaleidoscopic combination of colors.

"Roots, wood, bark and leaves each singly perfect may be
But clapped hodge-podge together they
don't make a tree."

Neither does a mass of flowers clapped hodge-podge together make a bouquet, nor a mass of flower beds a garden.

An Eye for the Beautiful.

Now "a thing of beauty is a joy forever" to him who truly sees it, and to more than one I doubt not has come the fear that he must apply to himself those lines of Wordsworth's in which the poet has drawn in colors that shall never fade the portrait of one mentally and morally poverty-stricken. You know the lines:

"A yellow primrose by the river's brink
A yellow primrose was to him
And it was nothing more."

But, I venture to assert, that there are but few to whom a yellow primrose in a green nook by the river's brink does not give at least a start of pleasure. There are but few to whom its appearance is not like a burst of sunlight in a cloudy day. But the old-fashioned garden and—alas—many new-fashioned gardens do not form pictures destined

to "hang on memory's wall." And why not? Because, to use a truism, we do not follow nature when we plant a garden.

Nature's Plan.

Nature, wise old woman that she is, does not spread out all her jewels to our view at once, nor does she display them without their appropriate settings. Her primroses are placed singly where they may be reflected in the glass of the river or, if in a mass, that mass will have a background of tree and bush and a foreground of greensward. Her lilies in their stately courtesying always withdraw into the shadows of some leafy nook. Her roses always—always grew on bushes, and did you ever think how much more bush there is than blossom.

But perhaps you think of that "Dear common flower that grows beside the way
Fringing the dusty road with harmless gold."

Yes, the dandelion does grow in masses but yet not so lavishly but that the fresh green of the spring grass overbalances it six to one—nay, usually sixteen to one. The goldenrod perhaps you have also thought of as an example of masses of flowers. Nature does sometimes mass things heavily. But I think you will find the golden rod seldom stands alone; it fringes the edge of a wood; it encircles a solitary tree or a mass of green underbrush; the red sumach is quite likely to grow with it in one place and the purple aster in another. But always the eye has something to rest upon in addition to the mass of color. And her poppies nature always places at the tip-top of long slender stems that nod and beckon in the breezes. And, did you ever think, that their time of blooming is just when the grass is "heading out," if I may use an agricultural term in a flori-

cultural talk. And nature has at her command all the varieties of poppies that we have, but did you ever find her bringing together all or many of those various formed and colored beauties and putting a fence around them? Oh, no! She separates them by miles and often by the breadth of the continent or even by old ocean itself. Doubtless she could have brought all these varieties together and she could of course have made her poppy beds square or diamond-shaped. But no; those spots in the natural landscape that hold the eye, remain in the memory, and become truly "a joy forever" are rarely any mass of gorgeous blossoms, and never a mixture of numerous striking features. But rather some one or two things are so placed as to strike and hold the eye, and in the distance there will be a few groups that seem to accentuate the one particular beauty, and above all there will be plenty of room and green—great stretches of green, nor is the poetry of motion often lacking to the picture.

Man's Mistake.

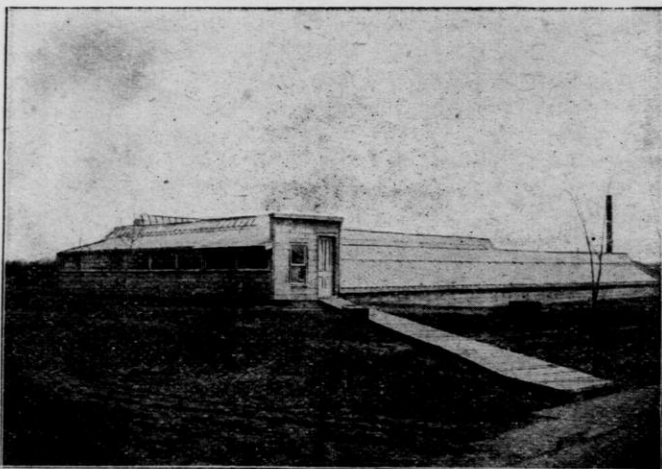
Thus does nature. But how does man when he would have a spot to rest his eyes upon through the long summer and to speak a word of cheer to the passer-by? What does he do with these same materials? First he plants a row or more of trees in a parallelogram all around his house, so that when they are grown if, from a distance, you look toward his habitation, you know it is there because you see that mass of trees and the smoke arising from the invisible chimney. Did you never notice in looking over this country from some high point like Castle Rock that there was scarcely a single vista through which one could get even a glimpse of the many beautiful homes scattered about?

And after the trees are planted how does he who would add beauty to his surroundings proceed? Often he plants a few flowering shrubs—"bushes"—probably he dots them into the straight lines of trees. And then he cuts out a flower bed or two in the middle of any small stretch of lawn he may have left, and in these flower-beds he plants the greatest number of varieties of asters or of petunias that a paper of seed of mixed colors will produce. Is the picture exaggerated? I think not. Trees are nearly always planted in straight

packets of seeds offered for sale in the boxes in the stores. It is almost impossible to buy anything except mixed colors in flower seeds.

Imitate Nature.

And what would I have? First I would cut down some of those trees so that you can get a view out and we can get a view in. Break up those straight lines as much as possible. Have a group of trees here and another there planted irregularly as nature arranges them in the spots we love to look upon.



THE JEWETT GREEN-HOUSES.

rows, and the house is often so surrounded that it can not be seen until we are within a few paces. And the flowers are in beds of intricate form, bounded in all kinds of artificial ways—by stones, shells, bricks, boards or willow twigs, and these beds often cut up and make small and cluttered what otherwise might have been a restful stretch of green grass. And to be convinced that the flowers are often of a most surprising mixture of colors and forms you have only to examine the

Use shrubs in groups by themselves or with the trees. And flowers—remember to use them and use them as neighbors, near neighbors to the trees and shrubs and the house. Don't isolate them and don't jam them in together and try to have a botanical kaleidoscope. If you have but a little room for poppies have only the single red ones this year and wait until next year to enjoy the white and pink ones. And don't dig a hole in the middle of the lawn for them, but plant them

where they can hold some relation to some other part of the landscape. Utilize the angles formed by two parts of the house or the space where a walk divides into two or makes a turn. Or fringe a group of trees and bushes in a distant corner with something brilliant and striking. Plant some hollyhocks behind other things where only their tall swaying heads can be seen.

But enough of "do this" and "do that" from your self-appointed and most pert critic. I will stop and try to give you a few practical suggestions about the handling of plants in the house. But this, too, I am afraid, will be full of "do this" and "do that."

House Plants.

And, first, two principles it is necessary to adhere to most rigidly. One is, never have so many plants that you can not give each all the room it needs. And the other is, never try to keep plants to which you can not give the proper conditions. If you have no very sunny window restrict yourself to begonias, ferns, palms, primroses, cyclamen. But if you have a window to the South without a porch over it then you may reasonably hope for success with most of the blooming plants.

The Right Soil.

Next I wish to say a little about soil. And first let me say with emphasis that almost any soil will do for any plant. This is proved over and over again by florists in different localities. One must use clay, another a light sandy loam, another a heavy black soil, and all can and do succeed. Take any good soil you may have, enrich it with well-rotted manure (from the cowyard it is best). Use about one-fifth manure—very well-rotted, remember—to four-fifths soil. If you have a heavy clay soil a little sand or leaf mold will help

to make it lighter and more porous. But our ordinary soil here is light enough for nearly everything. Mix your soil well and see that it is neither too wet nor too dry. Never attempt to handle soil that is very wet. If only a little too wet you can mix enough dry soil with it to make it right. If too dry add a little water and mix it until it is all alike. Have it damp enough so that it will cling together when pressed in the hand, but not so wet but that afterwards a touch will crumble it up.

Slipping.

And now the plant—first a cutting—or, if you wish, a "slip." Here are some branches from which I will make some cuttings. Don't use the whole branch. About two inches is the usual length of a cutting. Find by trying with the knife where to make the cut. Up here it would be too soft and sappy. It would wither away without making roots. Down there it is too hard and woody. Roots would start but slowly if it all. Use a sharp knife. Be careful not to crush the stem but draw the knife across, making a clean cut just below a joint. Trim off the lower leaves and if the cutting is too long cut off the top. Put the cutting in some damp material to form roots. Coarse sand well pressed down is best. Keep the sand moist, and if the atmosphere is dry and warm frequent light sprinkling of the leaves will prevent the cuttings losing too much by evaporation. Many things will root readily in ordinary soil—this geranium cutting for instance. Let us pot it now. Throw some soil into this small pot with one hand and holding the cutting with the other in the center of the pot fill up the pot with soil and press down hard. Put your fingers close to the cutting and make the soil very firm. Most amateurs do not begin to press the soil

hard enough. When finished the soil should be within about one-half inch of the top, so that in watering you can pour in enough at one time to soak through. Water thoroughly and do not keep in bright sun for a week or two. Be careful not to over-water until roots are formed. Occasional light spraying is good for the leaves when the soil does not need water.

Here is a cutting from the sand with roots just formed. It is perhaps three or four weeks since the cutting was made. Fill the pot half full of soil. Put in the cutting and, holding it erect and neither too high nor too low, throw in more soil and press down very thoroughly again. Water immediately and whenever necessary but not so frequently as you would if the pot were full of roots.

Repotting.

Here is a plant that has grown for some time in this small pot and it is a question whether it needs repotting yet or not. Look and see. It is not necessary to get a knife to dig with. Just spread the fingers of the right hand over the soil in the pot, invert the pot with the other hand and a rap or two of the edge of the pot on the edge of the table will leave the whole mass of earth in your left hand. You can always do that if a plant has been properly potted in a clean pot and you choose the time when it is neither very wet nor very dry. The roots to this plant are only just creeping out to the outside. It does not need repotting yet. Let us try another. There—that is what we call root-bound. It hurts some plants to get so root-bound as that, but a geranium will blossom the better. In repotting use a pot only about an inch larger than the other. Repot often, for if a plant is given a pot too large—one in which the roots can

no. begin to take possession of the soil—the soil is almost sure to become sour and unfit for use. So get used to repotting, keep some soil stored for use in winter, and give your plants pots just the right size for them now and expect to repot in perhaps two months. Slow-growing plants like palms and ferns only need repotting once in a year or more, but most plants need three or four shifts each year. And now we will repot this plant. Put a piece of broken dish or crock in the bottom of this pot over the hole. That is enough for this four-inch pot, as we know that this geranium will need repotting in a short time. If it were a palm that I knew would stay a year in the pot I would put in three or four more pieces. Or if it were a larger pot more drainage would be necessary. Throw in enough soil to raise this ball of earth up to within a half or three-quarters of an inch of the top of the pot. Keep the ball in the center, fill up with soil and press down. Don't break the ball but press the soil down around it with your fingers. If you can not get a finger in between the ball and the pot use a stick and ram the soil down hard. It must be just as hard as the old ball of earth, or the water will all run down around the edge and leave the center dry.

Watering.

But when shall I water my plants, you say? When they need it. That is the only honest reply any one can make to the question. I can not tell unless I know the habit of the plant, whether it is making growth rapidly, whether the pot is full of roots and what are the conditions of temperature, moisture in the atmosphere and sunlight. To water intelligently you must know the condition and requirements of each particular plant. But when you do water, wa-

ter thoroughly so that it will run out at the bottom of the pot, and do not water again until the soil has dried out. If it is a geranium let it get dust dry—do not let it wilt, but it should be hard and dry. A calla or an umbrella-plant you can soak each day at least. But there are no other plants that do not need to become somewhat dry before they are watered.

The worst thing you have to contend against in an ordinary living room is a dry atmosphere. On this account the kitchen is usually the best room in the house for plants. Have a hand-sprayer

and sprinkle the leaves of the plants both on the lower and upper side as often as you can afford time. Of course our living rooms are too warm for almost all plants, but that is something that can not be changed unless you have a place for plants alone.

And now I can not close without paying my respects to the angle worm. He is harmless—perfectly harmless, unless there are so many in a small pot that they plow the soil up too much and make it too open and porous. So don't bake your soil and so destroy its fertility.

GLEANINGS.

MRS. F. H. MERRELL, Portage, Wis.

We are told that in olden times it was customary for the women and children of the family to go into the harvest field, and following the reapers, gather up the heads of grain which fell from the sheaves. In the times of famine the poor were often permitted to glean, and in such cases were allowed to carry home the product of their labors, much or little in amount, according to the care and thrift of the reapers who went before.

Now as I enter the field in search of a subject upon which to prepare a paper for this Farmers' Institute, I find that so many diligent and thorough workers have been in the same field before, that only scattering heads are left to me, which, if they prove upon the gathering to contain but little grain, I can but ask the sympathy and indulgence of my audience.

I am a farmer's wife. I was born and reared upon the farm. It is but natural that my interests and my sympathies should center there.

The Wife's Province.

Farmers, come to the Institute and bring all your family with you, is the invitation printed upon the programs and distributed throughout the state this winter, and every winter since the work began the same spirit of welcome to the wives and daughters has been maintained and the usual courtesies extended.

Twelve years ago when such meetings were almost an experiment in this state, I remember that the women waited in the hotel or the grocery while the men and boys went up to the hall to see if any other women folks were there. After dinner, if reports were favorable, we went up ourselves for an hour or so, and stayed such time as we could spare from the all-important work of gossiping, sight-seeing and shopping. I would like to know if such is the common practice yet? I fear it is, but why? Because perhaps you say you are not interested in the breeding or feeding of the cattle, hogs, sheep, etc. You

don't care about farm drainage or crop rotation. Well, you ought to, in a certain degree at least, for the income of the family and the value of the farm depend upon these very things, and I think the time is here when we women ought to have a fairly accurate knowledge of the business that is furnishing us a living. Unavoidable circumstances of one kind or another may put us in a position where it will be necessary for us to assume management of that business, and many are the mistakes and discouragements we could avoid if

we undertake the business management of a farm.

Our Boys and Girls.

There is another side to the question. The boys and girls of our homes absorb and reflect the conditions which surround them. Father runs the farm as he likes, pockets the profit if there is any, and growls at hard times if there isn't. Mother plods along year after year with no companionship, no rest, no recreation. It is no wonder that in such an atmosphere our sons and



Ft. Winnebago Farm. Home of Mrs. Merrell. Front view of farm buildings which occupy the exact site of old Ft. Winnebago. The smaller windmill pumps water from the old well built by the soldiers in the center of the hollow square.

a due knowledge of it is provided for. The father of our little ones may suddenly be cut down in the vigor and prime of life, and as we return from the new grave on the hillside it may be, where we have left him sleeping, we have not a woman's heart or a mother's love if we desire anything more than to keep our children together and our home intact. A woman's wit and insight is a proverbially wonderful thing, but it is hardly to be relied upon in the matter-of-fact struggle that commences when

daughters get a dislike for farm and country life and leave it at the first opportunity.

A Mutual Interest.

This state of things will be largely done away with when the fathers and mothers have each an *active, living* interest in the other's work, when there is a spirit of co-operation manifested and nurtured among the different members of the farmer's family. In this age of co-operative effort, I know of no greater

necessity for it than among our rural homes, right in the homes themselves.

I do not mean that there should be an interchange of labor, that you should go into the field, or that he should come into the kitchen to work, but that there should be an interchange of plans for the year's work, the needed improvements or the farm management; and right here let me say it is a good idea to include as many of the children as are old enough to understand such matters. Do not be afraid, my dear farmer friend, to take your wife and children into your confidence. You will find encouragement in her interest, and in their hearty willingness to help, a leverage that will not be small in lifting mortgages.

The financial side of this question is worthy of least consideration. The happiness and development of a family depend almost entirely upon this understanding and consideration, and the man who gives his family a chance to develop intellectually as well as physically may not lift the mortgage from the farm quite so quickly, but he runs no risk of making a transfer of it from the farm to the lives of the wife and children. It is an easier thing to pay interest upon a mortgage than upon a blighted life or a starved soul, and when your sons have grown to man's estate and are filling positions of responsibility and trust and your daughters it may be are filling with becoming dignity their own sphere in life, your bank account may not be long, but you can still with truth look back upon a life whose success is not counted in material things.

Reading for the Farm Home.

It has been said that, "There is no entertainment so cheap as reading nor any pleasure so lasting." A few, a very few, of our farm homes are sup-

plied with reading matter of a kind which furnishes entertainment for the family and profitable instruction as well. Too many homes are there where only a local weekly with a patent inside furnishes the mental nutrition for the household and perhaps the neighbors. It is an age of cheap papers and cheap books, and although there are some publications that would be dear at any price, still it is not a very difficult matter to make a few wise selections which will furnish rest and stimulus to the different members of the family.

A Study for the Wife.

It is quite time our farmers' wives began to get awake. We are too prone to follow in the ruts and to adhere to the traditions of our ancestors, forgetting that as there is advancement and improvement in all lines of labor, so there must be in our own if we but find it out. There are fifty agricultural schools and colleges in the United States where much attention is paid to the scientific feeding of all kinds of farm animals. It seems to me that it would be a great deal to the point in this age of balanced rations if some practical attention was paid to the feeding of the farmer himself.

Cooking is an art which has enabled man to subjugate to his use many of the elements of nature, and yet it is so little understood and so much abused that often the articles of food in their raw or uncooked state would more nearly meet the requirements of the human body.

I do not mean to imply that the cooking of our farmers' wives is bad, or that all the bad cooking is found in the country, but that if we more clearly understood the important part that the food and its preparation plays in the nourishment and growth of the body, there is not the slightest doubt but

that some of our articles of diet would undergo a change or else be laid aside entirely.

Domestic Science.

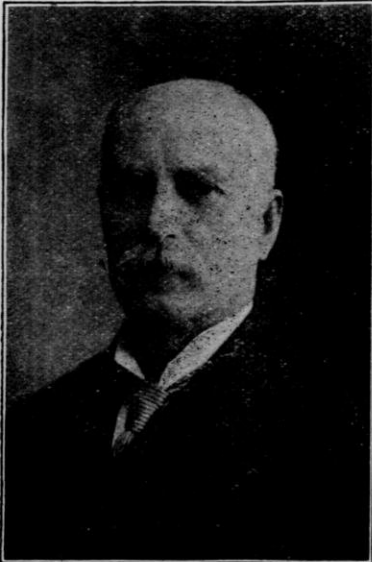
The time is not far distant when our states will provide departments of domestic knowledge that will reach and include the women on the farm. It is a comparatively easy matter to reach the women of the towns and cities, but the isolation of our country homes is an element that has always worked against any effort to bring about a change in their manners and customs,

We know the difficulties of reaching and interesting the women on the farm, and yet the future welfare of our state demands that something shall be done to increase the economic value of their labor.

I believe there are some efforts being made along this line in several of our states. The next step in the right direction will be taken when the corps of workers who now travel the state doing missionary work among the farmers shall be paralleled by another corps doing equally efficient work among the women of his family.

EDUCATION.

L. D. HARVEY, Supt. Public Instruction, Madison, Wis.



L. D. HARVEY.

Mr. Chairman, Ladies and Gentlemen:—The subject of education is a large one and an important one.

By what right does the state engage in the business of education? By what right does it organize a system of schools and provide for their maintenance through taxation? By what right does it determine what instruction shall be given in those schools and what the qualifications of the teachers shall be. By what right does it establish and maintain institutions for training the teachers of those schools, and by what right does it go still further and say to the parents of children in the state of Wisconsin that they must send these children to some school, public or private, for a certain portion of the year.

The state is here touching the individual very closely, and there must be some basis of right for this action on the part of the state.

I shall not attempt to discuss this basis of right in detail, but simply state this single proposition, which, as I understand, is the fundamental one upon which the right of the state to establish and maintain an educational system rests. It is this, that the state has a

right, and it is its duty to do whatever is needful to be done for training in good citizenship, because upon good citizenship depends the perpetuity of the state.

Demands of Good Citizenship.

Now, what are some of the things which good citizenship demands? I shall speak briefly of two or three of these.

First, I take it that good citizenship demands a trained intelligence, and by that I mean something more than the mere storing of the mind with knowledge, the accumulation of masses of material. The words "trained intelligence" mean power to use the intelligence to certain definite purposes and ends, and that is the fundamental thing which the schools must undertake. That is basic. No man can succeed in any vocation who does not have a trained intelligence, and the better the training, the more highly developed the intelligence, other things being equal, the greater the success of the individual in any department of life. Without a trained intelligence the individual is liable to become dependent upon the community, and the people at large are taxed for his support and maintenance.

But the state has not done its full duty when it simply provides for the training of the intellect. It must go further than that and do something for the development of character, a character which shall guide and control the actions of the intellect for the well being of the individual, and of the state of which he forms a part. Any public school or any private school, which does not undertake to do these two lines of work, is failing in those things which are absolutely essential, in my judgment, for good citizenship.

Training the Mind.

In this training of the intelligence there are several things to be considered, and I believe that we must take up, first, the matter which is to be taught. What shall it be? I cannot undertake, to-night, to discuss fully the courses of study of the various kinds of schools in an educational system; but, briefly, there must be a training which shall cultivate the different powers of the mind, the different forms of its activity—the memory, the imagination, the reasoning powers, the judgment. We get that training sometimes through books, but many times outside of books, and we should do far better, I think, if we had more of the training in dealing with the material which lies outside of the text-books. Too often, in our text-book work, we stop short of the truth. We simply cram the mind with facts and fondly imagine that we are training the mind of the child and developing it, whereas, it frequently happens that instead of forming and developing, we are warping and stunting the intellect. We give no time for the assimilation of this material; it is not worked over in the mind of the child, thus becoming a part of his living being, which is the essential thing. We have come to believe, too many of us, that education is a thing of books, that we are simply to gather up what others have said, to accumulate that knowledge, and that when we have done that, we have become educated; but you need not go very far in any community to find men whose opportunities for the study of books have been very meagre, but whose intelligence is keen, whose reasoning power has been developed, and this has happened because these men have secured their training in contact with the things about them, in the doing of things which their environment has given them to do. So I

think we may learn a lesson from these instances which occur all about us, and it is possible that in our schools we may incorporate into the training of the intelligence something further, and something even more beneficial than much of the work that we have been doing.

As I sat here to-night and listened to the very excellent address of the young lady who gave us some very practical illustrations in making cuttings and potting plants, it occurred to me that the training which enabled her to determine just how much of a cutting to use, and just how to place it in the pot, was as valuable a training as would come, perhaps, from the study of equations or the solving of a mathematical problem, or the declension of a Latin noun. As I listened to the speaker who just preceded me, and to his strong plea for industrial education for the red man, I said to myself, why specially for the Indian, why not for the white man, as well as for the Indian.

Industrial Training.

The great majority of our children in the schools must earn their livelihood by the toil of their hands; they cannot all live by their wits; they must live by taking part in the ordinary vocations which demand manual labor.

Now, what does this industrial training do? It seems to me that it does this. Whenever any individual undertakes any piece of industrial work, I care not whether it be the use of a tool, the potting of a plant, or the plowing of a field, or any other line of industrial work to which he brings his intelligence, there come into activity the same qualities of mind which are brought into activity by the very best of the work of the schools. Not only can you bring these qualities of mind into play, but you are bringing them into play in relation to the vital concerns of life, with

the things which the individual, even if he does not have to do, will be the better for because he can do; because, after all, education does not mean storing the mind and spending the time of our lives in idle dreaming; its results are shown in doing; in the activities of life; and it is not complete or valuable until this training of the intelligence shows itself in the doing of things worth doing; then education has become a vital, valuable thing. So, then, I would plead for the white man, for the white boy and girl in our schools, that they may have training of the eye and the hand, as well as the red man, or any other man.

Training Eye and Hand.

Why should the eye be trained? How many of us go through life and see the beauties that lie about us? If in our schools we undertake the training of the eye, so that the individual may see things about him as they are, and in their relation to other things, we open up a broad vista for that individual, the exploration of which will be a pleasure and a profit to him all through his life. In doing that, we are training his intelligence in a way which will be of use to him, no matter where he may be, whether in a lawyer's or a doctor's office, whether in the pulpit, on the farm, in the shop, or engaged in the mercantile pursuits, he will always be the better for that training. But, when we confine the work of training in our schools to the printed words on the page, and nothing more, we are depriving the child of something to which he is entitled.

But let us follow that a little further into the training of the hand, so that every movement may become automatic. There lies back of the movement of the hand the activity of the mind—the mind to direct, to guide, to determine

what the movements of the hand shall be, the mind to judge whether or not the act of the hand has been performed in the proper way, with proper accuracy, or whether it must be done again—until the act of the hand becomes an habitual one. At every stage in the progress, until it becomes purely automatic, there must be the control of the hand by the intellect, and I take it this is one of the best possible ways of training the intellect. In this training that we are to give in our schools I would have, not only the training that comes from the accumulation of all that has been given to us in books, in our study of the problems of science, mathematics and classics, but I would have that training of the intellect which comes with the training of the eye and the training of the hand, because, in the training you are doing the vital thing; you are training the individual to command his own powers and to do something in the world's work.

Development of Character.

But that is not enough. You may train an individual in all these ways, and yet he may become a curse to the community, unless you have also developed solid character, and so in the educational institutions, supported by the state, it becomes the duty of the state, by every power which it can command, to see to it that the people who are charged with administering this work shall be people who are able to develop and round out the character of the young who are coming under their instruction. That means two or three things. One is, that in the work of the schools, in the development and formation of character, there should be implanted in the minds of the children high and noble ideals of living, acting, thinking and doing, not only as concerns the field of morals, but as con-

cerns every other field of human endeavor. There should be implanted in the mind of the child an ideal which will not permit him to cut a slip and do it carelessly; which will not permit him to do any piece of work in any other than the best possible way; there should be implanted in his mind an ideal which will demand always of him truthfulness and honesty; which will not permit him to act a lie, while he would not tell it by words or write it; which will not permit him to think first and foremost and always of himself, and last, if ever, of others; an ideal which shall develop unselfishness, care and thought for others, consideration for parents, for mates, friends and associates. These are the ideals which will develop good citizenship, patriotic sentiment, and the qualities which go to make up American manhood and womanhood.

These ideals are not mere day dreams. They are ideals whose realization must be desired by the child, and for which he is willing to strive and work, and the teacher who does not succeed in developing such ideals is failing in a very vital point in this education for citizenship.

Cultivate Truthfulness.

But we must go still further than that. These ideals must find their working out in habits where the mind comes to work automatically, as the hand comes to work automatically under the law of habit. We must cultivate a habit of truthfulness—when the individual tells the truth, not as the result of a careful weighing of probabilities, not because, after thinking the matter all over, he concludes in this particular case that honestly is the best policy—not at all, but when he tells the truth just as a matter of habit. He does not think of telling anything else.

He does the honest thing, the generous thing, in the same way—because he has always done it.

But even that is not all. There will come times in his life when the actions of the hour are not habitual ones, when he stands confronting new conditions, and new problems are sprung upon him in a moment. Then the judgment must come into play to determine whether he shall do this or the other thing; when this judgment has decided for the right thing, there must be the trained will back of it which impels him onward to do that right thing, even though it is the first time it has come up for his consideration and determination.

So there are four things, vital in the development of character: 1—A trained intelligence; 2—The formation of high and noble ideals; 3—The formation and development of good habits, intellectual, moral and physical; and 4—The development and training of the will of the individual.

The Teacher.

Now, how are we to get this trained intelligence? How are we to get this development of character? We must get them through an organization of the educational forces of the state and of the community, remembering always that the central force in bringing about these results in the individual is the teacher, and in determining the fitness of the teacher to discharge the duties which lie along this line of training for citizenship, we must keep these ends in view.

In the selection of a teacher, shall we say it is best to get one that can be had for \$15 a month? We can get that sort of people who are called teachers, and sometimes, my friends, I fear the question of whether it is \$15 or \$25 a month is the uppermost question. But when

you consider your child and your neighbor's child, and the future of these children in the state, and as individuals, will you put over against a few paltry dollars the question of the training of the child's intelligence, of the formation of the child's character, making him a useful and valuable member of society? If you do, I fear you make a grave mistake.

The Best is the Cheapest.

No, my friends, in determining who shall be the trainer of the citizens of this state, the question of money consideration is the last one. The first question is always, what are the qualifications of this individual who is to do this grand and noble work, this making of men and women. You would not think of putting into a factory a piece of machinery that was inadequate, because it was cheap. You would not think of putting into your factory a cheap superintendent, just because he was cheap. No, you always look for the best equipped and the best qualified individual to do that work. And why? Because there is money in it, that is why. And there isn't any money in a business unless it is organized and conducted on this basis, is there? When you farmers buy stock, what do you buy? The cheapest you can find? It has taken a long time for the farmers in this state, and others, to learn that it doesn't cost any more to keep blooded stock than it does mongrel stock, and that the product is worth very much more. Now they are looking for the best they can find, and that is business.

I wonder when it comes to the training of our children, whether we should be any less considerate in the choice of a teacher than in the choice of a hog it will pay best to keep on the farm. That is a plain way of putting it, but it

is the plain business proposition which confronts us.

So I want to plead with you, ladies and gentlemen, you who are interested in educational movements in the community where you live, you who have children to be trained with all their possibilities of manhood and womanhood lying dormant, ready to be developed, I want to appeal to you, when you are selecting the person who is to train the children—yours and the children of your neighbors—that you will keep in mind the qualities of heart and mind which are needed in the teacher if the best results are to be secured. There is something more necessary than merely putting a teacher into a school-room.

Supervision Necessary.

If any of you gentlemen were engaged in an industrial enterprise where you employed a number of men, would yet set those men to work and then go off and leave them, or would you watch them and see that their work was properly organized and carried out. One thing is sure, if you do not you will go into bankruptcy, your business will be closed up. The same thing is true in the matter of education. There must be a business organization of these educational forces if you are to get the best results.

There are 300,000 children in the schools of this state under the supervision of the County Superintendents, and of the 300,000 less than five per cent. will ever get beyond those schools. We expended last year \$3,171,000 in the maintenance of these district schools. We have large industries, commercial and political interests in this state, but I want to inquire of you as intelligent citizens, as business men, if you can tell me of any other interest in this broad land, so great as this, where so large

a sum of money is expended annually for so vital an interest, where so little business management is introduced into the handling of the enterprise. I have looked for it in vain. You will find it in no municipality, in no state or national government anywhere. This is always the end of business organization—to reach the desired ends most effectively with the least waste of time and money. That is what we undertake to do with business organizations and that is what we ought to undertake to do in our common school system in the State of Wisconsin. Are we doing it to-day? The City of Milwaukee has 851 teachers, I think the best body of teachers in the State of Wisconsin, nearly every one of them a university or Normal school graduate, with experience. Those teachers are gathered within a little area not the size of one of your townships, where they can be visited very readily, twenty of them in a single building. And yet I think it will surprise you when I say to you that the city of Milwaukee spends every year in the supervision of those 851 teachers, \$20,000 more than the entire State of Wisconsin spends in supervising the 8,416 schools wherein there were 9,000 teachers last year. It may also be interesting to you to know that in the office of the City Superintendent of the City of Milwaukee there is expended every year \$7,000 more for salaries than is expended in the office of the State Superintendent of Public Instruction in Wisconsin.

Business Principles.

Now, the point I want to get at is this: Why is it that the people of Milwaukee expend that amount of money in the supervision of their schools? They do it because they believe it pays, just exactly as every great industrial

enterprise in that city and in every city spends large sums of money for close and effective supervision so as to get the desired ends with the least waste of time. They are adopting business principles there just as they are in every city in this land. Have they all made a mistake, or is the mistake on the other side? Is it not possible that there could be a little more money put into the supervision of the 8,416 schools than we are now putting in? Would we not get better results if we could have better business organization? I want you to consider seriously whether there is not an opportunity for the introduction of business organization and business methods in the handling of this great interest, the education of this vast number of children who go to school but six or six and a half months a year, whereas in Milwaukee they have ten months. There are forty-three counties in this State with a number of schools ranging from one hundred to two hundred and ninety-four, each county under the supervision of a single superintendent, and there are many, many schools in many of those counties which the superintendent has not visited during the past year, and in some cases for two or three years. My friends, an effective supervision is as essential in the school room as it is in the chair factory or on the railroad, or anywhere else. Remember that at least one-third of the teachers in these schools are new people, absolutely without experience in teaching, and they need the help of the supervisor to prevent loss of time and energy. So I plead with you to-night for a business organization of the common school system of the State of Wisconsin. That is the standard by which you run your farms, your factories, your creameries, and dairies, the standard by which every business enterprise is carried on.

The Training for Farmers' Children.

I want to talk just a moment on another phase of education. You are gathered here at this Farmers' Institute to discuss the problems which concern the farmer; a large number of these Institutes are held annually. We have a magnificent agricultural department in connection with our State University, doing a grand work for this State. This work is worthy the support of every public-minded citizen, and I am not putting it on any theoretical grounds. I am not talking as a school teacher now, I am putting it simply on the grounds of dollars and cents given back to the people of this State, because of the work done through these agencies, and I want to suggest to you that I believe in the extension of the idea I spoke of a few moments ago, of the training of the eye and hand by manual training in the schools; it should be carried out so that the boy and girl upon the farm and in the little rural school, not having the opportunities for the better advantages which the city offers in its school systems, could receive the benefits of such extension. I would give them that training of the eye and the hand, that cultivation of the taste that should lead the boy and girl to see more beauty in farm life, in the country about him. I left the farm when I was fifteen years old, and one of the reasons why I left it was that there was so little there which furnished anything pleasing, nothing but hard work and long days, one after the other, the year through, and no prospects ahead that I could see. I had none of the training for which I am asking now, the training which would lead me to see that there was an ample field for the exercise of my best powers upon the farm. If we could introduce into the homes of the country some of this training in the theory and art of agriculture, some of

these simple things which should show to those children the possibilities for finding employment pleasurable and profitable on the farm and in the country, I believe we should prevent some of the rush of the country people to the city. We shall keep the boy and girl on the farm only as we make it more attractive to them, and I speak of the girls because they need the same kind of training. I would not have this education of a quality which shall simply fit the individual for the farm, because I believe that the kind of training which would best fit them for the work of the farm is at the same time the best possible training of the intelligence and the best preparation in life.

What We Need.

If we could have established in many of the townships in this State a high school which should bring in the boys and girls from the surrounding country, and we could have given in those schools instruction in the fundamentals of agriculture so that the work there should be correlated with the work of the Agricultural Department of the University, we should introduce into our educational system something that it sadly lacks to-day, and something

which I believe it is entirely feasible to introduce. I know there is agitation to-day to put this work into the district schools at once. You cannot do it, my friends.

I have worked in these schools for twenty-five years and have seen such experiments tried, and the only result would be to put back the work which you want to do, ten or fifteen years. Let us organize schools in different portions of the State, awaken an interest in our Normal schools, and in the meantime have the work so organized on a business basis that it can be introduced in every school where the children are old enough to receive instruction.

I believe, then, that we need a trained intelligence, not simply from the study of books, but a training of the eye and the hand that can go on and keep pace with the study of books. We need development of character, and in order to do that we must have the highest quality of teaching power if we get the best results. In determining the quality of the teaching power, we need careful consideration; we need to look at this matter purely from a business standpoint of the ends to be sought and what is necessary to secure those ends, and then, shall we pay for it?



THE WORK OF WOMEN'S CLUBS.

MRS. A. C. NEVILLE, Pres. State Federation of Women's Clubs,
Green Bay, Wis.



MRS. A. C. NEVILLE.

There is a world of mind and a world of matter. In the beginning it was the physical that predominated, and man—the man with the strongest brute force, was exalted as leader. As time passed mind found its place in the development of the world, but learning hid itself among the religious orders, and many rulers of great nations knew not even the letters that spelled their names.

Women's Place in Olden Times.

What was woman's place in this age of darkness and ignorance? She was the slave, the drudge or the plaything of man, supposed to be without soul or

intellect. Even St. Paul, who had a keen insight into most things, failed to foresee the place she was to fill in the world. In his letter to the Church at Corinth he wrote: "The head of every man is Christ, and the head of the woman is the man; a man indeed is the image and glory of God, but the woman is the glory of man; neither was the man created for woman, but the woman for the man." Putting forth boldly these and other assertions regarding woman's position, a second thought caused him to add concerning this, "I have no commandment of the Lord but give my own judgment."

Since time began there has been a gradual evolution in the development of woman, and consequently in her place in the conduct of affairs. There were learned women in England in Elizabeth's age, but learning was not popular. It is not half a century since Tennyson wrote:

"She knows but matters of the house
And he, he knows a thousand things."

Jane Austin was no mean writer of fiction for her day, yet she was considered a "blue stocking," and her writings did not add to her popularity. She gave expression to her discontent and contempt of the age in which she lived, when she wrote: "A woman if she have the misfortune to know anything should conceal it as well as she can."

Women's Sphere To-day.

In the last century there were many brilliant women, sparkling in conversation, wielding an influence in politics, but in the nineteenth century they are

found filling a new place, and because they were ready for it they have quietly, without ostentation, taken their exalted position shoulder to shoulder with man. They aim no higher, and are sharing his burdens while enjoying with him the wholesome pleasure of life. Now that they have come into their own no one rejoices more than their co-worker; he gives them the lighter end of the burden and shields them even more tenderly than of old, while through their eyes he sees the world in another light and is finding new manhood and new happiness.

The intellectual awakening of women in our day can not be traced to any one set of influences; there have been many at work. The clubs, which are a part of the general evolution, have had much to do in showing to them the wealth of their own minds, in quickening their mental and spiritual life. Woman's sense of duty, which is strong and which when she disregards it causes her to suffer, gives her a feeling of responsibility towards the development, the mental improvement of self that finds its answer in club work. Through them she has stepped out into the freedom of the outer air and has found a kinship with the whole world.

I have said before and I hope I may be pardoned for repeating here that women have found time for self-culture, for clubs, through the changes in their relation to labor, caused by men taking to themselves much of the work that was formerly considered exclusively theirs. Many of the things which in the old time bound them down, which held head and hand in the thralldom of weary work, have, through the development of science, become unnecessary. There is a cry among men that women are crowding them out in their domain, becoming clerks, lawyers, doctors, brokers and even practical builders of

houses. So they have, but it became necessary, for men have pushed into their sphere as weavers, bakers, milliners, dressmakers.

One of the multi-millionaires of New York, not long ago, had a chef to whom he paid a salary of \$5,000 per annum—note that when a man is a cook he becomes a chef and draws a salary, not wages. This chef resigned his position because his employer—you would not say master—added salt to the soup which his dictum had passed upon as perfect. So men stepping into woman's place become autocratic and demand and receive higher pay for the same work, where woman takes the man's place conditions are reversed. In days gone by certain duties were performed at "early candle light," and who was it furnished the candles? From early dawn women slaved at this unsavory toil. The tallow was tried out and melted while the air was redolent. It was well that the houses stood apart, for it was always "Candle day" in some household; and where would have been the fragrance of the eglantine, the four o'clock and the pink, had our dear, dainty old grandmothers had only the smell of melted tallow in their nostrils from Sunday to Sunday? Man stepped in and took to himself the lighting of the world, and now "we press the button and he does the rest." He makes the butter and the cheese, he makes the shirts, he launders the linen and he makes the bread, the cake, the crackers. So we might go on through the whole category of baking, weaving, sewing, but it is unnecessary for my point.

A pretty clock once stood on the dressing table of a young girl, of which a friend said to her, "Excuse me, my dear, but your clock does not seem to keep correct time." "Oh, you are mistaken," replied the girl, "that clock is all right, the trouble is you don't un-

derstand its peculiarities; when both its hands stand at twelve it strikes six and I know that it is half past four."

Longfellow said truly,

• "Things are not what they seem."

Intelligent Methods.

To some masculine minds women seem to be wasting time in attendance at clubs for which home duties are neglected, and they judge so because the housework is not done as their mothers did it. They forget that it is they, with their multiplied patents, their improved clothes wringers and dish washers, sewing machines and cooking utensils, in which a whole dinner may be cooked at once, who have made housekeeping light work, besides the greater part as done of old, to-day they do themselves. The art of spinning, weaving, salting down meats and stringing apples have become lost arts in the family economy by the march of progress. But the science of home making and home keeping has become a finer art. If the old ways are gone the new ways are better. Woman to-day is giving to the home a more intelligent service than ever before; she has studied sanitary laws, and the air is pure and the drinking water free from the contamination of out-buildings—that sure breeder of typhoid and diphtheria. She has studied psychology and knows that her child thinks before he speaks, that the development of the mind must be slow; and so because she knows her children grow normally into the similitude of the divine mind. She knows food values, and so the bodies of those of her household are properly nourished and the mechanism not stunted nor worn out on waste material.

Women have had time to learn these, and a thousand other things, because men have taken upon themselves so much that of old was their work they

have been freed from the drudgery of half a century ago and have now time for culture, for entertainment, for clubs.

Women's Clubs.

Club life is uplifting. It takes us out of the ruts of thought and action and gives us a broader outlook; a deeper insight. After the first pleasure of the study of art, literature, history, politics, philanthropy, it is discovered that the true secret of knowledge is not "to know, but to do."

Shakespeare says:—

"Thyself and thy belongings

Are not thine own so proper as to waste
Thyself upon thy virtue, they on thee.

Heaven doth with us as in with torches
Not light them for ourselves; for if our
virtues

Did not go forth of us, 'twere all alike

As if we had them not."

The Wisconsin State Federation of Women's Clubs is to-day composed of 115 clubs with an individual membership of over four thousand, and these four thousand women, while aiming towards intellectual development, towards culture, towards betterment of self, have gained the true wisdom of altruistic thought, and are reaching back to help others to come up higher, for Goethe gives assurance, "On every height there lies repose."

Some years ago in a fine public discourse I heard it said, that it were well if all could realize the power of individuals when combined in a mass. A torchlight procession is made up of many single men, each bringing his solitary lantern from his own home, but when they are massed together and their various lights, blue, red and green and white, may be seen playing and flashing in the far distance they present a sublime spectacle and seem a grand army marching on to victory. So club women bring together their diverse

many colored lights and let them shine before men, and they appear not simply as so many separated individuals, but as the Sacramental host, moving on as with flaming torches and streaming banner to the conquest of the world.

Clubs for the Farmer's Wife and Daughters.

A half dozen or a dozen neighboring women in a farming community form a club,—they may call it a Kensington Club or they may call themselves The Daughters of Ceres. They meet once a week, and some one reads while the others sew and they have many delightful afternoons. At first only the pleasure of intercourse holds them together, then comes the desire for a more formal organization, more definite work. A president is elected and the meetings thereafter are conducted according to parliamentary usage. Where is the gain in this formality, you ask? It teaches how to properly conduct a meeting, how to put a motion, the rules of debate, above all how to be governed by a majority. It rubs off rough corners, and the characteristics of each become rounded, symmetrical, and women so trained may be thrown into any work with others without inharmony or friction. The club, from reading stories or books, excellent in itself, takes up a serious course of study, and then, or even at the first, adds its torch to the light of the federation and is helped as it is helpful.

Such a club can be sustained as well in the country as in the city, if distances are not too great, and it will be the more valuable to its members because of their separateness from the distractions of town. It would find help for its work in the federation. The Library Committee would furnish it outlines of study and traveling reference books. The Educational Commit-

tee would lend its aid in the improvement of the schools of its district. The Art Interchange Committee would assist in instruction as to what may be done to improve the school rooms and send to it cases of traveling pictures to be used either in the home or the school. From the Reciprocity Bureau it could obtain the loan of excellent papers on almost any line of study prepared by Club Women with access to large reference libraries,—Town and Village Improvement, a work introduced into the federation this year, would be found as useful in the country as in the town, for there is always room for improvement everywhere. It has been said that Uncle Sam keeps house on bachelor principles, and so this branch of work has come to be known as a little house cleaning out of doors. As women's clubs in other states are doing what they can for the beautifying of their own towns and have been able to accomplish great things by combining their forces and creating a public sentiment that has made the community ashamed of what it has placidly put up with before then, why may they not in Wisconsin, and together cause our beautiful State in town and country to blossom like the rose?

Children's Aid.

In the Talmud it is said, "The breath of the children is the salvation of the world." So the federation aims in this branch to interest and work through the children. They are formed into Junior Good Road Leagues and furnished badges which show their membership. They are taught that they may serve their community by taking out of the road these round stones that never crush but roll back and forth, with every passing wheel, working a larger and larger hole in which water settles until the road is filled with deep ruts,

Children in many places properly encouraged have taken great pride in this work, also in reporting needed improvements to proper authorities which they, passing over the roads so many times weekly to and from school, discover before others, and promptly reporting save delay and added expense. The work is further promoted through the children by the "Do" and "Don't" cards which are furnished free by the federation and now hang in every room of very many schools. They are printed on large squares of cardboard and read:

DO

Make your street and yard in front and rear clean and attractive.

Plant shrubs, vines and flower seeds.

Pick up loose paper.

DON'T

Throw upon sidewalks or into the street fruit skins or waste paper.

Spit on floor or sidewalks.

Throw stones at birds.

Injure trees or flowers planted in public places.

Mark walls or buildings.

On many of our Wisconsin farms there are attractive homes, some of which have been illustrated in previous bulletins, but frequently we find beauty and I might say health sacrificed to what is thought to be convenience, and the barn, the granary, in fact all the out-buildings, elbow the house in unwholesome proximity.

In an old churchyard in a Kentish village there was not long ago discovered the following epitaph:

"In the morning I went forth well,
Brought home my death, took by a
smell;

Therefore in death always prepare,
To meet our Lord and Saviour there."

Thus it is to Heaven we ascribe the ills brought on by ourselves. The coun-

try is free from the menace of sewer gas and dirty alleys, but has it yet learned the distances foul disease-breeding germs will travel through the soil viciating the well water.

The Farm Home and Surroundings.

Some homes on the farms of Wisconsin are as beautiful in the refinement of surroundings as any to be found in the cities. But there are others, more especially in the northern part of the state, far otherwise. In the cities it is the fashion to keep all the machinery of work out of sight. Kitchens are placed in the rear or on the tops of the houses to get rid of disagreeable sounds and odors, while on one of the beautiful avenues of Milwaukee, stables costing thousands of dollars are placed out of sight below a hill, at the back of the grounds, so as not to interfere with the view of the lake. Sometimes in the country, in the exaggerated idea of utility, all other is lost sight of, and outbuildings crowd close to the house, shutting off the view of distant hills or rippling streams, and are always a reminder of the drudgery of life, to say nothing of even more disagreeable things.

If the buildings are there the women of the household can do something to make them better by planting vines or quick growing box alder trees to shut off the unsightly things; if they are yet to be built they can use their influence to have them relegated to their proper place in the rear. Those buildings do not gain interest or beauty, either when covered with posters of a by-gone circus or advertisements of stove polish, plug tobacco or its antidote, where you are requested "not to spit your life away."

In Wisconsin, as in most other parts of the country, we have been too busy clearing up lands and growing out of

the log cabin period to have had time to devote to the esthetics of life, to that which is the development of beauty, but now, in most parts of the state, we are free from the long grind, and wood-piles are relegated to the rear. Vines clamber over the porches, lawns are cut, trees are planted along the road sides, flowers are in front instead of vegetables, and the homes become an expression of the culture of their inhabitants, and preach a sermon to the passer-by.

"Go make thy garden as fair as thou
cans't,

Thou workest never alone,
Perchance he whose plat is next to thine
Will see it and mend his own."

The line of demarkation between city and country, like the Mason and Dixon line, is fast disappearing, even in imagination, and women's clubs have had much to do with the advance. In some places instead of forming what has long been known as city federations, country federations or sectional federations are organized, and city and country clubs hold quarterly meetings together, and each are stimulated to new growth. To make acquaintance with the farmers' wives, to give them pleasure and

help, women in many towns are opening rest rooms for country women, where they and their children may spend the time while waiting for husbands detained by business, and club women meet them there on an equal footing, and mutual good is gained. The world of thought grows broader as progress is made, and a woman is no longer judged by the abundance of that which she has. To the woman of the country, as to the woman of the town, is now opened a field of new opportunity, and each is only judged by the heart, the intellect, the spirit, which she makes manifest.

Committees Appointed.

Supt. McKerrow named the following gentlemen as a Committee on Resolutions: C. P. Goodrich, Ft. Atkinson; H. C. Taylor, Orfordville; L. E. Scott, Neenah.

The following Ladies' committee was appointed to pass upon certain exhibits: Mrs. A. A. Arnold, Galesville; Mrs. A. C. Neville, Green Bay; Mrs. H. A. Briggs, Elkhorn.

The Institute adjourned until 9:30 next day.



SECOND DAY.

The Institute met at 9:30 o'clock, March 15. Thos. Convey in the chair. Prayer, Rev. David Ferguson.

BEE KEEPING.

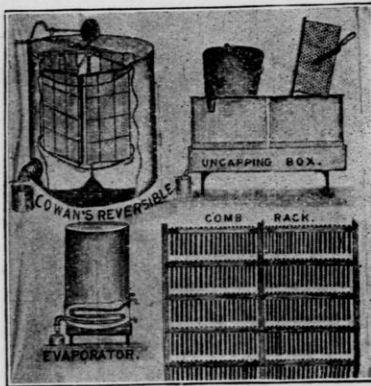
N. E. FRANCE, State Apiarist, Platteville, Wis.

Wisconsin averages as many pounds of honey per colony, and of as good quality as any state in the United States. She also takes the lead in the manufacture of beehives and supplies, as is shown by the manufacture in Wisconsin for last year, of 30,000,000 section boxes, 100,000 beehives, and

000 to 50,000 pounds of honey per year. Some devote their time to the producing of choice queen bees, and one lady sold 1,000 queens last year.

Useful Contrivances.

Smokers of various kinds are in use; the best patterns are the Crane, Cor-



Best extractor. Pail funnel. Comb and uncapping knife. Uncapping box. Storage comb rack. Honey evaporator used to ripen honey taken from unfinished sections.



Smokers.

Bee Veils.

two bee-keepers of our State making 23,000 pounds of beeswax into comb foundation.

Beekeeping is carried on by ladies as well as by the gentlemen. Our State has lady beekeepers, who, by the management of their bees, secure from 15,-

neil and Bingham, and lastly the Clark. Smoker fuel, composed of plainer shavings, punk, wood, cloth, hard dry split wood or even dry oat straw, cut short through a feed cutter, will make good smoke. Whatever is used should be well compacted to burn slowly and

make plenty of smoke. One thing should not be used as fuel, and that is tobacco, as it will flavor the honey and injure its market.

Bee veils are a convenience to wear at certain times. The old-fashioned patterns have had their day, such as a sunbonnet with a veil in front, coil of wire cloth around the head with a cloth cover, or even the globe veil. I prefer a black cotton veil with a piece of ladies' good veiling in front. This veil, with rubber band, fits around the crown of a good straw hat, and should be secured below by a similar band under the arms. This hat and veil, when not in use, should be found in its place in the tool house.

Care of Implements.

All implements, when not in use, should be kept in their place, under cover. An organ box, with hinged door and shelving inside, placed in the most convenient place in the apiary, affords a cheap tool house, and should be supplied with all necessary implements.

Marketing Honey.

Comb honey made from white clover, basswood, willow-herb, button-ball, golden rod, or mint of the valley, is always in demand at good prices, if they are put in neat pound section boxes, which are cleaned of all propolis and other stains, and carefully graded when put in non-drip shipping cases. To those who produce such honey I would advise stamping each box, when crated, with your name, address, and producer of this honey. In a few years this will furnish you with more orders from consumers than you can supply, and do away with the commission of middlemen. Never buy honey to fill orders, and affix your brand, for you may soon get complaints and ruin your market.

Unfinished sections should either be

sold at home as off grade, or the honey should be extracted from them, and the side walls shaved part way down and saved for another year. Often such extracted honey is not ripened and will require some means to ripen it. A good way is to put it in a bright tin can, which can be set in another a little larger. This larger one should be supplied with boiling water, and either set on the stove to keep up the heat, or over an oil stove, and coiled pipe in the lower can. Never use heavy comb foundation in a section box, but nearly full sheets are best either in section boxes or in frames for the brood chamber.

Extracted Honey.

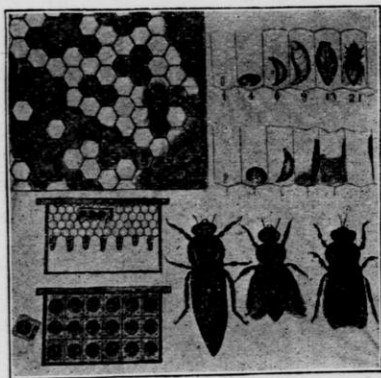
Extracted honey should seldom be taken from the combs until the bees have ripened and sealed it. The cappings I let fall in the upper stories of hive bodies, with a copper wire cloth on the bottom to allow most of the honey to drain out. The cappings are then soaked in clean water, adding enough cappings so that the honey sweetens the water until it will float a fresh hen's egg. Put a cheese cloth over the open-headed barrel and set aside for next year, when you will find you have the best of vinegar. The cappings and broken comb are melted in a bright tin dish and then drawn in a liberal supply of hot water, to allow any sediment to settle, in cooling. If an iron kettle is used to melt the wax in, it will be sure to darken the wax, and reduce its market value.

The extracting combs are stored away in our beehouse in the fall, on 2x4's, so as to hang the same as in the hives. We leave a little space between the combs to prevent mold, and if there are any moths they can easily be fumigated and destroyed by putting two or three spoonfuls of sulphur over coals of fire, or on a red hot iron, in the room.

The honey is taken from these combs when the cappings are shaved off by the use of the Cowan Reversible Extractor, which throws the honey out and leaves the comb to be replaced in the hive and refilled with honey. When full, the old pattern of funnel would often tip over, the same as some other things that get full, so I use instead a pail with a short funnel at one side of the bottom, which is a good improvement.

The Queen Bee.

We are all aware that all kinds of farm stock have been improved by the careful selection of the breeding stock. This rule also holds good in beekeeping, and all queens should be raised from selected stock. When the honey har-



Queen rearing and introducing.

vest has commenced from this select stock, remove one of the brood combs and exchange for a new comb, built from a full sheet foundation. The queen will nearly fill it with eggs at once. These eggs, in normal condition, will produce our choice queens. Cut this comb of eggs into strips and fasten into frames half full of comb by the use of a teaspoonful of melted wax. With a small stick or match remove at least

every other egg, so as to give room for the care of these queen cells when formed. This comb is given to a strong queenless colony that will properly feed and care for these eggs, and in a few days you will have a fine lot of sealed over queen cells, far enough apart so that you can save all of them.

Two queens will not live in one colony so we remove these queen cells before their time of hatching—fifteen days from the egg. Cut little blocks of wood, about two inches square, from inch lumber; then bore a $1\frac{1}{2}$ inch hole through each block, and put a wire cloth on either side. Also bore two small holes, $\frac{3}{4}$ of an inch, in side of block adjoining the large hole. One of these smaller holes is supplied with a sponge soaked full of honey, and the other is the queen cell, the point end opening into the middle of the block. These blocks should be put in a frame and given a strong colony of bees. In this way the queen cell will not be injured and the queen will soon hatch. In a few days our colonies should be queenless, and ready to receive these new queens. If a queen's wing is clipped it should not be the upper portion of the wing, but the feathery portion, and they should be clipped for the same reason that we clip one wing of a chicken.

Wintering the Bees.

We never allow bees to swarm, as they are apt to do when we are busy haying, or away from home. If bees are wintered in a cellar or beehouse, it should be dark, with a uniform temperature of from 42 to 45 degrees; there should be free circulation of air to prevent dampness, and a full supply of honey and young laying queen. Indoor wintered bees should be removed to the same stand as they last occupied, about sundown, so the bees will get settled

down by the time the morning sun appears. We prefer to keep them in the cellar until warm weather, and soft maples or something else will furnish natural pollen. In spring, during cold days, when sunshine would induce bees out to perish, single-walled hives should be shaded with a board or something of the kind. Large, double-walled, chaff-packed hives have each year furnished us our strongest colonies when honey season came, so that, for some years past, most of our bees are kept in such hives on summer stands the year around. We are particular in each apiary to have a wind break on the north and west.

Foul Brood.

I have here illustrated a comb affected with this contagious disease called foul brood, and also the various ages of a bee from the egg to the hatched bee, and under the same the stages of this disease. It has destroyed large apiaries, but by careful treatment it can be cured—the hatched bees kept in their own hive. Even the diseased combs can be melted and the wax be safe to use, but great care will be necessary. As State Inspector I have examined several thousand colonies, and have cured nearly every case without expense to the owner, except my board a couple of days, and perhaps 25 cents worth of comb foundation per colony.

DISCUSSION.

Mr. Wilcox—How much to the hundred feet of cubic space would you use of sulphur and would you place it above or below the comb?

Mr. France—The room in which I fumigate is about eight feet square. I put a kettle in the middle of the room on the floor, with coals or red hot iron,

then about three tablespoonfuls of sulphur. I want it so that the room gets blue with smoke as I look in through the window. I have tried various amounts and whenever the little millers, which come directly to the window, will drop from the effects of the fumigation, I know I have it strong enough.

Mr. McKenzie—Can anyone readily learn to divide bees instead of letting them swarm?

Mr. France—I think so, yes. There is one thing in bee culture that I would recommend as a first investment. I am advertising nobody's books, but there is a little book called "The A. B. C. of Bee Culture," which costs \$1.00 or \$1.20, and you can turn right to it and get whatever you want on bee culture. It is the best book I ever saw in print for this purpose.

Mr. Hodgson—What is the proper time of day to work in taking the honey from the boxes?

Mr. France—Any time when the sun shines.

Question—You spoke of clipping the queen's wings. Do you not also clip them where you allow them to swarm naturally?

Mr. France—Yes, I should clip the queen's wings of each colony.

Question—You spoke of clipping and dividing, which is best?

Mr. France—I would do both.

Question—Is it best for the farmer to let them swarm naturally?

Mr. France—It depends upon how much time he has. If he can leave the hay field and watch those bees, let them swarm naturally.

A Member—The wife does that.

Mr. France—She has enough to do at home without watching and ringing the bell for us to come home.

Mr. Richardson—What is the cause of foul brood?

Mr. France—I am at a loss to know.

Of the four thousand cases I have had in the State, I have followed as closely as I could the back track, the history, and the majority of cases are contagious from some other locality. I think, however, that it sometimes develops from a filthy condition.

Mr. Wilcox—Is foul brood an infectious or a contagious disease. In other words, does it come from contact or is it in the atmosphere?

Mr. France—I don't think it floats in the atmosphere. I often find a place where one hive is affected and the very next one not.

Question—Do you prefer to keep your bees in an underground building during the winter, or in some building above ground?

Mr. France—We can hold the temperature for the wintering of bees a little better below the surface than above ground, although either one is good. The point is to keep it dry and at a uniform temperature. There are many buildings in the State above ground where the walls are perhaps a foot thick, packed with sawdust or something in the shape of a lining, which makes an excellent building above ground.

Mr. Stiles—Do you think it is advisable for the farmer to put them in the cellar under the house?

Mr. France—I think over half the bees that have been wintered this year in this State have been put under dwelling houses and many of them are coming through in good shape.

Mr. Hodgson—Do you prefer the Italian or the black bee for general purposes?

Mr. France—I prefer the Italian. With me the Carnolian bees have produced a little more honey, but other qualities considered, I do not consider them so valuable.

Mr. Briggs—Give us some of the dis-

tinguishing features between the Carnolian and the native bee.

Mr. France—The bands on the abdomen in the queen bee are quite light-colored; with the Carnolians it is almost iron gray in color.

Question—Will bees work on alfalfa?

Mr. France—Yes, it is the greatest honey plant of Colorado.

Question—Will they work on red clover plants?

Mr. France—No, not very much. I will say to those who have bees and are producing honey for the market, that the outlook now for Wisconsin honey is good; it is to-day in great demand and at a much higher price than we have had for the last two or three seasons. Let us not throw it away.

Mr. Menn—Which is the more profitable, comb or extract honey?

Mr. France—If one lives near a market where they can put comb honey right on the market, it is usually the most profitable. If we are far away from the market generally extracted honey is the most profitable.

Mr. Kellogg—What prices do you expect this year?

Mr. France—Last year extract honey went from five to six and a half. Comb honey ten to fifteen. I look for at least ten to fifteen per cent. better next summer.

Mr. Wilcox—The color of the honey is a great point. In extracted honey it don't make any difference, but in comb honey it must be light-colored.

Mr. Briggs—Will Mr. France give us a list of the best plants that produce honey?

Mr. France—That would depend much upon the locality in the State. What is good in one part may not be good in another. A good deal of the State, the first bloom is dandelion, then follows the varieties of fruit bloom. In the south and central parts of the State white

clover, basswood and buckwheat. We used to have a great deal of buckwheat, but we have to go into the north central part of the State now in order to get buckwheat honey. In that part of the State, where the timber has been cut off and fires have passed is the willow-wort, or fire weed, and along the Wisconsin river is what is called mint, bergamot, also what is called button-ball. Alsike clover makes as good as any honey, but we are dependent upon the farmers who raise it. It has been my observation that bees would even leave white clover and go to alsike.

Mr. McKensie—Can you have as good success with bees at a distance from a running stream as near it?

Mr. France—Bees consume a great deal of water and we should think of that. My home is quite a little ways

from a stream and I keep water in the yard all the time for the bees to drink during the summer season. It should be kept in a dish that is not too cold.

Mr. Goodrich—How is sweet clover?

Mr. France—In many localities it is a good honey plant, but take the State as a whole, it is not a very productive plant. Dr. Miller, just over the State line in Illinois, has a field of sweet clover as good as any place I know of. Two years ago he had ten thousand filled sections made from sweet clover.

Question—In what kind of a vessel do you keep the water for the bees?

Mr. France—In many places I have a pail with a faucet that will allow the water to drip and run out on a board with little grooves, so that the water is all the time running across those boards and it gets warm in the process.

POULTRY FOR FARMERS.

C. E. MATTESON, Pewaukee, Wis.

Mr. Chairman, Ladies and Gentlemen:—In taking up the subject of "Poultry for Farmers" it certainly gives me a great deal of pleasure, because I claim here to-day, as I always claimed, that poultry is a branch of farming, and, although being a poultryman myself, the farmer with the same experience can make more money out of it than we can, for he has nearly all of the raw material right at his hand, without spending any time or labor in getting it elsewhere.

Farmers as Poultrymen.

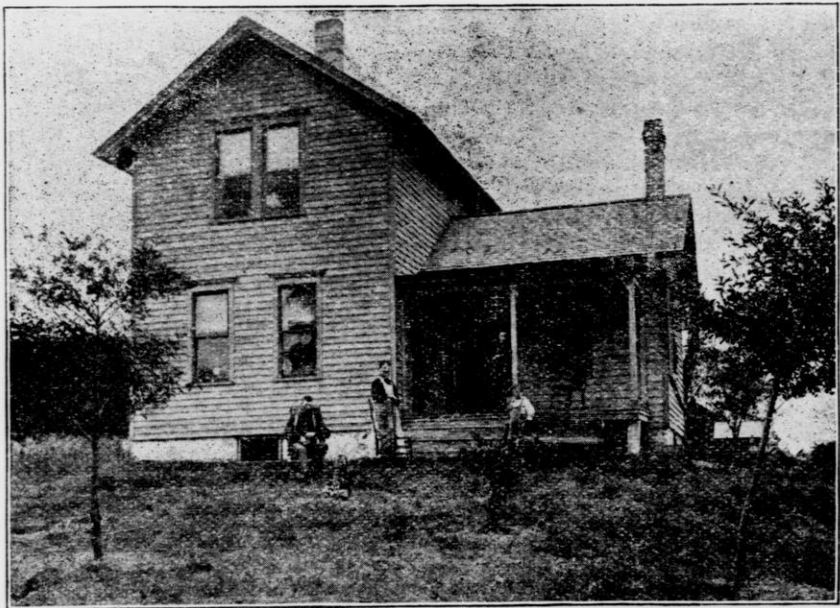
In the first place we must consider that poultry is not cared for on the farm as it should be, in fact I think a great many times that farmers would

not make anything out of poultry if they could, for they generally house them in some little 8x10, out of the way house, little attention being given to warmth and comfort, and generally a thing that is never thought of is a balanced ration, which is certainly of great importance, especially in the winter time when we are after the cream of prices.

Now, to make anything out of poultry we must make it a winter business, in fact, I should hate to undertake to make a living out of summer poultry farming, as the profits are too small. If fowls are to be profitable they must be kept comfortable, and I do not think any fowl is comfortable roosting in tree tops, or on corn cribs. Good housing,

good breeding, and good feeding, work hand in hand in this business. Good housing does not mean that it is best to keep them indoors all the while, but that they should have comfortable quarters in cold, stormy and inclement weather to do their work in, letting them out of doors at all times when the weather is not too cold.

plastering I put tarred paper between the studding. This is a very simple process. Take a 36 inch roll of tarred paper and saw it in two parts; then from these rolls cut off strips long enough to reach from the upper floor to the sills, and fold it and place it between the studding, tacking a lath to either side, being careful not to let it



Farm Home of C. E. Matteson.

The Best Poultry House.

What experience I have had with the different plans of house, I like the scratching shed plan of a house the best. It seems to be more the natural condition, and my eggs are always more fertile gathered from this house than from the original long house plan. The center part of this house is what I call the roosting room, and is built very warm, first by placing building paper on the studding, then siding over this with six inch drop siding; before lathing and

touch the outside wall. This gives you two dead air spaces, after it has been lathed and plastered, and nothing gives a hen-house the inside finish that a good coat of lath and plaster does, as it is so much easier to keep rid of the red mites.

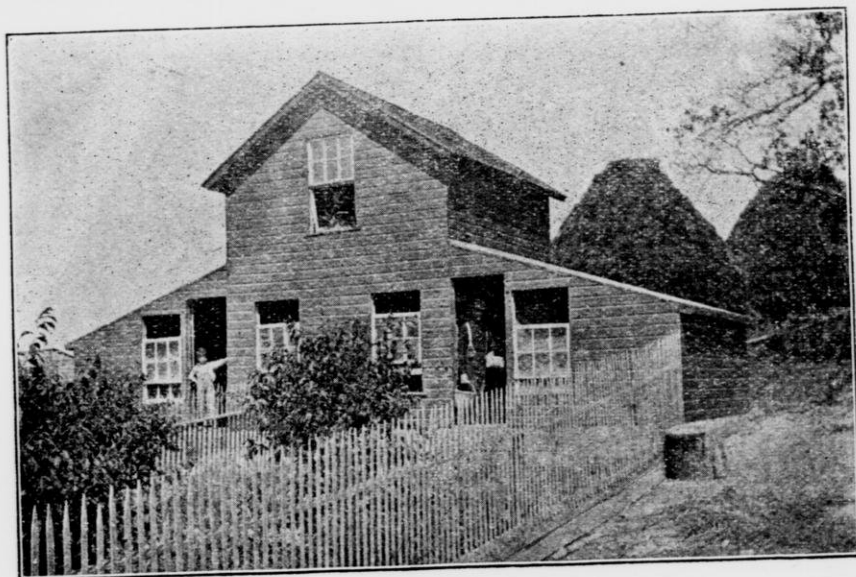
The scratching shed of this house almost explains itself and, although cheap, costing but very little, a hen-house is not complete without it. It is 5 feet high at the eaves, 7 feet high where it connects onto the main building and is enclosed with drop-siding.

Two colonies, of 35 fowls each, occupy this house. Each colony has one of the scratching sheds and one-half of the roosting room. All of the feeding is done in the scratching shed and in the corresponding yards in front of the south side. It is a great mistake to have too much glass in a house, for the reason that it will radiate cold at night, when your fowls are on the roost, as well as heat during the day time, when

ration. They have too much carbohydrates, and must be narrowed down by using animal food of some kind, and green food of some kind.

What I Feed.

My method of feeding is this: The first feed is fed in the morning, which is always some fine grains, cracked wheat, wheat screenings or cracked corn, thrown or buried in their litter.



Poultry House, with Scratching Sheds on each side.

your fowl are busy scratching, which is just what we do not want.

A Balanced Ration.

Feeding is something we have all got to learn a great deal about yet, and to be a successful feeder we must first study the laws of foods, and also what we are feeding for. Eggs are nearly all protein, with some fat in the yolk, and no carbohydrates, so reason must teach us by this that the wide grains that are raised on the farm are not a balanced

This is given more as an exercising ration than as food, for this exercise must be had if your fowls are to be healthy. Towards noon, say about 11 o'clock, they get their so-called morning mash, which is fed in hods, and only a light feeding is given them, for if they are permitted to gorge themselves until their crops are full, it stops the exercise for that day, and, as I said to you before, without this much desired exercise your fowls will neither be profitable nor healthy.

The foundation of this mash is milk placed in kettles and brought to boiling point; then stir into this boiling milk enough buckwheat middlings to make a nice thick gravy. After this mix up to a crumbly state, with equal parts of wheat middlings, wheat bran, and ground oats. This mash should always be mixed up three or four hours previous to the time of using, so as to get it into a half-cooked state, making it easier to digest and assimilate.

it is a sure sign that they have been overfed the night before.

Other Healthful Foods.

Besides these feeds I keep green food before them at all times, and as an animal food I wish to speak very highly of green cut bone. It has given me the best results of anything I have ever used, being full of phosphates, lime and nitrogenous matter. Now, when I say green cut bone, I mean just what I say,



Brooder House and Yard.

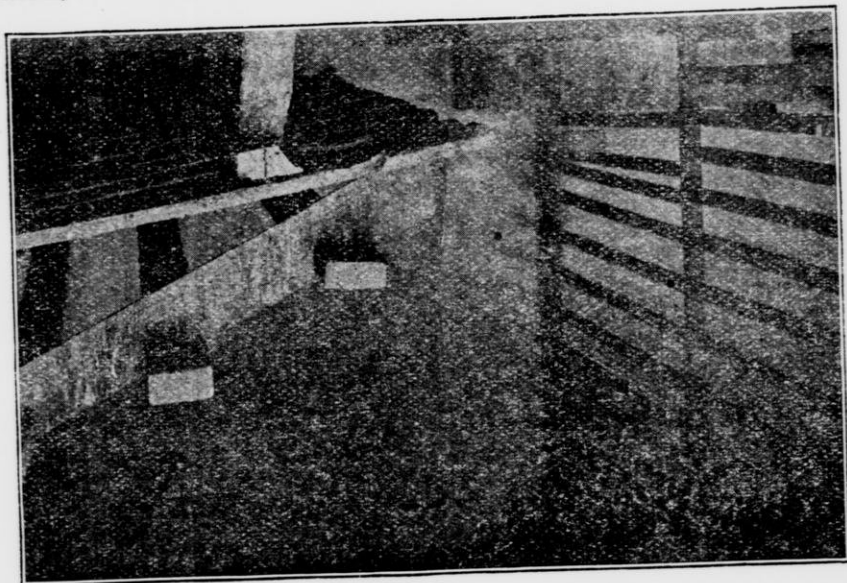
The third feed I give them at night, which consists of some of the whole grains, wheat, barley or oats, and in real cold weather an occasional feed of corn is all right, always being careful about feeding too much. A good way of telling if you have fed too much is by watching the fowls the next morning. They should all be out in their shed as busy as larks every morning at sunrise, not even excepting Sunday. If they linger on their perches after that time

for I find that some are claiming that these so-called animal meals are just as good or even better than green cut bone, when, as a matter of fact, they should never be compared for a moment. Animal meal is the product of soap factories and rendering establishments. At such places immense quantities of bone and meat of dead animals of all descriptions are placed in a large pile until a sufficient quantity is obtained to fill a large vat. Once in the

vat the steam is turned on until the grease is all extracted. Then the fibres, skin, muscles, etc., are pressed into cakes, then dried and ground into these so-called meat meals, which is certainly not a wholesome food for poultry.

I do not think it would be advisable for the average farmer to get rid of the common barnyard fowl that is generally kept on the farm, and go into pure bloods, though I recommend pure bloods, as I always have, for they are

are all hatched, and to wait 48 hours will do no harm. It is a great mistake to feed sooner than that, leaving them in the machine during this time (if it is a well regulated one, as it should be). Then we will take them to the nursery, where they receive their first introduction to their foster mother, the brooder, and their first food is dished up to them, which is generally rolled oats and bread crumbs, equal parts. I feed this dry to begin with, until they have learned to



Inside view of poultry house, showing lath partition and roosts.

all bred for special purposes, but you are liable to get disease, vermin, etc. In that case discouragement is sure to be the result. But what you can do, is to introduce a pure bred male, being careful to get one free from disease and vermin.

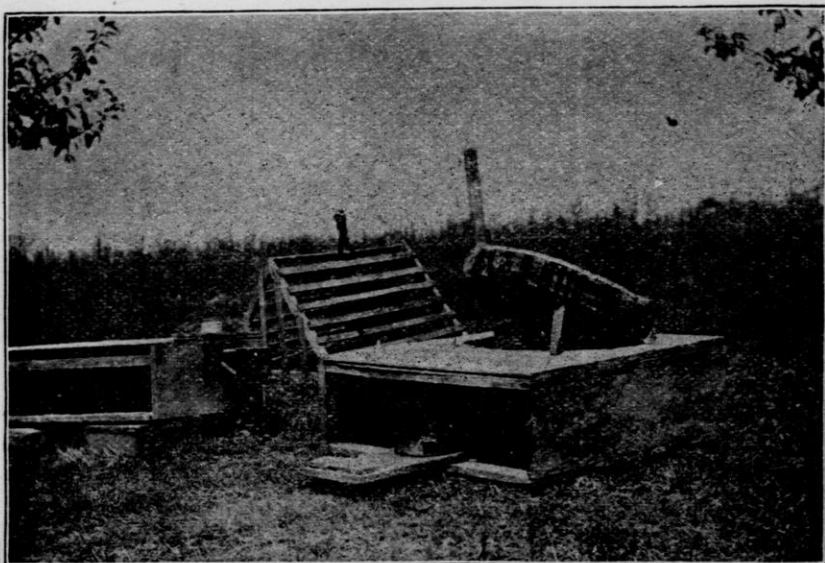
Care and Management of Young Chicks.

In the first place, chicks should never be fed for at least 36 hours after they

eat nicely. Then it is better to moisten slightly, using water at first, for two or three days, then using sweet skimmed milk, both to moisten their food with and also giving it to them to drink. When they are five or six days old we gradually commence to feed equal parts of corn meal and wheat bran scalded, and, as they grow older, say when two weeks old, we feed cracked wheat and corn, one feed each day. At that time I entirely drop feeding the rolled oats and

bread crumbs, and commence to feed cut bone plentifully, keeping it by them after they are four weeks old. At this age, if they are for broilers, I use a great deal of cracked corn, but if they are intended for my future laying stock, the cracked corn is left out, and we use either wheat, peas or oats in its place, peas being by far the best. Fresh water should be kept by them from the start.

who has ever realized the magnitude of this business. Who has ever realized that the much-neglected American hen almost takes first place among the products of the country, corn and hay alone excepted. Right here I would like to quote you a few statistics, taken from the Iowa State Register. For instance, in the United States the average products are as follows:



Hot Water.

Brooders.

Hot Air.

Exercise Necessary.

The temperature of the brooder should be pretty close to 100 degrees for two or three days. After that it should be cooled down as the chicks grow older. Above all things, see that the little chicks have plenty of exercise, getting them outdoors on all pleasant days to harden them up. *Much depends upon this.*

A Few Figures.

Before closing I would like to ask

Wheat	237,000,000
Sheep	106,000,000
Dairy Cows	263,000,000
Swine	86,000,000
Tobacco Crop	43,000,000
Potato Crop	80,000,000
Oat Crop	120,000,000
Cotton Crop	290,000,000
Corn Crop	440,000,000
Hay Crop	450,000,000
No. of Chicks Raised.....	3,350,000,000
No. of Eggs Marketed....	13,000,000,000

From this table you will see that the production of chicks in this country last year reached the enormous number of 3,350,000,000, and the number of eggs produced was over 13,000,000,000, and the total valuation of chickens and eggs combined reached the enormous sum of \$300,000,000.

So let us not ignore the little American hen, but try to better her condition. Give her better feed, better housing, and by all means a little better breeding, and I am sure there will be less hard times upon the farm.

DISCUSSION.

Mr. Nicolai—What time do you start your chicks for pullets for use in laying the following winter?

Mr. Matteson—What breed do you refer to?

Mr. Nicolai—Any breed. I keep the Brown Leghorns.

Mr. Matteson—Well, the Brown Leghorns can be hatched as late as the first day of May. The American class will have to be hatched at least a month earlier, if you are using the larger breeds, the latter part of March is about right.

Mr. Hodgson—What is the reason that high bred stock are apt to get diseases?

Mr. Matteson—I did not mean to say that, I said you should be very careful where you get your pure bred stock from, because you are liable to get more disease and vermin than you are pure blood. Of course you need have no fear about getting your eggs. I was speaking of purchasing pure bred males.

Mr. Wilcox—How do you get rid of the lice and mites?

Mr. Matteson—The perches of your house should be movable and you should dip them into whitewash once a week. Your house should be lathed; a

house that is boarded up on the inside, the mites will spread from the roosts onto the cross pieces and it is quite a job to get rid of them. Simply whitewash thoroughly, at least twice a year, perches, nest boxes and all.

Mr. Robinson—I have some full blooded Plymouth Rocks that I am quite anxious to keep pure blooded, and especially to keep the proper color, but I have found that the pullets that lay the best, lay the first and most persistently during the winter, are much inferior in color and size to many of my pullets that have not laid yet. Now, what shall I do this spring, shall I breed my best layers and sacrifice the barring and size, so that my stock will not show up so well or take so many premiums?

Mr. Matteson—Were these pullets hatched at the same time?

Mr. Robinson—The pullets that laid first were not the earliest hatched.

Mr. Matteson—That is the case a great many times. There is too much of this fancy breeding going on. It should be put down by the producer.

Mr. Robinson—But these fowls of mine that are not so well barred are just as well bred as those that are better barred and have not laid yet.

Mr. Matteson—You will find that is so, especially in the white varieties. The American Standard says there shall not be any color on the pure breeds, and it is always noticeable that the best stock shows that brassy color.

Mr. Phillips—What market do you raise your broilers for, and how many have you hatched now?

Mr. Matteson—I try to sell most of my broilers in Milwaukee, eighteen miles away. At the present time I have nearly eight hundred chicks doing nicely, that are four or five weeks old.

Mr. Hodgson—What do you do in the case of picking feathers out of the neck?

Mr. Matteson—That is called feather

pulling. It is pure mischief. It is a vice contracted through idleness. If they have the habit, wet a sponge with kerosene and put it on the feathers, and they won't like that very well. But the best way is to keep them busy, just short enough on their feed so they will keep scratching.

Mr. Jones—How about eating eggs?

Mr. Matteson—It is a vice just the same.

Mr. Jones—Would you put kerosene on each egg?

Mr. Matteson—To prevent it I would take some decoy eggs, china eggs, or something of that sort, and scatter them around, and by all means use them as nest eggs, but it is a difficult habit to cure.

Supt. McKerrow—Will hens that are properly fed and have a small feed of bone meal every day, eat their eggs?

Mr. Matteson—Oh, yes, if they have once contracted the habit, and if you have old fowls on your place that have this habit they will soon teach the whole flock to do it, but then you should not have any old hens on the place.

Mr. Richardson—How much space would you allow for roosting room and also scratching shed for twenty-five chickens?

Mr. Matteson—The roosting room should be about one-third as large as the scratching shed per hen, and the roosting room and scratching shed combined, you should allow about six feet per hen.

Mr. Thorp—What is an old hen?

Mr. Matteson—Anything past fifteen months with me. You may think by that that a hen that is past that age won't lay as many eggs. I never have claimed that they will not lay as many eggs, but that you get their product on the market in the summer months when they are not profitable. They go into moulting in the fall and

they don't get into business until the best prices are past. She may lay as many eggs, but she won't lay as many in the season of the year that you want them.

Mr. Imrie—What kind of floors do you have in your roosting sheds?

Mr. Matteson—Earth, by all means, it is much better than anything else. In the summer time, after the fowls are sold off, clean out about three or four inches of this earth, draw it out to the field and bring back the same amount of fresh earth. It furnishes a dust bath where they can dust themselves when the sun shines in the winter.

Mr. Arnold—I can make an old hen lay just as well as I can a young one.

Mr. Matteson—Tell us how you do it.

Mr. Arnold—Cut its head off.

Mr. Wing—What do you use for grit?

Mr. Matteson—I use fine, sharp gravel.

Mr. Stiles—What is the size of the roosting perches?

Mr. Matteson—I use 2x4's, and every perch should be movable so you can take them out and whitewash them.

Mr. Stiles—I have a couple of pieces of glass here that were in a rooster's gizzard six days, and they are pretty well worn off.

Mr. Matteson—I understand Mr. Scott to have some glass balls. He killed some roosters and the pieces of glass that they swallowed were worn perfectly round. If I were breaking up glass for the fowls, I would make it about the size of a pea, cut in four parts.

Mr. Richardson—You seem to suggest to the farmers that they can make more profit out of winter eggs than out of summer eggs.

Now, I believe that they will have to be at it several years before there is much profit, on account of the extra food and care in the winter. I believe

that nine out of ten farmers can make more money by keeping a large flock of non-setting varieties during the winter by just feeding them enough to keep them healthy and not trying to get eggs, and letting them lay during the summer; because in the summer the cost of keeping them is practically nothing. Besides, the farmer is not going to do a great deal for his hens during the winter.

Mr. Matteson—In the first place I do not claim that there is any such thing as a non-setting variety. I have Leghorns that are called non-setting, but they are setting just the same. In regard to producing eggs in the summer time; have you kept an account so that you are sure that these eggs don't cost more in the summer time than in the winter time, for the reason that the cost of feeding both winter and summer has all got to be charged to your cheap summer eggs, while if you keep a fowl laying you only have to charge her up with the feed she eats as she goes.

Mr. Robinson—My proposition is simply that it is a question for the ordinary farmer to decide whether he shall keep what we call the non-setting varieties; shall he keep the Plymouth Rock or the Cochin Chinas, or the larger kinds, or shall he keep the smaller kinds. But my point is simply this, that unless the farmer takes great care of his hens, he had better keep the non-setting variety, because the Plymouth Rock, if it is not cared for in the winter, will not lay any eggs. Then, you commence to feed them in the spring and get more profit out of them. Of course, if they handle hens as you and I do in the winter, they can make more profit, but I am talking of the average farmer and his ways.

Mr. Matteson—Of course I am not here to recommend what breed you

shall take. I say it is no more work or trouble to get eggs out of pullets in the winter time than to get eggs out of hens in the summer time.

Mr. Thorp—Your claim is that it is the best plan to keep pullets so as to have eggs when they are high in the winter. How many pullets do you keep through November and December, and how many eggs do you get?

Mr. Matteson—I have about a hundred and sixty laying pullets this winter. My aim is to have eggs to fill my machines when I want them. During the months of November, December and January we got from one hundred and sixty about ninety eggs a day, and got about two cents apiece for them.

Supt. McKerrow—I was going to ask Mr. Hodgson or Mr. Robinson if they thought, from observation, that the average farmer who keeps his flock of hens in the average way, after he figures out the loss from their scratching, the damage to other things, can figure out any profit from this summer laying?

Mr. Matteson—That is the kind of argument I am trying to make right along. There is no profit in summer eggs.

Mr. Arnold—According to all this, then, the average farmer with his average hens, treated in the average way, is considerable of a fool.

Supt. McKerrow—No more than the average man in any other line.

Mr. Nicolai—If we would all go to poultry raising for winter eggs, would not the average farmer have a better chance, just as the average dairyman has?

Supt. McKerrow—When the summer poultry farming grows to be more valuable than winter poultry farming, then it won't be the average farmer that will be following it; it will be the progressive farmer.

A Lady—What is the best general hen

as an egg-producer for the farmer, for eating and for laying?

Mr. Matteson—Of course you have got to select from some of the American classes, for instance the Wyandottes. It should be understood that you cannot combine two qualities in one hen, but as near as you can get to it, I would recommend the barred Plymouth Rock or the Wyandotte.

The Lady—What about the White Plymouth Rock?

Mr. Matteson—That is of the same class, an excellent fowl.

Mr. Hodgson—What kind of laying places do you provide and where do you place them?

Mr. Matteson—The nest boxes should always be a little lower than the perch. Mine are set right in the partition in this roosting room and they are double, movable boxes. This building fronts south.

Mrs. Thorp—Where can you get the Wyandottes?

Mr. Matteson—I don't know. I haven't any for sale. There are a great many advertised in all the poultry journals.

A Member—Mr. Alexander, of Viroqua, sells them.

Mrs. Sargent—Do you call the Wyandottes better than the Plymouth Rock?

Mr. Matteson—There is but very little difference; the Wyandotte is a pound lighter all around than the barred Plymouth Rock.

Mr. Wing—I want to say a word for the Buff Wyandotte, or any of the buff breeds. They lay every once in a while and they are delightful to fry if you have any ministers or other friends that come pretty often.

Mr. Hodgson—Which fowl is the best for the market?

Mr. Matteson—It depends on the market you are furnishing. If you have a market that needs a large roasting

fowl, you have to have some of the Asiatics, but if you want light weights you can select some of the American fowls.

Mr. Callender—What do you do with the upstairs in your chicken house?

Mr. Matteson—That is where I keep my feed.

Mr. Powlar—Would you recommend an incubator for a farmer who keeps one hundred hens, more or less?

Mr. Matteson—I don't see how you can make any profit with poultry without an incubator.

Mr. Powlar—What machine do you use?

Mr. Matteson—I recommend the Monarch machine. I build my own machines, but I am not building to sell.

The Chairman—Can you give us some instructions as to what is necessary in an incubator?

Mr. Matteson—The first and all important point is that they should be self-regulating. Such is not the case in ninety out of one hundred. The Monarch is perfectly self-regulating, no night work about it. Besides that, it is packed with two inches of insulating material and a dead air space. Then probably one-half of the cost of the machine is the nursery below the egg chamber, where the chicks are put in after they are taken from the egg chamber. They should stay in the machine at least thirty-six hours after they are hatched.

Mr. Arnold—Can you get sufficient grit out of ground oyster shells, such as is on the market?

Mr. Matteson—No, oyster shells are digestible. I have not used them for nearly eight years and I defy any one to find a soft shell egg in my place. All you need is to aid the digestion with charcoal and glass; then make them work for their living and they will get all the lime they need out of their feed.

Mr. Goodrich—We have heard about beautiful hens; which is the most beautiful, a hen that will lay an egg every day all winter, or one that will only lay an egg once a week in the summer time?

Mr. Matteson—There is too much of this fancy poultry farming going on. When we buy a fowl, we should ask how many eggs it lays in November, December and January, instead of asking about their points of beauty.

Question—Would you recommend the Des Moines incubator?

Mr. Matteson—I would not.

Mrs. Sargent—Do you ever use coal ashes?

Mr. Matteson—They are all right if you are going to market your eggs at the stores, but I have had some difficulty in incubating them on account of the shell being too hard.

Mr. Herbst—Isn't it true that certain parties will get more eggs out of the Plymouth Rocks than others?

Mr. Matteson—They have a tendency to take on fat and unless you are careful in feeding the production of eggs will stop.

Mrs. Sargent—Do you feed clover hay?

Mr. Matteson—I do not, but it is an excellent article to feed. There is more lime in it than in any feed we can use. Pour boiling water over it and let it stand two hours, then chop it up and feed it to them, or you can chop it up first, then pour boiling water over it afterwards.

Mrs. Sargent—What kind of green stuff do you feed in the winter?

Mr. Matteson—Cabbage and mangel wurtzels.

Mr. Kellogg—Do you think one farmer in ten will succeed with the brooder and the incubator?

Mr. Matteson—As I said, only a small per cent. succeed in any occupation, and this holds good in poultry.

Mr. Arnold—I believe that chickens are like some other kinds of animals, it is not the show chickens that lay the best, as a rule.

Mr. Robinson—With me the smaller hens are the best layers. I want to ask which is the best place to put the incubator, whether upstairs or in the cellar?

Mr. Matteson—In a dry cellar or a dry room where the sun does not shine in. If you have a good machine it won't matter if it goes even a little below freezing in that room.

Mr. Hodgson—If an incubator doesn't work right, isn't it the fault of the person who keeps it, generally?

Mr. Matteson—There are incubators on the market to-day that nobody can run, and a good machine anybody ought to be able to run.

A Lady—What is the weight of your broilers at ten weeks old?

Mr. Matteson—If you have given them good growth from the start they should weigh a pound and a half at ten weeks. I have had them weigh two pounds at eight weeks.

Question—Do you feed sunflower seed to your poultry?

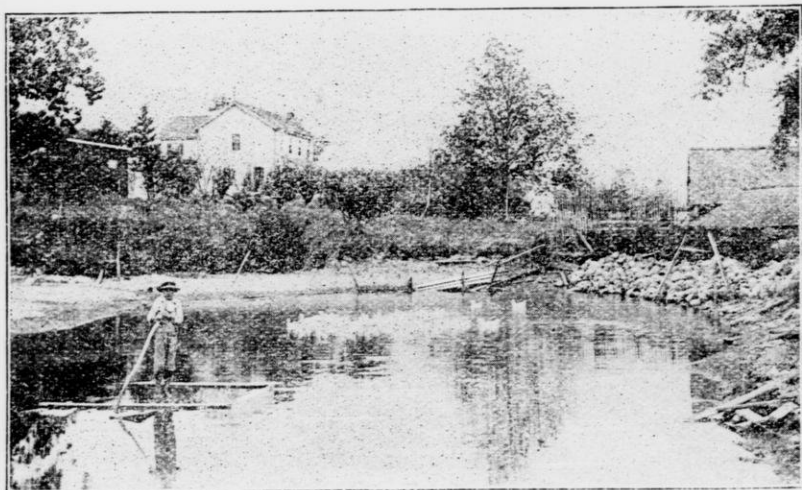
Mr. Matteson—No, I do not feed it myself, but it is all right, one or two feeds a week.

TRUCK FARMING.

H. E. NICOLAI, Big Bend, Wis.

Like all other farming, truck farming has its years of depression, and like all other lines of business, when in a depressed condition, it endeavors to cut down expenses by labor saving machinery, and in this way the low prices are overcome to a great extent.

In choosing a location for this line of farming, a sandy loam for early potatoes and sweet corn, and all kinds of vine crops, is preferable, while a deep, rich muck is best for cabbage, cauliflower, celery, and all kinds of root crops. If the location is such that irri-



View on Farm of Mr. Nicolai.

Study Soil and Location.

For the best results the soil and location should be adapted to the crop grown. If you cannot choose your soil and location, then grow only such varieties as are adapted to your soil, and the person must be well suited to this particular line of work in order to be successful. As Mr. Utter, of Caldwell, truly says, "You cannot do garden work with a sulky plow, self binder, or hay loader."

gation can be applied, no pains should be spared to apply it.

Preparation of the Soil.

The best soil without manure will give unsatisfactory results. Land that has been in clover one year, or the same followed by potatoes or corn, will be in good condition for any garden crop. Manure the land late in the fall or during the winter, by spreading it on broadcast. The manure should be short

and well rotted. Plow the ground as soon in the spring as it will work up nice and mellow, and then harrow it once a week until planting time, to keep it from drying out. In case the land becomes packed by heavy rains before planting, it should be thoroughly pulverized by a smoothing harrow and roller. The rows should be straight and no further apart than necessary to insure ample room for thorough cultivation and the development of the plants.

Cultivation.

Seed should be procured early, and from reliable seedsmen, regardless of cost, and it should be tested before planting. No general rule can be given for the cultivation of all kinds of vegetables, as different varieties require different machinery in order to save labor. The harrow can be used on potatoes, sweet corn, and peas, both before and after the plants are up, followed by the weeder and then the cultivator, while among the smaller varieties the garden rake can do good service, followed by the hand cultivator. For tomatoes, melons, cabbage, and many other varieties, the one-horse cultivator and hoe are about the only tools that can be used to good advantage.

All crops should be cultivated at least once a week and after every rain as soon as the soil is dry enough to work up mellow. While the plants are small the cultivation should be close and deep, but after the roots begin to spread out, shallow cultivation is best, as root pruning is injurious to all plants. The ground should be kept level and smooth.

Tomatoes—Seed.

My method of growing tomatoes is as follows: Sow the seed about March 1. If the hot-bed is used, instead of placing soil on the manure, use boxes 18 inches wide, 4 feet long, and 6 inches

deep. For sowing seed fill boxes about 4 inches with rich, light soil (rich muck is preferable). Water daily with warm water, until the plants are up. Transplant from box to box two or three times during the spring, as the plants become crowded. At the last transplanting put 18 plants in a box and pinch off the tops to make the plants stalky.

Setting Plants.

When the time comes for setting plants mark the ground 6 feet one way and 6 and 9 feet alternately the other way for large varieties, and 4 feet instead of 6 feet for the dwarf varieties. This will give a chance to pass back and forth with a horse and stone-boat when setting plants, and also to carry out tomatoes during the picking season, without stepping on the vines. In setting plants in the field, the easiest way I have found is to hitch a horse to a stone-boat, put two or three boxes of plants on the boat, and drive in the alley-way, setting a row of plants on each side. Four men can work to good advantage in that way—two to dig holes, one to distribute plants, and one to cover.

The plants should be thoroughly watered before they are disturbed in the boxes, and care should be taken to disturb as little dirt as possible when removing the plants from the box to the ground; also to expose the roots to the sun as little as possible. The holes should not be dug any faster than they are wanted, and the man covering should keep up close to the one distributing. Plants set in this way, if they are good and stalky, will never wilt a leaf.

How to Grow Early Muskmelons.

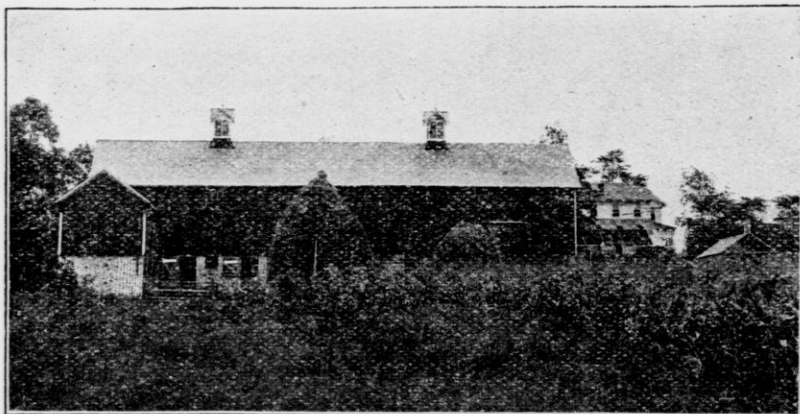
Melon vines cannot be transplanted successfully, hence we have to adopt

some other means to overcome our short seasons. Select a tough sod (such as is usually found in old pastures—it should consist of black loam), and cut into pieces from 6 to 8 inches square, and about 4 inches thick. Place them, grassy side down, and close together, so as to form a level bed. Plant about May 1 and put from six to ten seeds in each sod. When the plants throw out their second leaves, thin them down to four in a hill, and when they are ready to be moved to the field, thin again by taking out the weakest plant of each hill, leaving three plants to grow.

How to Prepare the Hotbed.

I prefer the double hotbed, which is 13 feet wide and any desired length, according to the number of plants you wish to raise. Select a protected place, a south slope is preferable. Drive three rows of posts, 4 feet apart, and the rows 6½ feet apart (2x4 pine will do for posts). Board up the outside of the posts with common inch boards. Nail a 6-inch board on the side of every second post across the bed for a brace.

Saw off the posts level with the top of the outside boards, and the center posts level with the top of the cross pieces.



View of Farm Buildings of Mr. Nicolai.

When ready to be removed to the field, mark the ground 6 feet each way, and plant as directed for tomatoes, only instead of using a stone-boat use a truck wagon to haul out plants and distribute plants directly from the wagon to the hill. Place the sods about two inches below the surface of the ground.

When the vines cover the ground and the melons begin to form, cut a path between every second row and always walk in these paths while picking and carrying out melons.

Nail a 10-inch board on the top of the center row of posts, and a 2x6 on the top of that, for a walk. This will leave 2-inch space on each side of the 2x6 for the sash to rest on. Nail a 6-inch board on the top of the other two rows of posts, and your frame is completed. Bank up the outside of the frame by taking the soil from the inside. If the ground is frozen, the frame can be put on the top of the ground and banked up with manure. The hotbed should be about 3 feet deep or more. Fill with fresh horse manure to the depth of 2½

feet. If a quick heat is required, pour on some hot water.

The cover of the hotbed should be of glass to start the seed, and after the plants are well established use glass and cloth alternately, that is, three feet of glass and three feet of cloth. This will keep a more even temperature and will save opening the bed on sunny days. I change my glass and cloth once a week by taking off a sash at one end and moving the next one into its place, and so on, which places the cloth where the glass was the previous week. The covers should be removed from over the plants about a week before they are set out into the field, in order to harden them.

Garden Truck Gathering and Marketing.

The gathering and marketing of garden truck is one of the important items of this business. Most vegetables are perishable, and must be upon the market when just right, to sell for the top prices. The sorting and packing should be done by a careful and honest person, so that the products will have an attractive appearance, and not belie the quality.

If shipped to commission houses use packages of the same size and form as are in general use in the market shipped to, being careful to pack so that the contents will reach their destination in the best condition possible. If located near a large city, the grocery, restaurant, and hotel, are the best customers, as orders can be taken from day to day and filled according to the needs and wants of the consumers. But in the latter case a good salesman is necessary.

There are five essential points for the success of truck-farming—a suitable location, nearness to market, earliness of vegetables, good quality, and a good salesman.

DISCUSSION.

Mrs. Sargent—What do you do for the little fly on the muskmelon vines?

Mr. Nicolai—I use land plaster with a little Paris Green, but of late years I have not been troubled, because my melon vines are well established in the hotbed and when they get out in the field I have no trouble.

Question—Would you recommend transplanting?

Mr. Nicolai—If you are going to have ripe tomatoes by the middle of July, you want to transplant three times.

A Member—I believe that to have any one of these small early tomatoes that the large tomato will pay just as well. Won't they come into bearing about as quickly as the small kind, if properly started; the Pondenova variety, for instance?

Mr. Nicolai—No, not the Pondenova, or any late variety, and I would not recommend anybody to use such a large coarse tomato. It will take three or four days longer to ripen and in many cases it will get too ripe on one side before the other side is ripe enough.

Question—Will you tell us a large kind of tomato?

Mr. Nicolai—The Beauty, the Favorite, the Dwarf Champion. For family use I think the Dwarf Champion is about as good as anything you can get, and will ripen about as early as any good variety, and yet it will keep in good bearing until frost comes, no matter if you pick your first tomatoes the 4th of July. If you cultivate it well and keep the soil loose around it, you will have nice ripe tomatoes on the same vine to the first of October.

Question—What time do you transplant into the field?

Mr. Nicolai—That is a question that has to be decided by the person transplanting. I have transplanted as early

as May 6th, and I have had tomatoes frozen June 1st.

Mr. Linse—Do you trim the vines?

Mr. Nicolai—Not after they are in the field.

Mr. Scott—You spoke of starting your muskmelons in the sod. How will this method do for early cucumbers and for watermelons?

Mr. Nicolai—It will answer. I have raised cucumbers in that way, also crooked neck squash.

Mr. Hauser—What variety of muskmelons do you raise where you transplant them, early or large?

Mr. Nicolai—I have raised both varieties.

Mr. Hauser—Do you think it is necessary to have as much as six or eight inches square of sod around the plants?

Mr. Nicolai—You could use a smaller amount, but you would be just so much further behind in the season. You want to give your plants a chance to grow. I would rather have the sod eight inches square than less, and start my seed early enough so that the vine is large enough to fill the space. If it fills the space and has to go out in the field the vine becomes spindling and the wind whips it to pieces and you lose rather than gain. The same is true of the tomato plant. When the tomato plants get so that they touch and prevent the sunlight from striking through, they keep on growing, but they grow upward. When you get them out in the field, they lop over and then the sun will strike in where they were shaded before and they will sun scald. It makes a puny plant. You have got to have your plant a good dark green, and so arranged that the sun and wind will not get at it too much. That is the reason we use a large sod.

Question—What variety of muskmelon would you recommend?

Mr. Nicolai—I raise three or four

varieties. The last two years the Tip Top has been my favorite, and the Princess; I have also used the Early Netted.

Question—Are the Tip Tops so high that the boys can't get them?

Mr. Nicolai—We have so many that the boys have all they want.

Question—How is the Thomas Hybrid?

Mr. Nicolai—One of the best.

Mrs. Sargent—When you raise celery from the seed, do you transplant or do you cut down to make it stalky?

Mr. Nicolai—I have cut it down and that is the only way you can do for market gardening. You might transplant for home use, but raising celery has been overdone, so that we have to expend as little labor in raising it as possible, in order to get any profit out of it.

A Member—It has been recommended to put it into trenches and then, I read that you should set it out on top, earthing it up.

Mr. Nicolai—Nearly all the celery raising near Milwaukee is now done in that way. Of course the old way of raising celery was to plant it in trenches and level it up by hand, but that is expensive.

Mr. Hauser—Where you transplant these muskmelons, do you put manure at the bottom, or around the plant, at that time?

Mr. Nicolai—Land for melons and in fact all garden truck should be very rich, so that it does not need manuring in the hill. That is expensive, and unsatisfactory; when it becomes dry you will do more damage than good, because it will dry out under the hill. You should use a very rich piece of land, the richest you have, and then carry on at least thirty loads of well rotted manure to start with, as large as your two best horses can haul, and if you use the same

land again next year, keep right on putting on that amount of manure every year, you cannot get on too much. If you put on all that you can plow in it won't hurt the plants.

Question—Is there any vegetable besides the onion that will follow itself year after year on the same ground, and do well?

Mr. Nicolai—I never raised the onion for market more than two or three times, but it is better to rotate all garden crops as well as general farm crops.

Mr. Hauser—Would you recommend spring plowing altogether for garden stuff?

Mr. Nicolai—No, not altogether, but usually it comes the handiest, because you have to put on the manure in the fall and during the winter. I want to say that Mr. Thomas has almost exclusive control over the seeds of the Thomas Hybrid; I am a near neighbor of his but I have never been able to get any. Perhaps some of the boys in the neighborhood know where his seed patch is. When we go to buy them we always get them mixed.

Supt. McKerrow—We have here with us a representative of the pickle company and we would like to hear from him.

RAISING PICKLES.

MR. GRAVES.

Mr. Chairman, Ladies and Gentlemen:—I represent the H. J. Heinz Company, of Pittsburg, Pa., the largest pickle manufacturing concern in the world. Our crop of pickles last year was 500,000 bushels. We raise pickles in New York State, in Canada, in Michigan, in Ohio, Indiana, Wisconsin, Illinois and Iowa, so you see that if the crop is a failure in the East, it is not likely to be in the West, and if it is a failure in the West it is not likely to be in the East. We are not placed in a position where we have to go to any one else to help us out.

Soil—Seed—Cultivation.

Now, I have been asked to come here and say something with reference to the growing of cucumbers for pickle factories. You prepare the soil the same as you do for tomatoes or any other garden truck. The sandy loam soil, for raising cucumbers for pickles is the best. The very best soil is black sandy loam. Fol-

lowing that is what we term the gray, sandy loam; then comes the clay loam, though we seldom recommend that for growing cucumbers. We instruct farmers to plant five feet one way and eight feet the other, and that is so that when the pickle season comes they can be picked to better advantage without destroying the vines. We recommend the planting of six seeds to the hill; when they come up, if they are strong, pull out two or three, as the case may be. One pound of cucumber seed will plant and replant an acre of cucumbers. The cultivation of the cucumber vine is like the cultivation of anything else. We recommend the use of the hoe a great deal; however, we want the fields clean so that the cucumbers can be found to better advantage, and if there are a great many weeds in there you cannot pick all the cucumbers off; you won't see the little ones nor some of the larger ones either, and they will destroy the strength of the vines.

About Picking.

The picking of the cucumber is the main thing. If you haven't help you do not want to raise them at all. That sounds like a bold statement for a man to make who is coming into your midst to establish a pickle factory, but I repeat it, do not go into it if you haven't the help to pick the vines, because that is the main thing. When I am asked what is the average crop of cucumbers to the acre, I say about 100 bushels of the small ones and about 15 to 30 bushels of the larger ones. At the same time there will be many farmers who will not get more than forty or fifty bushels out of his crop, simply because he has not attended to the picking properly. He picks only every third or fourth day and sometimes lets them go a week, and when you allow four or five big yellow cucumbers to remain on the vine, you have finished that vine. Now, we make this statement, that the smaller you pick the cucumbers from the vines, the greater the number of bushels you get. I sometimes see people shake their heads when I say that, but it is true. There are some flowering plants, which if you do not pick the flowers off will bloom very little, and it is so with the cucumber. The more you take off, the more will come on. You can prove that statement very easily by taking a few vines this summer and picking them very carefully and leaving a few right beside them without picking, and see what the result will be. I have heard farmers make the statement that they have picked a bushel of cucumbers from one hill, and I know it to be true from actual experience, because I have done the same thing. I am talking now about the average season. There are 960 hills in an acre, planted as I told you, five by eight. You see it is possible to get a bushel from one hill, but

you must not expect to get 960 bushels from an acre; it is not practical, for one hill is not as good as another. Many farmers have told me of getting 400 bushels to the acre, but I put it at 100 bushels, because I do not wish to exaggerate in any way. I have been in this business twenty-eight years, and I speak from actual experience. I have known pickles to be raised on a piece of ground for thirteen consecutive seasons. Of course it was manured occasionally, not every year, so you can see that the cucumber vine does not drain the soil of its vitality very much.

Free Seed.

When we enter into a contract with a farmer, one of our specifications in the contract is that we furnish him the seed free of charge, and we do that because we get the very best seed that is to be had, the most profitable to the farmer, and we don't want him to experiment with different kinds of cucumber seeds. We have had farmers that have laid our seed on the shelf and bought something that was well recommended, and when the pickles came to us they were long green fellows. They thought they were planting even better seed than ours, but we couldn't use that man's pickles; so you see it is to our interest to plant seed that is profitable to you and it is to our interest also to give you seed that we know to be the very best there is. We use the Early Frame variety. We know all about the different kinds, the White Spine, and the Early Jersey, and all the rest, and have experimented with them, but we have come back again and again to this variety. We cultivate it ourselves in the West and ship it to the East, and vice versa. We experiment with our seed and know that it is right before we hand it out to the farmer.

DISCUSSION.

Question—How do you pick your cucumbers, cut them off with the shears?

Mr. Graves—No, pull them off with your hands.

Mr. Nicolai—What is the proper time for planting cucumbers for pickle purposes?

Mr. Graves—About the 10th of June. By that time the bug season is out of the way. If you plant in May, you are likely to be bothered with the bug which destroys the vines. If you plant in June there will be so many cucumber vines, the bugs will have more than they can take care of.

Question—How many pickers to the acre?

Mr. Graves—That depends upon the season; three men, three boys, or three girls will take care of two acres in an ordinary season, but if it is a good season, they can't do it; you will want four or five, and it will keep them jumping.

Mr. Arnold—What do you pay a bushel?

Mr. Graves—Forty cents a bushel; we have a contract here; fifty pounds standard weight to the bushel.

Mr. Hodgson—What is your standard as to size?

Mr. Graves—The forty cent pickle is all sizes, not exceeding three and three-quarter inches in length.

Mr. Wilcox—Do you contract for a term of years at forty cents or only for one year?

Mr. Graves—We have a contract here for five years. When you are growing cucumbers for a pickle factory, if you sign a contract you know what you will get next August and September when you bring your pickles to the factory; there is no uncertainty about it.

Mr. Thorp—If you are going to plant these pickles the 10th day of June,

what shall we do with this land prior to that? Shall we make a seed bed out of it earlier in the season or shall we let it lie and grow full of weeds?

Mr. Graves—We plow in the fall and again in the spring; then plow again, so it will be mellow. We have raised cabbage on our own grounds, and it is out of the way by the time we want to plant pickles.

Question—What do you pay for the larger size?

Mr. Graves—Fifteen cents for the large size, which is over three and three-quarter inches. We have no use for what we call sizers.

Question—Is it policy to pinch the ends of the vine off?

Mr. Graves—It is not practical, there are too many vines to pinch.

Mr. Arnold—How often should you pick?

Mr. Graves—Every day except Sunday, after you begin.

Question—What was the average crop raised at Ripon last year?

Mr. Graves—A hundred and eighty-two bushels and a half.

Mr. Arnold—How many pickle factories are there in existence in the United States besides your organization?

Mr. Graves—I don't think I can answer that question; there are probably forty or fifty. As a rule we have more pickles than all the rest combined.

Mr. Taylor—What do they cost per acre to produce?

Mr. Graves—At 100 bushels to the acre, the small size, and fifteen to thirty bushels the larger, they cost anywhere from 20 to 25 cents, making \$25 per acre; that is, from the time you put your plow in the furrow down to the time you get your money. Of course that does not include manure. Some years we put \$25 worth of manure to the acre on the ground.

Dr. Porter—What is this plant that is to be established here?

Mr. Graves—A building about 130x 180 feet is to be built, costing about \$3,000.

Question—What is the expense of picking?

Mr. Graves—That depends. If you have a large family it does not cost much. It costs from 5 to 12½ cents, depending upon what labor is worth in your locality.

Mr. Nicolai—If the cucumbers are planted about the 10th of June, it is all right, but if sooner than that, the grub worm is liable to cut off the plant. Clover sod is not troubled much with grub worms, but old pasture or timothy is. In our section of the country we call breaking, breaking up the old pasture or timothy sod.

Mr. Hauser—The question of picking is the principle work about the cucumber business. The cucumber is the same color that the vines are and you are a little liable to skip some, and every day is not too often to pick.

Mr. Graves—And we recommend very close picking on Saturday, so as to

avoid having large pickles on Monday.

Question—Do pickles grow more rapidly on some days than others?

Mr. Graves—Oh, yes, you will find that out very soon.

Mr. Hodgson—I found that there was a great deal of difference in the growth of pickles on different days.

Mr. Graves—A man who attends to all these details carefully and intelligently, will make a success. It is not at all unusual for a farmer to raise 400 bushels of pickles. We are going to have a pickle factory here; we are going to make some contracts, and there will be some farmers who will come in with 40 or 50 bushels at the end of the season. We will make a contract a second year with that man, and give him a chance, but if he does the same way we drop him. We don't want a farmer of that kind when we know that he can easily raise 100 bushels to the acre; he is not doing us any good or himself either.

Question—Is the crop easily affected by drought?

Mr. Graves—Yes, very. Do not plant your cucumbers in sandy soil.

POTATO GROWING.

H. M. CULBERTSON, Medina, Wis.

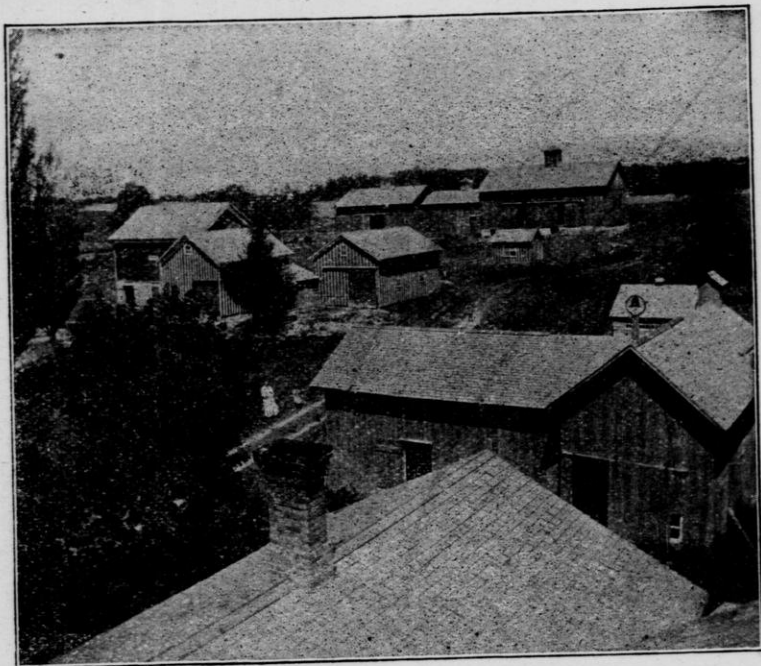
Knowledge which enables the promotion of the study of conditions is the requisite of all classes and those engaged in all lines of pursuits. The growing of farm crops is no exception. Therefore we never reach the height of excellence farther than to more fully realize the need of more and better knowledge.

Soil and Fertility.

In taking up this subject of potato growing, as that of any other farm crop, there is an immediate drift of thought as to the various conditions, such as soil, fertility, seed, tilth and cultivation, moisture, etc. This crop requires soil of open or light character, well underdrained naturally or other-

wise. Stable manure supplies the fertility required, but the best time to apply it depends upon conditions. I would prefer to apply it to sod after the hay crop was removed the year previous to planting and plow in the fall, because this would give the manure time to largely become available plant food for early summer growth, and fall plowed land has the tendency to store

touch, except such as may be in direct contact with the humus. Its purpose is adding some fertility. By keeping the soil porous and mellow more air is admitted into the soil by atmospheric pressure, the winds and by the rain, and the oxygen of the air is required in progressing decomposition, or the breaking down and making available the ingredients of fertility which other-



Farm Buildings of Mr. Culbertson.

more moisture for the following crop than spring plowing.

Soil humus, a term applied to decomposing coarse substances in the soil, is a very essential element to all plant life. We all know what it is, for it is that which we secure when sod is plowed and becomes decayed sufficiently to permit the earth to become somewhat compact, so that all soil particles

wise might not be soluble by the moisture and lost to the use of the crop. The roots of the plants also require air.

Moisture.

By keeping the soil porous or mellow, humus is especially helpful in permitting the rainfall to enter the land instead of running away on a hard, smooth, surface. Humus serves some-

what as a sponge by holding in readiness the available plant food and moisture, and giving it up at the plant's command; and when we are told that 400 pounds of water are required to mature one pound of dry matter in the potato crop, we can begin to realize the need of study along this line of moisture to insure a profitable crop.

Cultivation or tith produces fine, mellow soil, which assists in providing

plow is followed immediately by the harrow to pulverize the soil well, while moist, and it is sometimes rolled to compact it sufficiently.

The Time to Plant.

The bulk of the crop is planted during the first half of May, which enables most any variety to mature before frost. If we could foretell the time we would have the most rain, we might



Potato Digging on Farm of Mr. Culbertson.

the conditons favorable to moisture; also the admission of air, the easy development of the root system, and ease of the tuber in displacing the soil as it grows larger and larger. The rotation, or crops preceding, also have their mechanical effects in supplying this condition. We usually plant on a clover sod manured during the breaking up of winter, at which time nearly all manures are applied to the land. The

better judge, perhaps, when to plant, because if extremely favorable weather strikes the crop when the tubers are setting, a great number start and a drought following will pinch off the yield. The month of July and the first half of August is usually the fatal period for the potato crop, because it is during this period the excessive heat and drought prevails, followed by potato blight and reduced yield, and it

is here that the conditions favoring a thrifty, vigorous, rank growth show their good effects.

By early planting, or when the land has become warm, perhaps the last of April is the best time for the early varieties, because they are largely out of the way of these midsummer conditions, and in fact I believe it is the best time generally, if the crop occupies suitable soil. Late or June planted potatoes usually require least care in guarding against bugs, and frequently they secure the largest yields, as the unfavorable midsummer conditions prevail when the plant is small and very vigorous, and the late fall rains make the crop, provided the frost holds off. These potatoes, however, are usually immature and lacking in starch. Some very interesting reading along the line of the starch content in potatoes is given in the Twelfth Annual Report of the Agricultural Experiment Station.

Seed Potatoes.

Our seed potatoes are divided into two classes: The first is selected tubers from the previous year's crop and planted on a portion of the field to select the next year's seed from. The second is the general portion grown from the seed mentioned. The size of the seed planted, which is from two-thirds to a little more than full size of a hen's egg, is not determined by the number of eyes, but by the size only, to furnish nourishment for the young plant. Good crops are grown, however, from very small seed cuttings by having an abundance of available plant food in the soil so that the tiny rootlets can secure their required amount in a moist, mellow soil. Planting seed having too many eyes is objectionable as they produce many plants, and the sure way of reducing

the size of potatoes is by thick planting, or having too many plants occupy the land.

How We Plant.

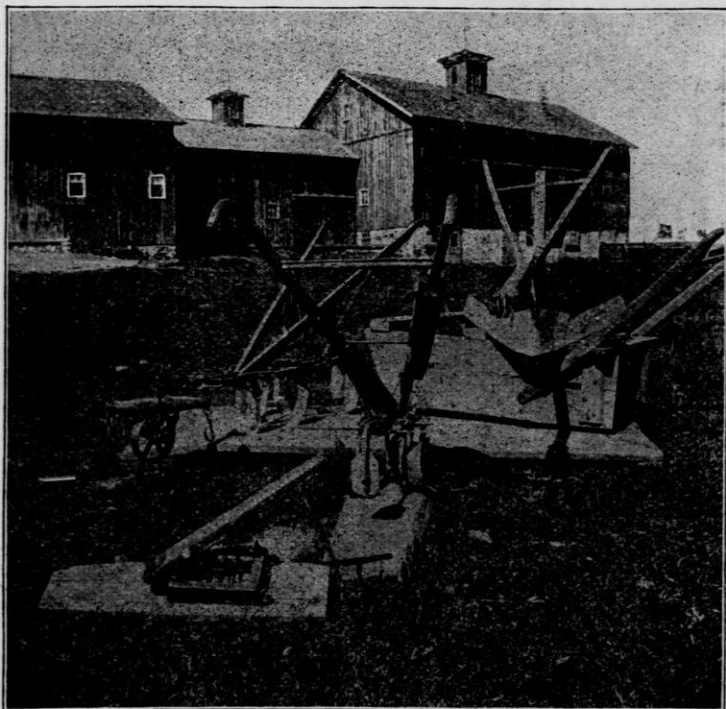
Some varieties have a greater proportional number of eyes than others, and this number may be increased by planting on land in unfavorable condition, which potatoes are likely to lack in vitality. For our early home use we plant whole, large potatoes, with most of the eyes cut out, and in this way we secure the earliest crop. We have sometimes planted with the Aspinwall horse planter, but usually we plant by hand, dropping the seed into a furrow made by a shovel plow adjusted in the center of a six foot axle of an old two-horse wheeled cultivator, driving so that one wheel follows the bottom of the last furrow made, giving equal distance between rows three feet apart. The furrows are made about four inches deep from the level of the land, which in practical speaking would be seven or eight inches deep. The depth depends somewhat upon variety, because the early, low yielding varieties produce small sized tubers growing close to the stalk, and the large yielding varieties spread in the hill and require more covering to insure against worthless, sunburned tubers; still this may be overcome by hilling.

The seed is dropped into this furrow sixteen to twenty-two inches apart, depending upon the variety and condition of soil. An illustration is found in the large yielding Rural New Yorkers, which will grow objectionably large and perhaps hollow upon well tilled fertile soil, if given too much room, but if crowded somewhat the same land will produce more bushels of desirable sized potatoes of finer quality, while the low yielding varieties never grow too large,

but require room and encouragement, especially on poorer soils.

The covering is done with a coverer made of two planks four feet long, set on edge and braced so as to be three feet apart at the front end and ten inches at the rear, with handles provided to control its use. This is drawn

move a portion of this ridge we will find little thread-like plants, the germinated weed seed growing rapidly, when the harrow is put on going crosswise of these ridges, leveling them somewhat. In a few days we go across again, continuing until the land is level, the weed seed given an opportunity to



Seven Shovel Cultivator.
Potato Cutter.

Narrow
Cultivator.

Plow Hiller.
Coverer and Hiller.

Some Tools used in Potato Culture.

by two horses, and gathers the mellow dirt from each side midway to the next furrow, not only filling this furrow, but leaving a ridge of earth.

Our Method of Cultivation.

The cultivation begins a few days after planting, at which time if we re-

germinate, and the little plants destroyed in all the upper portions of the soil, thus doing away largely with the weed crop.

Some potato growers object to this, saying that too much seed is harrowed out. This is their mistake, however, in not making their furrow four inches

deep below the level of the land, and by not dropping the seed into the bottom of the furrow, or else from the very loose condition of the soil an excessive quality of dirt is drawn into the ridge leaving the seed within the covering, instead of below the level of the land. And still another mistake and the general one is that the coverer is not properly guided by the operator, allowing one side to enter the furrow which will crowd the seed out. So, I say, the success depends upon the operator.

When the plants are three to four inches high we begin the cultivation, throwing dirt towards them. The next time through a little hilling is done with a shovel plow having a wing attached to each side at the bottom, making a gradual slope from the shovel point to the end of the wing. This time over stirs nearly all the soil between the rows and deposits a little dirt near to the plant. The next time through which follows immediately, the cultivator is again used, being set very narrow, mellowing the center of the row to conserve moisture. This will be understood as the hilling system, only shallow, however, which most truly exposes more surface to evaporation than level culture. But there are advantages in digging, also in placing the root system nearer midway in soil which contains the available plant food and best tilth.

Destroying the Bugs.

Many crops of potatoes have been lost by neglect of bugging at the proper time, and all other work must be deferred until the bugs are destroyed. Those who have made plant life a study tell us that most of the plant food receives its final preparation in the leaves, that it is here the elements in the sap taken from the soil by the roots

become carbonized by the air in the thin leaf film before they are ready for assimilation. Accepting this for a fact, as we are all capable of reasoning it to be, we readily understand what results must follow if the leaves are destroyed by insects or disease reducing the necessary surface for exposing the sap of the plant to the carbon of the air, not permitting it to become such as its nature requires, causing premature death, inferior quality, low yield of product, and an expensive crop.

The Bordeaux Mixture.

I have always practiced applying poison in water for the bugs, for the reason that the labor can be performed at any time. We used the Bordeaux mixture one year in two applications, for blight, and although it prolonged the growth of the vines there was not much increase in the yield, but the weather was very dry until the frost cut the crop.

As was intimated at the beginning of my talk, success all depends upon conditions, and there are times when we question ourselves why we did not better control the conditions at our command. We cannot furnish ourselves with a satisfactory reply, and never will be able to do so. Perhaps we lack in judgment more or less, at the moment the condition is presented.

DISCUSSION.

Question—Where do you get your cutter?

Mr. Culbertson—It is manufactured by the Dowden Company, Prairie City, Iowa.

Mr. Fraser—If you plant four inches deep, is there any danger in the hilling process over level culture in a dry season, on account of being less able to retain the moisture in the ground?

Mr. Culbertson—A little hilling is required for large yielding varieties, to obviate sun-burned potatoes, and I doubt if any serious results follow the extra loss of moisture over that of level culture.

Mr. Wing—If your hilling is correctly represented on that chart, I think it is about what an ordinary man would call level culture.

Mr. Culbertson—I don't know as it is. A great many, especially on sandy soils, leave the land entirely level, and, I think, perhaps it is proper on account of the very loose condition of the soil.

Question—How do you account for the difference in the growth of those two varieties of potatoes on the chart?

Mr. Culbertson—It is an illustration of results if the bugs are allowed to destroy the leaves. The leaves are required to expose to the carbon of the air the sap of the plant, to make it perfect for plant life, and if this leaf surface is diminished the plant suffers under unnatural conditions, and a low yield follows.

Question—At what time do you finish the cultivation of your potato crop?

Mr. Culbertson—We never finish unless the vines get so large we cannot get through. We keep up the cultivation all summer. Of course there are certain conditions under which you can give the growing crop too much cultivation. But I believe if we do not disturb the hilling, cultivating only in the middle of the row, we are doing much good, for suppose there are a few feeders destroyed, we are not only doing away with a crop of weeds which grow up late and take both moisture and fertility, but by shallow cultivation we retain moisture by tith.

Mr. Hodgson—Is there any difference in the seed end of a potato and the other end, and in cutting the potato for seed are you careful to have the seed

come to the center of the potato to protect that inside germ that grows on each eye?

Mr. Culbertson—We are told by authority that the so-called seed end gives the strongest plants. I believe this to be true because in planting large, uncut potatoes the opposite or stem end throws out but few plants in proportion to eyes. As for the inward germ I have given no attention in cutting.

Mr. Scott—Wouldn't you prefer to have the seed piece in a chunky form?

Mr. Culbertson—Yes; I like that little apparatus for cutting very much. It suited my idea much better than cutting by hand, because the pieces are very compact.

Mr. Goodrich—You have recommended to plant potatoes four inches deep. Undoubtedly that is right in a general way, but doesn't it make a good deal of difference what the soil is? You remember you and I were up to West Superior, and when we talked of planting potatoes four inches deep, somebody said that if he covered his potatoes four inches deep he would never see them again, you might as well put a solid rock over them, because of the heavy clay soil. You know we are talking for the whole State, and there are all kinds of soils.

Mr. Hodgson—Have you ever planted small potatoes and how small?

Mr. Culbertson—I have planted them down to about half the size of a hen's egg.

Mr. Nicolai—In our section we are adopting that, and we find in a dry season that it is better than using the planter. When the soil is dry for two or three inches, the cover drags the dry dust on the potatoes and onto the seed, and if it is cut, it is liable to be injured a great deal.

Mr. Culbertson—Of course you must consider conditions. When potatoes are

dropped in a furrow and exposed to the hot sunshine they are injured, but on a hot day these furrows are only open a very few moments. They are covered up almost immediately.

Supt. McKerrow—I judge from what I know and have seen of Mr. Culbertson that he means to state that the average depth should be about four inches. If the soil is very light and sandy, they should go deeper; if it is very heavy clay, they should go nearer the surface.

Mr. Scott—I want to refer to experiments. You know the farmers, some of them, are getting it into their heads that they cannot raise any crops without the use of commercial fertilizers. Prof. Roberts, down at Cornell, though, he would see what could be done by intensive culture. He picked out a piece of land on which no fertilizer had been used for five years; he plowed it three times, twice in the fall and once in the spring, giving it good preparation. Then

he took a double mould board plow, furrowed it out about three feet broad, dropped the potatoes and then took the same implement and split these ridges throwing up quite a high ridge over the potatoes. He left the field in this condition until the weeds had started; then he put a 2x4 scantling under his harrow diagonally and went on to smooth this down. They followed this method for two years and as a result they got from two hundred and fifty to nearly four hundred bushels on land that had not had any manure on it for five years.

Mr. Taylor—I saw in a paper the other day that in order to raise potatoes in a dry season it was recommended that you plant onions every other row. The strength of the onions will water the eyes of the potatoes and moisten both crops.

The Institute adjourned until 1:30 P. M.

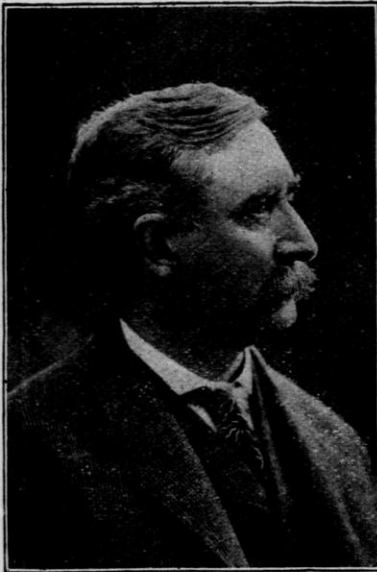


AFTERNOON SESSION.

The Institute met at 1:30 P. M. Mr. H. A. Briggs in the chair.

SWINE BREEDING.

A. J. LOVEJOY, Roscoe, Ill.



A. J. LOVEJOY.

The hog is well known over the world and is confined to no one part in particular. He is the animal which the ancients sacrificed to the Goddess of the harvest, Ceres. He is also, as the Irishman says, "The gentleman that pays the rint."

The utility of the hog is in a great measure owing to its remarkable fecundity, reproducing at one year old, and bearing from five to ten at a time and

often more. Some man of figures has estimated the product of a single sow with only six young at a time, in ten generations to amount to the grand total of 6,500,000. This number will no doubt equal even the statistics of the American hen, as given by our ardent advocates of her producing qualities. It takes a great statistician to get ahead of a hen enthusiast.

Money in Hogs.

The hog has been a reliable source of revenue on the American farm since the earliest recollection of man, when the farmer raised but a few to use up the refuse of the kitchen and dairy and to supply the family with good, old-fashioned pork and sausage, up to the present day when his lordship, the up-to-date hog, supplies in his various products the wants of the people of the civilized world, not only with choice bacon and hams, but with lard, illuminating and lubricating oils, head cheese, sausage, souse, combs, brushes, buttons and ornaments of many kinds, there being nothing lost or wasted after his slaughter except the squeal.

Hardly a day passes that we do not hear the remark "as dirty as a pig." This I consider a vilification of the animal which Franklin's colored servant said was "the only gentlemen in England," from the fact that he was the

only animal that did not work in that country. In that respect he much resembles the members of our Legislatures. He calls to order and adjourns to eat and sleep. I believe that the hog is the most cleanly of our domestic animals, if raised as he should be and given a chance to roam about and not be confined to very close quarters.

It has been said that "the American hog is a machine that oils himself, puts ten bushels of grain into less space than a bushel measure, and in so doing doubles its value; then carries it to market on his back." Corn loaned to a well-bred hog is money at big interest. It is like a mint, while the great American staple, corn, is the bullion which put into the hog is transmuted into coin. It is an honest mint and gives sixteen ounces avoirdupois of edible material. Properly bred, fed, and intelligently handled, this autocratic porker will pay off our debts, place a piano in the home, a surrey at the door for yourself and family to ride to town in, educate your boys at the Agricultural College, and leave a balance in the bank for a rainy day. So much for the hog in general.

The Best Hog to Raise.

What kind of hog is most in demand? What shall we as farmers breed to receive the most profit from, in the shortest possible time? There has been of late a great hue and cry about the "bacon hog," and there are many who think we should return to the type of thirty or forty years ago, thus losing all the improvement made in the feeding qualities of our modern hog. The markets to-day are paying more for the fat backs, the corn-fed hog, than for any other class, and to show you that even in London, England, and in Limerick, Ireland, what is thought of American bacon and hams, I will quote again:

"The principal reason that our pork products are discriminated against abroad, is because it is of a better quality, and sells cheaper than their own home production."

American Hams.

It is a well-known fact that the highest priced fancy pork products sold in Ireland by the Limerick dealers was put up in Chicago, and by special instructions marked with private brands of Limerick dealers, who for years past have been selling Illinois and Wisconsin pork products on the Continent, as best Irish bacon and hams. The authority for this you can find in consular reports, Nos. 122 and 129. In further proof I can cite to you the case of the Bacon Curers' Association of Great Britain, who prosecuted the Junior Army and Navy stores of London for selling American hams for Irish, and secured a fine and costs amounting to \$360.00. Investigation showed that the American hams were changed into Wiltshire hams by oiling and rubbing meal over them, and branding them "Finest Wiltshire." They were then put on the market as Irish product, and sold for 24 cents per pound, while the remainder of the identical consignment sold for 17 cents per pound, as American hams. A Leeds correspondent of an Eastern paper states that "in their market the best American hams can be bought for 13 cents and they need no 'faking.' What the American farmer wants to do is to keep up the quality of his product and the English market is assured." Thus it would seem that we do not need any change of breeds by going back to the Razorback, or his first cousin, the Tamworth.

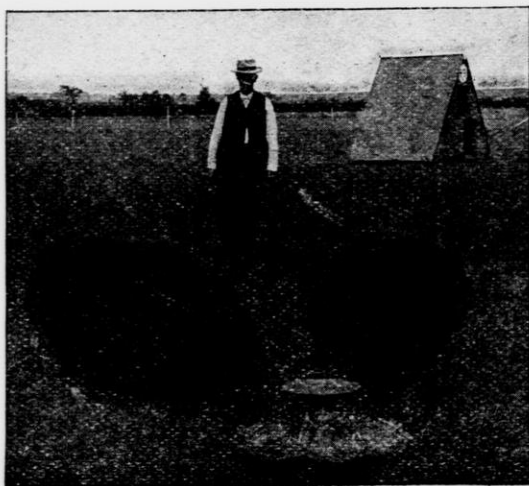
Best Feed for Good Results.

If we want to make any improvement in the quality of our hogs for produc-

ing bacon it can be done by selecting the larger, more rangy sows for breeders, then by a system of feeding the by-products of the dairy and mill, with good pasture and less corn, we can practically accomplish the result, but not until the packers of this country make a higher price for hogs fed with a view to making a finer quality of bacon. The early maturing type of hogs will pay the best, especially in the corn belt. Most of our breeders and many of our best farmers are changing their

Advantage of Early Maturity.

I spoke of there being more profit in the early maturing type of hogs than the so-called bacon sorts. By the early maturing type I mean the improved hog of to-day, of whatever breed one fancies. It is a hog that by many years of careful selection, breeding, and feeding, can be put on the market at an extremely early age, and at a weight that is to-day a popular weight. A hog of this kind can be grown at much more profit than one that takes twelve to



A pair of Mr. Lovejoy's prize Berkshires and movable pig-shed.

methods of feeding from an all corn ration from pignood to maturity to one of greater variety. It is conceded by all up-to-date farmers and breeders that the hog is a grazing animal. Nothing so helps to cheapen the production of our pork products as grass or the clovers. It is almost a necessity that for economy in cost and better thrift of the growing animals, it should find a place on the bill of fare of every breeder and feeder of swine.

eighteen months to get ready for market, as it is a well known fact that the first hundred pounds costs less than the second hundred. I believe it requires but about one-quarter as much for the food of support for the first hundred pounds as for the fourth hundred. The risk is also much less in growing a hog that can be turned off at six or eight months of age than in carrying them along through the winter and making a heavier weight. Better raise two crops

of hogs a year and sell them younger, than one crop of heavier hogs.

Selection of Brood Sows.

In selecting the sows for breeders do not select the young, fat plump sow, that is immature. Breed from mature animals. Nine-tenths of the loss from swine diseases comes from the continuous breeding from immature animals, and an unbalanced feed ration, such as an all corn diet. When you find you have a brood sow in your herd that is a good regular breeder of large, even litters, that is a kind mother, one that furnishes plenty of milk for her young, keep her as long as she lives—she is worth a dozen young, immature things. It may not be generally known that there is as much difference in the milking qualities of the swine herd as there is in the dairy herd, but it is nevertheless a fact.

The Proper Time to Mate.

In this climate I would mate the animals in November, thus bringing the litters during March. Perhaps as far north as this it might be better to breed in December for April litters. The earlier the pigs are farrowed, if one is prepared to care for them—and everyone should be—the better. They can be pushed along during the suckling period by giving them plenty of feed on the side, and by the time the young clover is ready put them on that, which with a feed composed of wheat middlings, ground oats and skimmed milk, with plenty of corn and corn meal, will soon finish them for the early fall market, and their cost up to this time has been comparatively small.

To the breeding sows that are to farrow during the spring, much care should be given, as on the proper feed and exercise much of the success in securing strong, vigorous litters will de-

pend. The sows at this time should not be fed on corn alone. Corn makes nothing but fat, or the white meat. They should have as great a variety of feeds as possible. Oats are a good feed for brood sows, fed either whole or ground. Wheat bran or middlings are among the best feeds also. Some corn can be fed to advantage, or a mixture of ground corn and oats together makes a good feed. Roots, either mangles or sugar beets, we have found a grand thing for our hogs during the winter months. We also feed once a day, a feed of clover hay run through the feed cutter. The above feeds, with plenty of exercise, will insure good success. Give good shelter where they can be warm and comfortable. Keep but few in a place if possible.

Cooked Food.

The young shoates or fall pigs should be fed similar, only that rather more corn can be fed to advantage after they reach a weight of one hundred pounds. At our farm we are strong believers in feeding cooked or scalded feed to all young stock in the winter. Not that we believe there is any more or as much nutriment in cooked feed, but that the pigs like it better and eat more of it, and for this reason do much better. We have fed in this manner for twenty years and see no cause to change our methods. Nothing looks worse to me than a lot of pigs fed cold slop when the thermometer is below zero. They come out from their sleeping place warm, eat a little, get chilled, hump up their backs, and run back to their pens and pile up. Young pigs fed in this way cannot thrive, and will have an unhealthy look.

Careful Attention to Details.

There are many things connected with the successful growing of swine

besides the one great thing of being a good feeder. This, of course, is of the most importance, but a man to get the best results should be a very careful and close observer. He should note daily every animal, see if each comes to his feed promptly and eats with a relish, watch the condition of the bowels, examine the coat, and see that they are free from vermin. This is one of the greatest troubles to contend with. It will require eternal vigilance to get entirely free from this pest, both from the hogs and their sleeping quarters, if once the herd becomes infected. Probably as good a remedy as any is a strong kerosene emulsion. To prepare this, take one quart of soft soap, or $\frac{1}{2}$ pound of hard soap, and boil it in two quarts of water. When the soap is dissolved add to this mixture while hot one pint of kerosene. Stir violently, and it will make a permanent mixture. This should then be diluted with ten parts of water, and the animals sprayed with it. This should be repeated as often as once a week, for two or three weeks. The sleeping places should also be thoroughly cleaned and sprayed in the same manner. Notice the herd also, and see if there are any among them coughing. If so, give them a little turpentine in their slop or drinking water. This cough is usually caused by the small threadworms in the throat, and a very few doses will cure the trouble. We use large quantities of cob charcoal made after the plan used and advocated by your fellow farmer and most thorough swine breeder, Mr. Theodore Louis. This is prepared by making a pit. Ours is five feet deep and almost five feet across the top, shaped like a cistern, being smaller at the bottom. We start a fire in the bottom, throw on a few cobs and as the fire increases add more cobs, never letting them burn only to

a glow. Continue this until the pit is full. Dissolve copper in a barrel of water and add some salt. Then pour this on the mass and cover the pit closely, and you will have a wagon load of the best charcoal. You will be surprised at the amount your hogs will consume.

Use Good Sanitary Measures.

It is said that "An ounce of prevention is worth a pound of cure." Keep all feeding floors, sleeping pens, and troughs clean. Use a good disinfectant and use it often. Air slacked lime is good; scatter it around and use plenty of it. At our farm we use chloronaphtholeum. It can be purchased in any quantity, and should be diluted with from fifty to one hundred parts of water. It thus forms a milk-white fluid that is one of the best germicides and disinfectants known. It is used the world over in hospitals, asylums, stables, etc. Sprinkle it over the feeding places, in the sleeping places, and over the hogs. If they get some of it in their feed, so much the better. Do not let too many hogs run together; old and young should be kept separate during the winter. We use small houses.

You may say all these things are too much trouble, too much work. Why, in my opinion, it would be one continual round of pleasure compared to being a dairy slave, and to be tied to a cow's tail 365 days in the year, and I very much doubt if it would not pay better than the dairy cow, unless in the hands of an expert. Neither business is a path strewn with flowers, but if you like to feed swine, and will give your time and attention to it, you will find it one of the best and quickest methods of condensing the products of the farm into cash, and at the same time keeping up the fertility of the farm by feeding the produce and marketing only the

finished products. It is the finished product that brings the most money. Our farms should be manufacturing plants, and everything produced should be sold in a condensed form. In these days of close margins no man can sell the raw material from the farm for a series of years and succeed.

In closing I would say, breed good hogs, feed well, select carefully, use your best judgment, and you will find the breeding of swine one of the most profitable departments of the farm.

DISCUSSION.

Question—Have you been troubled with cholera?

Mr. Lovejoy—Yes, I was, about twelve years ago. I want to say that before the cold weather comes we put in about two feet of straw in these houses.

Mr. Convey—What does a building of this size and kind cost?

Mr. Lovejoy—My buildings cost me \$14 apiece, but they are double; they are painted and they look very nice. They are eight feet square. They are about 200 feet between each building; each house sets in the center of an acre. Each sow and litter has an acre of ground. There is a floor which is made on 2x4's connected with the frame.

Mr. Imrie—Wouldn't it be better if that were simply a platform, so you could lift off the house and clean the floors thoroughly?

Mr. Lovejoy—They never are dirty. Those houses are cleaned every Wednesday, swept out and thoroughly cleaned, and clean rye straw put in them. They are kept on those twenty acres and after a few years I will move them onto another twenty.

Question—How do you carry water and milk to them in the winter?

Mr. Lovejoy—We have a little black Morgan mare that has fed the hogs for

ten years and she knows just what to do. We have a little wagon made, only eight inches high. I went down to the factory and got four band wheels with six inch surface and put on a platform eight feet long and four feet wide. We can set four or five barrels on that; the man goes up one side of the lane and feeds them, and turns and comes down again on the other side. We feed in round iron troughs, eight animals to the trough. We put a sow and litter in here every year, and when they are older, we put the sow out in the pasture and leave the litter until they are shipped.

Mr. Arnold—Do you ever sow any small grain for pasture?

Mr. Lovejoy—Yes, rye and oats.

Question—Do you ring your hogs?

Mr. Lovejoy—I do, those that are in that pasture.

Question—How would those little houses answer for the northern part of this State, where it is pretty cold?

Mr. Lovejoy—I am eight miles from Wisconsin, over the line in Illinois, and we never have any trouble. Sometimes the snow might drift around by this door and you would have to shovel it away.

Question—You feed them outside?

Mr. Lovejoy—I do; I never fed an animal under cover in my life. We have a little feeding floor about sixteen feet square, on which one of these troughs set in the center. The houses are in the center of the acre.

Question—What is the shape of the acre?

Mr. Lovejoy—It is a little longer than it is wide.

Mr. Hodgson—Do you feed warm or cold feed?

Mr. Lovejoy—Warm feed to our young stock.

Question—What do you use for fencing?

Mr. Lovejoy—Page woven wire fence, thirty inches high; any kind will do. My fence cost me about 31 cents a rod. It is a good one. We are raising hogs to sell as breeders and we sell all over the world; we have to keep them pretty nice. We have pigs born every month in the year, pretty nearly every week.

Mr. Wing—Wouldn't it pay to keep them in this way even for commercial purposes?

Mr. Lovejoy—I think so, but most men would not think so. My twenty acre lot didn't cost me \$500 as it stands now.

Question—Did you ever sow millet for pasture?

Mr. Lovejoy—No, I didn't. We are where we can raise first-class clover and that is pretty good.

The Chairman—Did you ever grow alfalfa?

Mr. Lovejoy—No, our springs are a little too wet for alfalfa.

Mr. Imrie—How do you seed those pastures to clover when you want to re-seed?

Mr. Lovejoy—I calculate when this pasture gets used up to move onto a new place. That will run the five years. It will run into blue grass before that, it is now running into blue grass. It was all clover when I first went in there, but as time goes on the other grasses take the place of the clover.

Mr. Convey—Have you tried Alsike clover?

Mr. Lovejoy—No; I understand it is very good. We have fed clover to all of our breeding sows once a day this winter. We feed it dry, but they eat it up nicely.

Question—How do you keep your hogs from tearing up this grass?

Mr. Lovejoy—We ring the mother when she goes there with a litter and about the time the youngsters are big enough to root they are sold.

Question—What is your chief point of excellence in selecting a brood sow?

Mr. Lovejoy—We like to select the sow that is large and roomy, a kind of a motherly-looking sow. But don't select the chunky ones.

Mr. Arnold—Which is the most valued part of the hog, on the market?

Mr. Lovejoy—Why, the ham of course.

Mr. Arnold—Then it is necessary to have a breed with good hams and shoulders. What is the comparative value of the hams compared with the side meat?

Mr. Lovejoy—I should judge it was worth 25 per cent. more.

Mr. Arnold—You can't get a very heavy ham on a long hog.

Mr. Lovejoy—Oh, I don't know. You get more weight at the same age. I can show you shoats, farrowed June 17th, that weigh 300 pounds now, and they are not fed for weight. They have had clover hay and wheat middlings and ground corn and oats together, twice a day.

Mr. Moseley—Before farrowing, what do you consider a balanced ration for the dam?

Mr. Lovejoy—We feed wheat middlings, ground oats fed twice a day with sugar beets and some corn. Of course, I wouldn't feed corn alone; I wouldn't think of such a thing. I should expect small pigs and a feverish dam like as not, and she might eat her pigs up.

Mr. Arnold—What do you think about this early maturity, breeding from immature animals in order to induce it?

Mr. Lovejoy—I don't think that is proper. I would breed from an animal of the early maturing type, but I would have a mature animal.

Question—Would you select a sire of the same type as the sow?

Mr. Lovejoy—No; we select a sire shorter and more compact. Our breeding sows have lots of food and lots of exercise. They have to come to the edge of the enclosure to get their food twice a day. We have a farrowing box and we put the sow in there and keep her there twenty-four hours after pigs are farrowed. Then she has her own little house that she is put into after that. Every pig is born in the same patent farrowing house on our farm.

Question—How do you get them in and out?

Mr. Lovejoy—They are well trained and go in and out like a horse.

Question—If you should select an immature sire and dam wouldn't it have a tendency to make a small, finer bone, less liable to carry the weight you put upon it?

Mr. Lovejoy—Yes; we never sell a sow that is a good breeder. We have one in our herd now that is in her thirteenth year and we have a dozen over eight years old, and they will stay there as long as they live.

Mr. Wing—Don't you use your sows at a year old for breeding?

Mr. Lovejoy—Oh, no; we have fifty sows this year and they are all one and a half to eight and ten years.

Mr. Wing—They haven't got through growing?

Mr. Lovejoy—Oh, yes. But they have not got through raising good pigs. Many farmers breed them before they are a year old and feed them corn every year, and every year the pigs grow smaller. Our hogs are bigger today than they were twenty-five years ago.

Mr. Convey—Describe what you consider a perfect type of hog.

Mr. Lovejoy—That is a pretty good shaped hog on the chart now. It looks as if it might be Klever's model, the \$5,100 hog.

Mr. Arnold—Do you like as much jowl as that?

Mr. Lovejoy—No, not quite, and I like the back a little bit more arched. That is rather a small leg, too, for that hog. I don't like great, coarse bone like a Clydesdale, but I like a good-sized bone.

Question—Is not that hog in too good condition?

Mr. Lovejoy—Yes, he is a show hog and in too high condition for breeding.

Question—Is it advisable to buy a hog that has taken a prize at a fair?

Mr. Lovejoy—No; I hardly ever bring them home, and yet you will be surprised to see how quickly men will buy the fattest pig they can find.

Question—If you were raising hogs for the market in general, would you advocate breeding from mature dams, then?

Mr. Lovejoy—I think so, yes.

Question—It seems to me you would increase the cost.

Mr. Lovejoy—It costs hardly anything to keep a lot of breeding sows, if they are mature. We don't try to keep them fat.

Question—You cannot very well keep a sow a year for less than \$10.

Mr. Lovejoy—You cannot if you grain them, but if you put them on pastures it don't cost anything near that amount.

Question—Not if land is worth what it is in Wisconsin?

Mr. Lovejoy—It is worth \$100 an acre down where I live. You could not get me to breed from young sows anyway.

Question—If I or anyone should send to you for a good class of hogs to breed from, what type would you send me?

Mr. Lovejoy—I would send you one of a type not in your market. I try to keep my pigs in thrifty, nice growing condition, and make right around a pound a day to ship out.

Question—You would send a different kind to what you would take to the fair to show?

Mr. Lovejoy—I would send the same kind of a pig, but he would not be fitted up like a show pig.

Mr. Hodgson—If you were selecting a type of hog would you make a difference in the kind, Poland China, for instance; would you want a heavier bone, or say a Berkshire; would you make a difference in the two kinds in the quality especially of the bone?

Mr. Lovejoy—No, I would try and select a hog about the same type whatever breed I use. Every man has his type and he wants to stick right to that.

Mr. Convey—After all, among the better class of all breeds, is there very much difference in type?

Mr. Lovejoy—Not very much. You take the Poland China and the Duroc—I never saw a type of hogs that have changed like the Durocs. They have adopted the Poland China type. I notice the Jersey Red fellows are getting nearly to the Poland China type. They are about alike, except the color, and the tip of the ears, and I have been judging in nearly every State in the Union.

Question—You are a Poland China man, aren't you?

Mr. Lovejoy—No, sir, I am not.

A Member—There seems to be quite a difference of opinion with regard to the cost of keeping a young sow and an old sow. I have been breeding hogs in large quantities for a number of years and I have come to the conclusion that we can keep the old sow just as cheap as the young one. You have got to feed

the young sow a larger amount of dearer food. If you feed the old sow with that same food, she will accumulate much more flesh than the young sow. I prefer the old stock in every instance.

Mr. Lovejoy—Our breeding sows cost us very little after they have weaned the pigs.

The Chairman—Of course, the young sow has got to make her growth while the old sow has her full growth, so that the young sow must be fed liberally in order to develop properly, and that is true with all stock, which fact many farmers do not appreciate.

Mr. Lovejoy—Many fatten their dams as soon as the pigs are weaned and turn them off. We do not do that.

Mr. Arnold—I think you can tell something of the quality of the bone by the hair on the leg. Where the hair is rough it is apt to be weak, and where it is silky it is stronger.

Question—I know many farmers who are feeding their sows this winter on nothing but corn. In my own herd I have sixteen, two, three and four years old, with long, nice bodies, and it doesn't cost me hardly anything to winter them, just a few small ears of corn. Now, can I improve upon that herd by changing their feed?

Mr. Lovejoy—If you are feeding corn exclusively I should give part oats. An all corn ration is apt to make the sow feverish and inclined to take on too much fat, and she won't do as well.

Question—What is your breed?

The Chairman—He is breeding Berkshires.

SHEEP BREEDING.

J. E. WING, Mechanicsburg, Ohio.



WOODLAND FARM.
A good Dorset ram lamb.

Mr. Chairman, Ladies and Gentlemen:—I wish I could get up as much interest in the sheep question as has been shown in the hog question. My heart has almost failed me in going through Wisconsin, I am afraid there are not many good shepherds. I believe I would like to ask you to hold up your hands, those of you who are shepherds. (A good many hands go up.) Well, that is better than I expected; I was too easily discouraged.

I will give you just a short talk and make a few points to hinge your questions upon. If a young man should come to me and ask me what I would advise him to do, what work I would

advise him to read to teach him to be a shepherd, I would say, "Get your Bible, open it to the 21st chapter of John and read the fifteenth verse; commit it to memory," and when he had done that, he would find that that verse, among other things, says, "feed my lambs." That is all there is in the sheep business. You ask why not feed the old sheep. Of course, when we feed the mother, we are feeding the lamb, but why not feed the old sheep? Because you can't afford to do it. You can't afford to feed these old sheep for the number of pounds they put on, and that is why I say, feed the lambs. We should feed the lambs because when they are lambs their digestion and their assimilation are so perfect, the food almost all "sticks to their ribs," and you get much greater gain in proportion for the food given to the little lamb than when fed to any other animal on the farm. You can make a pound of lamb mutton cheaper than a pound of any other meat on the farm, and taking the average, you will get more for your mutton than any other meat you produce.

The Good Shepherd.

It takes a little skill to be a shepherd; it takes a man with a little loving kindness to be a shepherd. I don't like hogs very well, that is, not for very long at a time, but I do love the sheep. I can hire plenty of men to feed and take care of hogs, but I cannot easily hire men that will take care of sheep properly, and that is the reason why the sheep business is not going to be overdone.

Feeding Lambs.

Now, about feeding the lamb. How soon are you going to commence to feed them. You have got to begin a long time before they are born. You want the mother fat when they are born, and a good, strong flow of milk, which will continue. Ewes are wonderful milkers, far exceeding the milking capacity of the cow, and the milk is richer, too, sometimes testing as high as fifteen per cent. butter fat. You have got to feed them for that; you want the ewes to come in with a full udder and with a quantity of fat back of it. You have got to feed food rich in protein, bran, linseed meal, clover hay, and such things as make milk, the ewe has no magic power within her body that will enable her to make milk out of corn—it has not much of the element of milk in it. About the time the lamb is a week old you will see it looking around to get something to eat. Then give it a chance. Suppose you are having lambs come now, and you ought to, this is none too early, somewhere in the corner of your barn you want to fix a little creep, make it of any kind of boards, just little picket fence boards, seven or eight inches apart, depending on the size of the ewes. Make a little fence and enclose a little pen, and in this little pen put a little trough; put a little wheat bran in this trough and then a little corn meal and about 10 per cent. of oil meal. Be sure the trough is clean, and put a little brown sugar on it right at the start to get the lambs to eating it. After they learn to feed they won't need any sugar; they will soon learn and will put this corn meal and bran where it will make growth. Clean that trough out every day and give to the ewes what is left, and fill it up fresh. Feed them two or three times a day. At home I use a self-feeder. I use it

because it is convenient to put in two or three sacks of feed at once, and day after day I go to this feeder with a basket and pull out with my hands all that is in sight and give it to the ewes, because the little lamb is very particular and he doesn't like any kind of food that another lamb has nosed over. Give them a little clover hay and alfalfa, and if you have nothing else, give them timothy, but don't give it to them next year. Have something better. It makes no difference whether you are going to keep your lambs until fall or not, that grain feed fed to them now is worth a dollar a bushel. When they get out on grass they will have the ability to eat and they will go through the summer in fine shape, and in the fall they will weigh very much more than they otherwise would.

The Best Feeds to Grow.

In my experience in making mutton I have found out that feeding these little lambs one hundred pounds of food will make double what it will on a lamb of five or six months old. Now, about the production of that feed. Grow your own protein, don't be dependent upon others in your early feeding. When we had to feed so much oil meal and wheat bran, and pay for it, it was because we were feeding timothy hay and oat straw. A sheep wants to eat some oat straw, and that is all right, but we began to grow clover and more of it, then alfalfa and more alfalfa. Now we are growing very little on Woodland farm but corn and rape, clover and alfalfa, and our farm all goes to sheep, and we have cut down the cost of our lamb production very much. It used to cost us \$6.00 a hundred, last year it only cost us \$3.50 a hundred. We fed just alfalfa and corn this last year to our fattening lambs. I rather dreaded telling that in Wis-

consin, because I knew I was coming among men who have a mighty reputation for scientific feeding, and I was liable to hurt my own reputation when I said I was feeding only alfalfa and corn to my lambs, after they were weaned, but I took occasion to tell Prof. Henry about it, and I have more confidence in his judgment in questions of feeding than of any man in the United States. I said, "I know it is

leaf, a green, juicy plant, with more sugar in it than cabbage. When I walk through a rape field I always break off a stem and eat it, I like it because it has so much sugar in it. The rape comes up in a great wealth and will make mutton for nothing, because it will grow on black ground that would produce only weeds; or you can sow it in your corn at the last cultivation and in Ohio we can pasture until Christmas;



Dorset Ewes on Alfalfa. April, 1899.]

not a balanced ration." He replied, "I don't know. You couldn't better it; you are getting returns at any rate, making money."

Rape for Making Mutton.

I want to refer to one other point. After your grass is cut, then comes a period of drought, and then in the fall it comes again, there is where your rape comes in. Rape is like a big cabbage that forgot to head out, a branching

it takes cold of about 12 degrees above zero to injure the rape. You must not turn your ewes in after it has been frosted, you will find it very profitable to turn your lambs in there in September, October and November. After you put your lambs in the barn let them have a chance to gambol around in the yard and have plenty of air. Don't try to keep them warm, but just in a clean, dry place, with good air. Turn them out on the hills and not in the same

pasture every year; then turn them in the rape and then in the market, and see whether you haven't a larger lamb for less trouble than anybody else in your neighborhood.

DISCUSSION.

Mr. Imrie—Do you feed these 1,100 sheep altogether or in bunches?

Mr. Wing—They were practically in two lots, but they would have done just as well fed altogether. There are two essentials in feeding a lot of sheep together, one is that the air must be pure; our barn basement is practically a covered barnyard. The air comes in freely all around. The other point is that every sheep must have a chance so that they can all eat at once, and the little fellows not wait for the big ones to get through.

Mr. Goodrich—Where there are so many fed together don't you find that some of them are more ravenous and greedy and get more than their share, while others that are slower in eating don't have so good a chance?

Mr. Wing—Our lambs are rather even in quality and in size, and we have room for every one to eat at once; when they get their heads placed in the racks they don't pull them out until they have fed a long time. They do not roam around. It is a good plan, of course, to sort out those that are not doing very well.

Mr. Imrie—I understand this gentleman was fattening lambs, while I think Mr. Goodrich was speaking of wintering, where they are not fed so heavy.

Mr. Wing—Yes, in wintering breeding ewes, I would always have three lots.

Mr. Arnold—If you were buying stock sheep for breeding, would you buy one that was well woolled or not?

Mr. Wing—I always want them well

wooled, but I would never seek an excessively covered sheep. Sheep that are bred especially for wool and have wool on the tips of their ears and on their toes and eyeballs, are not profitable sheep for the general farmer.

Question—Is there any truth in the statement that it costs more to raise a pound of mutton than a pound of beef?

Mr. Wing—It costs less and you get the wool for nothing.

Question—Have you had any trouble in losing lambs along in August or September, from worms? We have lost twenty or thirty out of about two hundred, and have been unable to stop it.

Mr. Wing—Yes, I am sorry to say, I have had considerable trouble. A good many of my gray hairs come from a little stomach worm, not in my own stomach, but in my lambs', and from what I hear I think they are very much in evidence in Wisconsin. Often the shepherd will not realize what is the matter. Lambs that have scours have stomach worms, a little twisted worm that gets in the fourth stomach and destroys the lamb's digestion. Benzine is the only thing I know of that is of any particular value in reaching them, and I will tell you how we administer it. A dose for a lamb is from one to three teaspoonfuls, and it is a pretty good idea to buy a measuring glass to measure the teaspoonful, because teaspoons vary, and you can get a measuring glass for a nickel. It must be diluted with something, because, if you give that raw benzine to the lamb he will be dead in a second. The best thing is flaxseed tea, made just thick enough so you can pour it. Take four ounces of the flaxseed for a dose for one lamb. It must be mixed separate, put that all in a bottle, shake it together, set the lamb up and don't rear his head back, and pour it down him

slowly. Do it when he is hungry; shut him up the night before, repeat for three days, and that will nearly always correct his trouble.

Mr. Philips—Please give us the proportion of gain with you between the Mexican lambs and the others.

Mr. Wing—I fed them all at the same time and fed them the same quality of hay and about the same feed. The Mexican lambs weighed fifty-six pounds when we bought them, February 8. They weighed seventy-eight pounds when we sold them, May 8, and we picked out the grade Dorset lambs born in February that we didn't care about keeping for breeders, which were not always the best, and sent them to Buffalo along with the Mexicans, without weighing them, and when they got to Buffalo they weighed eighty pounds on the average. The Mexicans had gained twenty-two pounds, and their wool besides. In the same time these little fellows had gained seventy pounds, saying they weighed ten pounds when they were born, and they weighed eighty pounds at the end of this time. That is not all. They sold for $7\frac{1}{2}$ cents a pound; that is, the little fellows, right from their mother's side, that were not weaned, whereas, the Mexicans sold for $5\frac{1}{2}$. It was just like finding money and every one of you can do it.

Question—But you had to keep the ewes?

Mr. Wing—We had the wool. I don't say the wool quite paid for the keep of the ewes.

Mr. Mosher—Have you ever had any trouble with bloat in sheep running on clover?

Mr. Wing—Yes; the best way to guard against that is after your sheep gets used to clover, never take them off of it, but if a sheep is bloated, you can tap it, just the same as you would a cow. I have never lost any that way.

It is a good thing to have a little punch with a hollow needle.

Supt. McKerrow—The sharp blade of a jack knife and a goose or turkey quill will work all right. We have heard a good deal in going around the State, of trouble in lambing time. What do you think of feeding corn to ewes indiscriminately?

Mr. Wing—That won't do. If a man knows how to feed corn to pregnant ewes in a cold climate, it is all right, but it is a dangerous practice with the inexperienced.

Supt. McKerrow—Might there be a possibility of feeding too much clover and bran?

Mr. Wing—That is where the skill of the shepherd comes in. He has got to strike a balance in these things. If you feed too much wheat bran, it develops too much bone in the unborn lamb; they will be abnormally large and then sometimes the ewes and lambs will both die at birth. There are several things a man wants to find out about in the sheep business.

Question—Have you ever fed corn-stalks to sheep?

Mr. Wing—Yes; that makes excellent feed, but you want to remember to feed some oats and wheat bran. I don't think the stalk itself is of much value to the sheep.

Question—If you were buying a sire of any of the down breeds and they were built just alike, but one would produce ten pounds of wool and the other fifteen, would you make any difference in the price, and if so, how much?

Mr. Wing—I can't tell you that. I might choose one and I might choose the other.

Mr. Goodrich—Wouldn't that depend upon the value of the wool?

Mr. Wing—No, sir, not to me. It would depend on whether I saw in the

sire that produced the ten pounds of wool a more abounding vitality and vigor, a more robust, compact sheep, and what I thought would be a better sire. Between two sires of the same breed, one a great, large, coarse sheep, with a dull eye, and the other one twenty or thirty pounds lighter, quick, nervy, built like a little pony, I would give twice as much for the latter and expect to get larger and better lambs.

Question—In places where they don't take good care of their sheep, for instance, in stormy weather, would not a dense fleece be better?

Mr. Wing—I prefer a dense fleece on a sheep. I can't answer many questions about wool, because that is not my forte. It is one of the last things I look at in buying sheep.

Question—When lambs are born in April do you breed them the next year or the same fall?

Mr. Wing—I would not breed them

the same fall, certainly not. I would have the first crop of lambs when they were about two years old. Before they are two years old our lambs are generally mothers. I find that where a young ewe goes too long before she reaches maturity, she is apt to be a poor milker and perhaps less careful of her lambs. If she is well fed, she can be developed to maternity before she is two years old, and she makes the better mother thereafter, in my experience.

Question—What kind of a sheep is the most profitable for a man to keep?

Mr. Wing—That is an easy question to answer. Thick chested, big through the heart, with a round body, and broad straight back. Choose the thick-necked kind, where it sets on his shoulder broad and thick, and big, heavy quarters, with a straight, short leg. I do not look for a small bone in a sheep, I don't care how large it is.

A LESSON IN FEEDING FARM ANIMALS: A PROPOSED LINE OF INSTRUCTION FOR RURAL SCHOOLS.

W. A. HENRY, Dean College of Agriculture, University of Wisconsin.

I ask the farmers gathered before me in the closing institute to listen to the presentation of an elementary lesson in stock feeding. I shall present it in greatly condensed form for lack of time, as it seems to me it is possible for intelligent teachers in our rural schools to do when they shall have properly qualified themselves for such effort. I shall use a few comparatively new terms, but not many. Remember that in these days we are constantly finding it necessary to add to our vocabulary, and the farmer is no exception. There are new words for him to learn as well

as for other people. Please follow me closely, remembering that I shall condense many lectures by the country school teacher into one in this talk.

Protein.

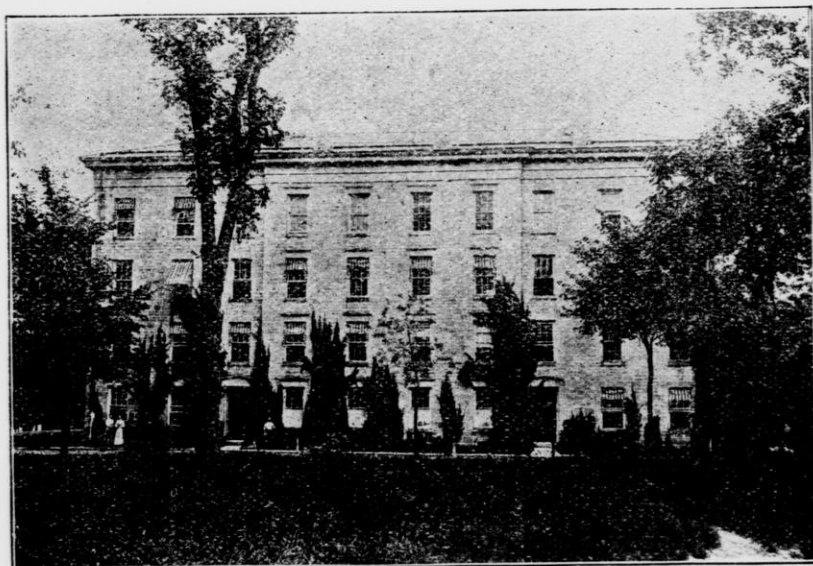
The nutritive portion of all substances which go to nourish man or beast may be grouped under five divisions, viz.: protein, carbohydrates, fat or ether extract, mineral matter and water.

We may consider the white of an egg or the cheese part of milk the best examples of protein. The gluten of flour,

the lean part of meat are also protein substances. Oil meal, gluten meal, peas, bran and middlings are all rich in protein. Oats contain a fair quantity of protein, while Indian corn is relatively poor in that constituent. The stems of leguminous plants, such as clover, alfalfa, cow peas, the common field peas, etc., are quite rich in protein when cured into hay, while oat straw, corn stover (shock corn from which the ears

muscles of the body and to replace their waste. The protein substances also constitute the organic part of the bones, most of the hide, hair, horns, nerves and blood of the body. The word "protein" means, *first in importance*, and we will readily agree that it was well named.

In its secondary use protein is broken down in the body and furnishes heat and energy, or it may be converted into



AGRICULTURAL HALL.

The offices of Experiment Station and Farmers Institutes are located in this building. Also agricultural library, laboratories and lecture rooms where agricultural students meet.

have been husked), are comparatively poor in protein. Instead of saying "protein substances," we frequently use the term "nitrogenous substances," to characterize this group of materials for the reason that they all contain nitrogen, an element not found in the groups of which I shall next speak.

The highest use of protein or the nitrogen substances is to build up the

fat for storing in the tissues against a time of need.

Carbohydrates.

Here is a long word, but let us learn to use it. Sugar is a pure, crystalized carbohydrate, and I am sure no one need ever forget the meaning of the word hereafter. Starch is another carbohydrate, as is also the woody portion

of plants. The carbohydrates, as we shall soon see, constitute a large portion of all the food consumed by man or animal. In the body the carbohydrates furnish heat and energy. They also serve as the main source for furnishing fat to the tissues. The carbohydrates can not build up the muscles, but they may nourish them and prevent their waste. The sugars in plants and fruits, the starch in tubers, roots and stems, and the woody fiber of the leaves, stems, etc., constitute the carbohydrates used by man and beast as food. We can readily understand how abundant the carbohydrates are, and we will learn further on by the tables what quantities are required by some of our farm animals.

Fat or Ether Extract.

The fatty substances of forage materials are called "ether extract" by the chemist. We can readily understand what sort of substance the fat of feeding materials is. Corn contains a considerable quantity of oil or fat, and linseed meal or cotton-seed meal still more. There is considerable oil in oats, but not much in corn stalks or wheat straw.

A pound of oil from flax seed or Indian corn, for example, will give off more than two times as much heat when it is burned as will an equal weight of sugar and starch, and this being true, we may readily believe that for certain uses in the animal body fat or ether extract is worth more than twice as much as the same weight of carbohydrates in the form of sugar or starch. Oil and the carbohydrates contain the same elements and so serve the same purpose in the animal body, namely, furnishing heat and energy and building up the fatty tissues. The fat of feeding stuffs is a concentrated form of fuel just as coal is a more concentrated source of heat than is wood.

Fat stored in the body is a supply of fuel for the body against a time of need. When an animal is starving, or when it is sick, it often lives for days upon the fat stored away in the body. The shrinkage which the body undergoes at such time is in part due to the loss of fat which is given up for the purpose of supporting life.

Mineral Matter and Water.

For building up the bony framework of the body there is required a certain amount of mineral matter, and some exists also in the tissues of the body. Generally where animals are properly nourished otherwise, they are getting in their food all of the mineral matter they require. Since we must be very brief at this time we will not talk further about mineral matter.

A large part of the animal body consists of water, but this is supplied so abundantly as a rule that we need not consider it further.

Digestibility.

Having considered all of the groups of substances required to nourish the animal, let us next consider their digestibility.

Food consumed by the animal passes into the digestive tract, which is a tube running through the body. Before any of the protein, carbohydrates or fat supplied in the food can be taken into the body from the alimentary tract, it must first be dissolved by the digestive fluids secreted from the walls of the alimentary canal. These fluids of various kinds attack the food materials containing nutriment, and dissolve more or less of it. The dissolved portions then pass through the linings of the intestines and enter the blood, while the indigestible portion passes on as waste. For present purposes we shall consider only the digestible portion of feeding stuffs.

A Sample Table of Common Feeding Stuffs.

In the table herewith presented are given a few of the common feeding stuffs together with the quantity of digestible material contained in 100 pounds. A school teacher would have to assist her a large chart which would not only give the substances I here pre-

sent, but many others as well, so that the farmer boy and girl could learn something about all the materials which are used on our farms or might be used thereon for feeding animals. Please remember that this is a sample table containing only a few articles which are required for to-day's discussion.

TABLE SHOWING THE DIGESTIBILITY OF SEVERAL COMMON FEEDING STUFFS.

Feeding Stuffs.	Total Digestible Substance in 100 Pounds.		
	Protein.	Carbohydrates.	Ether Extract.
	Lbs.	Lbs.	Lbs.
<i>Roughage.</i>			
Corn stover.....	1.7	32.4	0.7
Red clover hay.....	6.8	35.8	1.7
Timothy hay.....	2.8	43.4	1.5
Oat straw.....	1.2	38.6	0.8
<i>Concentrates.</i>			
Corn or corn meal.....	7.8	66.7	4.3
Oats.....	9.2	47.3	4.2
Wheat bran.....	12.2	39.2	2.7
Oil meal, old process.....	29.3	32.7	7.0

Studying this table we learn that in a hundred pounds of corn stover (shock corn with the ears removed) there is 1.7 pounds of protein available for the animal, i. e., digestible, while the carbohydrates equal 32.4 pounds, and the ether extract or fatty matter .7 pounds.

Red clover hay is four times as rich in protein as corn stover. We find still more protein in the concentrates, especially in wheat, bran and oil meal. While corn stover contains a considerable amount of carbohydrates, corn is

much richer in that nutrient; oats are less rich than corn in carbohydrates, and wheat bran still poorer. In fatty matter or ether extract corn is a great deal richer than corn stover, and oil meal is still richer than corn.

Requirements of Farm Animals.

We readily understand that each farm animal requires a certain amount of food for the support of the body. This subject has been carefully studied by investigators, and here is what they report.

TABLE SHOWING THE DIGESTIBLE MATERIAL REQUIRED DAILY BY FARM ANIMALS PER 1,000 POUNDS LIVE WEIGHT.

	Digestible Nutrients.		
	Protein.	Carbohydrates.	Ether Extract.
	Lbs.	Lbs.	Lbs.
Ox at complete rest in stall.....	0.7	8.0	0.1
Fattening cattle (first period).....	2.5	15.0	0.5
Milch cow (yielding 22 lbs. daily)....	2.5	13.0	0.5
Horse (medium work).....	2.0	11.0	0.6

Remembering that in each case the figures are for 1,000 pounds of animal, we learn that an ox of that weight standing quietly in his stall, neither gaining nor losing in weight, requires .7 pounds of protein, 8.0 pounds of carbohydrates and .1 pound of fat or ether extract each twenty-four hours to support the body. In other words, this is the amount of food material necessary to run the animal machine without accomplishing any results further than body support. If we propose to fatten this same steer, we are shown by the second line of the table that the protein must be increased until 2.5 pounds are given daily, and the carbohydrates run up to 15 pounds and the ether extract to .5 pounds. The milch cow needs the same protein and fat as the fattening ox, but not quite so much carbohydrates, and the horse at medium work requires less nutrients than the cow, excepting the ether extract.

Please remember that this table is only a sample, and does not give all that the school teacher would have when teaching her class. On her chart or in the text book used there would be a much larger table showing the feed required for pigs of different ages, for the dairy cow giving different quantities of milk, also for the sheep, etc.

Practical Application of Tables.

We have now had two tables before us for consideration. In the first we were told how much digestible material is contained as an average in several common feeding stuffs. We have been told in the second how much feed different animals require for their proper support. In order to apply this knowledge let us endeavor to calculate a ration for the dairy cow. Remember that by "ration" we mean the amount of food necessary for the support of an animal one day. Further, we mean by

"standard ration" just the amount of nutriment the animal requires for one day—no more and no less, for here is where the usefulness of this line of instruction comes in. Every cow, for example, requires a certain amount of food for the support and nourishment of her body, and she must have this amount before she can return any profits to her owner. The amount that the cow requires for merely supporting the body is about that represented by the ox at rest in his stall, which is given in the second table. We see that when giving 22 pounds of milk daily the cow will require more than three times as much protein as the ox at rest, while she will need 13 pounds of carbohydrates instead of 8, as required by the ox at rest. The ether extract or fat required by the cow is five times as great as the ox at rest.

Let us next calculate a ration for the dairy cow, using the feeding stuffs named in the first table, and meeting her requirements as given in the third line of the second table.

Calculating a Ration for the Dairy Cow.

In determining a ration for a dairy cow yielding 22 pounds of milk daily, we choose from the list of feeds in the first table 8 pounds of red clover hay, 10 pounds of corn stover, 3 pounds of oat straw, for roughage, and 5 pounds each of corn-meal and bran for concentrates. The digestible nutrients in these are ascertained as follows:

CALCULATIONS FOR DRY MATTER AND DIGESTIBLE NUTRIENTS IN TRIAL RATION FOR DAIRY COW.

RED CLOVER HAY.

In 100 Pounds.	In 8 Pounds.
$84.7 \div 100 \times 8$	6.776
$6.8 \div 100 \times 8$.....	.544
$35.8 \div 100 \times 8$	2.864
$1.7 \div 100 \times 8$.....	.136

OAT STRAW.

In 100 Pounds.	In 3 Pounds.
$99.8 \div 100 \times 3$	2.724
$1.2 \div 100 \times 3$.....	.036
$38.6 \div 100 \times 3$	1.158
$.8 \div 100 \times 3$.....	.024

CORN MEAL.

In 100 Pounds.	In 5 Pounds.
$89.4 \div 100 \times 5$	4.47
$7.8 \div 100 \times 5$.....	.39
$66.7 \div 100 \times 5$	3.335
$4.3 \div 100 \times 5$.....	.215

CORN STOVER.

In 100 Pounds.	In 10 Pounds.
$59.5 \div 100 \times 10$	5.95
$1.7 \div 100 \times 10$.....	.17
$32.4 \div 100 \times 10$	3.24
$.7 \div 100 \times 10$.....	.07

BRAN.

In 100 Pounds.	In 5 Pounds.
$88.1 \div 100 \times 5$	4.405
$12.2 \div 100 \times 5$.....	.61
$39.2 \div 100 \times 5$	1.96
$2.7 \div 100 \times 5$.....	.135

Arranging these results in tabular form, with the standard of table for comparison, we have the following:

FIRST TRIAL RATION FOR DAIRY COW WEIGHING 1,000 POUNDS AND YIELDING 22 POUNDS OF MILK DAILY—STANDARD.

Feeding Stuffs.	Digestible Nutrients.		
	Protein.	Carbohydrates.	Ether Extract.
	Lbs.	Lbs.	Lbs.
Red clover hay, 8 pounds.....	.544	2.864	.136
Corn stover, 10 pounds.....	.17	3.24	.07
Oat straw, 3 pounds.....	.036	1.158	.024
Corn meal, 5 pounds.....	.39	3.335	.215
Bran, 5 pounds.....	.61	1.96	.135
First trial ration.....	1.750	12.557	.580
Standard.....	2.5	13.0	.50

This trial falls considerably below the standard, especially in protein, and to correct this, 3 pounds of oil meal are added.

SECOND TRIAL RATION FOR DAIRY COW WEIGHING 1,000 POUNDS AND YIELDING 22 POUNDS OF MILK DAILY—STANDARD.

Feeding Stuffs.	Digestible Nutrients.		
	Protein.	Carbohydrates.	Ether Extract.
	Lbs.	Lbs.	Lbs.
Ration as above.....	1.750	12.557	.580
Oil meal, 3 pounds.....	.879	.981	.21
Second trial ration.....	2.629	13.538	.79
Standard.....	2.5	13.0	.50

The first ration chosen with 3 pounds of oil-meal added gives us a ration very close to the standard.

We learn from this that a satisfactory ration for a dairy cow weighing 1,000 pounds and yielding 22 pounds of milk daily may be composed of the following: Red clover, 8 pounds; corn stover, 10 pounds; corn meal and bran, each 5 pounds; oat straw and oil meal, each 3 pounds.

Teaching These Things in Our Country Schools.

Farmers of the closing institute: What I have told you in this brief space of time represents a dozen talks or more, if need be, by the enthusiastic, intelligent teacher of the rural school. Lack of time and the necessities of the case have caused me to be brief before you to-day and to crowd a great many facts into a few brief sentences. I ask you as thoughtful farmers if I have not presented a subject which is worthy of a place in the country school course of study? It is true, I have used a few unfamiliar terms, and these words will sound strange when first heard by our country school children. I beg of you, however, to think of the scores of words which you were compelled to learn and use when at school and which you have forgotten since your school days. Do you not recollect that you were taught to use such words and phrases as "minuend," "subtrahend," the "least common multiple," the "greatest common divisor," and scores of others in arithmetic, grammar and other books? Do you not agree with me that the words "protein" "carbohydrates" and "ether extract" are just as important as many of those old school-day words, and that the farmer boy and girl should become familiar with them? Do you not agree with me further that the country

school teacher might profitably lead the little people she is teaching slowly ahead until after a time they have a fair understanding of these feeding tables, and the older ones be taught to calculate rations not only for the dairy cow, as we have done to-day, but for the horse, the fattening steer, the sheep and the pig. If this subject were taught in the country school, would not the boys and girls coming home at night have interesting topics for discussion at the supper table, and would not father and mother as well as John and Mary become interested? When doing his daily chores, would not John supply feed to the farm stock with more carefulness than if he had never thought of these subjects before?

Is It Not Practical?

If our teachers can acquire a knowledge of arithmetic, physiology and other branches sufficient to pass examinations thereon and to teach these branches more or less successfully, could they not in time gain sufficient proficiency in some of the farm topics to teach them effectively and to the great advantage of all concerned? Remember that what I have here presented is only one of many subjects which might well come into our course of study for the rural schools. If such topics as these were added to the course of study, would not much good be accomplished thereby? The facts that I have gone over concerning the feeding of farm animals are useful not only for the stable and feed-lot, but they apply indirectly in many ways to human nutrition, and so our boys and girls, while studying these topics in the country schools, would gain a great deal of helpful information. Can not and should not our teachers prepare themselves in the near future to give instruction in some lines of agriculture

at least as well as in the branches now in the course of study?

DISCUSSION.

Question—Where can we obtain that twenty-five cent book you spoke of?

Prof. Henry—It is Prof. C. C. James' book on the Principles of Agriculture, Bryant Press, Toronto, Canada. It is a beautiful little book.

The Chairman—Don't you think before we have these things taught in our common schools, that the teachers will have to have some instructions?

Prof. Henry—I do, and I think money should be spent in order to have the teachers taught in our Normal Schools so that they can teach about agriculture in connection with other branches.

Supt. McKerrow—Do you know how many school district libraries have put your book on Feeds and Feeding into their libraries?

Prof. Henry—Allow me to say that I have prepared a book of nearly seven

hundred pages upon the subject of stock feeding; upon that book I have spent every spare moment, holidays and nights, for six years, and a large amount of money for help gleaned from five or six languages, everything that could be found in regard to feeding cattle. I went clear as far as Finland to get experiments on feeding stock, and I have gathered them into a book called "Feeds and Feeding." Six hundred copies of this book have gone into your schools, having been put on the library lists by the County Superintendents, so that if you wish to consult it, you will find it in your district libraries.

Mr. Scott—I think it would be a great advantage for the scholars to read such books as Prof. Henry's "Feeds and Feeding" and the farm bulletins that are issued, which too often lie upon the library shelves unread, and would be more likely to be read if the system of education which has been referred to could be inaugurated.

The Institute adjourned till 7 o'clock.

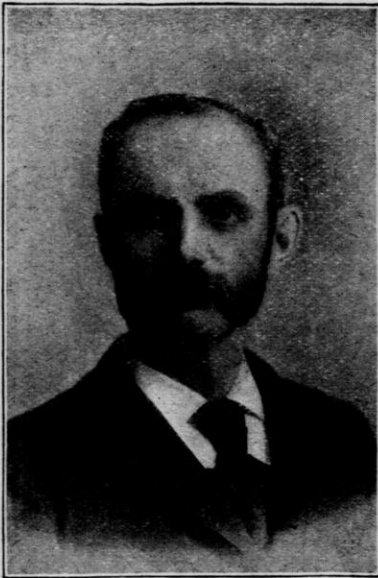


EVENING SESSION.

The Institute met at 7 o'clock P. M. Mr. H. C. Taylor in the chair.

THE LYCEUM.

W. H. SCHULZ, Lyceum Manager for Wisconsin, Spring Green, Wis.



W. H. SCHULZ.

The history of the Lyceum, in its present form, is short; but in some form or other it has existed where some sort of popular government has existed. The Hebrews of old knew it before they had kings. The Greeks had it for centuries; the Romans had it during the life of their republic. Our ancestors had it in their day. It has always been the school of popular oratory, and the arena of contending thought.

We have never had such organization of the lyceum work as had the Greeks. Ours was not planned and directed by philosophers. We are now endeavoring to do this. We are making the teachers and the people who are interested in education the leaders of this movement. We are succeeding. Yet our history is short. The work was begun five years ago in Sauk County. It has had four years of constant, healthy growth. There have been lyceums organized in all parts of Wisconsin. During the year the work has been expanded, and we have now the following departments of work: the common school, the graded school, the high school, the public library and the farmer's Lyceum Leagues, each having a distinct and separate organization of its own. It is thought best to omit a description of the other branches of our work and limit ourselves to the two branches of most interest to you, namely: the common school lyceum and the farmer's lyceum.

The Common School Lyceum.

The common school lyceum league is the parent organization. All others have since been formed, but are a part of the State Lyceum. In each school district where it is possible a Local Lyceum should be organized. The officers should be elected annually, so as to have a permanent organization.

Where there are two or more lyceums in a town, a Town Lyceum League should be organized for the purpose of various kinds of contests. Where there are several Town Lyceum Leagues in a county, a County Lyceum League should be formed for the purpose of various kinds of contests to be held but once in a year, perhaps, in connection with the county fair, as is now the case in many counties.

We will now outline for you as briefly as this is possible the work for 1899 to 1900:

I. Debating, and Questions for Debate.

1. Resolved, That there should be no distribution of real estate by will, but an equal distribution by law.
2. That France has a better form of government than Mexico.
3. That there should be an educational test for voting.
4. That literature has greater educational power than painting and music combined.
5. That foreigners should not be permitted to hold large landed estates in the United States.
6. That the army is more important in war than the navy.
7. That congress should be a permanent body like the senate, a part of the membership elected every year.
8. That capital punishment promotes better government.
9. That the common schools are more favored than the higher institutions of learning.
10. That a morality test should be required of all immigrants.
11. That an educational test should be required of immigrants.
12. That States should make all their school apparatus.
13. That the State should make and sell to school districts at cost all school books.
14. That Civil Service should be extended to all administrative and clerical officers, except elective officers.
15. That the State should have a "pardoning board."
16. That press opinion is good popular opinion.
17. That the trader is more servicable than the mechanic.
18. That inventions should be rewarded by the government and then belong to it.
19. That co-operation solves the labor question.
20. That the State should make and sell all liquors.
21. That territorial expansion is desirable.
22. That no one should be allowed to own over a quarter section of good land.
23. That there should be a protective duty on all goods produced in the United States.
24. That all treating should be prohibited by law.
25. That a graduated income tax is the only fair and just tax.
26. That the United States should loan money on real estate.
27. That the United States should loan money on stored imperishable farm products.
28. That the annexation of Cuba is preferable to the annexation of Canada.
29. That wheat has a greater influence on prosperity than gold.
30. That candidates should be prohibited from influencing primaries.
31. That there should be an eight-hour labor-day.
32. That all international disputes should be settled by arbitration.
33. That lawyers are more useful than doctors.

34. That there should be no interest paid on money.

35. That an increase of science means a decrease of poetry.

36. That witnesses should be allowed to testify without taking an oath.

37. That wealth tends more to increase of crime than poverty.

38. That strikes are in the end beneficial.

39. That only partial education is harmful.

40. That the government should provide work for the vagrants.

41. That the government should keep the poor.

42. That tax-paying women should have the right to vote.

43. That the United States needs a standing army.

44. That the United States needs a larger standing army.

45. That woman is more considerate than man in matters of politics.

46. That a partisan can not be a patriot.

47. That divorce laws should be national.

48. That debating has greater educational value than declaiming or oratory.

49. That the novel has more educational value than the poem.

50. That Washington was a greater statesman than Lincoln.

It is not wise to have debates oftener than once in two or three weeks. The number of judges should be at least seven, so as to insure fairness. Each debate should be well outlined, written up, and the greater part committed to memory before delivery. Debates which are read have but little value.

Each party of debaters should have several well-read counselors to advise them about points to be made and to help them to matter for preparing the debate. The speakers should not repeat points, except in a summary or for

emphasis. The counselors should see to it that the debates are free from trivial matter or things which are calculated to give offense.

II. Literary Exercises.

The following are some of the literary exercises for this school year. The numbers refer to township library books:

Essays.

Cat story, 26. Autumn, 27. Winter, 28. Spring, 29. Orioles, 31. The fearless girl, 36. One of seven, 39. A brownie, 40. Long ago, 43. Patsy, 50. Sweet William, 51. The ice queen, 56. A bird myth, 64. A sun myth, 64. Lohengrin, 66. Beowulf, 66. Cincinnati, 72. King John, 72. Washington, 73. Indian home, 79. Franklin, 79. The arctic girl, 95. Adventure of a school-boy, 99. A bad boy, 102. Nuernberg stove, 116. Tip, 131. The Pearl, 134. Paul Jones, 154. Tannhaeuser, 172. Julius Caesar, 175. Plymouth Rock, 187. Pueblos, 188. William Penn, 190. Mt. Vernon, 196. Our flags, 196. Greenland, 205. The porcupine, 212. The grasshopper, 214. The swallows, 216. The Eskimo, 225. The Tartar, 226. Chicago, 223. Skate-sail, 235. Peanuts, 235. Burros, 236. Natural gas, 239. Sugar, 239. Saxon home, 297. Primitive man, 330. Nero, 332. Bunker Hill, 333. Spanish Armada, 336. Wolfe, 341. Isle Wisconsin, 368. Marquette, 368. Black Hawk, 368.

When possible there should be essay contests. The teacher or someone else who is competent should examine the essays before they are read in public, so that all errors may be corrected, and to eliminate copied matter and bookishness. Originality should be insisted upon.

Orations—1. Original. 2. Classical. There will be found an abundance of

material in the library books and in good school speakers. The orators should be well drilled by competent persons, and there should be contests to stimulate to greater efforts.

Declamations—1. Prose pieces. 2. Poems.

This is very profitable work. It develops power of speaking, a love for literature, and makes pupils more careful about their school work. There is nothing better suited for a contest than the declamation.

Current Events—1. Political events. 2. War. 3. Art. 4. Science. 5. Discoveries. 6. Inventions. 7. Foreign news. 8. Home news. 9. Educational news. 10. Philanthropy.

This leads to reading, and develops in making a choice of matter.

Quotations—This year from Longfellow. Have quotations given by eight or ten members, selected for that purpose. Take them in groups, one kind of quotation for each meeting, say: 1st, Voices of the Night, then Nature poems, ballads and songs, and so on.

Talks—Have occasionally a half hour or less for talks by members, on certain subjects on which they have prepared.

III. Music.

At each lyceum meeting there should be some music. Let the musical part of the program be as varied as possible, consisting of various kinds of school songs and popular airs, and also of occasional instrumental pieces.

IV. General and Library Reading.

General Reading—Various kinds of clubs can easily be formed. The clubs need not be large—two to ten members is a good number. The exchanges can be made at the meetings of the lyceum at stated times. In a club of that kind each member furnishes his share of

reading material according to what the nature of the club may demand. It is remarkable how much more interesting reading becomes when one reads articles others speak about. The kinds of clubs usually formed are:

Book Exchange Club, for the exchange of books; magazine exchange club, for the exchange of magazines; newspaper exchange club, for the exchange of papers.

Reading Circles—Books to be read this year. In some cases it may be wise to substitute, but usually it is best to read what others are reading.

Primary—Poetry. Nursery rhyme book. Prose, Story hour.

Intermediate—Poetry, Riley's Child World. Prose, Winter fun.

Grammar—Poetry, Riley's Child rhymes. Prose, The Pilot.

Advanced—Poetry, Gill's Hermione. Prose, David Harum.

V. Special Day Exercises.

Authors' Birthdays—On such occasions the exercises are largely devoted to that author.

Statesmen's Birthdays—Patriotic exercises to suit the occasion. Addresses and papers about events in the life of that noted personage.

Arbor and Bird Day—It is well to have exercises for the public in the evening, for at that time of the year an audience of grown people can not be obtained during the day.

VI. Nature Study.

Plants—These exercises should be object lessons as much as possible. A few questions of interest are added. 1. What are asci, bulbs, calyxes, aments, corms, runners? 2. What is a cyme, drupe, echinate, fastigiate, frond, indusium, peristome, pyxidium, umbel, umbonate? 3. What is an ascococcus, epiphyte, equisetum, a fungus, kelp,

morel, lycopodium, stapelia? 4. Describe the volvox, teak, sundees, screw pine.

Animals—These should be studied objectively, too, but it is profitable to read good books about them. A few questions of interest are added: 1. Describe the rotifera, wheel animal, leech, trapdoor spider, alcedo, dodo, tern, lingula, acaleph, hydra, sea fan, limulus.

Minerals—Describe quartz, syenite, hematite, biotite, hornblende, feldspar, mica, graphite.

Landscape Studies—Surface features, their nature and beauty. Study of streams. Study of forests. Study of soils. Distribution of plant and animal life. In appendix G, report on rural schools.

VII. Exhibits.

Exhibits consisting of maps, drawings, plants, and animals are always interesting.

VIII. Questions of Interest.

This is one of the most interesting and profitable departments in the lyceum work. Let every member procure a note book and write down the answers to all the questions that he or she is obliged to look up. There is an entirely new set of questions given each year.

General Questions.

1. What is meant by cell division? 2. What is karyokinesis? 3. What is an amphora? 4. Define cameo, silhouette, ecliptic. 5. What are truffles? 6. What is an ipicycloid, hypocycloid? 7. What is a crown wheel? 8. What is a lantern pinion? 9. What is a rack and pinion? 10. What are sister hooks? 11. What is a bar shot? 12. What is a cheval-de-frise? 13. What is a dum dum bullet? 14. What is canister?

15. What is a tam-tam? 16. Describe the Aeolipile. 17. What was the dinoceras? 18. Distinguish a mammoth from a mastodon. 19. Describe a trilobite. 20. What is a glyptodon? 21. What is a bark, brig? 22. What is a junk, cutter? 23. What is a nut buoy, bell buoy? 24. What are lazy tongs? 25. What is a hellbender. 26. What is a triton? 27. What is a sea mouse? 28. What is a water spider? 29. What is a bulbul? 30. Do buzzards live in Wisconsin? 31. What is a crake? 32. Describe the emu. 33. What is a guan, guano? 34. What is a whiskey jack? 35. What is the actinia? 36. What is the gorgonia? 37. What is a holostraca? 38. Describe the cyclops (animal). 39. What is the angel fish? 40. What is the sun star? 41. What is a sting ray? 42. What is a topknot? 43. Describe the pinworm. 44. What is an ant-lion? 45. What does the tortrix do? 46. What is the wheel bug? 47. Is the blackfish a fish? 48. What is the borele? 49. What is a narwhal? 50. What is a picchicago? 51. What is a shrew? 52. What is a cuttle bone? 53. What is a devilfish? 54. What are sea grapes? 55. What is a squid? 56. What are infusoria? 57. What is a bell animalcule? 58. What is an amoeba? 59. What is a loggerhead? 60. What is a leatherback? 61. What is a sea peach? 62. What is a chameleon? 63. Who was Aeneas? 64. Who was the apostle of England, Ireland, Germany? 65. Who was Atalanta? 66. Where is Asgard? 67. Explain, "Barkis is willin'." 68. Where is Bimini? 69. Who was Boz? 70. Where is Cave of Mammon? 71. Where is Cipango? 72. Tell the story of Clyptic. 73. Who is Saint Crispin? 74. Which is the day of dupes? 75. Who was Don Quixote? 76. Which is the Eternal City? 77. Who was Faustus? 78. Who was the good gray poet? 79. What is a

hanswurst? 80. Who was Ixion? 81. Where is Kaf? 82. What is a jingo? 83. Who is Loki? 84. Who was Mab? 85. Who is "the only"? 86. Who was the Paper King? 87. Who was Mr. Puff? 88. Who was Uncas? 89. Who was Jean Valjean? 90. What was ygdrazy? 91. Where is the Wisconsin industrial school for girls? 92. Who is the chief justice of the United States? 93. Who is your congressman? 94. Who are Wisconsin's senators? 95. What is a census? 96. When was Nicolet in Wisconsin? 97. Who was Father Hennepin? 98. When was La Pointe founded? 99. When was the first steamboat in Wisconsin? 100. Where was Black Hawk captured?

The Farmers' Lyceum.

It shall be the duty of the officers of the common school lyceum to assist in organizing farmers' lyceums in all such cases where they themselves have not done so. If it is not thought advisable, then two of the lyceum meetings should be for farmers. It is hereby suggested that Dec. 2, 1899, and Feb. 3, 1900, be set apart for that purpose. There should be as many papers and talks by farmers as possible, but members of the school lyceum should assist in making up the program. Some of the following topics are suggested:

Agricultural Studies—1. Origin of soil. 2. How is soil made? 3. Various means of making soil fertile? 4. Best fertilizers? 5. Plant food in the air? 6. Natural fertilizers? 7. Artificial fertilizers? 8. Value of manures? 9. Composition of plants? 10. Composition of animals? 11. The nitrogen problem? 12. Digestibility of food for animals? 13. Composition and properties of milk? 14. How is milk tested? 15. How may milk be kept from spoiling?

Agricultural Physics—1. Farm drain-

age. 2. Farm buildings. 3. Silos. 4. Bridges. 5. Good roads. 6. School houses. 7. Movement of soil water. 8. Airing the soil. 9. Good implements of tillage. 10. Harvesting machinery. 11. Conditions of soil, temperature for crop growth. 12. The farmer as manufacturer.

Farm Economics—1. When do we farm for profit? 2. How can the farmer control prices? 3. Money and its functions. 4. Industrial crises and their causes. 5. Rent and renting. 6. Taxes and taxation. 7. Enemies of farm plants. 8. Enemies of farm animals. 9. The farmers' duties. Address Hon. John E. Morgan, Spring Green, Wis., about organization of Farmers' Lyceums.

Public Opinion.

It is undoubtedly a wise step to cultivate public opinion on important questions. It is our duty as American citizens to be thinking about the questions that confront us; it is also our duty to express our views on such questions. It is our duty also to bring questions to the front which need our attention. The scheme here proposed makes this possible.

Questions for 1900—The following questions will be discussed at all lyceums at the second meeting in February. After the discussion a vote by ballot shall be taken on each question:

Ques. 1. Res. That there shall be a course of moral instruction and training in every school course. Provided, that it is free of sectarian instruction and does not make a separate branch of instruction.

Ques. 2. Res. That the county superintendency of schools shall be taken out of politics, and that such officers shall be elected at the same time and for the same term as county judges.

Ques. 3. Res. That the elementary

principles of agriculture shall be taught in country schools. Provided, that it is taught as a part of nature study which is already provided for in our Manual for Common Schools.

New Questions for 1901—On the second meeting in March of every year each Lyceum may propose new questions. The three questions receiving the highest number of votes to be reported to the Lyceum Manager. From a! the questions proposed in the State, the three receiving the highest number of votes will be the questions for the next year's discussion and voting.

Organizations.

Local organizations shall have the following officers: President, vice-president, treasurer, solicitor, reporter. All these have the usual duties of a deliberative body, except the solicitor, who shall solicit books, papers, pictures, and magazines for the lyceum library, and for the various reading exchanges. The reporter shall report the membership to the Lyceum Manager, W. H. Schulz, Spring Green, Wis., also the votes under "Public Opinion." In case that there are two or more lyceums in a town, then a town lyceum should be organized, having the usual officers.

The purpose of the town lyceum is for contests and has only one or two meetings a year. Only the winners in the local lyceums should be permitted to enter these town contests. In case that there are several town lyceums in a county, there shall be held a county contest once each year, consisting of the winners in the town contests; or if not a sufficient number, winners of local contest may be admitted. The County Superintendent shall be president of the county lyceum.

State Organization.

President—Supt. Walter H. Hunt, Kingston, Wis.

Vice presidents—Otto L. Leu, Centralia; R. M. Derse, Hartford; Myron E. Keats, Fond du Lac; Emerence Walters, Neillsville; Charles H. Nye, Lancaster.

Treasurer—R. H. Burns, Richland Center.

Secretary—D. F. Burnham, Waupaca.

Lyceum Manager—W. H. Schulz, Spring Green.

State Leagues and Officers.

1. Common School—State Lyceum officers (see above).

2. Graded School—Prin. Geo. Davis, Pres., North Freedom; Prin. E. U. F. Loether, Secy., Eau Claire.

3. High School—Prof. D. B. Frank-enburger, Pres., Madison; W. H. Schulz, Secy., Spring Green.

4. Public Library—Officers, Wisconsin Library Commission, Madison, Wis.

5. Farmers' Lyceum—Hon. John E. Morgan, Pres., Spring Green; Supt. Geo. McKerrow, Secy., Madison.

Special Attention.

1. There will be appointed in each county from two to ten supervisors of lyceums whose duty it shall be to look after the interest of the lyceums in their districts, and to organize new lyceums where practicable.

2. It is necessary to have some funds to prosecute the lyceum work of the State. We therefore urge upon each lyceum to contribute at least two cents per member. Send this amount to the treasurer, R. H. Burns, Richland Center, Wis.

3. The reporter of each lyceum shall at once report names and P. O., of lyceum officers to W. H. Schulz, Spring Green, Wis.

CULTURE AND HEROISM ON THE FARM.

MRS. FRANK HAWLEY, Wiota, Wis.



MRS. FRANK HAWLEY.

Sister and Brother Farmers, Ladies and Gentlemen:—When requested to take a part on this program my first impulse was to positively decline, knowing my inability to properly prepare anything that I thought would be interesting or instructive. But upon considering and remembering how many times I had been pleasantly and profitably entertained at these Farmers' Institutes, I decided to give you my very best endeavor. Hence my subject, "Culture and Heroism on the Farm."

In society the farm has always held a sort of material supremacy to which every other interest has looked with filial respect. Its authority among

human interests has been paternal; it has fed men, supplied their first material wants, been the commissary department of the world's great army of human eaters. The farm is the source of the world's supplies, as it is also the headspring of society.

The Important Product of the Farm.

The material supplies for human society which the farm produces are not the most important of its products. These come from the soil, rocks and sands, clays and ores of the farm, but from the houses and homes of the farm are vastly more precious and important products. The children of the farmer's home and heart that go out from the household to supply the villages and cities with a healthy, brainy, hearty population are infinitely more important than all other products. How many fine boys and beautiful girls go from the farms into the schools and colleges to become teachers and professional men and women! The farm is the place of all places to rear children. They enjoy and flourish in its freedom, industry and plenty, its nearness to nature, to the woods and free water and air, to animal life and the natural production of the soil. These things make it the glad home of childhood and youth, and afford ever fresh inspiration for young minds, and they are always learning of nature.

Childhood Joys.

Those of us who are reared on farms and have enjoyed the society of the domestic animals, the brooks and fields, who rejoiced in the growing grass and grain, who gloried in the

bright days, the flying clouds, the starry nights which farm life makes so beautiful because we live so in the midst of them, can never cease to value the farm as the place of all places to rear children. To us who appreciate what farm life is to those who enjoyed its early advantages, how dear and delightful to memory is the old farm, the house and barn, yard and garden, where so many happy and profitable hours were spent, and to which so many roseate recollections will always reach back.

As I look back to the farmer friends of my girlhood days, I can point with pride to those who have graced and honored the halls of congress as well as the professions; but it is with more commendable pride that I look to those who have remained on the farm, and made beautiful homes and helped to develop and make ours one of the most beautiful as well as the most independent and intelligent agricultural States in the Union.

Favorable Conditions for Young Farmers.

There is a generation of young farmers taking the place of their fathers under far more favorable circumstances than their fathers had—new and better homes, new and better implements, new and better processes is the order now. Quickened minds, more intercourse with and knowledge of the world, its business, markets and demands, and increased nearness to the social pulses of village and city life, are among the improved conditions. They are brought much closer to the business world; the crop reports are becoming vastly important; the business of the world goes up or down more according to their success or failure; the market value of farm produce has its

weight on the stock markets and on the exchange of the world.

This bringing the farmer so into the world's centers, lifts up his vocation and augments his power. It is becoming a matter of general conviction that knowledge is worth as much to the farmer and as well becomes him as any other man; a bright man or woman shines as well on the farm as in the city drawing room. Nobility of mind and character is not a whit less noble in the cornfield than in the counting room or at the Bar. A splendid woman graces the farmer's home quite as much as a merchant's; beautiful children are quite as beautiful amid things of nature as of art, and adorn the farm home not less than the city home. It is character that dignifies and honors employments and places.

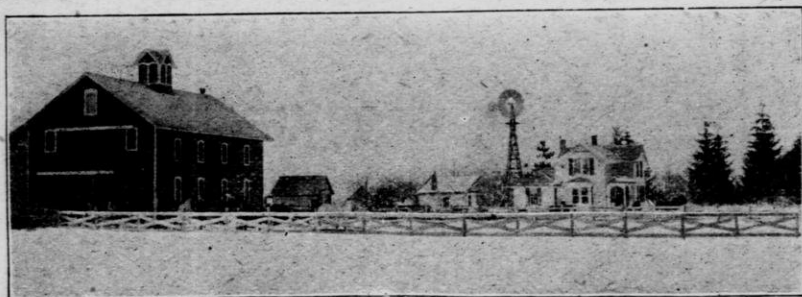
Mental Culture.

The farmer's business is called agriculture, which means land culture or field culture. The term ought to include mental culture as well, for of all the products of the farm men and women are the most important. It is worth while to improve the potatoes, cabbage, oats, wheat, grass, cows, sheep and horses, but still more worth while to develop into better types the youth and men and women of the farm. Oh! that there were more faith in human culture. So little do many believe in it that they scarcely think of improving their minds, manners, speech or habits, much less their tastes or affections. The common thought is that whatever is done in this matter must be done in childhood and youth, whereas the true idea is that the whole of life should be made the season of improvement; while we live we ought to grow wiser and better; by our work, experience, reading and observation we ought to enlarge our minds and enrich our characters.

Of all callings farming is the most suggestive of personal improvement. We are improving other things, why not improve ourselves; growing harvests on our farms, why not in our own minds; feeding men's bodies, why not feed men's minds with knowledge. The world needs more rich farmer minds, more intellectual, moral, political leaders from the farm, more of the stamp of Washington and Martha Washington. Oh! that books were written on farms, laws originated, inventions made, and fashions gotten up. Better by far would it be if our literature and legislature savored more of the farm, were more natural, practical and

any other class of women. This it is that makes them such practical and judicious mothers, who give the world so many noble, strong-hearted men and women.

It is perhaps true that women are overworked elsewhere, but not on the farm more than elsewhere. The trouble is, we make life and its work too complex and artificial and not simple and natural enough. We make eating and wearing and housekeeping too elaborate and demanding, so that they tax and wear us too much. Plainer, simpler, and more wisely and easily prepared food would tax our purses, time and strength less, and serve us in health



Farm Home of Mrs. Hawley.

thoughtful; they would then be more wholesome and useful.

The Farmer's Wife.

It is thought by many that farmers' wives are overworked and overburdened. This is perhaps true, but it is equally true that they bear their work and burdens as well as do women of the village and city. Of all the women farmers' wives do have the most things to do, and usually the largest households to provide and care for; and this it is that develops in a large degree a practical common sense, a business ability, not found in so large a degree in

and good spirits better. The true way to reform and make our work easier, and our lives happier and more useful, is to think, talk and read more of these things. Women are thinking more and more, and farmers' wives and daughters with the rest, and the more they think wisely of their lives, the more easily will they perform their duties and the better will become their homes and the results of their lives.

Heroism for Women.

What we need is more heroism. Woman ought to be heroic as well as man. Her life is as real and earnest;

her conflicts are as sharp and trying; her desires as strong; her hopes as inspiring; her position as responsible; her interest in the present and future life are as great; she has as much to live for and as much to achieve; she holds her hands on as subtle springs of power, acts a part in life as intrinsically absolute and grand—is one real and enduring half of humanity, and can no more live and be herself without heroism, than man. Indeed, she has special need of its awakening spirit to give her courage and force to break the shackles with which custom and law have fettered her mind and prescribed the limits of her action, to be and do what her abilities and duties require at her hands. She has her inalienable prerogatives to assume, her natural position to acquire as the acknowledged companion and friend of man. I think there is no friendship more beautiful than that of men and women. Sometimes it is called gallantry, and takes on courteous and polite manners, but more generally it takes the form of helpfulness and kindly intercourse. There is much friendship of this kind that is very noble and pure; it is often begun early and lasts through life, and does much to mould and elevate noble characters. The high intercourse of men and women is a moral help of vast and ennobling power. How it stimulates to noble endeavor, to watchful self-direction, and all the higher offices of manly and womanly life.

Never did the home, the farm, the school, the literature and all the great interests of the world call more loudly for heroism in woman, which craves and will labor for the best culture.

The woman soul is as susceptible of the heroic impulse, as clear in its conceptions, and as grand in its capacities for experience, as man. Mind is everywhere the same mysterious, wonderful thing, moved by like forces and subject to similar laws and needs, the inspiring stimulus of real heroism. As Longfellow puts it "Life is real." Life is everywhere a conflict to be accepted as a field of disciplinary exertion, and whether man or woman, the same necessities are laid upon our minds, the same grand opportunities are open to us, and the same inspiring objects ought to captivate our ambitions. If we would be and do our best, if we would grow in what is greatest and realize all of wisdom, success and honor in life, we must be moved by the subtle spirit of heroism, and take hold of life with a brave will and a strong hand. We must not be afraid of breaking up the ice that custom has frozen over society, nor of treading on the corns of fashion, nor of looking straight into the face of public opinion, nor of being that singular personage in modern society—an independent thinker and actor. We must each have a soul alive with sensation, strong with feeling, resolute with will, strung up with some honorable purpose, ready to do and dare, and be all that is right and good in its pursuit. Everywhere we want the human soul quickened and inspired, craving and doing the work of a being made in the likeness of God, that shall live to see the stars fade, suns go out, and a new and celestial Heaven spanning the fields of its glorious activities.

TEACHING DOMESTIC ECONOMY.

MRS. NELLIE S. KEDZIE, Bradley Polytechnic Institute, Peoria, Ill.



MRS. NELLIE S. KEDZIE.

I am very glad to-night to bring a greeting from the mighty corn State of Illinois to the Farmers' Institutes of Wisconsin, for I am certain that when I look into the faces of a representative body of farmers of this State, I am looking at the best part of the State that can be gathered together, for, from the farm homes come the strength and the power and the backbone of every State in this Union.

The value of a human life is measured to-day by the ability of that life to meet the demands made upon it. Nobody asks to-day "who are you," "whence came you," "who was your father," but in this workaday world everybody says, "what are you good for," "what

can you do," "what can you give to the world?" And the ability of each one of us to meet whatever is expected of us ranks us where we belong, among the world's workers, at the head or at the foot of the class.

Training for Our Children.

Perhaps no one problem has ever come more strongly to the men and the women to whom God has given children than the problem as to what training shall be given those children for their place in the world. What kind of an education shall be given to the boys and girls as they grow up, what kind of book training, what kind of hand training, what kind of training all along must we give to these boys and girls, and as the fathers and mothers decide this question over and over again in their homes, they decide the fate of the young people whose lives have been given into their hands. Some of us feel that education comes only in the schools—comes from book training, but the fathers and mothers know that the training begins before the baby is out of his cradle, and sometimes the baby trains the father and mother quite as rapidly as they train him. Sometimes the training that comes in the homes has a curious effect. Sometimes it comes home to us in the way that it did in the case of the little girl who had been very naughty and her mamma had punished her. The child went into the garden and stayed a long time, and when she came back her mamma said, "I hope you are going to be a very good little girl now." And she answered, "I don't know, but I got even

with you, I went out into the garden and I ate three bugs, two smooth ones and a woolly one."

The Right Education.

Whatever the education that comes in the home there must be added to it an education in the school, there must be the education of books. Some years ago a good friend of the children said to us, "We have taught words long enough, let us teach things a little while," and so we begin to feel the matter of education may mean something more than words to our children, may mean something more than getting them ready to read in any language; it may mean knowledge of things, and we look about us a little to see just what that would mean. We begin to realize that when we train our boys for their life work and we know that that life work is to be upon the farm, we should train them in agricultural lines, and now our boys are being trained in every science which shall bring to them knowledge of farm life and work. Again, if we are to make our boy into a doctor, we do not rest until we give him a college education, and then send him off to a medical school, where he shall have a thorough training in that particular line. If we are going to make him a lawyer, we do not rest until we let him have a college education, and then give him a chance to study law books. We want these boys thoroughly trained, we are not willing to trust our money or our property to uneducated lawyers, or our bodies in the hands of uneducated doctors. When we want our boy to be a minister we put him through his college training again, and we make him so earnest and so strong with thorough theological training that we feel he can come close to us in our homes in days of trouble and days of joy. We give him all that we think

he can use, and there we stop. We forget that our girls have something to do, and when the question is pressed upon us finally as to what we shall do for our girls, let us remember that it entered into the heart of one wise woman to say, "Let us train our girls for home life; let us give these girls some of the training which they need for work by and by—for the large proportion of our girls, whether they marry or not, will some day have need of a knowledge of home-making." And so Mary Lyon, away back in the early '40s, established the thought of giving the girl something of home training right along with her education, and that thought has rapidly grown until to-day, all over this broad land, the thought is established in the minds of the educators and of people who have girls to educate, until they feel that the girls must know something of household work, something of the principles governing household work, and in all the schools of this land there is a thought of putting this household training right into the school work.

Our English Cousins.

Across the water this thought grew in a little different way. In England they established schools for the training of teachers, and supervisors go about through every shire in England, keeping the teacher of the shire school up to the standard in cooking and sewing. In the Buckingham Palace Road School over two hundred girls are being trained to-day for supervisors, and they help teachers in the country schools. Away up in Northern Scotland I saw them carrying a cook stove into a little red schoolhouse, and when I asked the teacher about it, she answered, "Oh, we have always taught the lassies to sew, but now we are going to teach them to make scones and cook hotpot,

because we know the Scotch people must keep very strong and they won't do it unless they are well fed." In some of these schools they have some queer ideas. One teacher didn't want to ask about the way we do, as they do not

do not have?" I answered, "Why, I don't know. I don't see any pie in England; pie is an American dish, we have a great deal of it in our country." She said, "Why don't we have pie?" and pointed to a table, to a meat pie. I



In the Kitchen.

like to acknowledge that we can do better on this side of the water than they, in any way, but she said to me at last, "They tell me that you cook some things in America that we do not cook. What do you have over there that we

told her that we have meat pie, but that our national pie was made of fruit. That didn't satisfy her at all, she said, "But that is tart, isn't it?" You know tart is fruit baked in a deep dish with a thick crust on top; it is very nice, but it is

not our pie. So I described to her our pie as best I could. She listened very patiently until I got through, and then she said, "Indeed, and I should think it would be very nawsty." So I felt that they didn't want our pie, but all the same they were glad to know what we were doing on this side of the water, and I was glad to know of their work and the thoroughness with which they train their girls and put into their hands the ability to put good food, well cooked, upon the table. Across the channel they are doing the same work. Just outside of Paris a very wealthy man has devoted his fortune and his time to the training of girls of the middle class to cook. He is building a great school, and no girl with a great deal of money can get into that school, because he feels that the middle class people of France must keep up their strength by good food. In little Holland—what we sometimes call "Sleepy Holland"—they have kept up with the procession. They feel that good food is one of the necessities of life, and in all the great cities they have established schools where girls go for definite training before their education is counted complete. Over the front door of every one of these schools hangs a great sign, which reads, "Kook-skool."

Domestic Economy in America.

On our own side of the sea the work progresses a little differently. The sewing school prospered and sewing was put into a great many of our public schools; the cooking school became a factor in every great city and in many of the smaller ones, and it has done good work, but it remained for the agricultural colleges to start the work definitely in domestic economy, to make it a definite line of study, and to-day we find all over this land, the agricultural colleges which have admitted girls to

their courses of study are including this line of work along with their other studies. Many of the universities have put the work into their halls and some of the public schools are carrying it down into the lower grades. Washington has had it for years, New York, Boston and San Francisco have taught sewing and cooking for several years, and last year Chicago followed in the train. The agricultural colleges of Illinois, Kansas and Iowa began the work, and to-day it has spread from the Atlantic to the Pacific, from Canada to Mexico, all over this land, until there is scarcely a State in the Union that does not teach domestic economy in some of its schools, and the American people are beginning to realize that their girls are to have all the training they need to make them strong, capable women.

Methods at Bradley Institute.

Perhaps it will be interesting to you for me to tell a little of the general outline of teaching domestic economy, and in order to do that I shall have to tell you a little of the school where I work. It is a school that was established only a year and a half ago, by a woman who has sat in her lonely house—it is a home no longer—for thirty years; her home has been represented to her in seven graves out on the hillside, and she has lived alone until now she looks back over eighty-two years of life, piling up money for the one purpose of establishing some kind of a school which should help young people. When she established that school it was with the thought of a woman, who for thirty years had not known love, for thirty years had not felt little hands about her neck. She kept saying, "Teach the girls something of home making, put something into them that shall help them to make better homes, that will make

them better wives, better home-makers, wherever they shall be placed." So we put into the six year course of study, four years of definite work, with two years options in the way of domestic economy. The first two years we give a girl sewing an hour a day. After they get out of the sewing room, they go to their drawing, or Latin, or whatever the study is. At the end of the two years they have some knowledge

borrow the handsomest linen in the store—and the proprietor lets me have anything in his store for Bradley Institute—so I get some handsome table linen and some common table linen, and I show it to the girls, who study the weavings and the whole process from the flax to the finished damask. Then they hem table cloths and napkins; then they wash and iron them, and they become very much interested in the



The Sewing Room. Fitted up with tables, mirrors, sewing machines, and all the smaller articles needed in such work.

of cloth. When they begin they are given lectures and take down notes. Then they are given six basting stitches, then six running stitches, then six seams, then flannel seams, and gathering, and tucking, and button holes, and patches of different kinds. They have lectures once a week upon cloths and when they get to damask hemming I go down town and

whole process. So it goes on. They learn to select cotton goods, and they begin upon woollens and the selection of woolen goods, and by the time they get through with their sampler book they know something about a good many things. Then they begin on garments, and each girl makes a suit of underclothing and a simple dress, cutting and fitting it herself after her own

measurements and as her own judgment dictates. If she wants the garments she pays for the material and takes them home, and these girls are as proud as any American girl ought to be of the garment she makes for herself. When they are through with these two years they have a full suit of clothing, and I assure you they feel very independent. It is not necessary for every woman to make her own clothing, but for any girl to grow up and not be able to do it, gives her a feeling of dependence which is not consistent with our ideas of true American citizenship.

Other Branches Taught.

While they have been taking these two years of sewing they have had other duties; they have learned to know something of how plants grow, from whence come our woods and different kinds of foods that come to us through the plants. They learn something of the general growth in agricultural lines, something of the way that fruits have been developed, and something of the foods of foreign production. They have something to learn in biology, something of the lives of insects, particularly those insects that are so troublesome in the homes. They study Physics and learn to know something of machinery, to understand whether their ice-cream freezer is doing its work properly, whether their range cooks properly, whether the house is ventilated as it should be, and by the time all these principles are fixed in their minds they are ready to begin on their home work. They realize that certain effects will always come from certain combinations, that when they put two materials together in a certain way and give them a certain amount of heat, they will always produce exactly the same result. They learn, too, something of

the adulterations of foods, and in the chemical laboratory they learn to take apart some of the materials that are given them and to recognize the difference between the Tonka bean and vanilla bean extracts. They learn to buy coffee that will not contain 33 per cent of dough beans. They learn from general appearances and general effects to judge of materials. Then they learn exactness, and that means a great deal in a woman's life. These girls will not have to depend upon luck with their bread or with their puddings, but they will know whether they are going to be right or not, because they are learning to be exact in whatever they do.

Head and Hands.

Then comes their work with food, an hour a day, just the same as any other lesson. They come into the kitchen ready to work with their hands, to carry right along the thought of the brain. Ruskin said, you know, that there cannot be any separation of brain work and hand work. He said there could be no healthy thought without labor, and there can be no happy labor without thought; and when he said that he put into our hands the strongest weapon possible for this idea of manual training. By and by we shall come to the point when we shall feel that the man who only works with his brain is but half a worker, just as we feel to-day that the man who only digs in the ditch is but half a worker. The man who uses both hands and brains is the man who does the work of the world. So these girls are taught not only to know food values, but to handle and cook those foods as well. They come to their tables in the kitchen where they find a moulding board and a drawer, in which are put the various utensils. Their flour, cornmeal and sugar, are all handy;

everything needed for ordinary cooking is at hand, then they have a little gas stove and each girl stands at her table and cooks.

Our Food.

Now, this matter of food is one that comes home to us all. There is no question but that the healthy mind is dependent largely upon the bodily health. No child can keep up in school and do the brain work that is required,

getic, ready to meet hardship better than those who live upon a vegetable diet, and we all want the power to grow; we want energy and the daring that will bring us everything within reach. Of course we want, too, the tender, loving nature to be developed as well, so we must have a variety of diet, and we want to study these things and use what God has placed in the world for our good. Playfair asserts that the energy that gives us nerve force comes



The Kitchen Laboratory. Fitted up with individual desks where the pupils work out their lessons and prepare the food they are to cook.

unless his physical functions are in good working order, and it seems to me that if every father and mother could realize that, they would be able to take better care of their growing children. We try to make our girls understand about these things, because we believe that the foods which our American people eat have a great deal to do with the building up of the nation. We are told, and I believe it is true, that the meat eating nations are like the meat

from meat, or from nitrogenous foods. It is a question with us sometimes, as to whether our nitrogenous foods should all come from meat or partly from some other source. We, as a nation, eat more meat than any other nation on earth, more even than England, and the English people eat on an average two and a half ounces a day, while the Irishman has only four and a half ounces of meat per week. What wonder, then, that England has put her foot upon the neck of Ireland; what

wonder that the Irishman has been starved into submission, because he had not the nerve power and cannot receive it from his potatoes, although sometimes he eats as many as nine pounds a day.

These girls are taught the constituents of the food, the different kinds of food which contain nitrogen and other chemical qualities, and the ways of cooking which prepare them thoroughly for assimilation, because they will give us no help whatever unless they are properly cooked. A whole pot of beans will give us less nourishment than a strawberry unless it is in such shape that we can digest it; and so they are taught to select good food, to prepare it and cook it, and not only that but to buy it. These girls are taken to the market and are given a quarter of beef and are taught that a certain piece is best adapted for certain purposes, and they soon learn not to broil a piece of pot roast or to put a piece of tenderloin into the soup pot. They are taught what every piece of beef is best adapted for, and that every piece is good nourishing food if properly cooked; that sometimes a piece of neck cooked in the way it should be is infinitely better than a piece of tenderloin that has been spoiled on the stove. They learn to select in the butcher shop. They learn also to put their foods upon the table in good shape. It is a pathetic thing to go to the homes of many women, because they do not know how to get up a meal, although they may be fair cooks. Their bread is good, their preserves are very nice, but they don't know how to set the table right, and it makes them feel awkward when other people come to see them, who they know understand these things. Every girl ought to feel that she can set her table just as well as anybody in this land, and it is really a matter of very

little training with a bright girl, and she takes much real comfort in it when she has company.

Further Work.

After the girls get through this work of cooking they learn something about serving meals, and I wish you could have seen the pretty luncheon those girls got up for the faculty the other day. They got it up and served it inside of an hour, doing class work. They took so much pleasure and pride in doing it, that I felt it was quite worth while to help a girl toward such things. They learn, too, to meet emergencies—they are ready for whatever comes. We demand so much more of our girls today than was demanded of our mothers, that it seems to me it is only fair and just that we give them all the training we can. We ask them not only to keep house and make homes which shall be attractive to those who belong there and to the stranger who comes, but we ask them to do church work and study work, and community work, and Institute work, and unless we help them out by teaching them in every way we can, it makes it pretty hard for them. We should teach them this work so that when they come to it, it comes easily and flows through their hands smoothly. We are not living up to our privileges unless we do more than our mothers did, because we have our mothers' experience and our mothers' strength and wisdom handed down to us and we must use it to good purpose.

Care for the Body.

Then there is another thought that comes in connection with this domestic economy training. I hold that the first duty of every woman to herself, to her family, to her community, and to God, is to make herself the strongest, ablest woman possible; to train the body so that it shall be strong and well, and no

duty that comes to it will be a burden. I hold that no woman has any right to tamper with the health that God gave her, and many of us are not living up to our principles if we are not well and strong every day. Unfortunately some of us are not well born, although we have been told that is our privilege, but with some of us our mothers worked out their lives on these prairies before

stand that if they go to school in the morning without breakfast, if they go without lunch, or without rubbers, or do anything that shall interfere with their usefulness and the health of their bodies, that they are wicked. They have no more right to risk their own bodily health than they have to take a hatchet and chop off their fingers. I believe that many mothers have a lesson to



View in Dining Room.

we were born, and had no strength left to give us. But those of us who have any strength at all can build upon that and can make ourselves better and stronger every day if we will, and I hold that in teaching girls there is no one lesson that ought to come more strongly to them than the care of their bodies. I try to make these girls under-

stand that if they go to school in the morning without breakfast, if they go without lunch, or without rubbers, or do anything that shall interfere with their usefulness and the health of their bodies, that they are wicked. They have no more right to risk their own bodily health than they have to take a hatchet and chop off their fingers. I believe that many mothers have a lesson to learn along this line; the mother who sits up till late at night and works over her housework is not the mother who can have the brightest, quickest brain to use for her children. She cannot live for them and with them to the best advantage. I believe that every woman taking her regular and proper amount of sleep will do more work in a year

than if she cuts herself out of the sleep she needs. There cannot be too much said about this matter of bodily strength. The idea of delicacy that was at one time fashionable has gone by, and I am thankful to know that in this day and age our women are growing stronger, growing into better physique, they dress better, they live better, they eat better, and they sleep better. There can be no more wise and strengthening thought brought to the girl's mind than the thought of her responsibility for the work that may be coming to her. I know of a girl who has been sitting many years in despair because she believes that she has inherited consumption and will slip into her grave in her early thirties, but that is not right. We say to this girl, "It is your fault if you grow weak and slip into your grave; it is your own fault if you do not grow well and strong, because you do not take the care of yourself that you ought to take." That little girl was full of despair a few years ago. She had not been well taught and when she came to realize that she had not taken the proper care of herself, her despair was something very pathetic. So this lesson of health and strength comes to our girls. And there is another lesson we wish to bring to all these girls, the lesson of clean, strong lives. And not only to our girls but to our boys. I wish these American boys of ours could learn that the most attractive thing on earth is a clean, noble, earnest American lad. I wish the girls could realize the sacredness of strong, noble womanhood. When the day shall come that our girls and boys shall realize the clean lives they ought to live, we shall have a better nation upon our earth.

Character Building.

After all, this training is all for one purpose, the building up of the char-

acter, and when we can build up such American character as we ought to have, there will be no question about the men whom we send to represent us in the high places of this land; there will be no question about the men and women who compose the homes of our land, and if the homes be right the nation will be right. No stream can rise higher than its source, and this nation is made up of its homes. As the homes run, so runs the nation, and the women who hold in their hands the power to make these homes are the women who really make the nation. Ask any of our strong men to-day whence came the power that made them great, and they will tell you it came from their mothers' lives. They will tell you that to their mothers they give the credit of making them strong, wise, true men, and if we train the girls to make such mothers as this earth needs, we shall have no question about the bringing up of our boys, no question about the kind of men we have in the world, no question about our nation, because it will all be right.

Home and Mother.

Some of you men years ago shouldered your muskets and marched off in defense of your homes; you did not know for how long and you didn't care. You were ready to give your lives, but it was all for your homes. Only last year some of you saw your boys march off to defend, not your homes, but the homes of a people who could not hold their own homes, a people who had been down-trodden and oppressed until we had to take hold and help them, and you were glad to see your boys go in such a cause. They tell a story about the war, away back in the '60s, which gives us a little idea as to what the thought of mother and home was to the men who went into it. They say that

way down on the Rappahannock when the two armies were camping facing each other, there came a time one night when one of the bands struck up a tune. The other side listened. The band from the North played "Star Spangled Banner," on the other side the band burst out with "The Bonny Blue Flag." Then came the Northern band with its "Rally Round the Flag, Boys," and then across from the other side rang out "Dixie." But way down the river a lone bugler began, and he played "Home, Sweet Home." The soldiers around him first took it up, then another and another, until the song floated up the river and every man on both sides was singing from a full heart "Home, Sweet Home," until they rolled up to heaven such a chorus as never had been heard before, because both armies sang to one thought, and every man sent his heart back to the

home he was fighting for, to the home he longed to see, and the one thought that brought these two fighting armies close together was the thought of home, because that thought in this land was strong to the American men who sang there that night. And when we learn that the American home in its best phase is the one thing to be worked for, we shall learn the best lesson of this nation. When we learn that whatever we do, wherever we go, there is one picture of heaven that God has given us and that picture is a perfect home, the home that we may make, each one of us, the home that we might see all over this land, then we shall learn what heaven is to be to us by and by, and when we give to our girls and our women the capacity to make this home, we shall have done all we can do to make heaven upon this earth.

SNAP-SHOTS BY JOHN W. DECKER.

The illustrations here given are a few of the pictures shown in a stereopticon talk given at the Round-up Institute.

These pictures are all from original photographs taken by Mr. Decker. They are divided into two groups :

Group I. Foreign cheesemaking in Wisconsin.

Group II. Dairying in Europe.

Group I—The Different Kinds of Cheese.

There are about 1,600 cheese factories in Wisconsin, in which are annually produced about 55,000,000 pounds of cheese. Probably 40,000,000 pounds is the common American cheddar cheese, while the remainder, made in about 400 factories, is what may be termed for-

eign. Under the term foreign are grouped the Swiss, brick and limburger. Green County and the adjoining edges of La Fayette, Iowa and Dane Counties is the part of the State where these kinds of cheese are manufactured in the greatest quantity. Dodge County stands next in production, and the factories are scattered from there northward on the western side of Lake Winnebago to the edge of Lincoln County. In the western part of the State, in La Crosse, Trempealeau and Buffalo Counties are a number of factories. The cheesemakers come mostly from Switzerland or Germany: As milk is usually received twice a day and the work is therefore confining, the maker lives in a part of the factory.

Fig. 1 shows a Swiss factory known as the New Faser factory, located about five miles from Monroe.

Swiss Cheese.

Swiss cheese is made in two forms, round or drum Swiss, and block Swiss. The round Swiss is made in large cakes two or three feet in diameter and four to six inches thick. A good cheese should have numerous holes about half

worked over in the fingers it should not stick to them, but should mould like dough, when it is said to be of the "right dough." If it is sticky the eyes do not form, but irregular cracks appear and it is termed a "glassler." If it is without eyes it is said to be "blind." When abnormal fermentations occur the eyes may be too large or run one into another, or there may be fine pin holes, in which latter case it is termed a "nessler."

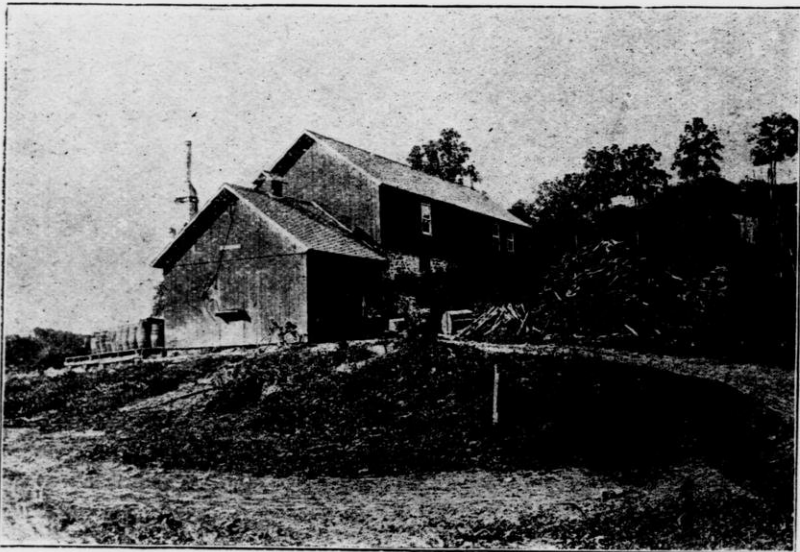


FIG 1.

an inch in diameter, evenly distributed through the mass. The surface of the hole or "eye" should be glossy.

Fig. 2 shows such a cheese. The square laid on the top indicates the size of it.

The quality of a cheese is described under two heads:—First, flavor, which should be clean and pleasing, and, second, the texture, which takes into consideration the physical appearance of the cheese. When a small piece is

Fig. 3 shows a cut from a cheese that exhibits three kinds of holes: (1) round eyes of the proper size, though they are not glossy, (2) nessler holes, and (3) glassler cracks.

To determine the quality of a cheese the buyer draws a plug with a cheese trier.

Fig. 4 shows a series of plugs illustrating the different kinds of cheese.

Swiss cheese is classed in three grades, as follows :

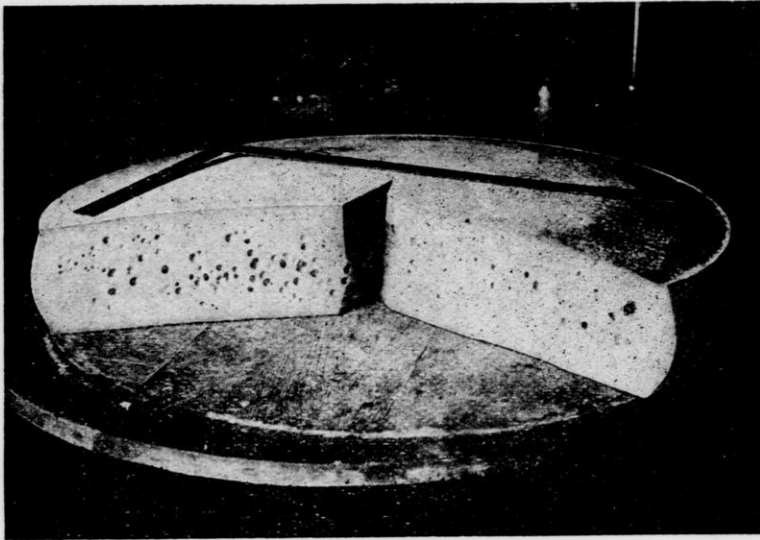


FIG. 2.

No. 1.—Flavor good; texture, right
dough and good eyes.

No. 2.—Flavor not fine; texture,
glassier, nessler or blind.

No. 3.—Flavor bad; texture, cracked
rinds or rat eaten.

What has been said about the quality
of drum Swiss applies to block Swiss,
which is pressed in the form of blocks
six inches square and twenty inches
long, and weighs about thirty pounds.

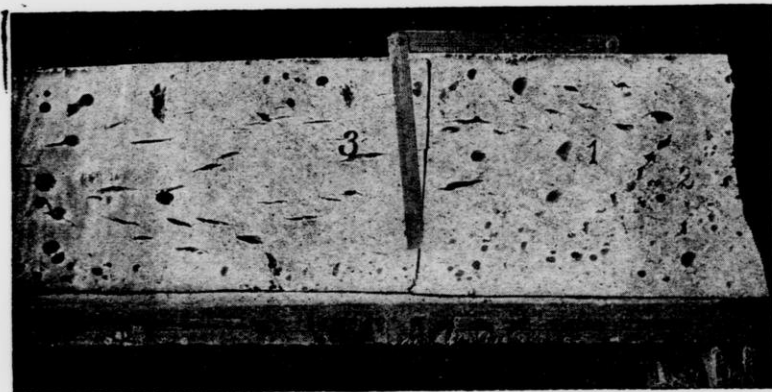


FIG. 3.

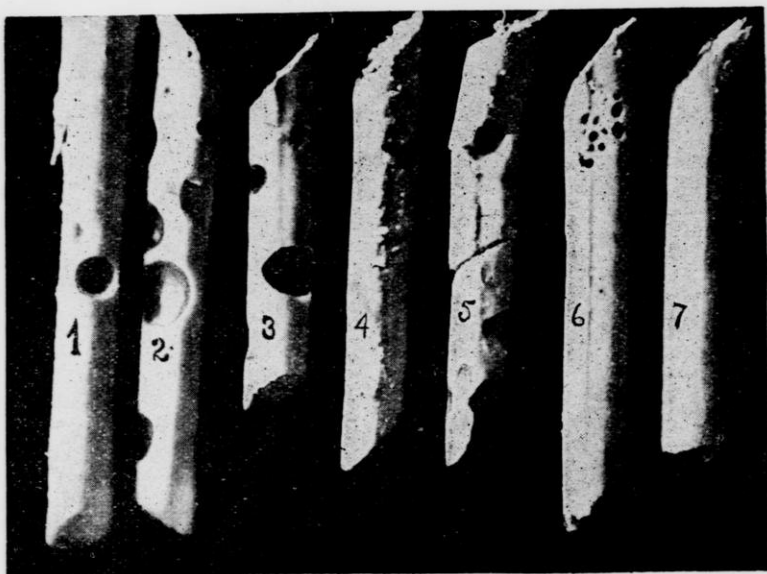


FIG. 4.—A series of plugs from Swiss cheeses of different quality. Nos. 1, 2, 3 would be classed as No. 1 cheese, though 2 has rather too many holes. Nos. 4 and 5 show the cracks of a glassier and the corresponding pasty appearance. No. 6 at the upper end indicates a nessler, though a typical nessler would have the small holes the entire length of the plug. No. 7 is what would be termed a blind cheese as there are no "eyes" or holes.

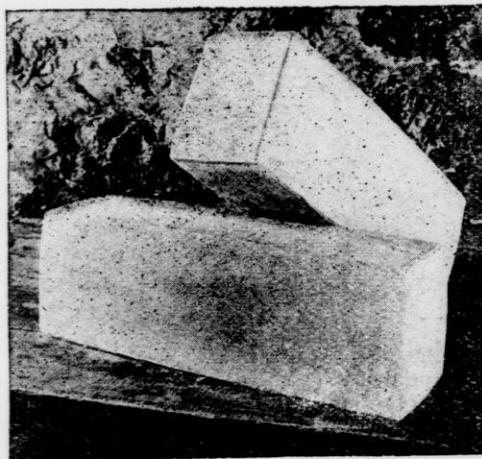


FIG. 5.

Fig. 5 shows two typical block cheeses.

Drum Swiss are packed six in a large tub, which will often weigh ten to thirteen hundred pounds.



FIG. 6.—A load of three tubs of cheese weighing a ton and a half being delivered at Grunerts' warehouse, Monroe.

Fig. 6 shows a load of three such tubs being delivered to the warehouse in Monroe, Wis. The cheese on this load weighed a ton and a half. Block Swiss is shipped in boxes, each holding six cheeses, so that a box weighs about 180 pounds.

Fig. 7 shows one of the large copper kettles in which the cheese is made.

These are usually made to hold two to three thousand pounds of milk. They cost one hundred to one hundred and fifty dollars. This kettle hangs on a heavy crane so that it can be swung away from the fire when the proper temperature of the milk or curd has been reached.



FIG. 7.



FIG. 8.—Interior of Five Corners factory, showing a cheese in the press and the means of adjusting the pressure. The small engine and churn are for making whey butter.



FIG. 9.—Curing cellar in Five Corners factory, near Monroe. The large drum Swiss cheeses are on the shelves. The small boiler supplies steam for moisture when too dry.

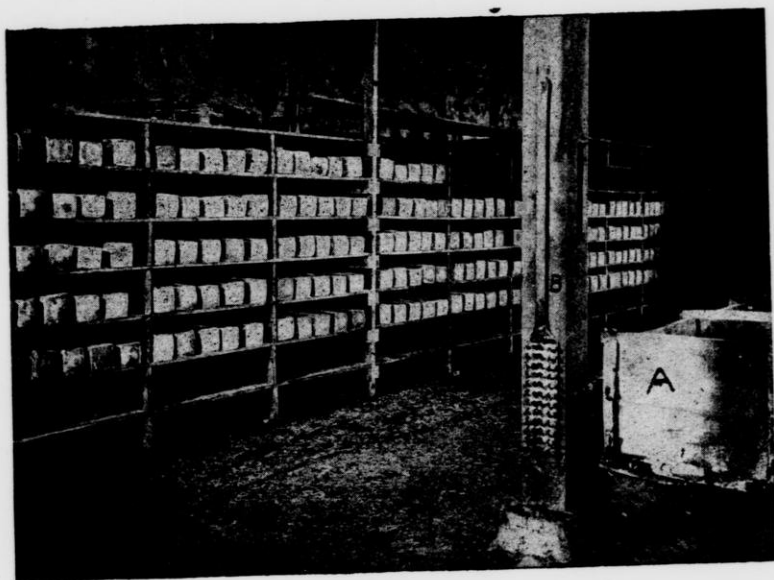


FIG. 10.

Fig. 8 shows the interior of a factory and the cheesemaker has his hands on the screw of the press.

Fig. 9 shows a drum Swiss cellar (Five Corners Factory, near Monroe) with the large cheeses on the shelves.

Fig. 10 shows a block Swiss cellar, with the blocks on the shelves.

After the cheese is taken out of the hoop it is put into a tank of brine for two or three days to salt. From the brine tank it goes onto the curing shelves. Coarse salt is sifted on top of the cheese to penetrate as the cheesemaker's judgment dictates.



FIG. 11.

Cause of Bloated Cheese.

We have already mentioned the fact that there are sometimes abnormal fermentations in cheese. One of these is the bloating or huffing of the cheese. Brick and Swiss makers are especially bothered with these. The cause is that certain kinds of microbes or bacteria get into the milk and by their growth

Fig. 14 shows State Instructor Baer using this test in a block Swiss factory near Monroe.

This past summer the writer was called to a Swiss factory where there had been trouble for four months. There were thirteen patrons. Inside of twenty-four hours the curd test showed that the most of the trouble came from the

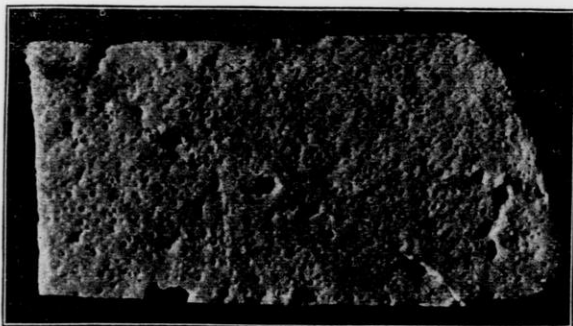


FIG. 12.



FIG. 13.

in the curd produce gas which swells the cheese.

Fig. 11 shows a good curd, Fig. 12 a curd slightly affected, and Fig. 13 one containing more of the germs, is like a sponge. By using the Wisconsin Curd Test invented at the Wisconsin Experiment Station the milk causing the trouble can be located.

milk of four patrons. The worst lot came from a farmer whose barnyard was filled up with manure and filth. The cows were milked in these surroundings and the dirt that got into the milk was the starting point for ruining the cheese. Two of the patrons had excellent milk and investigation showed that when the cows got dirty

the dirt was washed off before milking. A bulletin, describing this Curd Test, can be had by writing to the Experiment Station, Madison, Wis., for it.

Brick Cheese.

Brick cheese is made in the form of a brick eight and a half, or ten inches long, five inches wide, and two or three

by side on a table and draining boards, as indicated in the picture, lay on the table and are covered with a coarse strainer cloth. The molds rest on the cloth.

The curd is made from sweet milk in an ordinary cheese vat in the way that cheddar is made, except that no acid is developed. As soon as it is formed the

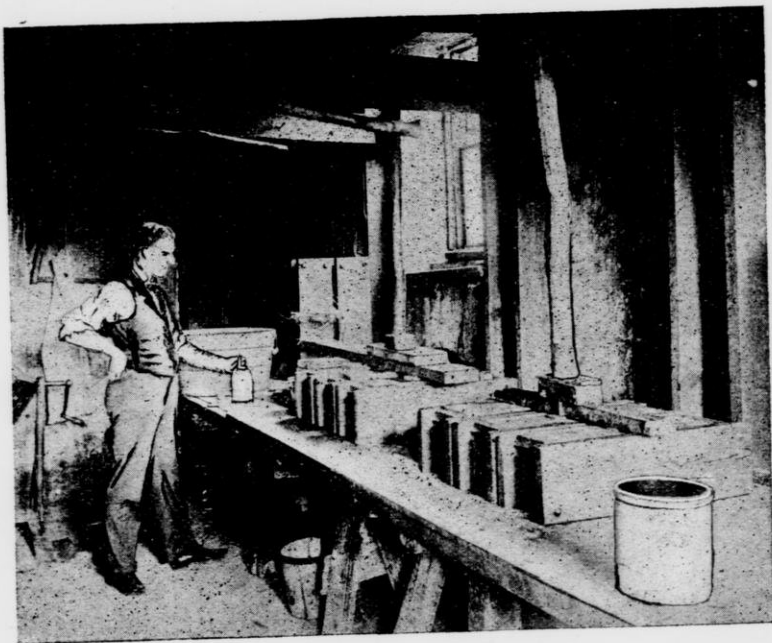


FIG. 14.

inches thick, and weighs about five pounds. It is also pressed under the weight of two bricks. It probably takes its name from its shape and the manner of pressing it.

Fig. 15 shows a brick cheese mold, which is made of wood, is of the length and breadth just named, and six or eight inches deep. A wooden follower fits in the top. These molds are set side

by side on a table and draining boards, as indicated in the picture, lay on the table and are covered with a coarse strainer cloth. The molds rest on the cloth. The curd is made from sweet milk in an ordinary cheese vat in the way that cheddar is made, except that no acid is developed. As soon as it is formed the whey is drawn nearly off and the curd scooped out with a scoop or curd pail and put into the molds. The whey runs off and the curd settles into a block. The followers are dropped into place and the brick put on for pressure. In the picture will be seen the vertical cuts made by a saw and small holes in the sides, through which the whey can escape.

Fig. 16 shows a table with the molds in position.

After twenty-four hours it is taken from the molds and salted on the surface. The blocks are piled together and salt is applied each day for three or four days and then it is put on the shelves in the cellar to cure. The attention in the cellar consists of washing two or three times a week. It is

Brick cheese, the principal difference being that more moisture is retained in the cheese and this induces a putrefactive fermentation. It is made twice a day from sweet milk; is cooked in an ordinary vat at a temperature not to exceed 95 degrees, Fahr., and is dipped into a mold similar to, but longer than a brick cheese mold. The mold is 20 inches long; no pressure is applied, and

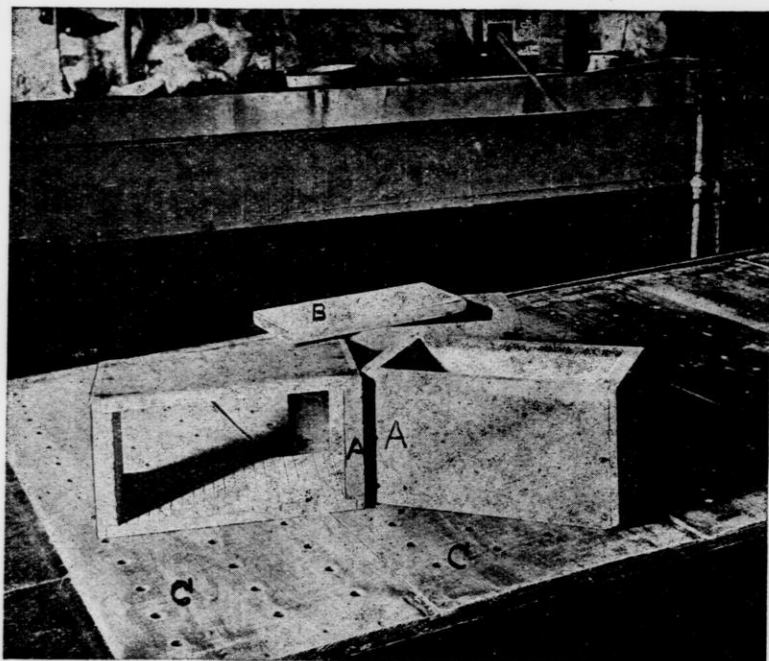


FIG. 15.—Brick and Limburger cheese moulds. A, moulds. B, follower, C, draining board.

usually sold when four or five weeks old. Each cheese is wrapped in a sheet of manila paper and twenty to twenty-five are packed in a box. On account of its mild flavor and the small size of the package it meets with considerable favor.

Limburger Cheese.

Limburger cheese is made much like

at the end of twelve hours the soft curd that has simply settled together, is cut into four blocks five inches square. These blocks are then laid on a draining table, with partitions between them. When a row the length of the table has been completed a long strip is laid next to the row to separate it from the next row that is started.

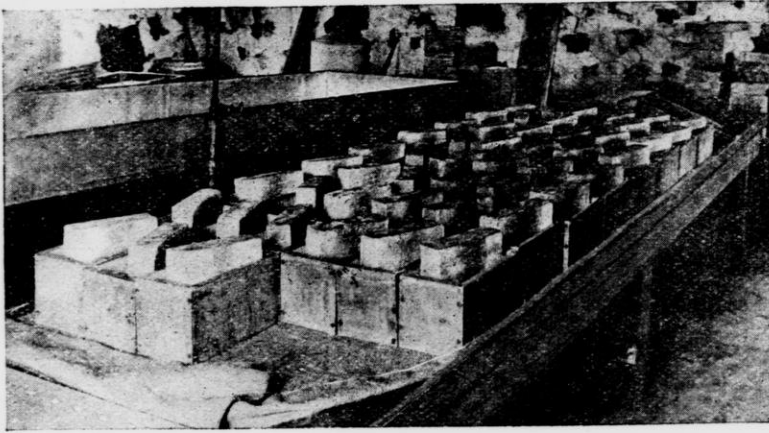


FIG. 16.

Fig. 17 shows a draining table so arranged.

After remaining on the draining table for twelve hours it goes into the cellar, where salt is rubbed on it each day for three or four days, as is done with brick cheese. Then it goes onto the shelves to cure.

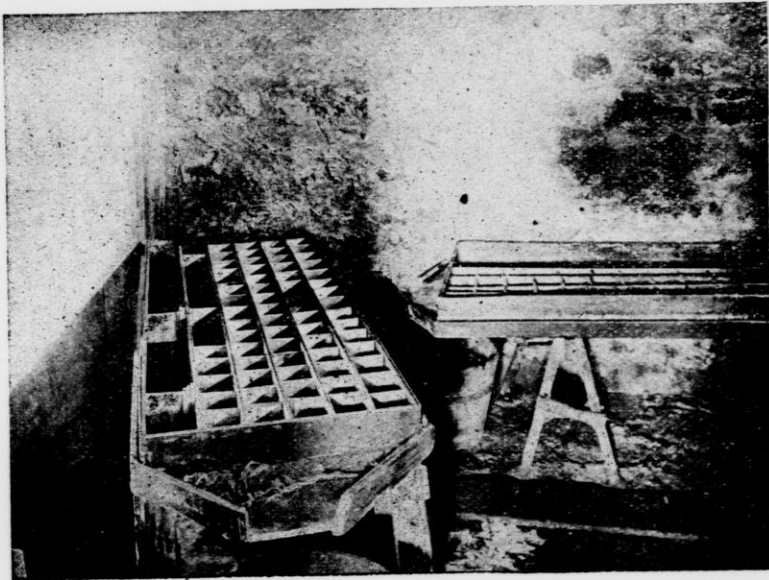


FIG. 17.—Limburger moulds on draining table showing the long pieces and the short partitions between.

Fig. 18 shows a limburger cellar. In the foreground is the salting table with the cheese piled in it. On the shelves arranged around the sides of the room are the cheese piled close together to keep them moist. The atmosphere is also kept moist. The outside begins to soften and turn yellow, and in the course of four or five weeks this fermentation extends to the center. It is then wrapped, first in manila paper,

will see points of interest to the dairyman that are peculiar to these countries.

The dairyman has heard the terms Jersey and Guernsey used as names of the two breeds of cattle without thinking, perhaps, of where they originated. Off the coast of the west of France twenty to forty miles, and south of the port of Weymouth in England eighty to one hundred miles, lies a group of islands known as the Channel Islands.

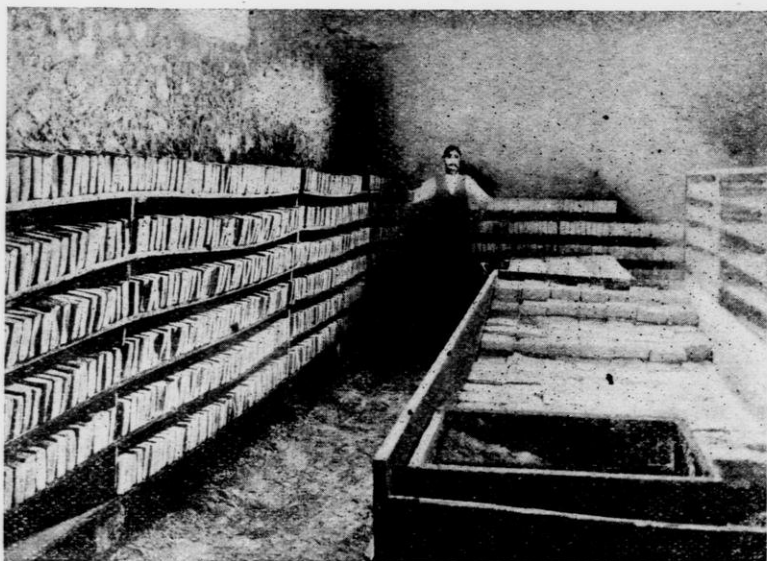


FIG. 18.

then in tin foil, and packed in boxes like brick cheese. It may be kept a month or longer in a cool place before it reaches the consumer.

Group II.—Dairying in Europe.

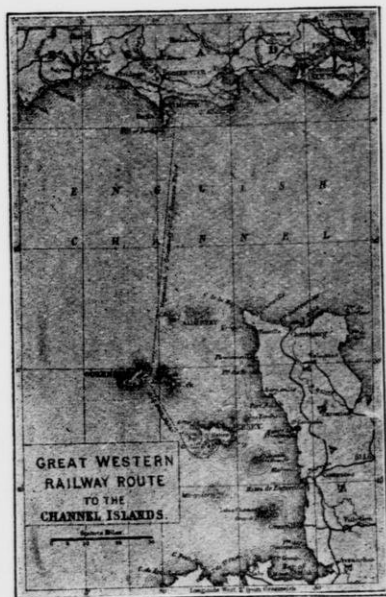
The pictures shown in this part will take us on a trip through the Channel Islands, Holland and Denmark, and we

The largest is Jersey, ten miles long and four or five miles wide. Next in size comes Guernsey and third Alderney. The latter has a strongly fortified harbor and is an important British naval station. The other islands are simply huge rocks that stand out of the water and produce little or nothing.

In early times the Normans overran not only that part of France called Nor-

mandy, but also these islands, and as the steamer runs along the shore numerous watch towers, yet standing in a good state of preservation, are to be seen. The Channel Islands, therefore, belonged to William the Conqueror when he defeated King Harold and became king of England. Afterward Normandy became French territory again, but the Channel Islands remained under English control. That is how they belong to England, though so near the coast of France, and a huge English fortification frowns over the harbor of St. Heliers Port, in Jersey, and over the harbor in St. Peters Port in Guernsey. In Jersey the noted Jersey cow is seen. As the island is small only the best can be saved. The udders of the cows are good-sized, square, and well set.

Fig. 19 shows two cows at Perry farm, St. Mary's Parish. They are typical of the cows seen on the island.



MAP OF CHANNEL ISLANDS.



FIG. 19. Cows at Perry Farm.

Fig. 20 shows the bull at the head of the herd at Perry Farm. They do not have the Babcock test there and do not know anything about the per cent. of fat in the milk. The dairy house at Perry Farm has a 600 pound Alpha separator in it. One creamery of which the island boasts was receiving 1,000 pounds of milk a day. The population

of potatoes as an article of production, and the island is thickly dotted with glass houses for forcing plants. The Guernsey cow on the island looks like the Guernsey cow in this country. They are used to churning the milk instead of the cream in making butter. One lady told me that she did not think good butter could be made by churning

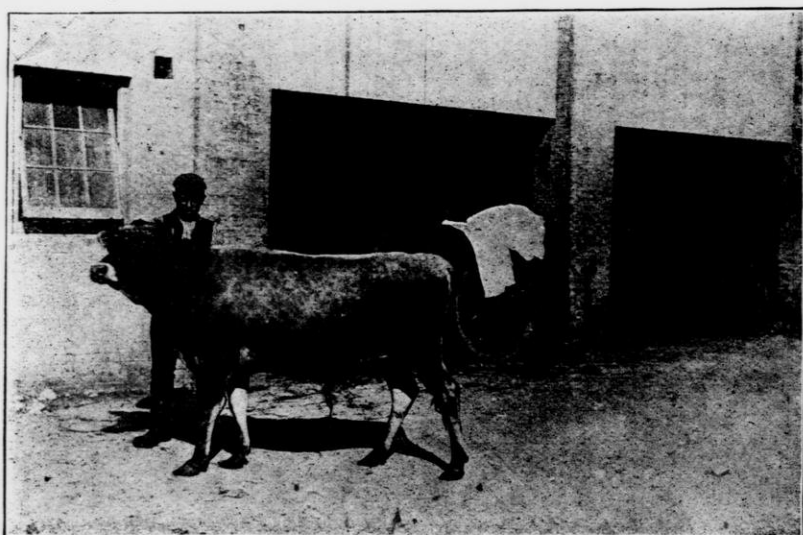


FIG. 20. Head of Herd at Perry Farm.

of Jersey is 56,000, and the people being so numerous, not only use all the butter the cows will produce, but import large quantities from France. Potatoes are raised and sent by the ship load to England.

In Guernsey the conditions are similar to Jersey, the population being 34,000. Tomatoes seem to take the place

the cream. There used to be an annual prize of \$50 given by the Queen for the best horses. The people sent in a petition to the Queen and this was changed from horses to cattle, and each year a cup is offered for the best bull, and another for the best herd of four cows and a bull.

Fig. 21 shows five cups won by John De Garis. His brother-in-law, John Prevost, has won eight cups.

Fig. 22 shows one of his best cows tethered in high grass. Nearly all the cows are tethered as the people cannot afford to have the cows tramp down what they do not eat. Three or four times a day the stakes are changed. The people are a mixture of French and English, and the agricultural reports are printed in both languages. Both Jersey and Guernsey have a local government quite as independent as that of Canada and their own coins and postage stamps.



MAP OF HOLLAND.

Holland.

A large part of Holland is below the sea level. Dikes have been built around the country and the water



FIG 21.

pumped out by means of windmills. It is with queer sensations that one walks along the top of one of the dikes and sees the water on one side ten or fifteen feet higher than the country stretching off in the opposite direction. The pastures are divided by ditches of water instead of fences. Holland is the home of the Holstein-Friesian cattle, and

Friesian cheese. Edam cheese is made in round balls, six inches in diameter, and is sometimes seen in our grocery stores. There are but few factories, most of the cheese being made on the farms. One factory that I visited was receiving 9,000 pounds of milk per day.

Fig. 23 is a picture of the curing room in this factory.

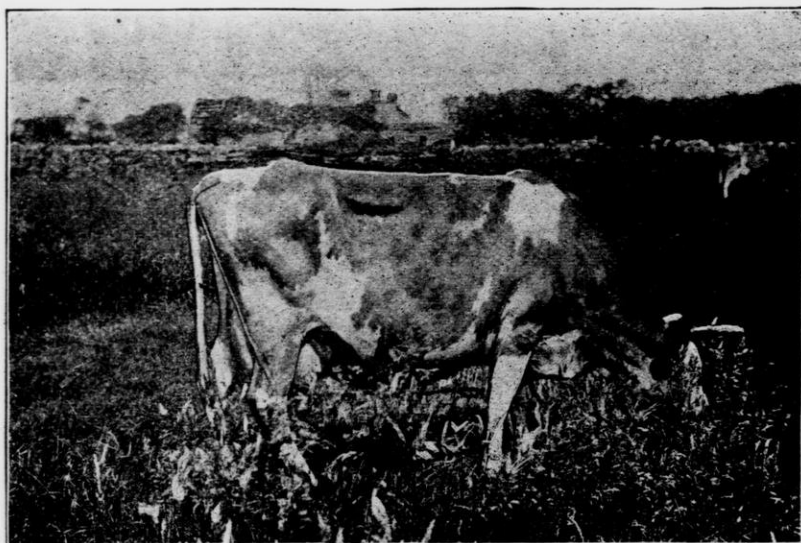


FIG. 22. Cow owned by John Prevost, King's Mill, Island of Guernsey.

these animals may be seen by the thousands in the low luxuriant fields of grass. About ninety per cent. of them are black and white, as seen in America; the other ten per cent. are red and white or mouse colored.

In North Holland Edam cheese is made; in South Holland Gouda cheese, and in Friesland butter, and a skim cheese (not good for much) called

The cheese is marketed when about a month old. It is washed and then oiled with linseed oil, and put into a cart and hauled to market. At the market straw is spread on the pavement and the cheese piled on this.

Fig. 24 shows a cheese market at Hoorn. As soon as the cheese is sold it is carried by the officials of the market to the market house to be weighed.

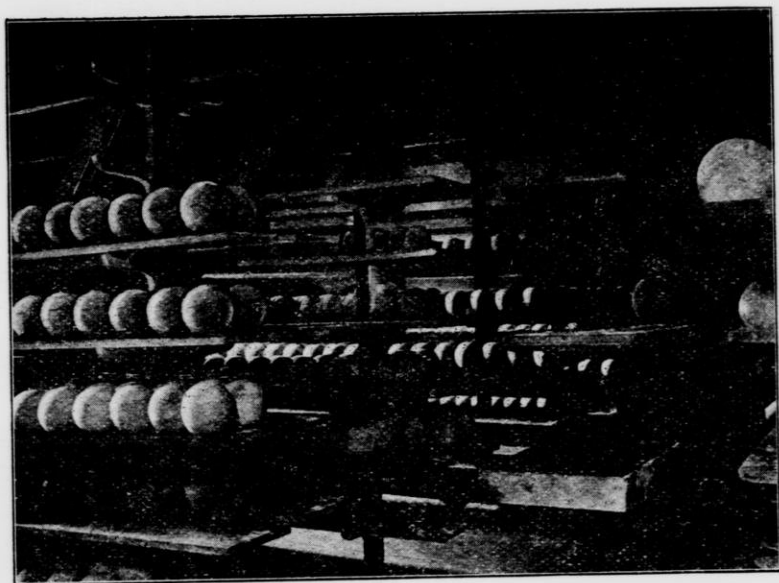


FIG. 23. Curing room of an Edam cheese factory in North Holland.



FIG. 24. The weekly cheese market at Hoorn, North Holland. The market building where the cheese is weighed is just beyond the statue.



FIG 25

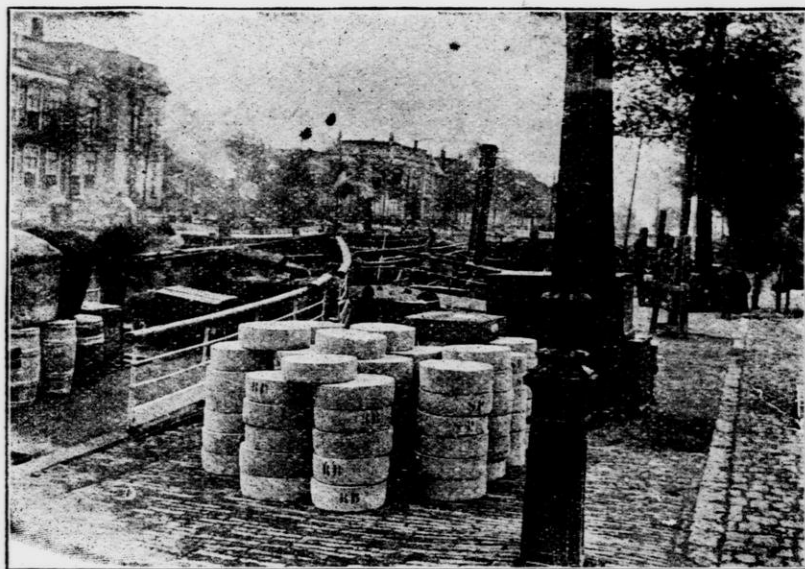


FIG. 26.

Fig. 25 shows the large balances and the officials weighing the cheese.

The Freisian cheese is put up in large cakes about the size of our American flats, but without bandage. Carraway seed is often mixed with the curd.

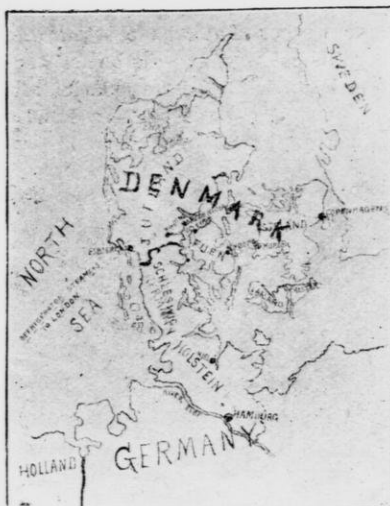
Fig. 26 shows a lot of this cheese being unloaded from the canal steamer at Leenwarden.

Friesland has many creameries and the butter, though put up in the same kind of packages, is not as good as Danish butter.

Fig. 27 shows a lot of butter on the wharf at Leenwarden.

Denmark.

The fame of Danish butter has gone throughout the world, and the English market receives about one-third of its supply from Denmark. It is by persistence and intelligent effort that the dairy business of Denmark has been put



MAP OF DENMARK.



FIG .27.

where it is. In the Agricultural College museum at Copenhagen I saw a Mason butter worker that was brought there from this country, and the butter workers in Denmark had been modeled after it. There are about twelve hundred creameries in the country and seven hundred and fifty of these are voluntarily under government inspection. The government inspection is done in this manner:

A cold storage, shown in Fig. 28, stands on the Experiment Station grounds. Any butter-maker who wishes to may put his factory under the government supervision, and every two weeks Dr. Emil Holm, who has charge

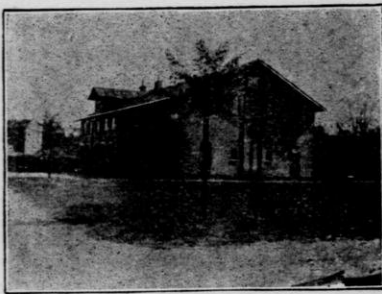


FIG. 28.

of the work, selects ninety factories and wires "send us a keg of butter on the morning train." The butter has to be taken from the lot that is in the refrigerator at the time the telegram is received, for there will not be time before the train goes to make a special sample. In the cold storage at the Experiment Station are three rooms and the butter is divided into three lots of thirty samples each. Every package is covered so that the judges cannot see any mark on the package. Three butter merchants are asked to score the butter and each judge takes one room at a time to himself. The three scores

on each package of butter are averaged and the butter-maker notified of the result, with suggestions as to how he may improve. If the score is low his butter is judged again in a short time, and if there is no improvement, an offer of help from an Experiment Station expert is given. If there is still no improvement the butter-maker is considered a hopeless case and is dropped from the government list.

There are numerous butter contests, at which diplomas and medals are given, and when I would call at a creamery the butter-maker would take me into his living apartments and point with pride to his diplomas and medals.

The milk is separated at a temperature of 85 degrees, and then the cream and skim milk are run through continuous pasteurizers. The skim milk is delivered hot to the patrons. The cream runs over a cooler in another room and then a commercial starter like Hansen's lactic ferment is added to ripen it.

These three factors—government supervision, butter contests, and pasteurization, with use of a starter to ripen the cream—have given Denmark its high and uniform quality of butter.

Fig. 29 shows the interior of a Danish creamery, which, with the exception of the pasteurizer, is not so different from an American plant.

Fig. 30 shows the cream ripening and churning room. The cooler shown on the right is filled with running water and the cream in its descent along the coil is thoroughly cooled. The cream is ripened in the large cans seen along the edge of the room.

The Danish churn is shaped like the old-fashioned dasher churn and the churning is done by wings, which revolve on a vertical shaft.

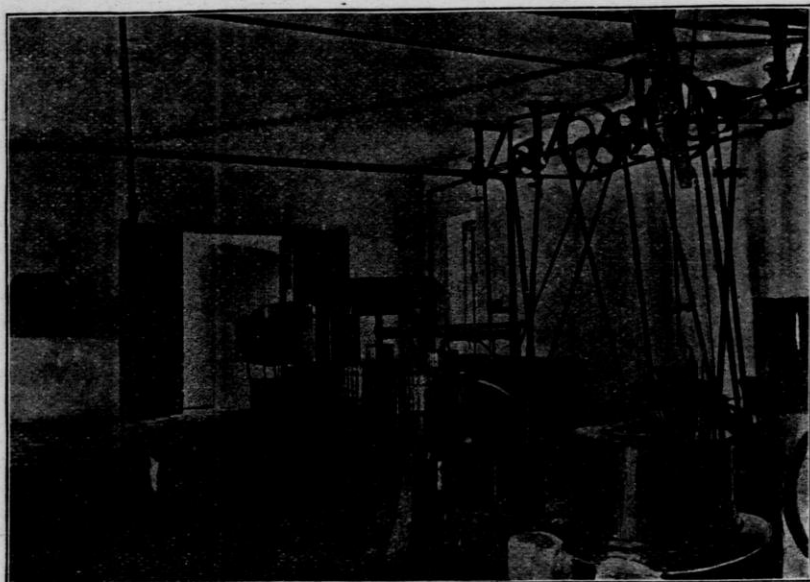


FIG. 29.

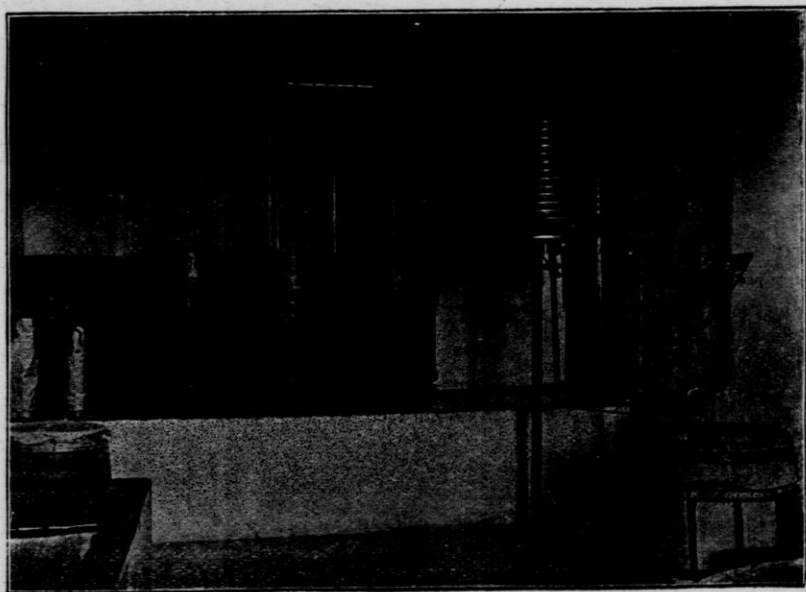


FIG. 30.

The Babcock Test is known in Denmark and is used to some extent. The Danes honor the name of Dr. Babcock and asked when they might expect a visit from him.

Dr. Fjord, the chemist in their Experiment Station, invented a cream test. A graduated test tube is filled with milk and swung in a separator bowl to raise the cream. The different percents. of cream show the relative values of the different milks. This, it will be seen, is only relative and not absolute butter fat. Yet this test has been of great service to the people, and when Dr. Fjord died a statue, shown in Fig. 31, was erected in front of the Experiment Station building. Thus is scientific agriculture honored in Denmark.

The Institute adjourned till 9 o'clock next day.



FIG. 31. Statue of Dr. Fjord.

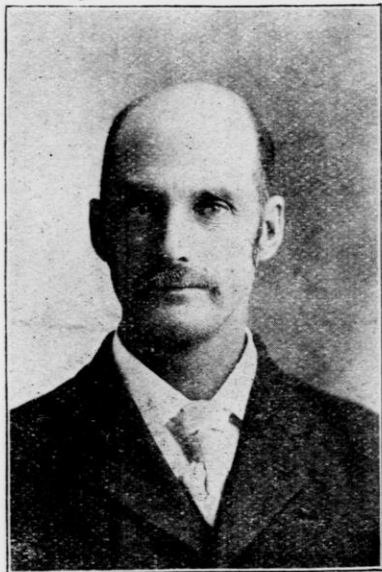


THIRD DAY.

The Institute met at 9 o'clock A. M., March 16. Mr. Chas. Thorp in the chair. Prayer by Rev. J. W. Priest.

GOOD DAIRY COWS.

F. H. SCRIBNER, Rosendale, Wis.



F. H. SCRIBNER.

Every one should ride a hobby horse of some kind nowadays. I mean by this that every farmer should make a specialty of some branch of animal industry. My hobby is the special purpose dairy cow. By a special purpose cow I mean one that produces the greatest profit from her milk product, and I am glad to say that this style of cow is not confined to any particular

breed, but that the Holsteins, Guernseys, Ayrshires and Jerseys are all entered in this race and it is left for us to decide which one we will choose. Because some one has made a success of Holsteins, it does not necessarily follow that you would. If you cannot see anything to admire in that great, large, bony carcass, covered with a shroud of black and white, and with a look of "more" in her eye that would scare any ordinary feeder, then do not touch her. And if some one has been fairly successful in the Jersey line, do not jump at this conclusion, because she don't give a very large mess of milk, and she is inferior in size and when you are through with her she would make but a few pounds of canned meat at most, but look on both sides of the question and decide for yourselves. Breed in this particular line and stick to it, and if you are a progressive student of the business you will be successful.

Best Type of Dairy Cow.

There are certain rules laid down which we all ought to be familiar with, and if we follow them we will not go very far amiss in picking out a dairy cow. These rules were not made, and then a cow made to fit the rules, but they have taken some of the greatest

milk and butter producing cows and made a diagnosis of them and found that they nearly all agree with the type held up before us, and have adopted it as a standard for a dairy cow. There are of course exceptions to these rules, but to the breeder and the one who is trying to bring his herd up to the highest point of profit, this dairy type of cow is the one most sure of transmitting her good qualities to her offspring.

There is so much that enters in to

tion, see that it is kept so by proper feed and exercise. So you will see that the man has as much, or I might say even more to do with this dairy conformation than even the animals themselves. No matter how well bred the calf may be along the lines of milk and butter production, the man may spoil it all by improper feed and care; he may not be able to do it in one generation, but if followed up it is bound to work disaster.



Prospect Hill Farm. Home of F. H. Scribner.

make this cow what she should be. In the first place the dam must have this dairy makeup and must be kept so, and can be kept so by proper feeding; next the sire must have these qualifications and must also be kept so by proper feed and exercise. One might ask what harm would come to the produce if dam or sire should lay on a little too much flesh. Because you have started tendencies toward repetition. The same tendency is apt to crop out in the coming generations. And when the calf comes and has this dairy conforma-

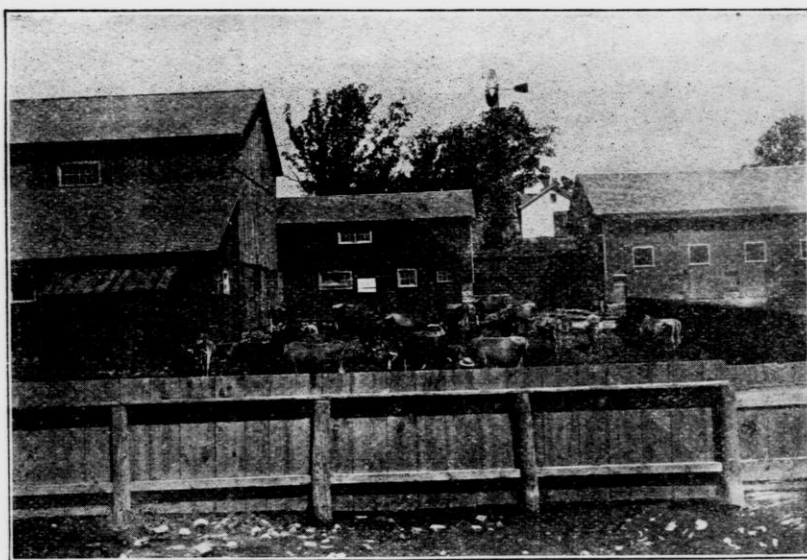
Profitable Feeding.

Josh Billings says: "Don't drink too much new cider, and however mean you may be, don't abuse a cow." Josh had an eye for business; he found out that to misuse our cows was poor sense and less cents. But we can abuse them in more ways than one; we can abuse them by over-feeding and we can abuse them by under-feeding, and it should be every breeder's and feeder's business to know just what to feed and how. Cows differ just as much in their taste and requirements as persons. To

feed all the cows in a herd alike, day after day, is not only a wasteful but an unprofitable way of doing, as some are sure not to get enough for the greatest profit, while others are liable to get more than they can use to good advantage. The good Lord has given us one of the most productive states in the Union; we are able to raise all the grasses and different kinds of grain necessary for the keeping of all kinds of animals, and He has left it for us to

standard can really be laid down for all conditions, and the feeder has got to come down to his own good judgment.

I do not think the feeding of stock can be carried on economically where animals do not lick up clean all that is put before them of the right kind of food. Of course there are exceptions to this, for instance, when hay is coarse or over-ripe, or when feeding dry corn stalks it would not be policy to force



Barns and Dairy Herd of F. H. Scribner.

formulate and balance up rations that we may get the most possible for the object for which we are working.

The words "scientific feeding" used to seem too big for me to comprehend, but after all it means only rational feeding; good common sense mixed with good judgment, and knowing the needs and characteristics of the different animals. A balanced ration is simply a statement of the results of experiments and observations; no fixed

them to eat it all. It is a fact that where animals are fed more than they can eat with a relish and leave food in the mangers, they do not prosper like those that clean up the manger. If she leaves her mess from some cause, do not force her to eat it, but remove it, and give her some fresh, or perhaps change the feed.

A Careful Record.

After we have gotten the herd nicely established and in good working or-

der, there are three things that we should adopt to our cow paraphernalia—a milk sheet, a pair of scales, and a Babcock tester; the three together tell the whole story. They tell whether we have cows that are keeping us or whether we are keeping them. Good judges tell us that two-thirds of the cows kept for their milk do not yield their owners an annual profit, and as a matter of ordinary business, every dairyman should study the individuality of every cow and know approximately the amount of milk and butter that each one produces, so as to be able to weed out the boarders and get his herd on a good paying basis.

There is so much to be read between the lines on a milk sheet; it not only tells how much milk she has given in a year, but shows the persistency by telling how many days she was in milk, and if you have been changing feed, whether the change has been one of profit or not; and it is also an incentive to better work on the part of the help, as I find they are more careful to get the last drop to try and beat yesterday's average. It also shows the variations in the milk yield and sets one to thinking what is the cause and how to remedy it.

The Sire.

For the average farmer, in starting a dairy herd, the best plan I know of is to take a few well selected animals and bred up to the size desired; this plan takes time, but I believe it is the most satisfactory in the end. It is often said, and I think truthfully, that the bull is half of the herd. In selecting a sire get the best. See that he is from a milk and butter producing strain. Every calf added to the herd takes half its blood from the sire and one can readily see that this step is a very important one. I also want to emphasize

the fact that care, comfort, and cleanliness have much to do towards building up a good dairy herd, and taken in connection with the sire one ought not to make any mistake. Five or ten dollars, or even more, is nothing on the price of a good cow, and if a man is raising ten or twenty heifer calves a year the money spent for a number one sire comes back to him tenfold.

I think that one of the greatest faults of farmers in general is not so much a lack of knowledge, as of application. We know a great deal better than we are willing to do; we are too slow in taking up the more advanced methods of caring for our stock. The successful man to-day is the man that is alive to all the little details of his business. So with the breeder and dairyman, it is not alone the breeding that is going to determine the future usefulness of the animal, but they must be combined with the daily care, feeding, and careful observation, which is going to make the cow what she should be.

DISCUSSION.

Mr. Philips—Is it a fact that where you furnish your hired men with a tally sheet and scales, and insist upon their weighing the milk from each cow, that they will get enough more milk to pay for all the extra help and improvements during the season?

Mr. Scribner—Oh, yes, there is no question about that. I find my men are just about as much interested as I am myself. Every milking is weighed, night and morning, the year around.

Question—Have you ever seen a cow of the form and build of that cow whose picture we have before us (Brown Bessie) that turned out to be a poor milker?

Mr. Scribner—Yes, I have seen them turn out to be poor milkers, but that

was the fault of the man who owned them, as a general thing. A cow with that conformation, that makeup, is safe to go by, as a rule, in picking out cows.

Question—You don't expect a cow to maintain her flow through a season of nine or ten months?

Mr. Scribner—She will hold out remarkably well.

Question—I would like to hear the good points of a cow described.

Mr. Scribner—The first point that I look at in a dairy cow is the constitution; if she hasn't that, she hasn't anything, as a breeder or a producer. I want to see that she has strong vitality. We look, first, to see that she has plenty of good heart room, plenty of lung power, and it is also indicated by her coat and her general appearance. She wants to look strong and healthy. Perhaps the next thing to look at would be the brightness of her eye, her intelligence, and last, perhaps, but not least, would be the udder, although many people are deceived, I think, by the udder. I want an udder that, when you are through milking, it has a dishrag appearance. We also like to see a cow well cut out in the thighs, which is a strong indication that she is not a beef animal; we want good milk veins, and especially good milk wells, the place where the milk vein enters the body.

Question—May not the milk vein be large and the milk well small?

Mr. Scribner—That is often true. If the milk well is small, it will necessarily enlarge the milk vein, the blood not being able to pass through readily into the body.

Question—About what is the weight of your ideal cow?

Mr. Scribner—I am not partial as to weight; I don't care, if the cow will do well for me.

Mr. Wing—You say that the cow should have a good heart diameter. Is

not that contrary to some dairy teaching? In Ohio a great many men are emphasizing the wedge shape.

Mr. Scribner—She may be wedge shaped over the shoulders, but still well sprung out in the ribs.

Mr. Taylor—In how many ways may a cow be wedge shaped?

Mr. Scribner—In two ways, from the top down, and standing in front looking back.

Mr. Taylor—She should be wedge shaped from the top down, making her wide at the heart.

Supt. McKerrow—She may have a good deal of heart capacity added by depth like a trotting horse.

Mr. Culbertson—What have the milk veins to do with the production of milk?

Mr. Scribner—The milk is made from the blood, although I cannot give you the process. We generally calculate that a cow with prominent milk veins has a large, strong flow of blood and is indicative of a large milker.

Mr. Hodgson—What time would you begin to feed this animal?

Mr. Scribner—Before she is born; feed the dam well and feed the sire right, then you will have the right kind of a calf, and it must be kept right by proper food; that is a protein food, which will give growth and will not be fattening. If you establish a tendency to lay on flesh on that calf, it will be something she will never overcome.

Mr. Taylor—Is it not the general opinion that the lungs of the dairy cow are larger than those of a beef cow?

Mr. Scribner—I think it is.

Mr. Taylor—I think it has been demonstrated that the lungs of a trotting-bred or a running-bred horse, the cellular surface of the lungs is larger than that of a draft horse, and it is required from the fact that the supplying of a large amount of blood necessarily in-

creases the size of the lungs, and in that case you have expanded her ribs; they must be well sprung, giving the largest space for breathing purposes.

Mr. Philips—Do you object to a heifer putting on flesh before she freshens, provided it is put on with protein food?

Mr. Scribner—No sir; two or three months before this heifer becomes a mother, I begin to feed her and she will lay on a little more flesh, but after she comes in, she will milk that all off.

Mr. Menn—If you had a good dairy cow and she commenced to lay on flesh, how would you proceed?

Mr. Scribner—I would narrow down her ration or give her such foods as would keep her from laying on flesh.

The Chairman—Do you find two-year old heifers with that form?

Mr. Scribner—As a general thing, no. This form comes after they start their milking habits.

The Chairman—Then, if you are going to buy a two-year-old heifer, how would you judge of her dairy qualities?

Mr. Scribner—I would want to know something of her ancestors first, of the dams on both sides. I should want them to be milk and butter producing animals.

Mr. Lovejoy—I am not a dairyman, but I have a couple of Jersey cows and they are just as fat as butter; they make what we use and about fifteen pounds a week besides.

Mr. Scribner—As a rule, if a cow puts her feed on her back, she won't put it in the milk pail. It is not a safe thing to do with an ordinary breeder.

A Member—I don't quite like the explanation of these springing ribs. In my own experience and what I have got from some of our dairymen, that rib should start at a wedge shaped back toward the hind part of the cow. I think, as it has been explained here,

you will get an animal that will lay on flesh, and after it is there, for every hundred pounds it takes about a pound of digestible nutrients to keep that, and there is just that much taken from the milk, and that beef is no good to you at all. If you are keeping that cow eight or ten years, you are supporting that extra flesh year after year at a loss. I like the depth, but not the width at the top.

Mr. Scribner—I don't want the width at the top.

Supt. McKerrow—As I understand it, that one hundred pounds of extra flesh will cost 1.7 pounds of digestible nutrients every day.

Mr. Merrell—I think it is well to lay a good deal of stress on the point as to where that rib starts. With an animal of the beef conformation, the rib starts well up and springs out full, and there is a place to lay on flesh. If the rib starts well down and leaves a good, broad chine, I think that is the ideal dairy rib, widening at the bottom.

Question—To go back to the weighing. Don't you find it impossible to feed a dairy cow intelligently without continually weighing the milk night and morning, so as to know when to add to and when to diminish the food of the cow?

Mr. Scribner—Yes, that is a fact. There will be times when she will take more food than she will at others, and she will show it on the milk sheet in the first place.

Mr. Linse—I think we can judge by the appetite of the cow without measuring and weighing so much. We want to feed her all she will eat with good appetite.

Mr. Scribner—Of course you have to take the cow into consideration and see that she has an appetite at all times, and eats with a relish.

Mr. Goodrich—Mr. Scribner, how

much time does it take to weigh the milk every time?

Mr. Scribner—You will be surprised to see how little time.

Mr. Goodrich—I have held the watch on the boys when they did not know they were being watched and it took an average of twelve seconds to do the weighing. They weighed the milk of five cows a minute and it does seem to me that a person can afford to spend twelve seconds of time twice a day for the sake of knowing something positively.

Mr. Hodgson—I don't see how a man can afford to milk without weighing the milk.

A Member—I have been buying some cows and I know that my cows eat far more than the cows that I buy; I cannot make them eat when they first come into my herd.

Mr. Scribner—The only way I have ever been able to do anything in the line of stimulating the appetite is by varying the food.

Supt. McKerrrow—In that case, where you wish to develop a cow it should be done very gradually and carefully.

Mr. Linse—I have found that we can increase the appetite of a cow by judicious feeding. Never overfeed her; the least overfeeding will decrease her appetite and it takes weeks to bring it back. I have seen the time after I got a new man, where a cow's appetite would go down to one-half after a few feedings, only by overfeeding. We should feed carefully and study her appetite, and we can certainly increase it.

Mr. Hodgson—Do you always trust to your hired man to judge about feeding a cow according to her capacity, or do you oversee it yourself, Mr. Scribner? You can't always be there yourself to see how the cows are fed. How do you manage that part of it?

Mr. Scribner—I calculate that a feeder will know every animal perfectly without sticking up any card to show what the cow wants. My help and I talk over the various feeds and cows together, and we know each one and just what each animal will take. If we see an animal that is off her feed, we talk it over together and find out just what she will do; we cut down her ration until she will take it all and lick it up clean.

Mr. Phillips—Isn't it true that a heifer that has had plenty of the right kind of food all her life until she freshens and becomes a cow, will have a better appetite than one that has been starved through calfhood and heiferhood?

Mr. Scribner—I don't know why she shouldn't, but I never tried it to see.

Mr. Merrill—There is one point on the feeding and development of heifers that has not been touched upon. How long do you milk a heifer the first season?

Mr. Scribner—We aim to milk a heifer longer the first year than any other period so as to form the habit of persistent milking. I would milk her nearly up to the time of calving again, just barely give her time to go dry and have a short rest.

The Chairman—That, of course, is the best practice, but it does not prove that heifers that are not milked that way will increase the length of time of giving milk. In my experience I have found that cows that would be dry from two or three and sometimes four months before I owned them, by persistent milking and good feeding would become cows that would be in milk two or three years continuously; it was very hard to get them dry at all.

Mr. Hodgson—At what age do you expect a heifer to freshen?

Mr. Scribner—At about two years

and that would depend somewhat on the heifer. If she is undersized I would let her run past that time a little, or if she were extra large, I would cut the time short a little, perhaps.

Question—Do you prefer letting her lay over one year?

Mr. Scribner—No sir.

Mr. Taylor—The first milking period of the heifer is a very important one. After making quite a considerable study and watching the results carefully, I have concluded that about from twelve to thirteen months should elapse between the first and second calving, and yet we should feed very liberally between these periods and help her to establish the business of her life well within herself. I would feed quite liberally this first year and see that she is thoroughly dried six weeks before she freshens; then continue to feed liberally until she drops the second calf. I think it is a serious mistake to milk these young animals continuously, as long as they will give milk, for we may carry it so far that we begin to get the new colostrum milk from her when it would be absolutely dangerous to stop milking until she freshens. Let us get these heifers in splendid condition and get them dry six weeks before they drop the second calf, and not stop feeding them.

Supt. McKerrow—Is that the way you developed Brown Bessie?

Mr. Taylor—Yes, sir, she was fed that way for six years.

Mr. McDonald—How do you get your cow dry on liberal feeding? We have to take away all the grain feed in order to dry up some cows. I am talking about mature cows, but I know we cannot do it without cutting into their record very much.

Mr. Taylor—All cows before they freshen will stop giving good milk, and you will observe that without any

change of food there is a time before freshening from two to six weeks that the flow of milk stops almost entirely, and that is the time for you to stop milking so you can continue to feed liberally. The cow will dry up if you stop milking. For two or three days it will do no harm, but when nature finds out you are not going to take that milk away, it will cease to secrete it. If you continue to milk, you will stimulate the colostrum glands. Another point, when the cow ceases to give good milk, you must then take all the accumulated milk out of that udder. If you do not, the liquid portion will be absorbed, the solid portions will remain, and you will find difficulty when she comes in.

Mr. Stiles—Would you not feed a heifer during the first milking period a narrower ration than you would afterwards?

Mr. Scribner—No, I don't think I should.

Mr. Merrell—I think it is a fact that at this time you are calling upon your cow to grow bone and muscle, and also to make milk and both require nitrogenous food; I think that with young, growing heifers, especially, we can feed a narrow ration.

Mr. Scribner—I misunderstood your question, I think. I would feed a narrower ration in that case, but a generous one.

Mr. Taylor—By proper food, we simply build up the powers of the cow which she is meant by nature to fulfil. This, of course, must be done with stimulating dairy rations, and it is a fact that the more they eat, the more they can eat. The old saying that "a cow well wintered is half summered" is just as true the other way; a cow well summered is half wintered, and we make a most serious mistake with our young heifers that are going to freshen sometime in the late fall or

winter, by allowing them to run in our frost-bitten pastures altogether too long in the latter part of the season, simply because they are down in the pasture out of the way and not bothering about the barns. No growing stock should be out in the pasture late in the fall; we ought to begin our winter feeding on these heifers much earlier than we do. Up at Green Bay, Dr. Buchanan made the point that bad results came from milk taken from cows that were milked too long.

Mr. Goodrich—I am afraid if there is nothing more said than has been said about feeding a cow high just before she freshens, that some men who have perfect faith in Mr. Taylor will lose cows with milk fever. I agree with Mr. McDonald that we must take away the grain food before the cow freshens, because I have lost splendid cows as a result of following the advice of men who talked just as Mr. Taylor does.

Mr. Taylor—My remarks applied entirely to young cows, while Mr. Goodrich is talking about old cows. I would in no instance advise you to feed an old cow that has been in milk several seasons in the same way, because I know very well that there are more cows over-fed than under-fed at that time. On no account would I feed these old cows, heavy milkers, heavily before they freshens.

Mr. Lloyd—Have you ever known a young cow with her first or second calf to have milk fever?

Mr. Taylor—No, I never did, and I am not at all certain that feeding produces milk fever in old cows.

Mr. Goodrich—I am certain of it.

Mr. Taylor—There are so many things to be considered that I know I don't know and I know Friend Goodrich is guessing at, that I hardly know what he knows, and I would hardly

know what I know. I do know this, however, that the secret of getting profit from a dairy cow is liberal feeding and that that liberal food should be more liberally supplied the first two months after she freshens instead of the first two months before; but I should not forget that a young cow giving milk, supporting an embryo calf and trying to complete her growth, is taxing her constitution to the utmost limit, and she should be fed liberally. You cow owners, with cows with their second calf not doing as well as with the first calf, don't blame the cow, but criticise your methods of feeding when she was with her first calf. If you have fully developed your cow and feed her right she is a better cow with her second calf than with her first. But do not discard her because you have made a mistake in feeding her, and she is not as good a cow with her second calf as with her first. Take that criticism to heart and carry her over to her third calving, and if you have fed her liberally, you will be surprised to find yourself mistaken, and the cow doing the best she can under the circumstances.

Mr. Convey—Several years ago we found that if we fed young cows heavily on ensilage, they came in with an unyielding udder, and we found also that by feeding liberally on roots and grass feeds at that time, we had no such complications.

Mr. McDonald—I believe Mr. Taylor is right for himself, but many of us who are trying to be dairymen have not had the experience he has. I am speaking for the people in general. I know in our community there are a great many cows lost with milk fever, but I do not think it is caused by over-feeding. It is caused by the cows standing in water and becoming chilled, or being allowed to be out on frosty mornings,

and other things of that kind. Now, I want to ask a question in regard to milking heifers. We find that no matter how carefully we feed, we have to milk some of our heifers at six weeks before they drop their calves or the udders will be absolutely spoiled. I would like to know how Mr. Taylor would manage in such a case.

Mr. Taylor—The gentleman has done pretty well to get these heifers to give milk before they freshen; he has done just a little too well, because he did not shorten up his feed a little while before they freshened, say two weeks before. Yes, you may laugh at me, but I want you to understand that liberal feeding means at the same time judicious feeding. Judicious feeding is liberal feeding before she freshens, but it does not mean right up to that time.

Mr. McDonald—We get her down to nothing but dry corn fodder and warm water to drink, and we keep her in the barn.

Mr. Taylor—You see he doesn't help me out at all. He keeps making it worse and worse.

Mr. McDonald—Furthermore, in place of making that milk from the feed we gave her, she took it from her body, from the flesh that she had put on there during our previous judicious feeding.

Mr. Taylor—I don't know that the gentleman knows that. I say this is a safe rule, feed your heifers liberally, get them in good, thrifty condition, not fat, and two weeks before they freshen shorten up their ration. We have ours in a box stall in the barn with no outside door. We put them in there always before they freshen, summer and winter. If they are heavy feeders and the grass is good, we take them off the pastures and put them in the barn and try to get them well acquainted with us. Their appetites will simply run

away with them for two weeks before they freshen. If the weather is hot and the flies bother, that is only another reason for putting them into the barn. No cow should roam over a sunburned pasture to get something to eat at this time. Put her in a darkened stable, supplement her feed, and let her lie down quietly by herself, and then when she freshens there are no exciting conditions. Be careful that nothing excites her after she freshens; take the little calf away from her and everything will be all right; take it away the second day after it is born. If you let it stay too long, you may work her into a fever of excitement and she becomes sick, and then somebody pronounces it milk fever. Just put a protection across the stable and put the little fellow over there, where she can reach it and caress it; you have done your duty then, and while she is caressing it, licking her calf, that is just the time Brother Goodrich will fool the cow by making her think the calf is taking the milk, when he is milking her. Mr. Goodrich has fooled a cow lots of times into thinking he was her red-haired calf.

Supt. McKerrow—I want to clear up one point that I am afraid is wrong. This gentleman over here said he cut his heifer down to corn fodder. Mr. Taylor, would you cut your heifers down to as wide a ration as corn fodder and timothy hay.

Mr. Taylor—No, sir. Feed her clover hay and lots of it, and bran. Never cut a cow down to corn fodder, especially if she is going to become a mother. These heating foods mean a derangement of the system.

Mr. Scott—When you take this cow off the pasture and put her in a box stall, would you go to the hay mow and give her all the hay she wants, or would you cut a little fresh grass sometimes?

Mr. Taylor—Of course, if it is necessary to keep her in there I would give her the grass in preference to dry feed.

Question—Did you ever try taking the calf from its mother immediately, so that she would not see nor hear it at all? It is my experience that if you leave a calf where the mother can get her nose to it, she will not give down her milk. Besides that, if the calf never learns to suck, it learns to drink better.

Mr. Taylor—I have done that, but I feel as if it was an awful mean trick. She can take better care of it than anybody else. Of course, if you meet with success the other way, that is all right, but I think that all the motherly instincts are more thoroughly aroused and enkindled if the calf is near her. I rather hold to the opinion that if she is allowed to run with the calf this maternity is better established in the cow.

Mr. Arnold—Would you take the mother away from the calf or the calf away from the mother?

Mr. Taylor—We have box stalls at

our place and we simply take the calf and put it the other side of a little partition, unless we are badly crowded, when we take the calf away from the cow and the cow away from the calf also; but here is the point I think Mr. Arnold wants to bring out. Never take this young mother away and put her in her regular place among the other cows and treat her as you do the other cows. I know just what you will do. You will want to be good to her, and you will open the barn door, turn out all the other cows, and leave her in the barn; if the temperature is pretty cold, inside of ten minutes the temperature in that barn will go down forty or fifty degrees, and that won't do. Put a blanket on her. Our interests demand better care and feed, more consideration for these bovine mothers. Let us learn the secret of this maternity and give intelligent treatment. Our financial interests demand it.

BUTTER-MAKING ON THE FARM.

CHARLES LINSE, La Crosse, Wis.

The days of butter-making, when the farm in general was the place for it, are days of the past. The creamery is the place where at least eighty per cent. of all the butter Wisconsin produces is made, at the present time. Who would or could deny that this very fact has made dairying a success in Wisconsin as well as in other dairy states of the Union. But nevertheless butter-making still has its place on the farm, and can be made a very profitable business if carried on in the right way.

To make the choicest butter it is nec-

essary to have the choicest materials for it, and neither science nor skill can produce the best qualities of butter out of inferior milk—not even the finest and best equipped creamery in the world. Consequently the butter-maker on the farm has everything in his own hands to enable him to produce the very finest butter. He is not dependent upon the honesty and skill of others, and therefore has the advantage of the factory, which has to depend upon the honesty and skill of hundreds.

The Best Milk.

To produce the very best milk for butter-making we must first have a cow adapted to that business. She must be a cow giving us milk rich in butter fat, as I hold that milk poor in butter fat will not make as high grade butter. We must also see that she is always in a healthy condition, and while it is necessary to feed a cow all she can assimilate and digest in order to get the full benefit out of her, we should carefully avoid over-feeding, as well as the feeding of mouldy and damaged food,

their milk almost unfit for cheese or butter-making.

Cleanliness at Milking Time.

The utmost cleanliness in milking must be observed, if the product shall result in fine-flavored butter. A cow is never milked in my barn before her udder is washed and wiped off with a dry cloth. This is not only necessary in the winter, while cows are stabled, but more so in the summer. The udder may look ever so clean, but by careful exam-



Farm Home of Chas. Linse.

as it may bring on indigestion, and is often the cause of ill-flavored milk.

A stable well ventilated, with plenty of pure air to breathe, is the most essential thing to the production of good milk. White-washing the stable once a year not only adds much to the healthy condition of the cows, but also makes it lighter and more pleasing for men to be in.

Decidedly injurious effect on the quality of the milk is caused by bad water. I know of cases in my neighborhood where cows were compelled to drink water out of stagnant pools, which made

inadequate in quantity and of inferior quality. In such a situation we will find an abundance of dusty substances clinging to the skin, especially in a dry time. By washing the same not only will most of the filth be removed, but on account of the moistening the dust cannot dislodge while milking as readily as when dry.

When drawn from the cow milk must never be left standing in the barn, but should be removed at once. The theory that milk will not absorb odors while warmer than the surrounding atmosphere, is proven by Professor Russell, of the Wisconsin University, to be false, as by careful experiments he found that

milk, while warm, is even more absorbent than when cold.

After observing all these precautions in the production of good milk, one more thing is indispensable if butter-making on the farm is made a success, and this is a building by itself, provided for such purposes. The attempt to make choice butter and to carry on all the manipulations of butter-making in the same building in which we live, sleep, or cook, is a hopeless task. Any proof of my assertion is hardly necessary after what has been said regarding the production and care of milk in the foregoing. Such a building need not be expensive; one about 16x20 feet in size is large enough for a dairy of fifteen to twenty-five cows. How to construct such a building is a matter of circumstances and must be decided by the builder himself. It should be located and constructed so as to offer good ventilation, and enable its owner to control the proper temperature at all times, which means coolness in summer and sufficient warmth in winter.

Care of Utensils.

The proper care of all dairy utensils is absolutely necessary to secure good results. All milk cans, buckets, cream vats, churns and butter-workers should not only be washed clean, and soap and brush occasionally used especially along the seams and in the corners, but they should be treated with steam or boiling water at least once a week. By this I do not mean the process of pouring boiling water into the cans and buckets as commonly practiced, but of submerging them in boiling water from five to six minutes. This can be done nicely by having a large vessel with water on the stove (a wash boiler will answer), and while such is boiling one vessel after another can be treated as described.

The Separator.

The separation of cream, as commonly practiced at present, is either with the separator or by the deep-setting in cold water. The former is the better way, and I would advise every man who keeps ten cows, or even less than ten, to use the separator. If the deep-setting process is in use, milk must be set in the water absolutely as soon as drawn from the cow. The temperature of the milk then should not be below 90 degrees (the nearer to blood heat, 98 degrees, the better) and the water in which the milk cans are set for creaming must, by the aid of ice, be kept below 45 degrees, if a thorough creaming is expected.

Ripening the Cream.

Cream can be kept in ice water for 48 hours without injury, but it would not be advisable to hold it much longer. The market demands butter that is made from soured, or so-called ripened cream. I will in brief describe the process of ripening, as practiced in our creamery. First I prepare a so-called starter. I take fresh skimmed milk, pour it from one can to another several times while in the fresh air, so as to get it well aerated and free from all animal odors. I have a square four-quart tin vessel with a tight cover, which is first sterilized in boiling water, and then the milk is put in for souring. While in the vessel I warm the milk to 90 degrees in a hot water bath, and leave it well covered in a warm place. To procure a proper souring it is necessary to keep the milk at as even a temperature as possible, and therefore I have a wooden box made of double boards, with air-space between, in which the tin vessel is placed during the process of souring, which will be accomplished in about twenty-four hours.

About one pint of the starter to every five gallons of cream is a good proportion. To ripen the cream in proper time, which should be within twenty to twenty-four hours, it must be warmed to about 60 degrees. To what temperature cream should be warmed in every case depends, of course, on the weather and the temperature of the room you keep the cream in. It is of great importance to know at what time the cream has reached the proper state of ripening, so as to impart the finest flavor to the butter. This cannot very well be told, but must be learned by experience. The cream should be well thickened, but not so much as to run off the ladle in streaks when immersed in the cream. The right temperature of the cream for churning must also be learned by experience, as different kinds of cream, changes of the weather, and the temperature of the churning room must be considered. But we must remember that we can always regulate the time for churning, by the temperature of the cream.

Churning.

Cream must be churned at as low a temperature as possible, and we should not aim to effect a churning in less than 40 minutes, and one hour is not much too long. The colder the cream is when churned, the more exhaustive churning we will attain, and the better the grain and the flavor of the butter will be. Churning should cease when the granules of the butter are about the size of a wheat kernel. When of such small size it requires the least washing to exclude the buttermilk. Water should never be left standing on the butter in the churn, but should be drawn off at once after washing as it is apt to leach out some of the fine flavors of the butter.

Salting.

Salting is done in different ways. Some salt in the churn. Most salting is done on the butter-worker. I prefer and practice the latter, as I can regulate the amount of salt better, and thereby obtain a more even salting. Great care should be exercised in the process of salting, as insufficient working or overworking are alike detrimental to the butter. The amount of salt to be used depends entirely upon what your customer or market demands, but whatever the amount is to be, try to have it uniform every time, as nothing will displease your customer more than a variation in the salting of your butter.

I have been trying in the foregoing to bring out a few of the most important points in the art of butter-making. I could, of course, only touch upon them in this short space of time. To the beginner I would like to say that if you do not reach the highest point of perfection at once, you must not feel discouraged, but must remember that there is nothing more true than the proverb, "No man is crafts-master the first day, and practice makes perfect." I must confess that after thirty years' practice I do not in the least feel as if I had reached or ever will reach the highest point of perfection, but am continually trying to learn.

DISCUSSION.

Question—What do you mean by animal odor?

Mr. Linse—You will always observe that fresh milk, while it is warm, has a peculiar odor which you can easily detect, but which will leave it after a while, especially if you aerate it. If after milking you cover up your can, it will be left there, and have a bad effect.

Question—Is that odor in the milk while it is in the udder or does it come after it is drawn?

Mr. Linse—Oh, it is in the udder. There are different odors imparted to the milk after it is drawn, therefore we want to remove it as soon as possible from the barn, and keep it away from the kitchen.

Mr. Merrell—There was one statement made by Mr. Linse that I shall have to take issue with, and that is to the effect that milk testing rich in butter fat will produce better butter than that of low test. I believe that milk low in butter fat will produce just as good butter, and although I am a breeder and lover of Jersey cows myself, I have seen just as good butter on the table of Holstein-Friesian breeders as I have on the table of Jersey breeders.

Mr. Linse—In the present day it may be that you will not so readily notice the difference between butter made of milk very low in butter fat, or such testing high in butter fat, as color will make it look alike, but leave away this color you will notice the difference very quickly, as low testing milk will produce, without fail, butter lacking in both color and grain.

Mr. Nicolai—Isn't it a fact that butter made from a Jersey cow or that strain of cow is firmer than from the strain of Holstein or beef cows; doesn't it stand up better in warm weather when put on the table, and is not that a great advantage in marketing butter, especially to a dairyman furnishing private families.

Mr. Merrell—I believe that this question of the quality and firmness of butter lies entirely with the question of the size of the butter fat globules, and I have seen milk testing four per cent. that I believed carried just as large butter fat globules as milk testing five per cent., and if it is argument that high

test milk gives us better butter and more solid butter, it is one argument against the great producer which we are all endeavoring to raise. I believe it is not a question of the per cent. of butter fat in it, but it is a question of the size of the butter fat globules. I have seen cream raised by the gravity process from cows giving a large flow of milk, with low per cent. butter fat, where the creaming was raised just as readily and gave us just as heavy cream and just as good butter as milk from cows giving a high per cent. of butter fat and a small flow.

Supt. McKerrow—Would you lay it down as a fact that the butter fat globules in low testing milk are equally as large as the globules in high testing milk?

Mr. Merrell—No, sir, not as a rule, but I would not admit that milk testing high in butter fat will make better butter than milk testing low.

Mr. Goodrich—In relation to the firmness of the butter, we know that they had a contest at the World's Fair in 1893. There were two herds of high testing cows, the Jerseys and the Guernseys. The butter was scored for firmness as well as flavor, etc. The Jersey butter scored a good deal the highest for firmness and the Guernsey a great deal the lowest; the Shorthorn butter about half way between. I studied that question, tried to investigate and find out; I found that the Guernseys were fed more oil meal while the Jerseys were fed cotton seed meal, and I am of the opinion that the feed made more difference than the breed of cows, as far as the firmness of the butter was concerned.

Mr. Merrell—What do you think about this idea of high testing milk giving us better butter?

Mr. Goodrich—The question a good many years ago was asked me in an

Institute, "Which breed of cows makes the best butter?" I answered like this, that there is no man on earth that can tell by sampling the butter what breed of cows gave the milk, and I am of that opinion still. It is true that some breeds of cows give high-colored milk, and will make high-colored butter, but now you know we have it all good June color anyway.

Mr. Decker—Just the point about the size of the fat globules. As the period of lactation increases the fat globules will grow smaller and we are liable to get a sort of tallowy butter. Mr. Goodrich is right when he says that the feed has a good deal to do with the firmness of the butter, but we also want to consider that the temperature at which it is churned has a good deal to do with it. Last summer a farmer came into Fond du Lac to ask me about his butter. He had been having trouble; they hadn't had any they could sell for about three weeks. I asked him all sorts of questions, but I couldn't make out what was the trouble, so I went around the next day. He showed me his cream, and it looked rather thin, but I commenced churning. They told me that they had churned, and churned, and churned, and when the butter did come it was so soft they couldn't get any texture to it. I put in the cream at a temperature of 56 degrees, churned an hour and there were no signs of it breaking at all. Then, after churning about thirty minutes longer, I saw some indications of its coming. The temperature had been up to 64 degrees, and when I had churned about an hour and fifty minutes the butter broke and I got nice granules, but they were very soft. It came at a temperature of 66 degrees. The cream was too thin to get the butter to break at the proper temperature. Now, cream that has been warmed up for ripening should be cooled long

enough for the fat to get solid. There is a good deal in this point of temperature and the thickness of the cream in controlling the solidity of the butter.

Mr. Goodrich—I had the records every day during the World's Fair of the temperature that the butter was churned at. The Guernsey butter some of the time was churned at a temperature of 42, and there is no mistake about that, because they had an accurate thermometer. That was the soft butter, where they had fed a good deal of oil meal. The Jersey butter was usually churned at from 52 to 58, and the Shorthorn butter was churned at from 48 to 50. In each case they churned at as low a temperature as they could and have the butter come.

Mr. Taylor—I want to call your attention to the fact that the butter that was awarded the highest prize at the World's fair, the butter that exhibited the most intelligence in the manufacture, that had the best flavor, the best grain, the best salting, and the best packing, was made by Mr. Linse, and you can't ask him any questions about butter-making that he cannot answer to our advantage.

Question—I want to ask, Mr. Linse, what price do you get for your butter, and do you compete with creamery butter?

Mr. Linse—I am making an average of about 200 pounds a week, and my butter is all sold in La Crosse to private customers. I have to compete with creamery butter, that is sure. There are several firms now in La Crosse who have an established trade and peddling creamery butter in prints direct to consumers. They follow me up to a number of my customers, but, nevertheless, I have not lost a single customer yet on their account, notwithstanding that I get five cents a pound more for my butter on an average. Those parties pay-

ing me these extra five cents, I suppose, know exactly what they do it for.

Mr. Hodgson—Is it not true that milk will take on taints when it is cold just as well as when it is warm?

Mr. Linse—It will, but not as quick as while the milk is warm. The safe way is not to expose milk to bad odors, whether it is warm or cold.

Mr. Lloyd—Why do you say you must not churn less than forty minutes to get the best results?

Mr. Linse—It is a pretty sure proof that if cream churns in less time, it was too warm and the result is that the butter is lacking in color and grain, and likely in flavor. You will, also, not have an exhaustive churning when churned too warm, and you will loose more or less butter fat in the buttermilk.

Mr. Nicolai—Haven't you noticed a difference in the texture and firmness of butter when the cows were on grass pasture, in different cows, and also the different breeds, so that it does make a difference in the breed or in the different cows, aside from the food received?

Mr. Linse—It is certain that the fat globules in the milk of some cows are larger than in others and for that reason you will undoubtedly procure a firmer butter with a better grain from some cows than others. I notice that in judging butter fifteen points are given to the grain.

I have had cows whose milk would not run over three per cent., and even less butter fat. I hold that a cow of that nature will not make first-class butter, at least in grain and texture.

Mr. Goodrich—Do you advocate working butter twice?

Mr. Linse—No, sir.

Mr. Goodrich—Can you get it dry

enough to suit your market with one working?

Mr. Linse—I can on the butter-worker. I think that we will spoil the grain of the butter more or less by working it a second time, especially in cold weather, when it will set and harden in very short time. Rewarming and reworking has a bad effect on butter all around, on grain and flavor.

Mr. Wilcox—I want to ask you, don't you think that people who use the butter-worker generally leave the grain in better shape than those who use the paddle?

Mr. Linse—If done carefully it can be done either way.

Mr. Convey—Mr. Linse heats his cream to ripen it. What result would he expect to get if he allowed that ripening to be carried too far?

Mr. Linse—Oversouring of the cream has undoubtedly a very bad effect and will spoil the fine flavors. The temperature of the cream during the process of ripening must be kept as uniform as possible.

Mr. Merrell—I notice Mr. Linse uses a starter in ripening. In many of our farm homes the women have no apparatus for such work, no outside dairies. How would it do to apply your little apparatus for ripening the starter to ripening the cream? It would shut up the cream and keep it from taking on any of the kitchen or house odors.

Mr. Linse—If you have a proper vessel, with a good tight cover, and put in such a box as I have described, so that the surrounding atmosphere is completely excluded, the cream is apt to take on no odors, and you can keep it in your cupboard or kitchen, providing such is warm enough in winter and a pretty even temperature kept therein, and not too hot in summer.

THE CO-OPERATIVE CREAMERY.

DAVID IMRIE, Misha Mokwa, Wis.



DAVID IMRIE.

Mr. Chairman, Ladies and Gentlemen:—The co-operative creamery is no longer an experiment; it has come to stay. It has proved a success in so many localities and it is crowding out all other creameries in our section. Ours was the first, but now there are other creameries all around us, and some of them are larger and better than ours.

A good creamery in a locality is a great deal better for the community than private dairies, as not every man can make a success as a maker and seller of butter, but most farmers can care for their cows and deliver their milk at the factory in good condition.

Organization.

Now just a word as to organization. The first creamery started in our county some fifteen or sixteen years ago, was a failure, all owing to mismanagement. They did very well for a year or so, until they tried to economize by hiring their helper as buttermaker because they could get him ten or fifteen dollars per month cheaper. Then they got a lower grade of butter and consequently had to pay less per pound. They went from bad to worse until they failed.

The entire management of a creamery should be in the hands of one man; never have two or three committees, one to buy supplies, one to sell butter, and another to look after the creamery, as they work at cross purposes, and if anything goes wrong one committee will try to blame the other, and then there is trouble. As soon as they get to quarreling in the company it is very apt to go to pieces.

Elect a man as manager that the patrons have confidence in, and let him do all the business. Elect a board of directors to meet every three months and examine the treasurer's and manager's books, and to give the manager any advice he may ask from time to time. Above all things never hire a poor butter-maker because he works cheap, as he can spoil enough butter in a day or two to balance his month's wages.

Facts and Figures.

We started our creamery four years ago this spring and have been gaining in the number of patrons and the quantity of milk ever since. We started

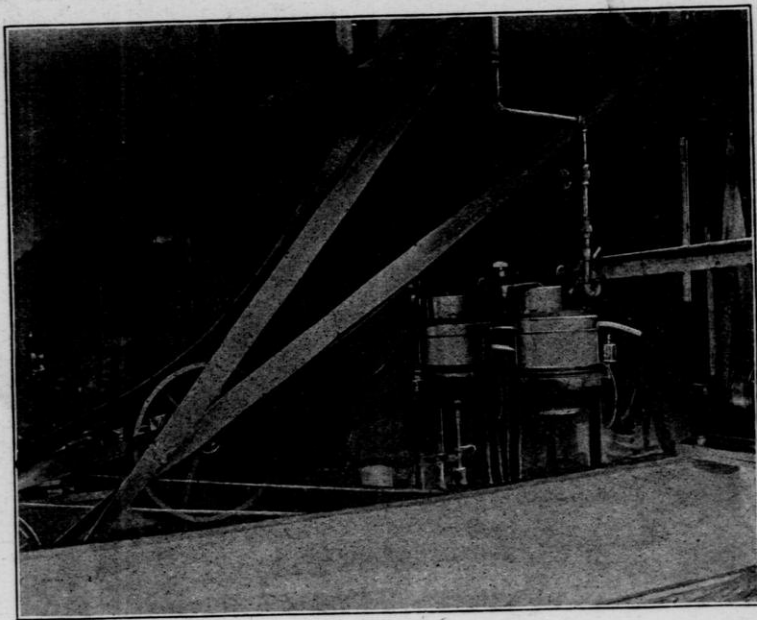
May 1, 1895, and our year ends February 1 in each year. For the first nine months we sold butter to the amount of \$7,568.91.

cows, and this lowers the price per hundred pounds of milk, as they do not test as high as the dairy breeds.
The average price received for butter

From Feb. 1, 1896, to Feb. 1, 1897.....	\$13,147.63
“ “ 1, 97, “ “ 1, 98.....	19,544.40
“ “ 1, 98, “ “ 1, 99.....	20,739.72

Our milk receipts for this year were 2,619,815 pounds, from which we manufactured 117,423 pounds of butter, taking 22½ pounds of milk to make a pound

in New York was 19½ cents; we paid for butter fat an average of 17½ cents, with an overchurn of 17.5 per cent., a difference of about 1¼ cents, but, re-



Separators. Burnside Co-operative Creamery.

of butter. The average test for the year was 3.83½. The average price per 100 pounds of milk 68¼ cents, and of course the patrons got the skim milk back, which is certainly worth 15 cents per hundred to any farmer who has calves or pigs, which would make a total of 83¼ cents per 100 pounds.

I will say right here that most of our patrons have native or grade shorthorn

member, one was butter and the other butter fat. The butter costs us an average of 2.8 cents a pound, f.o.b. cars at our station; this includes the sinking fund, and all stockholders get a part of this back every year, as we have always paid a dividend of 10 per cent., and one year 12 per cent., besides buying another separator, a skim milk weigher and making other improvements.

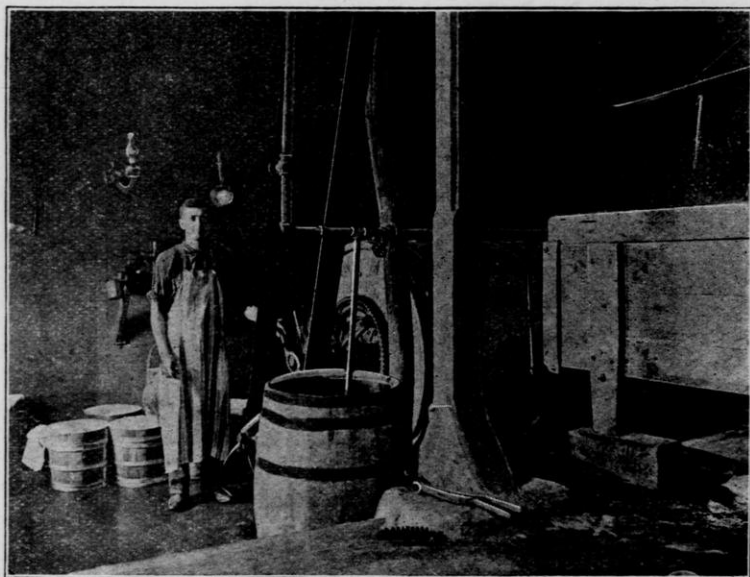
Our average daily receipts last year were 8,730 pounds. The highest average in June, 14,136 pounds, the lowest average in November, 5,030 pounds, that is, for working days, as we have never skimmed on Sunday.

Our Methods.

The butter-maker has the right to reject any and all milk which is not suitable, owing to taints or acidity, and we

Milk was not cooled enough....
 Milk to come in earlier.....
 Milk not to be kept near barn..
 Milk cans must be emptied
 and kept clean.....
 Never mix night's and
 morning's milk.....

Cover the cans with a blanket when coming to the creamery. Always bring good milk and come early and I will not need to send out this card.



Churn-room. Burnside Co-operative Creamery.

have little cards which we furnish the butter-maker, like the following:

Please look for the X below and it will tell you the condition of your milk to-day.

Milk was good.....
 Milk was not good.....
 Milk was sour.....
 Milk was tainted.....
 Milk was churned.....
 Milk was not strained.....

Good milk; fancy butter; extra prices.
 Tell us if the creamery is dirty at any time.

.....
 Butter-maker.

He attaches one of these to the can and the owner is sure to find it.

Not later than the twenty-fifth day of each month the general manager issues a statement to each patron showing his amount of milk delivered for the previ-

ous month, his test, pounds of butter fat and amount; on the debit side miscellaneous, hauling, butter used by patron, and check to balance; also total amount of milk delivered at factory, average test, overchurn per cent. These statements are signed by the manager and are issued with the checks, so that every patron, by keeping statements, knows at the end of the year what his cows have done during the year.

Benefits of Co-operative Creamery.

I do not doubt there are private creameries that could pay as much or perhaps more per pound than we do, owing to their large business, but the satisfaction of knowing that we are getting all there is in the milk goes a great way with us. The factory is always open to patrons, and if they think their test is too low they can go to the factory and see it tested. Everything is open and above board, so there is very little fault finding.

We do not have as many co-operative creameries in Wisconsin in proportion to our creameries, as in Minnesota and South Dakota. Sixty per cent. of Minnesota creameries are co-operative, and as I stated before, if they are conducted on business principles and there are cows enough within a radius of four or five miles, they are bound to succeed. But do not let some creamery supply house build you a creamery simply because they can get the stock subscribed when there are not enough cows to support one. Never start one with less than 300 cows, and more are better. After you have your creamery started stand by it; furnish all the milk you possibly can, and your farm will grow richer and your bank account larger.

A Financial Success.

There has been a great improvement, financially, in our community since our

creamery started, as the farmers get cash every month. A lumber dealer in our town told me that three-fourths of all the lumber sold during the spring and summer was paid for with butter money, and before the creameries started he had to carry a great many from spring until fall, where he now can do a cash business. Seeing the advantages of the creamery, as I do, you cannot blame me if I am something of a co-operative creamery crank.

DISCUSSION.

Question—Does the price of making that butter and delivering it on board the cars include the hauling of the milk to the creamery?

Mr. Imrie—No, sir.

Question—How much does it cost if you hire the milk hauled?

Mr. Imrie—That all depends on what bargain they make among themselves. If a man doesn't wish to haul his milk, he makes arrangements with his neighbor.

Mr. Corse—How is your company organized?

Mr. Imrie—It is a corporation. There are two companies there in reality. We have patrons who are not stockholders. Our incorporation is organized under a certain statute and it is called a mutual co-operative creamery company and our articles of incorporation were endorsed by the Secretary of State.

Mr. Corse—Do you know of any incorporated creamery that is run as a corporation simply by the farmers themselves or the patrons, without these articles of incorporation, that are successful?

Mr. Imrie—I never heard of any. All in our community are organized the same as ours; they have followed after our pattern.

Mr. Stiles—Our creamery has been

carried on for thirty years and we had no articles of incorporation. Everything in the creamery is owned by the stockholders themselves.

A Member—In our co-operative creamery there are a number talking of getting separators. Now, if they skim their milk at night and bring it in the morning, will it affect the butter?

Mr. Imrie—I think that the average farmer is apt to neglect his cream, although you can make very good butter from cream taken from hand separators.

Question—Will he be more apt to neglect that cream than he would his night's milk?

Mr. Imrie—The difference is that if it is not run through the separator, the creamery wouldn't take it at all if it was off, whereas they would take the cream although it was a little sour.

Mr. Goodrich—This was an idea that started a long time ago, that each patron should have a separator and separate the milk on the farm and then the cream be gathered. I know of several creameries that are run on that plan. You who read the dairy papers will remember about the trouble they had out in Nashua, Iowa. I was sent out there in the interest of Hoard's Dairyman and spent a week there. I investigated the cream that was delivered there and the butter that was made from it, and the best cream and the best butter was made from the cream that was separated on the farm with the hand separator. They took better care of the cream than they did of the night's milk. Undoubtedly one reason was because they were all some of the largest patrons, and another reason was that they only had about one-eighth as much to care for as if they had the whole milk. There is a creamery running there entirely on that plan now. When I first went out there they had 40,000 pounds of milk made up in that one creamery;

part of it was separated in the creamery, part was separated on the farm, and part was raised by the gravity process. The best butter was made from that separated on the farm, the next best from that that was separated at the creamery, and that that was raised by the gravity process on the farms was the poorest.

Mr. Briggs—You spoke of not skimming on Sundays. Did the patrons keep their milk at home from Saturday until Monday morning?

Mr. Imrie—Yes, there are a good many make butter of that, and others, who have ice, keep the milk over.

Question—Would you advise putting the morning's milk with the night's milk, or would you have them keep it separate?

Mr. Imrie—It must be cooled in a separate can; then you can mix it after it is cold.

Question—We have a creamery three miles from our place and I am going to have about thirty cows this coming season. Now, I want to ask you, gentlemen, if I would receive any benefit by buying a separator and separating that milk at home; if I would receive enough more to pay the expenses over and above taking it to the creamery?

Mr. Imrie—I am only a mile and three-quarters from the creamery; I had a hand separator and I sold it. There is a benefit in feeding calves this separator milk when it is separated on the farm. On the other hand, there is an added expense. The separator will cost you from \$75 to \$125, and to make a success of it you must have power. Then there is the extra work; this separator has got to be thoroughly washed and scalded, and the women folks objected to the separator at my place. If we were a little late in starting in the summer time, they had to keep a fire to do this washing after we finished. As

I only had to haul that distance, I concluded that I would sell the separator and haul the milk. But we have among our patrons those who club together, three or four of them, and go a good deal farther to the creamery.

Question—You speak of the women washing the separator. Who washed the cans after they were all sun dried.

Mr. Imrie—The women washed the cans, but they were not sun dried, and they had them in the daytime, not at night.

Mr. Goodrich—I have had a separator for seven or eight years and I have studied this question a good deal. Out there in Iowa they gathered the cream for one cent a pound, that is, one cent a pound for the butter it would make. When they hauled the milk the price was ten cents a hundred, which would make it about two and a half cents against the one cent for the cream. Then they had the milk warm and fresh and sweet to give to the calves, which is enough of an object to some men that I know. General Burchard thinks it pays him, because he has better calves, though he has to go two miles with his cream and it doesn't save any time. He has about twenty calves, sometimes more.

Mr. Imrie—Is he selling blooded stock?

Mr. Goodrich—He has blooded stock and of course the calves are valuable.

Dr. Porter—Are not those calves less liable to have tuberculosis?

Mr. Goodrich—Really I couldn't answer that question, whether the germs are ever carried from the creamery or not; that is something that I don't know. What do you think about it?

Dr. Porter—I think there is quite a little danger if there are tuberculous cows whose milk is sent to that particular creamery.

Mr. Merrell—I think that the condi-

tion that the skim milk is in when it is gotten from the factory is a large factor in determining whether it is profitable to skim on the farm. In some cases the skim milk is in such shape that it is absolutely hurtful to feed to calves, while in other factories they take pains to keep their skim milk vats clean and sweet, and others pasteurize the skim milk every day.

Mr. Imrie—Mr. Merrell has touched an important point. In our factory, in the first place, we heated the milk up with the exhaust steam to 150 degrees, but it didn't work, so we put on an attachment and now every patron can heat his skim milk just as hot as he wants to, and take it home; it will keep sweet for twenty-four hours, if he will put it in cold water and cool it down. It is so arranged that they can turn the exhaust steam right into the skim milk, and in that way they can heat it to suit themselves.

Question—I would like to ask some of these men who have had experience, how they fed their young calves when they started out. I know of one lot of calves that died right along. I asked the owner what he was feeding and he said separator milk.

Mr. Imrie—We feed our calves with new milk to start with. We don't raise steers, but we feed the heifer calves new milk, according to their vigor, sometimes a week, sometimes two weeks. Then we mix a little skim milk with it and we use oil meal; make a jelly of it, and gradually work that into the skim milk; all they get after that is skim milk, and as soon as they will eat oats they have oats and hay, and our calves are all right.

Mr. McDonald—How much skim milk do you feed a calf?

Mr. Imrie—Farmers think that the butter fat is all out of this skim milk, and they must feed a lot of it to satisfy

them. That is a great mistake. We never give more than two quarts or two and a half to begin with. When they are quite large I never give them more than four quarts.

Question—What does it do to him if you give him too much?

Mr. Imrie—It physics him.

Question—Go a little further and tell how much oil meal you put in.

Mr. Imrie—At first I take perhaps a teaspoonful, and as they get older I will

give them more, perhaps all I can take in my hand at last. It must be worked very gradually.

The Chairman—We found up north, at a town called Koro, a great many farmers patronizing a gathered cream creamery, and some of them went so far as to say that they bought their separators on account of the skim milk.

The Institute adjourned until 1:30 p. m.

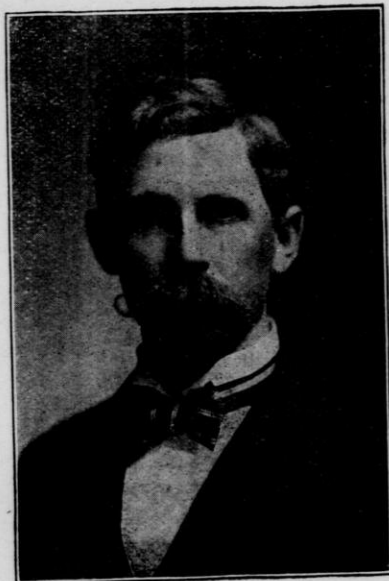


AFTERNOON SESSION.

The Institute met at 1:30 P. M. Mr. A. A. Arnold in the chair.
Prayer by Rev. R. C. Wright.

THE CHEESE INDUSTRY.

E. L. ADERHOLD, Neenah, Wis.



E. L. ADERHOLD.

That there is room for material improvement is obvious. The object of this paper is to enumerate the more important shortcomings and to suggest methods of improvement.

The Milk.

If we investigate the average milk that is delivered to cheese factories we will find two very serious faults with it.

We will find that it is not clean, and that it contains multitudes of germs that are liable to injure the quality of the cheese. If such milk stands for several hours in the cans there will be a dark sediment at the bottom which can be noticed in a greater or lesser degree when the cans are being emptied. This sediment is composed of dust and dried particles of dung that are brushed off the under side of the cow during the milking process and fall into the pail. Some people call it manure.

It has been figured out that the milk sold in the city of Berlin, Germany, contains sufficient manure to keep a forty acre farm well fertilized. I have made it a point to watch for settlings in the bottom of the cans as they were emptied and I have concluded that the average milk sold to cheese factories is no cleaner than that sold in Berlin, and I wish to state that, in my opinion, this is the most insurmountable of all obstacles we have to overcome.

If we consider milk from a bacterial standpoint, during hot weather, we find in 75 to 100 per cent. of the factories that there is more or less trouble with bad flavors, gases, slippery curds, etc. It is a very expensive trouble and may be looked for annually with the approach of hot weather. This great mischief is caused by germs, most of which find their way into the milk with the

above mentioned dust. The germs, as a rule, do not get in their work until some time after the milk is in the vat, consequently it is impossible always to reject the milk that works the injury.

Cleanliness.

Now, if the patrons would all practice clean methods of milking we would have clean milk, and it would be comparatively free from undesirable germs. The question is, how can we get the patrons to do this? I admit that it is a task of astonishing magnitude, and yet

ing that milk be sold free from filth. Such a law, well enforced, would benefit everybody, because we are all consumers of milk or its products, and the producer would be doubly benefited.

Bad Management.

The average cheese factory is built, equipped and managed with about as much sense as we would expect from an eight-year-old boy. There are reasons for this. At the beginning of the cheese-making era in Wisconsin the prices of cheese were so high that with very in-

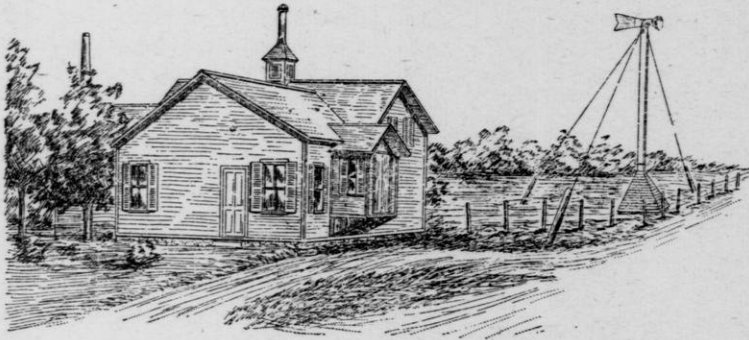


FIG. 6.—View of P. H. Kasper's cheese factory with funnel of sub-earth duct.
Prepared by Prof. F. H. King.

I believe it can and will be accomplished. To attain this end we need an army of educators, and perhaps more complete laws, well enforced.

The cow is the foster mother of a large portion of the human race, and the very health of this portion of young humanity depends to an appreciable extent upon the cleanliness of the milk they consume. In the ordinary handling of milk or in the making of butter or cheese there is nothing that will eliminate filth or destroy germs of disease. We are awake to the dangers of unwholesome food and I sometimes think we ought to have a law demand-

efficient management there was a big profit for all concerned.

Most of us makers learned the trade under that kind of management. Everything was imperfect and unbusinesslike. At present competition between factories is so close that the proprietors cannot see their way clear to make the investment required to perfect their factories. In addition to this the patrons and makers, instead of pulling together in their combined interests, have been chasing one another until the makers are well nigh brought to bay, or dunned up. As a result the unbusinesslike methods still are practiced, causing

enormous losses, and the patrons pay most of the "freight," as I will show hereafter.

I do not look to the patrons to work out their salvation. I look to the up-to-date maker to do it for them, and when he attempts it I expect most of his patrons will plant themselves squarely in his way.

How We Waste.

The manner in which the whey is disposed of constitutes a source of considerable waste. Unless it is properly cared for fermentation will be so rapid that the feeding value will be greatly diminished. An unclean whey tank is a breeding place for undesirable germs, and no doubt milk is infected by the hundreds of tons daily, because most of this stuff is carried home in the milk cans. Dr. Russell says: "It is necessary that the cheesemaker should have his waste vat free from sour and half fermented whey before he can charge all of the blame upon the patron who brings bad milk."

Mr. H. F. Thiel, of Wood county, is one of the few makers who save for their patrons all of the feeding value of the whey. Every morning, after the patrons are gone, every bit of the remaining whey is removed and the tank is cleaned. While the fresh whey is being drawn from the vat the steam is turned into the tank until the whey stands at 150 degrees. Some of the patrons used this whey in making up rations for their calves, claiming that it agrees with them, and that the calves so fed did finely. I believe that the neglect of whey at the average factory causes a loss of fully three cents for each hundred pounds of milk delivered.

Facts About Curing Cheese.

The curing room is also a prolific source of waste. The man who contem-

plates making Swiss, Brick or Limburger cheese first provides a room where he can keep the temperature low and the moisture high. In our cheddar factories the rooms are hot and dry a good share of the summer, and, instead of making the cheese to please the taste, we are obliged to make it so that it will stand the heat. In making such cheese it is necessary to allow the maximum amount of acid to develop that the curd can stand without causing a "high acid" cheese. It is also necessary that the curd be deprived of sufficient moisture to cause a toughness in the texture. All this at the expense of quantity and quality.

Acid dissolves curd, thereby causing a loss of solids. This can be readily observed before the whey is drawn. The whey is clear while it is sweet, but when the curd begins to spin on the hot iron the whey becomes cloudy. One hundred pounds of cheese contains some thirty pounds of water. Dry, warm air absorbs water rapidly. Cheese held in the ordinary curing room for fifteen to twenty days will shrink in weight, on the average, three to four per cent.

A curing room can be so constructed and ventilated that the temperature will remain below 65 degrees. Air treated in this manner loses its absorbing properties and there is a saving in shrinkage equal to 2 per cent. of the total weight of the cheese. Where such a curing room is available the whey may be drawn sweeter and a little more moisture may be retained in the curd, thereby increasing the yield of cheese several per cent., and also increasing the palatability of the product.

Construction of Curing Room.

The next question is—how can the temperature of the curing room be kept below 65 degrees in the summer? The

first necessity is to have a room properly insulated. Two thicknesses of matched lumber, with paper between, should be used at the ceiling. The floor should be made the same way, or perhaps a cement floor would answer still better. The walls should be treated in a like manner, both inside and outside of the studding. It is still better to have two air spaces, and fill the outer one with sawdust. The windows and doors should be double and close fitting.

Ventilation.

Having a suitable room it must be ventilated with cold air. This can be done in several ways. The system most in use is what is known as the horizontal sub-earth duct. In brief, it consists of a wind cowl about 50 feet high, which catches the breeze and leads it into the air chamber from eight to twelve feet deep in the ground, thence horizontally through small ducts of tile for a distance of 100 feet or more. These ducts connect again with an air chamber, which leads into the curing room.

Where a suitable well is available it furnishes the opportunity for most excellent ventilation at a small cost. Mr. Steinwand, of Clark county, ventilates his room from the bottom of a well some forty feet deep. The top of the well is tightly covered. Air is forced into it by means of a wind cowl. A galvanized iron pipe, about seven inches in diameter, beginning just above the water, leads upwards for some distance; thence underground to the curing room. This is the only outlet for the air in the well.

Mr. Rohde, of Sheboygan county, has a good way of tempering the air in his curing room. His ice house is alongside and adjacent to his curing room. The ice is so packed that air can circulate around and under it. At the bottom are two openings, some distance apart,

that lead into the curing room near the floor. A ventilator leads from the ceiling of the curing room upwards through the roof. Air is admitted above the ice and as it cools it naturally works downwards and crowds into the bottom of the curing room, thereby forcing the warmer air from the top of the room and through the ventilator. I would recommend this method of ventilation where the nature of the soil is such as to prevent the feasibility of the sub-earth duct.

Shipping Our Cheese.

There is another obstacle over which we have no immediate control. The buyers tell us that the cheese must be able to withstand the effects of shipping in hot box cars, and storing in common warehouses. Here again the cart is ahead of the horse. What kind of stuff would butter be if it were so made as to withstand such hardships without injury? But the butter-maker is not so foolish. He makes the butter to suit the palate and it is transported and stored at a temperature which will preserve the quality. The freight rates on cheese are so excessive that railway companies ought to furnish the best of refrigerator cars for this service.

For years the Canadian cheese have been held up to us as practically perfect, and they have been in good demand at top prices in the English markets. But things are changing, and the Canadians are in danger of losing this profitable trade. Last summer the Dominion sent her Minister of Agriculture and her Dairy Commissioner to England, to look up the trade, and they found the best Canadian cheese selling for forty shillings, while the English product was in demand at sixty shillings. The English cheese contained a slightly higher percentage of moisture, and was cured at a temperature of 61 or 62 degrees, this

being the mean summer temperature of that climate. While the actual difference in the quality was by no means sufficient to warrant such a difference in prices, yet this serves to demonstrate the taste of the people, and their readiness to pay a premium on such articles as best suit them. The taste is the same in this country, and if we will give our people the kind of cheese they like best they will eat two or three times as much, if they can get it. That will give us a better market than we ever had in England.

Improved Methods—Increased Profits

The present system of disposing of our cheese could be improved upon. It is not necessary that so much cheese goes through the hands of the middleman. The middleman does not always represent the consumer. Let us get as close to the consumer as possible, so that we may learn his taste, and save the middleman's profit.

While we have successfully fought the filled cheese evil there is still another fraudulent article upon the market which has a depressing influence on the price of all dairy products. Every man interested in the cheese industry should aid in the battle against yellow oleomargarine.

It is impossible to figure out what the gain would be under perfect methods, because there would be indirect benefits of considerable importance. I do not hesitate to say that, with clean whey tanks and pasteurized whey, with perfect milk, perfect curing rooms and shipping facilities, with more intelligent marketing and with yellow oleomargarine banished, we would realize at least twelve per cent. more for the milk delivered to cheddar cheese factories. That means about \$440,000 annually. That is worth going after.

Our business methods need a revision

as thorough as that suggested by General Sherman for the habits of a dude who asked him for advice. His advice was as follows: "Young man, throw away that vile cigarette, saw your cane into firewood, wear your watch chain on the inside of your vest, and stay at home nights and pray for brains."

DISCUSSION.

Mr. Convey—Are many of the factories of the state buying milk now without regard to the milk test?

Mr. Aderhold—I visited forty-five factories last summer and twenty of those were paying for the milk on the fat basis.

Supt. McKerrow—Last night Mr. Decker showed us photographs of cheeses made from one hundred pounds each of one per cent., two per cent., three per cent., etc., milk. Now, do you believe that the increase in the quantity and the increase in the quality make it a just and perfect basis upon which to buy milk?

Mr. Aderhold—It has been, so far, in Wisconsin. The factories that have kept track of the yield of cheese per pound of fat, have found that for each month during the season they have made just about the same amount of cheese for each pound of fat between two and a half to two and three-fourths pounds, made under normal conditions.

Mr. Scott—Then, besides that, with richer milk, you get a better quality of cheese, don't you?

Mr. Aderhold—No, not to appreciate the difference. You make cheese from three per cent. milk, or four or four and a half, and nobody could tell the difference.

Supt. McKerrow—You do not mean to say that there is no difference in the quality between cheese made of two per cent. milk and five per cent. milk?

Mr. Aderhold—We don't use two per cent. milk.

Supt. McKerrow—Well, three and five per cent?

Mr. Aderhold—I never have seen five per cent. milk in the cheese vat, but it runs from 3.3 up to about 4.6, and I do not believe any buyer could tell the difference in the richness of that cheese. We get more cheese. There is a little difference in this way, that the percentage of loss of fat in the whey is not quite so big. The chemist would find a little difference in the higher per cent.; the consumer and the buyer would not. Practically there is no difference in the richness of the cheese.

Supt. McKerrow—But the chemist would find it and the buyer's stomach would be apt to find it.

Prof. Henry—Last evening I had the pleasure of eating some cheese made from five per cent. milk. It was enriched milk and the cheese was in great demand at about 25 cents a pound, retail. I believe that buyers will in time come to see that it is worth more.

Mr. Aderhold—Of course, cheese made from re-enforced milk is a different thing.

Mr. Briggs—Where does that extra pound of butter fat go, if not into the cheese?

Mr. Aderhold—It goes into the cheese; we have got more cheese. There is more casein goes with it.

Mr. Convey—It is a common expression among cheese-makers that it requires a little different treatment to handle milk richer in fat in making cheese. Is that so?

Mr. Aderhold—No, sir, it does not require any different treatment. It might if you added cream to the milk, making abnormal milk.

The Chairman—Then if it is five per cent. milk you have more casein with relation to the butter fat than in three per cent. milk. In the five per cent. milk there must be more water.

Mr. Aderhold—Certainly, in one hundred pounds of fat, but we don't have five per cent. in cheese factories very often. It will seldom go over four and five or six tenths.

Mr. Kellogg—Then wouldn't the patrons who keep Holstein cattle get better returns than those who keep dairy breeds?

Mr. Aderhold—There are very few dairymen with Jersey breeds that send their milk to the cheese factories, and you will find where there are many Holsteins, they don't want their milk paid for by the test. The Holstein men are always kicking the most.

Mr. Linse—Isn't it a fact that when milk contains a certain per cent. of butter fat that the fats are not all very well worked in the cheese, there is a certain loss?

Mr. Aderhold—No, I have not found that at all.

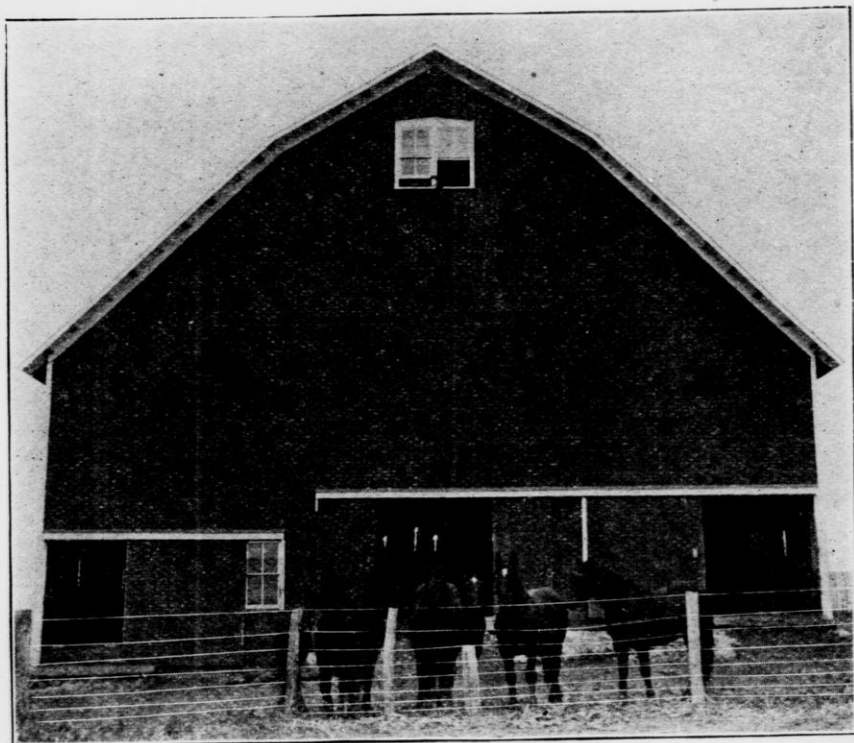
Mr. Linse—That is what some of our makers up here in La Crosse claim, especially in Swiss cheese. They claim that when it goes beyond $4\frac{1}{2}$ or 5 per cent. that cheese will not take in all the butter fat.

Mr. Aderhold—The Swiss makers cut their curd very fine and heat it high. There might be something in that for them but not in making our American factory cheese.

Mr. Scott—I saw a batch of cheese the other day, made by Mr. Decker from milk enriched up to 6.2, and he stated that there was no more loss of butter fat than there was from the poorer milk.

THE HORSE.

H. A. BRIGGS, Elkhorn, Wis.



HORSE BARN OF H. A. BRIGGS WITH BLACK PERCHERONS IN THE FOREGROUND.

Mr. Chairman, Ladies and Gentlemen:—The Chairman says I must be brief. It is easier to talk horse this year than it was five or six years ago, when horses were way down. It is with the horse business as with all other branches of business, supply and demand regulate the price. When there is an over-production of horses prices go down but there is no reason why a man who has been in the business for years should jump out of it and lose all his

horse sense. He should stick to the business, if he is adapted to it, and follow it, whether it goes down or up.

Supply Decreasing—Demand Increasing.

In 1892-1893 there was an over-production of horses in the United States. One thing that produced it was the panic which struck the country and stopped all kinds of business and the sale of horses; another thing, the street

cars were being changed everywhere from horse cars to electric cars, throwing about 90,000 horses on the market. At that time there were between sixteen and seventeen million horses in the United States. The last census report I got hold of, which was the first of January, 1898, showed that there were but little over twelve million in the United States, and showed a decrease in the number of horses in about seven years of between four and five million. Now, with that twelve million on hand at that time you would think there would be a pretty good supply, but it is not so. I will guarantee that four-fifths of the horses owned by the farmers in this audience are past the prime of life.

That is not all. By careful statistics which have been published lately in the *Farmers' Review*, with regard to the crop of colts raised last year, culled from the reports of many hundreds of farmers, they say that where the average ran from five to ten colts eight years ago, to-day there is only one and two. If this does not look as if there was going to be a horse famine, can you give me any proof of anything that will?

Another thing, if you studied the market reports of Chicago, which is to-day the largest horse market in the world, you would see that the price is steadily advancing and the supply is steadily decreasing. For the last six months it has averaged several hundred horses per week less as we have approached the spring time, when the supply ought to be the greater.

The Horse to Raise.

If we are going to grow horses, what kind shall we grow? And I say that every farmer in Wisconsin who has a farm of from forty to sixty acres, ought to grow at least one colt, and as many

more as his farm will accommodate, each year.

If you are going to raise a horse for your own use, the market that you are going to supply with that horse is your own home market; then raise exactly what you want, and if you haven't the horse you like there is nobody to blame but yourself, but if you are going to raise horses to put on the market, study the market and find out what it demands. For a number of years the market has been demanding either a draft horse or a good coach or carriage horse; these two breeds.

If you are going to raise horses, always aim to raise the very best, as with horses as well as any other kind of stock, that which tops the market brings the greatest profit to the producer. And there will be enough that do not come up to this high standard to fill all the places for the so-called general purpose horse.

Present Prices.

In regard to the range of prices, the general purpose horse can be procured anywhere in the market at from fifty to seventy-five dollars at the present time; that is, the general purpose chunk that will weigh from 1,200 to 1,300 pounds. As this horse increases in size the price increases, and the greater the size the more rapidly the price increases, until you get up to the horse that weighs 2,100 pounds, that sells as high as \$350, as I know was paid by a man last week, who makes a standing offer of \$400 for a mate for him.

In regard to the coach or carriage horse, I do not think there is one farmer in twenty who is situated so that it would be wise to go into raising coach horses. It takes a little more skill, a little more time, and a little more care, but if you dislike the draft horse and think it is a clumsy, awkward creature,



Julius 20712

Delavan 20709

Governor 20710

W.A. Evans
59

by all means raise the coach or carriage horse, for you will take better care of him. If you are going to do so, study the market and find out what it wants.

With regard to the draft horse, I am not advocating any particular breed; if you study the market reports carefully you will find that all breeds are selling well. The English and the Scotch buyers prefer the Clydes or English shires. The French and German exporters prefer a clean limbed horse, but there is a market for each and all breeds. Select the breed you like best; stick to it, and always aim for the top.

A Mistake We Made.

The depression in the horse market has caused very great damage to the farming districts, and for this reason: When they started to get out of the horse business they sold everything that they could sell, everything that the buyers would take, and the consequence is that nineteen-twentieths of the good, young breeding mares, that ought to have stayed on the farm, have been shipped to the markets. This is not all. During some considerable length of time, when this panic was on, among the horses going to the Chicago markets, there would be on an average one stallion to a car. All this means that there is now a scarcity of good breeding stock on the market, so that we have practically been set back ten or fifteen years in the horse business and have to commence and build up again to reach the point where we were ten or fifteen years ago. One good thing has come from this depression, and that is the foreign buyer, who, in the last few years, has taken between fifty and sixty thousand head of our horses a year, making a steady foreign demand for them, which have proved equal, if not superior, to European raised horses.

The Brood Mare.

If you are going to raise draft horses see what kind of brood mare you have. Don't try to raise a draft mare from a ten or eleven hundred pound trotting mare. Select your largest mares and cross them with the breed you like best, a pure bred draft horse, whether he is imported or American bred, you must get size and quality. If you are going to breed carriage or coach horses, select your mares that have size and quality, and cross them with the very best carriage horse you can. I am not going to point out the particular breed you should have. Among our American trotters we can get as good a type of coach horse as there is in the world, if we look to size and quality, but there are not enough of them. If American people had paid as much attention to producing good carriage horses as they have to producing speed and speed alone, we would have the best coach and carriage horses of any nation in the world, and we would have a national reputation for producing carriage horses equal to the one we have for producing little trotters. That has been the one great trouble with the men who have been raising trotting horses, they have lost sight of everything except the speed and the speed pedigree, and the result in many cases has been that not one in twenty-five has been fit to put on the market to sell for any kind of legitimate use. Get the idea of trying to raise trotting horses out of your head; if he can't do anything but trot you do not want him, because you would do more harm to yourself and your family in a financial and a moral way than anything you can do on the farm. But if you have a good standard trotting mare, and can cross her with a good French or German coach or standard bred horse, you can make good money

in raising coach or carriage horses. Such horses are selling all the way from \$150 up to \$1,500. They weigh from 1,150 to 1,250 pounds, and stand from fifteen and a half to sixteen hands high, with all of the style and nice, easy action that you can get in a horse, not a low, shuffling gait, but one that gets his feet up and shows nice knee action and nice hock action. That will give you an idea of the kind of horse that I think is advisable for the farmer to raise. You may have the very best breeds of either one of these kinds, and if you neglect feed you will have the veriest scrub that ever grew on a Wisconsin farm.

Care of the Colt.

The colt wants feeding just as much as the lamb, the pig or the calf; never let them go back. Many farmers think that it makes a colt more hardy to starve it, but I do not think they enjoy it, and I do not like to do it. The colt should be taught to eat grain when he is running with his dam. Never allow the colt to run with its mother on the road or while she is at work. Let the mare come up once in the forenoon and once in the afternoon, until it is a month or six weeks old, let it have the run of a pasture when the colt and its mother can run when she is not at work. When you wean it, after five or six months old, take the mare away where it cannot hear the colt. There is another very important point; there is nothing that will ruin a colt so fast as to give it excessively high feed and no exercise. You will develop the weight faster than the strength of bone and muscles. As to the kind of feed, anything that will apply to growing stock on your farm will apply equally well to colts, in the shape of nutritious protein feed.

Finishing Off For Market.

There is another time when a horse wants special feeding. If there were one hundred horses to sell in this vicinity and a buyer should come in here, I will guarantee that when he came to look over your horses, in nearly every instance he would say, "You have got a good horse, but it looks thin, it lacks in flesh for the market." There is no kind of stock that is grown on a farm that a man can put his feed into that will pay as good returns as the last one or two hundred pounds in finishing off horses. You may have a horse that will weigh 1,500 pounds in fair condition. Put a hundred pounds more of flesh upon him, and he will bring \$25 more if he is a well-proportioned colt, and if you put two hundred pounds upon him he will bring \$50 more. There is no animal on the farm that will take on weight more rapidly than a horse will in putting on this extra one hundred pounds. Take a horse four or five years old in good form and thin, and in thirty days you can put a hundred pounds of flesh on him, in sixty days you should put on two hundred, and in ninety days three hundred, that is if it has frame enough to carry it.

DISCUSSION.

Prof. Henry—What do you think of the fall foaled colt as a business proposition?

Mr. Briggs—I have raised just as good colts having them come in the fall as ever I did coming in the spring according to the circumstances. It is sort of contrary to nature to have them come in the fall, but if you can get them in the fall, raise them. If you are so situated that your mares are going to be idle in the winter, by all means try to have them suckle in the winter

and turn off the colt in the spring on grass, with a little feed.

Mr. Wing—Wouldn't you think it necessary to feed them unusually well if they were suckling colts?

Mr. Briggs—Certainly, they have to maintain life for themselves as well as for their young. There is one thing I forgot to speak of, and that is that a Wisconsin bred and fed horse will sell better on the market as a general thing than one raised in the corn belt, because their muscles and bones are built

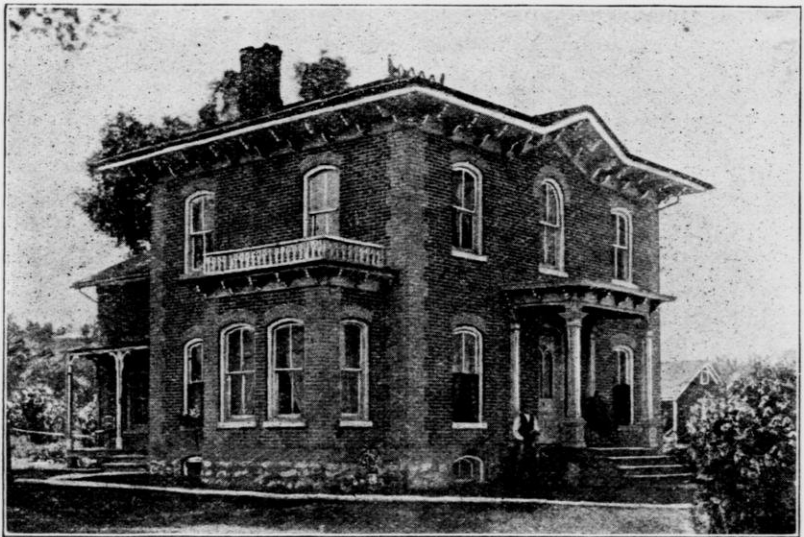
up with a protein feed and they are a better quality. This is not only my statement, but is a statement received from horse buyers that come to our place looking for horses.

Mr. Shimrock—Do you advise working mares while they are suckling colts?

Mr. Briggs—No harm is done if you do not overheat them. Just common farm work is no injury to the mare or the colt either.

WISCONSIN'S FRUIT EXHIBIT AT OMAHA IN FALL OF 1898.*

A. J. PHILIPS, Secy. State Horticultural Society, West Salem, Wis.



Home of A. J. Philips.

At a meeting of the Executive committee of the Wisconsin State Horticultural Society, early in August, 1898, Mr. A. L. Hatch was assigned the task of collecting and arranging the afore-

said exhibit. As soon as possible he went to Omaha, and apples, pears, peaches and grapes were sent to him from different parts of our State. He made tables and shelves to occupy the

* See picture, page 16.

space assigned to us; he arranged the fruit and remained in charge until September 20, when he was relieved by Wm. Toole, of Baraboo. When I arrived there, October 1, I found him busy arranging the exhibit in the best shape to keep up the reputation our State had already established. Though it was the first time I had ever seen him showing fruit at a Fair, I soon discovered that his soul was in it, just as when he displays his beautiful pansies at our State Fairs.

Wisconsin Seedlings.

About the time I took charge, of which I will speak in this paper, Superintendent Taylor brought me a blank to fill out for the committee on awards, stating in what way the Society wished the exhibit passed upon, and what particular points we wished to make prominent. After carefully examining our own and the exhibits from other States, and noticing the great admiration the visitors manifested for our new seedlings, to which I had already made a large addition from Western Wisconsin, (they at this date being so much better colored and matured than those first sent), I concluded to make a specialty of the new seedlings of our State, together with the Wealthy and Malinda from our sister State, Minnesota, and to show visitors and managers what we had accomplished while trying to find and produce varieties hardy enough to stand our trying climate, after we had heard times without number, "You can't grow apples in Wisconsin."

Arranging Our Exhibit.

So I went to work and arranged the apples as you see them in the accompanying picture. On the left I arranged a pyramid of the finest Northwestern Greenings I ever saw. Part came from Sauk, part from La Crosse, and part

from Monroe Counties. Being a winter variety no plate of apples received more praise from fruit men. On the extreme right I built a similar pyramid of beautiful large McMahon apples which called out more words of praise from the ladies than any plate on the table; their first exclamation was, "Oh! aren't they lovely." Near the center in front was a plate of five large Wolf River apples; the aggregate weight of which was near seven pounds. Back of these I had a pyramid each of Arista and Eureka; the former grown from seeds brought from Vermont; the latter a sweet seedling grown from seeds of the Tallman Sweet planted by my father in 1860. Across the center I had three pyramids of a Red seedling which I found in Monroe County, where it was fruited for three seasons. On account of its beautiful size and shape and deep red color it was a great addition to our show. It appears to be hardy, is of good quality, and if on trial it proves to be hardy enough for our climate, it will be a valuable addition to our list of commercial apples.

The Newell, from Sauk and Richland Counties, are on the right of the center, and were fine. Back of the McMahon I had a pyramid of Malinda produced on grafts four years from setting. This is a winter variety and has stood our severest winters. This early bearing top-worked is a valuable object lesson, as it is usually a long time coming into bearing. Back a short distance I placed two pyramids of Pewaukee apples sent from Sauk County. The judge, the Hon. H. E. VanDeman, former U. S. Pomologist, said these reminded him of pleasant hours spent with its originator, Uncle Peter Pepper.

Knowing that a list of Northern seedlings would be incomplete without the Wealthy, I placed in front a fine pyra-

mid of them, sent from Waupaca County, and marked them a Minnesota seedling, not wishing to take any honors belonging to our sister State. After making the show as attractive and impressive as I could, I left the back part of the tables as Mr. Hatch had them, only taking off those that had begun to decay, and replacing them with fresh fruit.

Several plates of the Morgan seedling from Vernon County were shown. It promises to be a good keeper. Several new seedlings came from Waupaca County. Some fine specimens of the Russian Longfield were sent from Mineral Point. From varieties sent I judged that Sauk County furnished the major part of the Russian apples, and they helped out the show very much. Some 36 varieties of grapes from the vineyard of Mr. Fox, of Sauk County, were picked, packed, and sent by Prof. Goff. Mr. Toole arranged them so that they added much to the exhibit.

I found apples that were sent from the Omro Society and from Janesville, in cold storage, but upon receiving the list sent from Mr. Babcock I found that duplicates were on the tables, so I left them where they were for Pres. Kellogg to replenish with as the earlier apples began to fail.

Seedlings that have originated in Wisconsin were shown in the Iowa, Montana, Oregon, Colorado, Idaho, and Washington exhibits.

Friends of Horticulture.

I feel that I cannot close without paying a tribute of respect to the men whose energy, knowledge, perseverance, and the unselfish way in which they pursued their work, made it possible for us of the State Society to make the grand exhibit shown in this picture, which was admired by hundreds of

thousands. I refer to Peter Peffer, Wm. A. Springer, E. W. Daniels, S. I. Freeborn and Peter M. Gideon, five men whose life work for the northwest cannot be estimated in dollars and cents. Of course we have others who have done much to advance horticulture, but when I looked over our tables the work of these five men came prominently before my eyes. Who was more unselfish than Uncle Springer? Who was more systematic with his work than the modest S. I. Freeborn? Who was more scientific than Uncle Peffer? Who manifested more perseverance than Uncle Daniels? And who has done more for the apple growers of the north than Peter Gideon? Echo answers, no one. The last time I saw Mr. Daniels he gave me six Northwestern Greening apples to carry to the Pine River Institute. He said, "Tell the people this is my last offering." I carried them to six Institutes, and they kept until after his death six weeks later.

On the whole the Wisconsin exhibit was a credit to our State, and to our Society. After looking through the large hall Prof. Henry said "Wisconsin does not have to take second place with any one."

DISCUSSION.

Mr. Kellogg—Tell us all you know about the Northwestern Greening.

Mr. Phillips—That originated in Waupaca County. I was called on this winter to go up into Minnesota and talk seedlings. I heard that this old tree was dead and gone years ago and I traveled fifteen miles one Sunday to find out about this tree and it is not dead yet.

It was planted about 1850 and the first scions were cut in 1871 and the two sons of the man that planted it are left. They don't know how the tree was

destroyed, but it was cut down to a foot above ground and around where it was cut there was a vigorous growth, sprouts growing out as thick as they could grow, and those sprouts are standing now. I told the man to cut them all off but three and see what it would do. This apple was shown at Omaha grown from about eight different States and it is the best winter apple that we have now. I sent out twenty letters of inquiry in different parts of our State and eight of the ten who responded answered that they considered this the best winter apple we now have.

Mr. Moseley—How large is the largest apple you had on exhibition at Omaha, from this county?

Mr. Philips—The largest weighed seventeen ounces. It was a Northwestern Greening, grown by Mr. Johnson near Leon. There is no doubt you have Wolf River apples that have been grown to over a pound and a half.

Question—What was the largest apple in the whole show?

Mr. Philips—The largest apple was in a glass jar and it was said to have weighed two pounds when put in. That was a Wolf River apple.

Question—What proportion of the Wisconsin exhibits were red apples.

Mr. Philips—I would say not over ten per cent. Our apples were largely green and yellow.

Question—How did our Wisconsin exhibit compare with other exhibits as to the size and variety of the apples? Were they as high-colored as others?

Mr. Philips—Yes; and the quality of our apples was up to that of anything shown there, that is, of the kind that we raise. Our apples averaged larger than any other exhibit. Our space was small, only three hundred feet, and we could not spread them out very much, but we had them where people could come in and take them in at a glance. Our exhibit was altogether ahead of anything grown in the North.

Mr. Convey—What share of the premiums did we get?

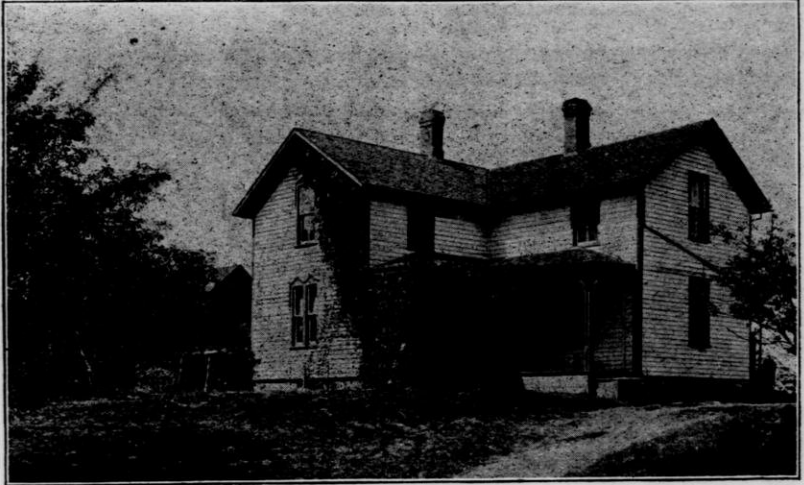
Mr. Philips—We were awarded twelve silver medals, one gold medal, and thirteen bronze medals, and also some diplomas. We did not compete with any other State. I was awarded a silver medal for the seedling apples and winter apples, and Mr. Kellogg was awarded a premium for fall and winter apples, but we did not compete against each other, and they specified on the start that they would give us silver and gold medals.

Mr. Kellogg—How many seedlings from Wisconsin were on our table there; how many varieties?

Mr. Philips—About fifty varieties we had, of seedling apples. We had very good seedlings from Vernon County, of a variety called the Morgan.

APPLE CULTURE IN WISCONSIN.

FRANKLIN JOHNSON, Pres. State Horticultural Society, Baraboo, Wis.



Farm Home of Franklin Johnson.

Whatever I have to say on this subject is from the standpoint of the amateur. I haven't any apple trees to sell, never have had and never expect to have. I confess that when a lad I wasted a good deal of time in raising some seedling apple trees, and later when we found the fruit they bore was nearly worthless they were top-worked and then produced some very good fruit. Profiting by my early experience whenever I wish to raise apples I now go to some reliable nursery man for my trees.

Local Nurseries.

In raising apples the getting of good trees is important. Another thing of equal importance is the getting of varieties that are adapted to the locality.

Remember that a man is more liable to be swindled in buying apple trees than he is in buying a horse. Hence the

importance of knowing both the grower and the seller.

Local nurseries are essential to the apple growing industry of this State. This is a pretty broad statement but I leave it with each one of you to say whether the facts that have come under your own observation will bear me out. You are all aware that Wisconsin had a good crop of apples the past season. A great many apples were shipped out of the State. Over thirty car loads were shipped from North Greenfield, over a hundred car loads from Baraboo, and so on from various points. Now of these various points that during the past year have shipped apples by the car load, how many can you name that sometime during the past twenty-five years have not had access to a local nursery? Can you name one such place? There are many points in

our State that have not shipped out any apples the past year. Of these points that have had no apples to sell, how many can you name where during the past fifteen years the farmers have had access to a local nursery? Can you name one such place?

Notwithstanding the immense sums paid for apple trees shipped into the state, it seems to be the home grown trees that give us the fruit.

The unjust competition with which our local nursery men have to contend, the pressure that is brought to bear upon them to become dealers rather than growers, and the helpless condition of the community when the local men are crushed; these are not pleasant subjects to consider, but they are subjects that demand earnest thought and combined and vigorous action.

Directions For Planting.

Now for cultural directions. Many of the catalogues have those that are very good. They usually read something like this:

"Get your trees in the fall.

Carefully trim, then bury the root and branches for the winter.

Plant in the spring, one or two inches deeper than they stood in the nursery rows, being careful to press the dirt firmly about the roots.

Cultivate the orchard with some hoed crop until the trees are large enough to occupy the ground."

Purchase in the Fall.

Most farmers are shrewd enough to see that it is to the advantage of the nursery men to turn off their trees in the fall. Seeing this, many fail to see what is equally true, viz.: that it is to the advantage of the farmer to get his trees in the fall.

Fall dug trees properly handled do better than spring dug trees because,

whenever a tree is dug its roots are more or less injured. If these injured roots are neatly trimmed and the tree buried, the healing process is carried on under very favorable conditions. The forces which nature has reserved within the tree to withstand the extreme cold of winter are not drawn upon, neither does it have to resist the hot sun or the drying winds which prevail in early spring.

Starting the Growth.

The first growth of every transplanted tree must of necessity come from the tree itself. There is no possible way for nourishment to pass from the soil into the tree until the tree itself sends forth the feeding rootlets. An examination in the spring of a tree that has been properly buried during the winter will show that the wounds have begun to heal. Where the roots were smoothly cut with a sharp knife you can see that between the bark and the wood a new growth has formed. It is from this new growth that minute rootlets will spring forth seeking food for the tree.

Whenever the tree may be dug it takes time for this healing which must of necessity be performed before any new growth can begin. Thus you see that trees dug in the fall start out with an advantage in time over those dug in the spring.

Trimming the Tree.

Again, whenever a tree is transplanted portions of the top should be removed to correspond with portions of the roots that have been removed.

A tree has a complete organism within itself. When the buds of a tree are about to unfold their leaves, the tree is prepared to send the right proportion of sap to each limb. If a limb is re-

moved at this time the wound will bleed profusely. If the cut has time to dry sufficiently it will seal the wound, but still the sap is forced to that point and a new branch is developed just below where the branch was removed.

But if a limb is cut from a tree in the fall the tree has time to adapt itself to the new conditions and when spring comes it sends the sap which would have gone to the branch that has been removed to the rest of the top, giving each branch and each twig its just proportion. Instead of wasting its blood and energy upon something that is gone, it puts all right where it will do the most good.

The Process of Transplanting.

The transplanting of an apple tree is a very easy and simple operation, and success in performing it should be the rule. I have dwelt thus upon the reasons why autumn is a favorable time for digging trees that are to be set in the spring, because I find so many who do not seem to realize the importance of time as a factor in enabling the transplanted tree to adjust itself to the new conditions. Many persons will also take much pains in an attempt to save the small fibrous roots (which is all very well though rarely successful) and at the same time neglect what is of far more importance, viz., the trimming with a sharp knife the roots that have been broken in digging.

Protection for Young Trees.

After a tree is transplanted the most it needs is time, and a fair chance. It seems as though most farmers would give young apple trees an opportunity to grow, yet many do not. Some allow them to be girdled with mice or rabbits. A common lath protector on each tree will prevent this. Some will pasture the orchard. None of our young forest

trees can survive in pasture. Some allow trees to be used for hitching posts. This is a very effectual way to kill any live tree. A hickory may live in June grass but it is not giving an apple tree a fair chance to make it contend with a tough June grass sod.

The Farm Orchard.

I am not here to advise each of you farmers to set out a large commercial orchard. But each one of you has a home and it does seem to me that no home is complete without apple trees. Think of the barren and desolate appearance of a farm home without trees, and then think of all the blessed family associations and memories that cluster around the orchard. The joy that is sometimes brought into a home by a single apple is well set forth by Mr. Bones in the February Horticulturist:

"In 1846 one of the Yellow Harvest trees bore an apple. It was my discovery. I was five years old and had to contract to keep "hands off" until the apple fell and then I was to have half. I kept my contract, but Oh! how slowly that apple grew and how many bare-foot tracks there were in the sand around that tree, that was finally swayed over by the weight of that great yellow ball. At last it lay in the sand, after a thunder shower, no "golden apple of the Hesperides" ever so beautiful. Its luster, in memory, is not dimmed after a lapse of fifty years. It was the first apple I ever saw growing."

Persistent Planting.

If I do not recommend *extensive* planting I do recommend *persistent* planting. The Wisconsin fruit-grower may reasonably expect to get very fine apples and enough of them to pay in dollars and cents for all of his care and labor. But judging by past experience it is not reasonable to expect that

his apple trees will be very long lived. Hence the necessity for *persistent* planting, that the young trees may take the place of those that will soon "bear themselves to death."

"Come let us plant the apple tree
Cleave the tough greensward with the
spade:

Wide let its hollow bed be made;
There: gently lay the roots, and there
Sift the dark mold with kindly care
And press it o'er them tenderly,
As, round the sleeping infant's feet
We softly fold the cradle sheet:
So plant we the apple tree.

What plant we in this apple tree?
Sweets for a hundred flowery springs,
To load the May wind's restless wings,
When, from the orchard row he pours
Its fragrance through our open doors;
A world of blossoms for the bee,
Flowers for the sick girl's silent room,
For the glad infant sprigs of bloom,
We plant with the apple tree.

What plant we in this apple tree?
Fruits that shall swell in sunny June,
And redden in the August noon,
And drop, when gentle airs come by,
That fan the blue September sky,
While children come with cries of glee,
And seek them where the fragrant grass
Betrays their bed to those who pass,
At the foot of the apple tree."

DISCUSSION.

Question—I wish the gentleman would give us some good varieties of apples adapted to this latitude, both for fall and winter, and for summer too.

Mr. Johnson—Well, for summer, the Transparent and Duchess; for fall, I would say Snow, Longfield, Wealthy and Plum Cider; for winter, Talman Sweet and Willowtwig.

Question—What do you think of the

Northwestern Greening and Wolf River?

Mr. Johnson—If I wanted to take the first premium for "Best Display," I would say Wolf River, I named varieties for family use; for commercial purposes in Wisconsin, I would not plant any late winter. We have a soil and climate peculiarly adapted to the ripening of the fall or early winter apples; there is no place in the Union that can compete with us in that line. There are places that can raise winter apples a great deal better than we can.

Question—As a general thing don't we plant too many varieties in the State?

Mr. Johnson—Well, that depends. If we are planting simply for family use, I would have quite a number of varieties, but if they are planted for sale, the fewer the better. For family use we want to extend the season. Hence we plant both early and late varieties.

Mr. Wing—How about the Ben Davis in this State?

Mr. Phillips—It is not hardy enough.

Question—What is your opinion as to the quality of the Ben Davis?

Mr. Johnson—I don't think there is much flavor in cork.

Question—How about the Newell's winter?

Mr. Johnson—The quality of the apple is excellent; there is nothing makes finer apple sauce; they are a little tart for eating.

Mr. Arnold—Do varieties of apples run out?

Mr. Kellogg—They do not. The scion from a Rhode Island Greening grafted on any stock in any country will bear true to its kind, except the variation of soil and climate, which has much to do in developing the finest characteristics of any fruit. I have noticed this in the seeds of varieties that have been

grown for a hundred years such as Rhode Island Greenings and Baldwins, the seeds seldom fill out, while all newer varieties that have not been grown more than ten years from the seedling have large quantities of seeds which are plump and fresh, showing vigor and new blood. There are some instances where a slight variation is found by the influence of stock, yet on this I have found that winter varieties grafted on such stock as Transcendent Crab will ripen up its crop from one to two months earlier than on other stock. Upon the little Cherry Crab, on the same tree, I have grown and ripened twenty-six kinds of choice apples, and all showed size and perfection of fruit except crab on crab, while I have known larger and finer fruit grown on Virginia crab than on any other stock because of its vigorous and healthy growth.

Mr. Johnson—I don't think the variety runs out. The common method of propagation practically gives us new trees. For each individual tree a scion is grafted upon a new seedling.

Mr. Kellogg—This tree that you have is simply the tree from this sprout you set on there. The root gives you the new tree. You have got the same old line.

Question—Is the quince productive in this locality?

Mr. Johnson—No, it is too tender.

Mr. Convey—I am somewhat surprised to hear a list of apples that does not include the finest apples that are raised throughout the State, that is the Wealthy. I never heard a complaint of the McMahan, also the Northwestern Greening and we find it even in the Northern part of the State.

Question—What is the best place to select for an orchard, in a valley or on the side of a hill?

Mr. Lovejoy—I think you will find the

best orchards on the hills; the northern slope, of course, is preferable to the southern.

Mr. Hodgson—In a time of plenty with apples, is there any possibility of thinning out the crop so as to make the trees bear the next year?

Mr. Lovejoy—Some trees have a habit of bearing every other year. For instance, take the Plum Cider. I do not believe you can get two successive crops by thinning the fruit.

Question—Do you call that a fall or a winter apple?

Mr. Lovejoy—Well, early winter, although I have Plum Ciders in my cellar now which have kept very well. Of course they are losing their flavor.

Mr. Thorp—Would you advise a man in this locality to try to grow the Willow twig apple?

Mr. Johnson—I am not acquainted in this county. In Sauk County I would for family use.

Mr. Phillips—It is not hardy enough for the northern and central parts of Wisconsin.

Question—Would you advise anyone to set out apple trees on vegetable loam underlaid with clay, eighteen inches to two feet deep before you strike the subsoil?

Mr. Phillips—I have lived on that kind of soil for thirty years and I would say no.

A Member—I would like to hear from Mr. Phillips about the model orchardmen from Ohio who have been canvassing this State.

Mr. Phillips—It is one of the most gigantic swindles that ever came through this country; it has struck our county, Buffalo County, and this county. About Norwalk they took about \$5,000 out of there. They go into a country where Mr. Man has a good orchard and they tell the people that while Mr. Man has a good bearing orchard, they

can sell them trees that can do a great deal better than the trees that he sets out, and that catches them; they sell sufficient for an acre for perhaps \$75. They say, "You pay us half down, and if you buy of these Wisconsin men you have to pay all down, then we will wait on you five years, without interest, for the rest," and that catches a good many fellows. They tell them they need not pay until the trees begin to bear. The man pays half down, which

is about half a dollar a tree, when Mr. Man, or any man in this State, can buy a great deal better trees for twenty cents a tree. They don't see the price they are paying for their trees, but they sign the order and they pay when the trees come, half down, which is half a dollar a tree, which they never get paid for. Don't fool with those men; buy your trees in the State, of men who grow them.

RESOLUTIONS.

Resolved, That it is the sense of the people, assembled in the Closing Farmers' Institute, now in session at Sparta, that the Senate Resolution introduced by Senator McGilvray, asking for an amendment to the State Constitution, to enable the State to grant aid in building permanent roads within the State, should have the unanimous support of the Legislature.

Resolved, That in view of the fact that all prosperity is based on agriculture, we hereby declare in favor of the teaching of the principles of agriculture in our common schools, and urge those who have the educational interest of the State in charge to take measures to provide suitable text books for that purpose.

Resolved, That we view with pleasure the movement which is being made along the line of industrial education, and we heartily endorse all that has been said by the different speakers in relation to the education of the hand as well as the head.

Resolved, That we who have been in attendance at the present Closing Farmers' Institute fully appreciate the kindly welcome and generous treatment

accorded us, and the assistance given us by the citizens of Sparta which has contributed largely to the pleasure and success of our meeting.

Resolved, That we wish hereby to express our special thanks to Mr. E. G. Harrison, of Washington, D. C., for his instructive and profitable address on the subject which is of very great importance to the citizens of Wisconsin, namely "Road Improvement," and to State Superintendent of Public Instruction L. D. Harvey, for his excellent address on Education. We wish also to thank Josiah Powlar, an Oneida Indian, for his very fine paper on the Industrial Education of the Indian; Mr. J. E. Wing, of Ohio; Mr. A. J. Lovejoy, of Illinois; Mrs. Nellie S. Kedzie, of Illinois, and many others to whom the success of our program is largely due.

And Whereas, the legislature of the State of Wisconsin in 1897 passed a law separating the incorporated villages in the State from the towns, and in the same law provided that the towns and villages should jointly support the bridges in the villages, thereby compelling the taxpayers of the towns to bear in fact the expenses of the con-

struction and maintenance of bridges in another and separate organization, wherein they have no representation, therefore

Be it Resolved, That we protest against the same, and request our representatives in the legislature to so amend that law as to eliminate the aforesaid provision.

Resolved, That it is the sentiment of this Institute that Senate bill No. 113, presented by Hon. Levi Withee, of La

Crosse, whereby the several towns and villages in the State shall build and maintain their own bridges, should become a law, and hereby request our representatives in both branches of the legislature to give it their support.

C. P. GOODRICH,

H. C. TAYLOR,

L. E. SCOTT,

Committee.

All of which were unanimously adopted.

WOMEN'S DEPARTMENT.

Cooking School.

Held at Sparta in Connection With the Closing Farmers' Institute, March 14, 15, 16, 1899.

Conducted by Miss M. L. Clarke, Supt. of Milwaukee Cooking School, Milwaukee, Wis.

Stenographic report by Miss E. M. Close, Madison, Wis.

TUESDAY AFTERNOON.

Miss Clarke was introduced to the audience by Mrs. Longwell, Chairman of the Ladies' Committee at Sparta, in a few well-chosen words, and addressed the ladies as follows:

Miss Clarke—Ladies of Sparta and Committee:—I believe the cooking school is no new feature to you, as you had Mrs. Jamison with you last year. It is a pleasure for me to follow in her footsteps; she is a pupil of whom I have very great reason to be proud, and I have always found where she has been the ladies are much interested in cooking school work; they realize that cooking means more than something to please the palate—it means the application of the principles of nutrition.

For our lesson this afternoon we will

prepare and discuss the following dishes:

A Balanced Ration
Salt Fish Pork Gravy Egg Sauce
 'Sconset Potatoes
 Carrots in Lemon Butter
Ginger Pudding Doublet Sauce

Salt Cod Fish.

Recipe—Wash the pieces and soak for several hours, over night, if it is very dry. Put the skin side up to let the salt escape more freely. Change the water and set on the stove where it will not boil for at least an hour. Increase the heat gradually after the fish begins to be tender, and let simmer for ten minutes at the last. Half an hour before serving lift the fish from the

water and cover closely to keep hot until wanted. Return the water to the fire and use it for cooking 'Sconset potatoes.

We have chosen for the first topic today, as you see by the announcement on our program, a balanced ration. Those of you who have been in the habit of attending Institutes will understand what is meant; we are applying the principles which these gentlemen have been studying and applying for years to their stock, their horses, cattle, etc., to our family life. For the main dish or meat of our meal we have chosen salt cod, as being one of the most nutritive of fishes, and also because it is one of those that is always with us. There is never any difficulty in obtaining salt cod. It is almost as nutritive in its salted form as fresh, although it loses a little of its digestibility.

The fish should be put to soak in fresh cold water. Albumen begins to coagulate at about 158 degrees, and to get the very best results, that is the very largest per cent. of the nutritive elements of the fish, we want to keep the temperature low; we do not want it to get much above 160 degrees until the last ten minutes, when we bring it just to the simmering point, which would be a little below 212 degrees.

The food value of codfish is very great, and that fact has caused it to be much sought after. When it is scarce the temptation on the part of the dealer is to substitute a cheaper fish in its place. The most common substitute is haddock, which is much the same as cod. The texture of haddock is even more delicate, and is as pleasant to the taste as cod, only it is not as expensive, and I have a decided objection to paying ten cents for haddock when it is really worth only six to eight cents. It is not as objectionable a substitute

as hake, which is a great deal coarser, lacking in flavor and of much less nutritive value. And not content with selling hake for cod I have known them to substitute catfish and dogfish, which are coarse meated and undesirable.

When buying codfish you are at the mercy of the dealer unless you test it, and this can just as well be done when it is dry as after it is soaked. Take a little piece of the fish and rub it between the thumb and finger. If it is cod the fibres will loosen and become woolly, but will not go to pieces. Other fish will crumble readily between the fingers. This that I have is probably haddock and haddock is a good fish.

'Sconset Potatoes.

Recipe—Scrub and pare the potatoes and lay them in cold water for two hours before cooking. Drop them into the boiling water from which the salt codfish was taken, and boil gently until tender, about thirty minutes. Try them with a sharp pointed knife, it will not break them like a fork. Drain off all the water and sprinkle with a little more salt. Dry off on a hot plate for two or three minutes before serving.

'Sconset is the name of a town in the extreme Eastern end of the Island of Nantucket, noted for its good potatoes and good chowders, and along the coast of Massachusetts and Maine, especially the northern part of it, it is common to cook potatoes in this way. After the fish has been cooked the water, which is flavored with the fish, is brought again to the boiling point, the pared potatoes are dropped into it and cooked as usual.

Is there any one here who has never made laundry starch? You mix the starch with a little cold water, and then what do you do? Add more cold water and let it boil? Why should you not do that? Because it makes the starch

sticky and you do not like it. Suppose you put your potatoes or starchy food into water that is not boiling. It becomes sticky, it is paste, and no amount of after cooking will ever correct it. Then just lay it down for a foundation principle, that foods consisting mainly of starch should always be put into boiling water to begin cooking.

The potatoes were pared this morning and left to soak because it is late in the season; they need to absorb the water that has been lost by evaporation. Do you try with a fork? And don't you very often break the potato in many pieces? When you put a wedge into a substance it is with the object of splitting it; the fork is a wedge, so instead of using it take a sharp knife to try potatoes; they will not split and they will not show the place where they were pierced.

Potatoes should be thoroughly drained; I think that is as essential as cooking, for if a little water is left in the kettle it is rapidly converted into steam and absorbed by the partially dried surface of the potato, and they are not dry and mealy as they should be.

Pork Gravy.

Recipe—Allow one tablespoon of quarter-inch dice of fat salt pork for each serving of fish. Cook slowly in an iron frying pan till they are perfectly crisp, but not colored. Serve scraps and fat together in a hot sauce bowl.

The salt pork for the 'Sconset potatoes is diced and put to cook in a warm frying pan, and cooked until it is crisp and tender. You must not neglect this pork while it is cooking; it needs constant attention to keep it from scorching. You should shake the frying pan to turn the diced pork that the pieces may be browned on all sides.

You have noticed that you cannot keep an edge on a knife that is used in

hot fat. That is because the heat of the fat takes the temper out of the knife, as it is so much higher than the heat at which it was tempered.

Question—Do you put it on in a hot frying pan?

Miss Clarke—It is not necessary to have it hot, but if it was a heavy iron pan I would heat it a little at first. This is stamped steel and heats through almost like a piece of paper.

Question—Then you want to draw the fat out of the pork?

Miss Clarke—Yes, we want all the fat out, and when the pork is cut in these quarter-inch dice it comes out very quickly.

Question—Do you want the very fat pork, or the streak of fat and streak of lean?

Miss Clarke—Just as you prefer it. Either is good. When the clear bits of fat turn white they are ready to use. It should be taken up before it has a chance to get yellow. As soon as the potatoes are in the dish in which they are to be served this sauce is poured over them and allowed to stand.

Question—Is it a loss to allow the pork to brown?

Miss Clarke—It is a loss of flavor, but not of fuel value. The instant we begin to brown pork we increase the difficulty of digestion. Browning carbonizes it, and the fat is partially disorganized or disintegrated.

Question—How would the lean meat of fresh pork answer instead of salt pork?

Miss Clarke—If it is liked equally well, it would be good, but some fat is needed to make the fuel ration sufficient. I think it is necessary to have both thoroughly cooked, and have it slightly browned.

Question—Do you cook the pork quickly or slowly?

Miss Clarke—If it is cooked quickly it

does not have time to draw the liquid fats from the fibre of the meat, and in cooking it in slices we want to have the meat thoroughly heated through and allow all liquid fats to be drawn out before we try to make it crisp. In any case it should not be a dark brown.

Question—Could you use bacon?

Miss Clarke—I think so, but the smoky flavor would not be as pleasant as the salt pork. I do not think I should like it as well.

Question—Do you keep turning it?

Miss Clarke—Yes, if I see it is browning too much I turn it so that all sides will brown alike.

Our pork gravy is now ready, the fish has been removed from the kettle and the potatoes boiled in the fish water. We are now ready to put together our material for the egg sauce, or drawn butter.

Egg Sauce.

Recipe—Cook two tablespoons of flour and two tablespoons of butter till well parched. Add one pint of boiling water; beat well and boil five minutes. Add salt and pepper to taste and just before serving as much butter as will blend, about three tablespoons. Add three hard boiled eggs coarsely chopped and serve at once.

The flour should be sifted once before measuring, and rounding tablespoons of butter and flour cooked together until parched. Cooking the starch a long time increases its digestibility. If corn is ground into flour it will cook in less time; in the form of flour the starch grains can be sufficiently cooked in from twenty minutes to half an hour.

We are all familiar with popcorn, which when shelled from the cob into a closed basket, cooks in a few minutes so that it makes a wholesome and palatable food. On this same principle the flour is put into boiling hot fat; the

boiling point of the fat being 400 degrees instead of 212, as in water, the starch grains pop open, and the flour cooks very quickly.

One pint of boiling water is then measured and poured slowly into the sauce pan, stirring steadily. The sauce is done as quickly as you can put it together. This is the basis of a great many other fine sauces. The French call it the mother of all sauces. If you do not wish to use it at once let it stand over hot water to keep hot and grow mellow, but it is ready to serve at once. Add salt and pepper to taste.

The eggs are cooked on the same principle as the albumen in fish. They were put into warm water to cook when the fish was put on, and cooked for an hour; not boiled, but left to "coddle."

Carrots in Lemon Butter.

Scrape the carrots, cut in one inch sections and soak in cold water till crisp. Cook in six times their measure of boiling salt water till tender enough to pierce with a broom straw. Drain and return to a hot place with one tablespoon butter, one-half saltspoon salt, one teaspoon sugar and a dust of pepper for each pint of carrots. Let it simmer covered until the butter has been absorbed. Pour over one tablespoon lemon juice and one teaspoon chopped parsley just before sending to the table.

These carrots, which have been cut into nearly half-inch cubes, should be treated the same way as the potatoes—put to soak in cold water and for the same reason. In the case of the carrots we have gotten ready to cook this afternoon, we had a pint to begin with, and now we have a pint and a half; they have absorbed enough water to increase their bulk one-half, and they will cook in a correspondingly

shorter time, and be more tender when they are cooked.

When putting the carrots on to cook add one peppertspoon of bicarbonate of soda, then cover closely and let them boil gently, giving them plenty of water. I should like a kettle large enough to cook them in six or eight times their volume of water.

Question—How much cold water do you soak them in?

Miss Clarke—I do not measure; probably two quarts, always enough to cover them.

Carrots have a great deal of flavor, and carbonate of soda dissolves some of it, and softens the woody fibre. Vegetables are classified as the starchy and woody fibre. Rice, potatoes, etc., belong to the starchy vegetables; carrots, turnips, onions, etc., to the woody fibre vegetables. They must be treated differently in cooking. Carrots have a woody fibre and we want to soften this in order to cook it more quickly and thoroughly. Try them with a broom straw at the end of 45 to 60 minutes, and if they are tender change the water in which they are cooking. Renew the water at the same temperature as nearly as possible. Cold water toughens the vegetable, and it will not become tender again. Put salt in the second water in which they are cooked so that they will be well seasoned.

None of the woody fibre vegetables are wholesome for food unless cooked so tender that they can easily be pierced with a broom straw. I believe that is one reason why children do not like vegetables. I really think that they are often not sufficiently cooked.

Question—Do you think bicarbonate of soda is better than the common soda?

Miss Clarke—It is better than saleratus. If you want to experiment with the brands on the market taste it, and

see if it has an acrid, burning taste on your tongue. Then take a little of the bicarbonate of soda and compare it. It should have a pleasant, smooth taste. Saleratus I do not consider at all in the question of foods for human beings.

Ginger Pudding.

Recipe—One-third cup butter, well creamed, with one-half cup sugar, whisk in one egg well beaten, mix and sift $2\frac{1}{4}$ cups flour $3\frac{1}{2}$ level teaspoons baking powder, $\frac{1}{4}$ teaspoon salt, two teaspoons ginger, one cup milk and one cup dry preserved ginger, cut small. Steam two hours in a buttered mold.

This pudding I am making to-day is a variation of cottage pudding. The baking powder is one of your old favorites, Dr. Price's. These three spoons are made to hold exactly 1 teaspoon, $\frac{1}{2}$ teaspoon and $\frac{1}{4}$ teaspoon respectively. Being fastened with an eyelet, the cluster of spoons can be hung over the kitchen table, within easy reach. The use of such small conveniences will do a great deal to make cooking easy.

Question—Are they for sale?

Miss Clarke—Certainly. Tell any enterprising house furnishing man about them and he will be delighted to secure a supply.

After you have creamed the butter and sugar add one egg well beaten, then the milk and flour alternately, being careful to keep the batter soft, adding the milk faster than the flour. In this way the batter will be smooth, soft and creamy.

For our fruit we are going to use preserved ginger. It has been cut in short pieces preparatory to mixing into the batter.

Question—Where do you get this prepared ginger?

Miss Clarke—It is kept by grocers and confectioners.

Question—Can it be kept on hand?

Miss Clarke—Yes, it is crystallized and will keep perfectly as long as it is dry. It will not keep in my house, because we are all too fond of it. It is a very wholesome fruit, and I am very glad to speak of that, because so many dislike to use spices and the more indigestible fruits. Ginger is a tonic and is slightly stimulating, but it is not an irritant like cloves or other hot spices.

This is ready now to put into forms. If you are at home give it time to cook in one large mold, but because I wish to serve it this afternoon, and to hurry it, I am putting it in several small molds. You can use a pudding pan, or cook it in a cake dish with a chimney in the middle. If cooked in a large mold it will take two and a half hours, but in these small ones it will cook in an hour.

Question—May I ask how you prepared that ginger?

Miss Clarke—I cut with a sharp knife across the grain. It is vegetable fibre, and if stripped with the grain it is stringy and tough, so should be cut across the grain.

Question—Could you use a chopping bowl?

Miss Clarke—Yes, I think so.

Question—Could you put it in a grinder?

Miss Clarke—I don't believe you would want it so fine as that. We want some of the little bits of fruit to show.

The pudding should be kept boiling steadily the first hour. This is an important point in steamed bread or pudding, as the lightness depends upon continuous cooking at first.

Doublet Sauce.

Recipe—One-fourth cup butter, $\frac{1}{2}$ cup cream, two cups coffee C sugar. Rub

the butter to a cream, add the cream and sugar alternately, beating until all is light and frothy. Flavor with ginger or chocolate.

The flavoring should be put in at once. The majority of housekeepers put it in the last thing, but I advise putting it in with the butter because it holds the flavor. We all know how butter will absorb odors and flavors, so that we must be very careful how it is kept. On this same principle putting the flavoring in with the butter helps to hold it. If you cannot work the flavoring into the butter readily, you may add a little sugar for the purpose of holding it.

Question—What kind of flavoring do you use?

Miss Clarke—Jamaica ginger. We use the preserved ginger root for the fruit in our pudding, and Jamaica ginger for the flavoring of the sauce.

Question—Won't that make the dish too strong of ginger?

Miss Clarke—I do not think so. I will let you be the judge of that when the pudding is served. I soften the taste of the ginger a little by the cream in the sauce. Cream is a wonderful emollient for softening sharp flavors and making them palatable. Keep the cream until we use all the butter and sugar, and then add it slowly, a little at a time.

Question—What is gravity cream?

Miss Clarke—I was told by an old dairyman at Milton Junction that any cream that simply rose to the surface without agitation was properly classed as gravity cream.

Question—Does that include the Cooley creamer?

Miss Clarke—Yes, any process where milk is set in pans, either deep or shallow, and allowed to rise naturally, without agitation. It does not include

cream that is separated by centrifugal force.

This sauce is also very nice made of other things than cream; in summer time crushed fruit—strawberries and raspberries, are very nice.

I do not believe it is possible to get really good results with this sauce without beating. It needs hard, rapid beating to bring it to a good condition.

Question—Would you get the same result by using white of an egg instead of cream?

Miss Clarke—I have never tried it. It would not taste so good, I know. It needs some of the richness of the cream, and albumen does not add that richness.

Question—Will this be a hard sauce?

Miss Clarke—No, it is creamy; it will not be oily, but creamy. It is made very much on the principle of a mayonnaise dressing. You must stop beating when you see it is just beginning to crack. Then put it aside and let it stand in a place just warm enough to keep it soft.

A Balanced Ration.

We have called this a balanced ration to-day, and for just a few minutes we have time to consider what is meant by a balanced ration. And here is where our friends in the Institute have gotten the start of us by a good many years. They say with the utmost assurance that the best ration for their stock is one to six. What does this mean? Bread and butter? A pound of butter to six pounds of bread? Many are at a loss to know. I wonder how many ladies are here who can tell what it means? Are you going to let these gentlemen get ahead of you? Is their stock more valuable than your children? Is it a bit better worth while for them to have a few dollars extra from feeding their cattle, horses and sheep,

etc., in just the right way, than it is for you to have healthy, handsome children, good tempered husbands, and brothers, and be well and strong yourselves?

In looking over an audience I often see faces that look as if they wish they never had to cook another meal. Of course there are none here, but it is sometimes the case. This would not be so if each one was really well; they would rejoice in their work if they were, just as children rejoice to run, play, leap, just from the mere delight of living; or as the highbred horse, when he is harnessed and led out, will arch his neck, lift his feet, not wanting to touch the ground, rejoicing at being called out to work. Do you feel that way with a big day's work ahead of you? This condition can be brought about by better food, a better balanced food ration.

A farmer supplies protein from clover hay and grain, fat from corn, and so on, but human beings go to entirely different sources for their nitrogenous elements, taking it chiefly in its transmuted form, in the shape of beef, milk and eggs.

Of the grains wheat is the richest in flesh-formers, though rye and oats are extremely valuable. From them we get material to form muscle tissue, build bones and nerves, starch to furnish muscle power, heat and fatty tissue, and fat to serve for fuel. They all serve as fuel, and yield energy in the form of heat and muscular strength and form fatty tissue, but each element has its own special work for which it is best adapted.

We get fats not only from meat, but the fats of milk, [butter, cream] oil of buckwheat and oatmeal. These are very rich in oily substances. Nuts are also very rich in oils, and are desirable food when taken as part of the meal

and recognized as such, rather than as an indulgence between meals or after a sufficient dinner.

The carbohydrates form fat, rather than muscle. The principal use of carbohydrates is to supply heat and energy. The carbonates and phosphates of lime and soda are wonderful assistants in the digestive processes, besides furnishing bone material.

Question—How much of these elements ought people to have?

the human animal. The sole duty of the young lamb, the young of any stock, is to grow. Are you satisfied to have your children do nothing but grow? Never to say bright, cute and sensible things? They are sent to the Kindergarten to learn science, disguised as games. We want them not only to grow physically, but to use their brains. You see there is a much greater activity than in the case of other young animals, and the amount of work that is

NUTRIENTS AND POTENTIAL ENERGY OF FOOD MATERIAL IN LESSON I.

	OZ.	PROTEID%	FATS%	CARBO-HYDRATES%	MIN.MATTER%	CALORIES
SALT COD	16	16.	0.4	0.0	1.2	315
FAT SALT PORK	4	0.7	19.1+	0.0	0.2	820
EGGS	6.4	4.7	4.1	0.2	0.3	262
MILK	8	1.7	1.85	2.4	0.35	155
FLOUR	9	6.25	0.62	42.5	0.35	934
POTATOES	40	5.	0.5	53.25	2.5	1100
BUTTER	12	0.75	63.8	3.75	2.62	2711
SUGAR	16	0.3	0.	96.7	0.8	1800
CARROTS	24	1.5	0.3	15.15	1.2	322
		36.9	90.67	213.95	9.52	8419
BREAD	18	10.01	2.1	6.24	1.1	1440
		46.91	92.77	220.19	10.62	9859

FULL DAILY RATION, FAMILY OF 6 = 15810 C.

DINNER SHOULD FURNISH $\frac{3}{5}$ = 9486 .

Miss Clarke—As much as possible. We talk of the proportion of foods for stock being one to six, that is, one measure of nitrogenous food to six parts of carbohydrates and fats. We need to feed people in the same proportion. For children from 2 to 6 years old 55 per cent. of nitrogenous material, 40 per cent. fat and 200 per cent. carbohydrates. Probably the reason for the large per cent. of carbohydrates is found in the much greater activity of

required is not at all to be measured by what we regard as our work. Think how hard it is for us to acquire a language. How many of you ever attempted to learn Russian, or German? You remember the wearisome hours you have spent over the inflections, words, and their relations to each other? Yet these babies are learning a language and in order that this work may be done they require a large per cent. of proteids to furnish the material for

growth and at the same time furnish the material used in activity. They are extremely active in muscular exercise. Do you not remember saying to a child, "will you never keep still?" "do be quiet," "be still a minute." Where do they get the power for that activity? The large per cent. of carbohydrates called for in dietary No. 1 is meant to furnish just that energy with-

out checking growth. Given food tables such as are published in Farmers' Bulletin No. 74, on Milk as Food, and others, prepared by Prof. Atwater, and the daily bill of fare can be calculated with some certainty. The following chart was compiled from tables contained in "The Science of Nutrition," by Edward Atkinson.

WEDNESDAY AFTERNOON, MARCH 14, 1899.

Miss Clarke—We have only a little time this afternoon, but can take for our subject eggs and their composition, and then suggest some different ways of preparing them for food.

These different ways of preparing eggs can be classified under a few simple forms—First, cooking in water or steam, poaching in water, stock, milk, etc. This may be so varied as to give an almost unlimited number of apparently new dishes. Second, cooking by dry heat, as in the many forms of omelets, baked and fried eggs, and, third, such made dishes as have eggs for their principal ingredient, escalloped eggs for instance or curried eggs or Scotch Woodcock. Urbain Dubois has lately published a book giving 300 ways of preparing eggs, but this number is mostly obtained by the great variety of sauces and garnishes used. The following recipes will be given to-day:

- Breakfast Eggs Golden-rod Eggs
- Breakfast Eggs on Toast
- Pretty Poached Eggs Egg Timbales
- Oyster Omelet

COMPOSITION OF EGG.

	Whites.	Yolk.
Water	84.8	51.5
Albuminates	12.0	15.0
Fats	2.0	30.0
Mineral Matter.....	1.2	1.4
Extractives, Pigments, etc.		2.1

By referring to the table of the composition of eggs (the white in the left hand column and the yolk in the right), you can see that the albuminates of white and yolk do not vary much. The white contains much more water than the yolk. The greater nutritive value lies in the yolk, chiefly on account of the large amount of fat it contains, 15 times as much as is contained in the white. The mineral matter is nearly evenly distributed; but the coloring matter and the flavoring is in the yolk only.

One of the German chemists of whom Mrs. Kedzie spoke, studying foods and their values, gives 750 grains as the average weight of a hen's egg, but some of the Wisconsin eggs I am using this afternoon must weigh much more, they are so large. All food materials contain a certain proportion of waste. In eggs for every 100 grains of weight we must allow about 10 grains of shell. In your 100 grains there will be 22 and a fraction of albuminates and fats, and 67.2 of water, so that you see how large a per cent. there is of nutrients, and one pound of eggs used as food will average about the same in value as one pound of the very best quality of butcher's meat; not tenderloin steaks, but the most nutritive part.

While we are eager to know just how

many pounds of steak it takes to sweep the floor, it may be interesting to know that one pound of hard boiled egg will set free force enough to lift 1,415 tons one foot high (if completely oxydized). If we take time to study the table of food values on the chart we can calculate the nutritive force furnished in our daily food, and when the ration is falling short it is easily brought up to normal by adding eggs in some form to the daily ration. Do not feel that it is extravagant to use eggs freely in breakfast breads, custards and cake. I believe in a reasonable, rational use of cake for food. The old-fashioned sponge cake, known as diet bread in the days of Queen Elizabeth, is excellent food, under certain conditions. What is more wholesome than the eggs, sugar and flour used in making it.

We have a very simple form of albumin in eggs, different from that found in meat; it is so easily digested and quickly assimilated that it is valuable as a food element. Eggs also contain more phosphates than the average of other foods. It is found in the whole egg, both white and yolk. There is also an especially valuable supply of iron and sulphur in the egg.

The fats of the egg are olein and palmitin, which are also found in other foods, but they are so proportioned in the egg that it is one of the few perfectly balanced foods that are found in nature; milk gives us another example of the perfect adjustment of fat with other elements under an agreeable form. Some people reject cream and take fat meat, while others relish cream and turn away from fat meat; still others who cannot take cream will enjoy an egg yolk, especially if beaten well with milk or water. But, however we choose to take it, we need a certain amount of fat.

Breakfast Eggs.

Eggs should never be boiled. By boiling a thin shell of the white is made hard and indigestible, while the bulk of the egg is barely warmed through. The following is a better way. Put six eggs into a vessel that will hold two quarts. Fill with boiling water, cover closely and set on the stove shelf for seven minutes, if wanted soft; ten minutes for medium, and twelve to fifteen minutes for very firm. In this way the egg will be thoroughly and evenly cooked. If soft the white and yolk will blend, and be rich and creamy; if hard, the white will be a delicate, firm mass, that simply melts in the mouth and is not more difficult of digestion than of mastication, while the yolk will be dry and mealy, and easily managed by the digestive fluids.

When serving these breakfast eggs, crumple a napkin in the dish and arrange them in its folds.

Breakfast Eggs on Toast.

Recipe—Cut slices of stale bread two inches thick into as large rounds as possible. Scoop out the center to shape them like a large tart, brush with melted butter and brown in a hot oven. Into each one break a small egg, being careful not to break the yolk, season with pepper and salt, and pour one teaspoon cream over the egg. Return to a very hot oven until firm.

The pieces of bread should be just thick slices from stale bread, cut as large as possible; make an inner ring with a sharp knife, and leave a little at the bottom. For seasoning, a safe rule is half a saltspoon salt and a dash of pepper to each egg. If more seasoning is desired it can be added individually at the table.

The eggs on toast make a pretty combination and a dainty food for convalescents, invalids and children. If they

do not care for eggs in the usual form it may give them an appetite to see this attractive arrangement.

Question—How long does it take to cook them?

Miss Clarke—It depends upon the oven. Four minutes is a good average. The time will vary from three to six minutes, according to the heat.

Question—Is the egg to be cooked before the cream is put on, or after?

Miss Clarke—After; lay it on the egg when it is first put on the bread and then return to the oven.

One of the golden rules for cooking is to taste for seasoning. It is a good scheme to have a little cooking spoon pocket in your apron to slip your tasting spoon into, so that you will not need to hunt for it.

Golden-Rod Eggs.

Recipe—Make a sauce with one tablespoon butter, one tablespoon flour, one cup milk, and season with $\frac{1}{2}$ teaspoon salt and $\frac{1}{4}$ saltspoon pepper. Take two hard cooked eggs, chop the whites fine, add them to the sauce and pour over four slices of toast cut in long slips and arranged on a hot platter. Rub the yolks of the two eggs through a coarse strainer over the top, and garnish with parsley, arranged to suggest stems and leaves.

You remember how we made our drawn butter sauce yesterday. You can apply the same principle to make the white sauce for golden-rod eggs. When your sauce has been brought to the boiling point it can be set one side, over hot water, until ready to use. While preparing the sauce the eggs should cook, and the whites and yolks can then be separated. If cooked after the directions given for breakfast eggs the whites will be firm and in excellent condition for chopping, and the yolks will be dry and mealy.

Question—Which do you prefer, black or white pepper?

Miss Clarke—Black pepper is ground with the outer coating and white pepper has this coating removed before grinding; that is the only difference.

Pretty Poached Eggs.

Beat the whites very stiff, adding a little salt; turn it into a buttered cup or deep saucer, lay the whole yolk gently on top and set the dish in a pan of boiling water. Cover and let cook two minutes. Sprinkle a dash of pepper on top before serving.

Or, Place the dish in a hot oven and bake until a delicate brown.

This is known in French as Œufs au Lit—Eggs in a Bed. That does not sound very well, and as we do not use French, we will call them Pretty Poached Eggs.

Here is an egg separator that works well. I think it superior to any invention I have ever tried. A curved partition holds the yolk unbroken at one side of this glass cup, while the white drains through a funnel shaped hole in the bottom into another dish. After the eggs are separated the whites are beaten very stiff, with a saltspoon of salt and a dash of pepper; turn them into a baking dish that has been thoroughly buttered. It is worth while to prepare this in a larger platter if you are going to make many, because it takes so much room if you poach many eggs.

Question—How do you know when whites are stiff enough?

Miss Clarke—The first stage is when it sticks to the beater; the second when you turn the bowl upside down and they will not slide out; and the final test is when little bits fly from the beater.

Another way to cook these pretty poached eggs is to place them in the steamer instead of in hot water; the

yolk is placed on the beaten white, making a nest, as before, and you have golden yolks reposing upon a mountain of beaten white. You can also place the dish in a hot oven and bake until a delicate brown.

Egg Timbales, or Savory Custard.

Recipe—Use six eggs, $1\frac{1}{2}$ cups milk one teaspoon salt, $\frac{1}{4}$ teaspoon pepper, fifteen drops onion juice, one teaspoon chopped parsley; mix like custard and bake in a dish or in cups. Serve with tomato sauce made like the drawn butter of Lesson 1, but using strained tomato instead of water.

For this I want to call your attention to the proportions, for it is much easier when you have analyzed the formula: 1 egg to each $\frac{1}{4}$ cup milk, and salt, pepper, onion juice, and parsley to taste. This should be treated exactly like a plain sweet custard. The eggs are not beaten very light, simply thoroughly broken. The onion juice can very readily be taken out by pressing the onion on a sharp grater.

Question—Do you chop the parsley fine?

Miss Clarke—No, not too fine; you want to have it show enough to look pretty, as well as taste good.

This timbale can be baked in one large dish or in individual cups. Be sure to set the cups in hot water and test exactly as you would a sweet custard, by cutting into the middle with a knife. You may serve this, if you chose, without sauce, but it is prettier with tomato sauce around the form. You may serve them with white sauce if you prefer.

The tomato sauce is made by the formula used for white sauce yesterday, using strained tomato instead of water, and adding a little onion juice for flavor.

Oyster Omelet.

Recipe—The oysters should be par-boiled and drained; the liquor from them may be strained and used instead of water to give a richer flavor to the omelet. For each egg allow one salt-
spoon salt, a dust of pepper and one tablespoon oyster liquor. Break whites and yolks separately, beating each until very light; add seasoning to the yolks and fold them into the whites, stirring as little as possible. Have the omelet pan hot, melt in it one teaspoon of butter, and cook over a quick fire until well browned on the bottom. Then set into the oven until the top is firm. Fold carefully, not to break the crust, and turn onto a hot dish. Serve at once.

The whites of eggs should be beaten very stiff, until they begin to fly, just as we did for baked eggs; the yolks should also be well beaten. Part of the oysters are put in with the omelet when it goes into the oven, and allowed to cook through in that way. The surplus oysters can be warmed with cream for a garnish.

The knack in folding an omelet lies in taking the handle of the pan with the thumb on the upper side, then a roll of the wrist turns it over. It is really very easily done.

You may vary omelets by changing the flavor. Made with meat or a sprinkle of cheese they are savory and extremely popular. If you have served roast chicken and think there is absolutely nothing left on the carcass, go over it again with patience and a sharp knife, and you can get enough delicate bits to give distinction to an omelet. If you have a few sardines left and do not know what to do with them, there will surely be enough to flavor an omelet. And so on, dozens of fragments that are worthless by themselves can be utilized for omelets.

Aside from meat flavorings some of the savory herbs can be used. If you have a plat of ground as big as a sheet you can have a corner in which chives, tarragon and a big square of parsley will grow; a little of these chopped fine will make omelets savory and delicious.

With fruits you can make a wide variety of sweet omelets. Instead of us-

ing pepper and salt for seasoning use a small amount of salt and sugar; instead of water use the juice of the fruit, and if a little pulp goes in it is all right. Take out the best of the pulp and when the omelet is done spread the pulp over it, dust with powdered sugar and garnish with slices of the fruit or green leaves.

THURSDAY AFTERNOON.

Miss Clarke—We are now ready for to-day's work, which is quite different in character from the work of yesterday and the day before. In those lessons we considered food and cooking from the standpoint of profit, pecuniary and economic—how to get the most out of an expenditure of time, money and labor. To-day we are going to cook for pleasure.

I have often heard it said that farmers' wives are unsocial; that is a libel, it is not so. They are the most sociable people alive. I know, for I have been around through these farming towns for five years, not doing so much work as this year, but more or less, and not in Wisconsin only, but in Michigan, Minnesota, Ohio, Illinois, Georgia, Massachusetts, Maine, North and South Carolina, and pretty much all over the country, and the truth is that they are most hospitable. The only trouble is that so many of them do not have facilities for getting help outside their own families, but must depend upon their own efforts for all the work involved.

Max O'Reill said, when he was in this country, "I have noticed one peculiarity in the American's hospitality, that the first course is very often a roasted hostess." Let us not have this true any longer. All we want, all we need, is to

bring brains to bear upon our daily work, and then to entertain friends will not be such a burden after all. Not anywhere in this county, but occasionally way down in Milwaukee, when an entertainment has been successfully carried through there is a long breath drawn, "Well! Thank fortune that job is done." Let us not have that true with us. Of course it is sometimes a burden, but see how easily these things can be prepared.

I know you have had Mrs. Jamison with you in the past, and are well grounded in the art of bread making, in all its manifold forms of twists, rolls, etc., so that your bread is sure to be a pride and delight. So we shall not touch upon that subject this afternoon, but take up a little variation that is known in the southern part of the country as Sally Lunn, and in New England as muffins.

MUFFINS.

Recipe—One cup milk, one scant teaspoon salt, one cup water, $\frac{1}{2}$ ounce yeast dissolved in two tablespoons water, one tablespoon sugar, two tablespoons soft butter, and about four cups of flour. Beat all very thoroughly and let rise to twice its bulk, beat again, adding two eggs, well beaten. Let rise again till light, then fill muffin pan two-

thirds full. Let them rise until a little over top of the pan, then bake in a hot oven 30 minutes.

This is a light, delicate mixture. The sponge was set at ten o'clock in order to have it ready for a two o'clock lesson. With the proportion given in the recipe $\frac{1}{2}$ ounce of compressed yeast should be used. The square cakes wrapped in tinfoil are meant to weigh $\frac{1}{2}$ ounce and are each equal to $\frac{1}{2}$ cup of home-made yeast. Put the sugar into the milk with the yeast. In beating the batter and eggs together do not spare muscle. Long, hard beating is very desirable to bring it to the right texture and also to beat in a large amount of air to make the yeast growth strong and vigorous. For shortening use half butter and half lard, or all butter.

Question—Do you ever use cottolene?

Miss Clarke—The only reason I have given up using it is because it is difficult to obtain it fresh. When fresh it is sweet and delicate, but as a general thing there is not enough sale for it to enable the grocer to have it fresh, and when not fresh it is very objectionable.

Question—Is it because of the scent of cottonseed oil?

Miss Clarke—There is no scent of the cottonseed when it is fresh. I went to see cottolene manufactured in Chicago, at the Fairbanks factory, where it is refined, and where the beef fat is clarified and the two put together and sent out as cottolene. After the cottonseed oil was refined in the tank by itself I took a glass cup and dipped some up and held it out to look at. Then I tasted and smelled of it, and really there was not the slightest taste or smell of cottonseed. But as soon as cottolene is stale the cottonseed taste comes back.

Question—Isn't there always a disagreeable odor to it when it is cooking?

Miss Clarke—Not when it is fresh.

There is an odor to lard and olive oil that is objectionable to some. When you speak of agreeable or disagreeable you use the terms relatively. To some lard is nauseating, and olive oil to others is equally disagreeable.

Question—Is the milk scalded?

Miss Clarke—It is not. The yeast ferment works so much more rapidly than the lactic acid that the yeast ferment gets ahead of it.

Question—In summer time would you take the milk for the bread without scalding?

Miss Clarke—Yes, in summer time we take the milk twenty-four hours old, and if you use compressed yeast, use a large proportion of it.

Question—Do you not consider that so much yeast destroys the nutritive quality?

Miss Clarke—Not unless it is allowed to over rise. If you use a small quantity and let it rise slowly some of the yeast germs become old and give a taste of old yeast to the bread. Give a generous measure of yeast so that you will have the whole bulk growing at once, and it will give a smooth, even, fine quality, the exact texture that we are all trying to get.

Question—Would you prefer compressed yeast to home-made yeast?

Miss Clarke—I prefer it to any other I know of.

Question—Which of the dry yeasts is the best?

Miss Clarke—I do not think there is much to choose between them. Use a standard one; there are several. My experience has been with the National Yeast Co., Sea Foam. You know you can keep this yeast a long time. In the compressed yeast I have used Fleischman's yellow or red label yeasts. There may be others you are in the habit of getting here, but they all have the same directions for keeping the yeast, and if

you follow them you will be able to keep your yeast for a month or six weeks in the summer time.

I want to call your attention to the appearance of the yeast after it is proved. The cake, which was a solid mass at the bottom of the glass, and the water clear around it has risen to the top; the water is milky looking and the yeast cake lies in a mass of foam on the top of the water. If the yeast is fresh, strong and healthy, it will always come up in that way. You can either use it at once or let it stand a few minutes.

Question—Why do you put sugar in the yeast before it is dissolved?

Miss Clarke—To hasten the process of fermentation, we put yeast with starch and water to make a dough and at once there begins a certain chemical process; an infinitesimal quantity of the starch of the flour is converted into sugar, then the fermenting process goes on and the sugar is broken into its elements of alcohol and carbon dioxide, or carbonic acid gas. By supplying sugar at first the same result is reached more quickly. We arrest this process of fermentation by putting into the hot oven.

Question—If bread is set in sponge over night would there be any objection to putting in a little soda to be sure it is sweet?

Miss Clarke—I am sure no Sparta housekeeper would have any occasion to put soda in her bread. That is a question I would hardly like to answer on my own account. I think it is Mrs. Ellen Richards who says there is no excuse for sour bread, but if it should happen through carelessness or any other way that the bread is sour; by all means bake it as it is. Sour bread is not necessarily unwholesome, although it is unpalatable. Our German friends in their fatherland prefer sour bread; the black rye bread is always slightly

sour. And the Russians, where the wheat is the richest in the world in gluten and phosphates, always make their bread with leaven; in South Holland the bread is invariably sour. It is unwholesome to put soda in our food as a matter of habit. To obviate the possibility of having sour bread I would set in the morning rather than over night.

Let me refer you to the work Mrs. Jamison has done in bread making. You will find it in the Farmers' Institute Bulletins for 1896-7-8. A helpful discussion for making potato yeast, tea rolls and fancy bread will also be found in these books.

Question—What is leaven?

Miss Clarke—Leaven is bread dough which has already fermented once; you remember the woman who had the two measures of meal in which she hid the leaven and the leaven leavened the whole. In some countries it is still customary to reserve a part of the dough and bury it in the flour to keep until needed to raise the dough for the next baking. It spreads from one portion to the other until the whole mass is permeated with it. It is not yeast, but it is nearly akin to salt-rising bread.

In making muffins the flour should not vary much from a cup of flour for each one-half cup of wetting, and it should be sifted once before measuring. Use the wetting just the ordinary temperature of the room. Yeast is a plant and should be treated just like any other plant, giving it heat, air, etc. The temperature in winter time should be 60 to 70 degrees; in summer 70 degrees is none too hot. If kept too warm your plant will have a weak growth, not strong and vigorous; if below, the growth will be stunted.

Question—Is bread made in daylight entirely, better than that made at night?

Miss Clarke—We watch it more closely if made in the daytime; if set over night it is apt to become chilled. There is no care taken of it until early morning, and there are all sorts of variations of temperature to which the sponge is subjected. How many have ever found a sponge over raised in the morning? How many have ever found a sponge not quite ready in the morning? If set in the daytime it is watched more closely, and is kept growing. The beating of the sponge is largely for adding air. A great deal of air is beaten in.

Question—Do you set sponge hard or soft?

Miss Clarke—If I am going to make a plain loaf bread my preference is to set the sponge stiff at once, but for fancy breads, rolls, sticks, etc., it is a little easier to handle if the sponge is soft at first and stiffened for the second rising.

Question—Do you think it is the kneading or the beating that affects the grain?

Miss Clarke—It is the kneading that gives a fine grain. The beating is solely and entirely for two purposes; one is to beat in the air and the second is to have the yeast thoroughly incorporated.

Question—When you knead bread hard do you let it stand over night?

Miss Clarke—Never, if I can help it.

Question—At what time would you set bread in the morning, and at what time should it be baked?

Miss Clarke—It would depend upon the size of the loaves how long it would take to bake them. If you set it at 5:30 you can have it out of the oven at 11:30. Smaller loaves will bake in 45 to 50 minutes.

The only fault I have to find with bread baking in Wisconsin is that they do not bake it enough. Starch is diffi-

cult of digestion and requires thorough cooking; no matter how long you bake a loaf the inside never gets above 212 degrees, and rarely ever gets over 180 to 190. At that temperature it does not cook thoroughly. If you have two loaves in a dripping pan you will often find they are a little under done in the center. Try the experiment once or twice of baking each loaf in a separate pan; make them a little smaller and see how your bread will be. Some flours need more cooking than others. The hard Minnesota and Dakota wheats will take twice or three times as long as the soft flours of the Middle and Southern States; you must allow for this fact. I had occasion to compare some flour with one of the Minnesota flours. I found that the Minnesota flour requires just six measures of flour to one of wetting to make bread and make it just right; the flour I bought in Kentucky required nine measures of flour to one of wetting. The spring wheat flours require to be made quite soft.

Question—Do patent brands require more baking?

Miss Clarke—I think so. On general principles I would say that the new process patent flours require more kneading and more baking.

Cranberries.

Recipe—Pick over, wash and put to cook in barely enough water to show between the berries. Cover them and let them boil till every berry is surely cracked, opening often to shake them. Add a scant cup of sugar to every pint of berries, boil gently uncovered for twenty minutes, then turn into a cold wet mold to harden.

The question of how much water is needed to cook cranberries has always been a troublesome one until this winter, when we experimented and found

that if you put in cold water until the berries just float clear from the bottom by pressing down with a spoon it will be the right amount; the water should just come to the edge of the spoon. I think you will find this a safe guide, and it is a convenient thing to know.

Just as soon as the berries have all cracked add the sugar. Do not stir them; just give them a little shake so as to distribute the sugar and break the crust. Then let them simmer or boil gently for twenty minutes by the clock. Then turn into a form wet in cold water, and set away. It takes about two or three hours to become as firm as it should be.

Imperial Cake.

Recipe—Make ready $\frac{1}{2}$ pound raisins seeded and cut in bits, $\frac{1}{2}$ cup walnut meats cut small, $\frac{1}{2}$ cup diced citron, $\frac{1}{2}$ pound flour with $\frac{1}{4}$ teaspoon soda sifted in it. Grate the rind of $\frac{1}{2}$ lemon in $\frac{1}{2}$ pound of sugar. Cream $\frac{1}{2}$ pound butter and work the sugar into it, adding one by one the yolks of five eggs and two teaspoons lemon juice. Beat five egg whites stiff and whip them in with the flour, reserving part of the flour to dust the fruit, which should be added last. Bake in sheets about one inch thick, or in one large loaf.

If you will be so good as to analyze the proportion of materials used in this cake I think you will recognize an old friend. If you want to have comfort in creaming butter warm the bowl well inside and not from the outside. The butter and sugar should be whipped to a cream, adding the yolks one at a time, so that the friction of the butter and sugar will work them light.

There is no flavoring in lemon juice, only acid; it is the rind that gives the flavor. I prefer to use the fresh lemon rather than the extract. In baking

cake we depend upon the eggs for lightness. Add part of the white of the egg, then flour, then the rest of the egg, then the rest of the flour.

Do you all put your flour and eggs for all kinds of cake together in this way? I like it; it is a very convenient way, and very satisfactory in results.

Question—Does stirring one way make any difference in the lightness of cake?

Miss Clarke—I have never observed that it did.

Red litmus paper is used to test alkali; put a piece of this red litmus paper in the white of egg and see how quickly it changes color. In two minutes it will turn a purplish blue, showing there is a strong alkaline reaction. In the five eggs in this cake there is almost enough alkali to raise the cake in connection with the air that is beaten in. You put in the acid of the lemon juice but that is not quite enough to balance, therefore we add one-fourth of a teaspoonful of soda, sifted into the dry flour. Three teaspoonfuls of lemon juice will usually balance that amount of material. Sometimes if the eggs are very large you may need to use four teaspoonfuls; if small, perhaps two teaspoonfuls will be enough.

Question—What is pastry flour?

Miss Clarke—It is flour which contains the largest possible percentage of starch and the smallest percentage of gluten. It is also prepared a little differently in the milling process. I wish I had time to discuss this subject of flour more fully, but I must hurry on to the other preparations on our bill of fare.

Question—Do you consider it of any importance to hurry a cake through?

Miss Clarke—Yes, I do. After the eggs have been beaten they should be added to the cake and put in the oven as soon as convenient.

Casserole of Chicken.

Recipe—Pick over one cup rice, wash and steam in two cups of water till very tender. Use while still warm to line a one quart pudding pan or mold, which must be well buttered. Have ready 1½ pints cold cooked chicken, cut in half inch dice, lightly seasoned with salt, pepper, and red pepper or paprika. Prepare a white sauce like the one in the first lesson, but using one-half cream and one-half chicken broth, instead of water. Taste for seasoning before packing it into the rice-lined form, cover with the remainder of the rice and steam 45 minutes. Let it stand ten minutes before turning out on a platter. A part of the sauce may be reserved to pour around the casserole, or it can be served with tomato sauce.

Someone asked for a definition of casserole. Roughly stated, it is a preparation of meat or fish, enclosed in a wall of some vegetable and steamed or baked. It is similar to a meat pie, except that we have a thick layer of vegetable all around instead of a flour paste. Our vegetable in this case is boiled rice. You may substitute macaroni if you choose, or potato is very good. You may use any kind of cooked meat in a white sauce or brown sauce, or fish either freshly cooked or left over from a previous meal. It is one form of serving hash. Creamed codfish enclosed in a wall of mashed potatoes and then steamed until heated through and browned in a very hot oven is excellent. Brown meats are usually served in a brown gravy, with macaroni or rice for the vegetable.

The sauce for the chicken is made by the same formula as the white sauce of yesterday or the drawn butter of the day before, only using a different liquid for it. To one pint of chicken stock is added one pint of thin cream, coffee cream. The mold should be lined with

the cooked rice which was steamed in two cups of water until very tender. In filling the mold pack the meat down firmly so that it will not break when turned out.

Question—Do you soak the rice?

Miss Clarke—No, put boiling water to it. Do not wash unless you think it is not clean.

When you have the mold almost level full you can begin laying on the rice for the covering. That should be carefully worked in with wet fingers; you will find you can make it adhere quite closely. Make a crust of rice, not too compact, enough to enclose the meat. In using potato it is better to set the form into the oven a few minutes to brown on top. Rice does not need it.

A casserole should steam 45 minutes, and then stand ten minutes before taking from the mold. This last is not really necessary, but you will find that it comes out easier.

Apple Frappé.

Recipe—One pint apple pulp (steamed and sifted), one cup sugar boiled 10 minutes in one pint of water and poured boiling hot on one tablespoon of gelatine well soaked. Mix thoroughly, adding sugar if needed, and water to make like thick cream. Add lemon juice if it seems too sweet. Freeze as usual, but not too hard to serve in glass cups; it should be like thick mush.

There is a little confusion between a frappé and a sherbet. A frappé is a soft ice; it is never frozen very hard. It is served in glasses and eaten with a spoon, and it usually contains some of the pulp of the fruit. Sherbet is frozen as hard as cream, keeps its shape when cut, and it should never be allowed to have any of the pulp, only the juice of the fruit. It may be served with a dinner or for an afternoon entertainment. Do not freeze too hard;

you can regulate that by the percentage of salt used with the ice in freezing, and just turning occasionally, just enough to keep it stirring.

Question—Do you put in all of the pineapple, juice and pulp, in pineapple sherbet?

Miss Clarke—No, only the juice. If you use both you have neither a sherbet or frappé, but a combination of both.

I recommend adding a little salt in making ice cream, but not in sherbet or frappé. It gives piquancy to ice cream; cream like eggs needs salt to bring out the full sweetness and flavor.

Question—Do you object to putting in a little butter?

Miss Clarke—If the cream is not quite as rich as you like it you can put in butter, if carefully whipped into it.

Coffee.

Recipe—To one heaping cup of coffee ground to a medium fineness, allow one whole egg. Mix thoroughly, adding cold water to make a soft paste. Let stand closely covered an hour or more, over night if convenient. Add one quart freshly boiling water, bring to a boil as quickly as possible three times, then set over hot water to steep for at least ten minutes. It will take no harm if kept hot for two hours. This is strong enough to bear the addition of another pint of water, unless wanted for black coffee.

The first requisite in making good coffee is not after all the coffee, but the coffee pot. It seems rather dreadful to say it, but the secret of a good deal of the poor coffee about which complaint is made, is to be found in a dirty coffee pot. A coffee pot with a seam on the inside is absolutely impossible to keep chemically clean; for this reason it is well to have one that is seamless. The next best thing is a very

cheap one that you can use until it begins to show an accumulation of sediment.

Question—Of what material is the coffee pot you are using to-day?

Miss Clarke—This is aluminum. This ware is cheap enough now to be within reach of all of us. It can be kept sweet with ordinary washing and leaving it open until thoroughly dry; just before using it should be scalded out.

Having secured a flawless coffee pot I am tempted to shirk the subject of coffee, as the taste for it is as different as taste in tea and flour. In making the coffee to-day I will use five ounces, the utmost limit of my coffee pot. It is part Java and part a coffee that is called Mocha. Put this into the coffee pot and use one egg, shell and all. Shake the coffee pot vigorously, and then add as much fresh cold water as is necessary to reduce the whole to the consistency of very soft mush. On that pour one and one-half quarts of boiling water. Set this in the very hottest place on the stove. Let it boil up once, and when the froth comes to the surface give the coffee pot a swinging motion until the coffee has settled down. Repeat this three times, then put on the cover and set over boiling water to stand until you wish to serve it.

Question—About what bulk will five ounces of coffee make?

Miss Clarke—One and $\frac{1}{4}$ cups.

Question—Have you ever used the oriental coffee pot?

Miss Clarke—I don't think I have used that particular one, though I have used a great many filter pots. I think most of them are good. Filtered coffee is excellent; it has a great many qualities to recommend it. For one, the shortness of time, and because untrained and unskilled cooks can succeed in making fairly good coffee, while

made with egg after the recipe I have given, it does require some skill.

Question—What would you do when a coffee pot has become stained, dark inside? How would you clean it?

Miss Clarke—It would depend upon the material of the pot. Granite ware can be cleaned with Sapollo. A silver plated coffee pot can be cleaned with a mixture of ammonia, whiting and alcohol. Aluminum is cleaned by washing with Ivory soap and occasionally rubbing with Tripoli. If you have one of the ordinary block tin coffee pots you can cleanse a few times with wood ashes, but after a few times cleaning in this way there will still be a sediment and dark line in the seam that is impossible to get out.

Question—Do you object to soaking coffee over night?

Miss Clarke—It is a very good thing to do; it saves a great deal of the flavor of the coffee. When you add an egg for additional richness the egg prevents the coffee from parting with its flavor quite so readily. By soaking, the flavor is drawn out and you get much more benefit. If you do not want to use the full amount that one egg will moisten you can put the coffee away in a glass jar for another time.

Question—Is coffee less injurious cooked in this way?

Miss Clarke—I am not sure it makes any difference; the injurious quality lies in the alkaloid called *caffein*. It is soluble and therefore found in coffee even when made by filtering. If coffee is

hurtful there is no way of preparing it that will entirely remove its harmful qualities. Many cannot take it at all, and others cannot take milk in it.

Question—Before closing your lesson will you tell us the best way of cooking oatmeal?

Miss Clarke—There are two best ways, which are entirely different. One is the real old-fashioned Scotch way of making porridge, in which the oatmeal is stirred slowly into boiling water already salted. This is the old-fashioned oatmeal, not the prepared flakes and the commercial preparations for quick work. It should be allowed to stand on a hot surface, protected by an asbestos mat, and boiled gently, not stirring at all after the first cooking. I suppose this is the ideal way of cooking oatmeal porridge, but the busy American housewife, with gasoline stove, gas stove, big range and hot fire, has no place for slow work; it is practically out of the question, unless, perhaps, she own one of the Atkinson ovens.

The second best way is to cook it in a double boiler. If we follow the directions given on packages of commercial oatmeal, oat flakes, etc., remembering to double the time given for cooking, we shall have a very palatable dish. The long cooking makes it more delicate in flavor. Always have boiling water and always cook without stirring. It is sure death to any delicacy of texture to stir any kind of cereal. Let it cook in just enough water to swell the grain and keep its form.

FARMERS PREPARE FOR THE TWELFTH CENSUS.

The 12th census of agricultural products will be taken on June 1, 1900, but it will be of the crops of the calendar year 1899 only, and of the animals, fowls and bees on hand June 1, 1900.

The law requires the census enumerators to take the (1) acreage, (2) tenure and (3) value of every farm; (4) color of the farmer; value of (5) buildings and permanent improvements; (6) value of implements, machinery, vehicles, sleighs and harness; acreage of (7) irrigated, (8) tile-drained, (9) improved, (10) unimproved and abandoned, (11) owned and (12) leased lands; (13) cost of hired farm labor (exclusive of household service) and of (14) fertilizers; acreage, quantity and value of all (15) grain, (16) hay, (17) forage, (18) vegetable, (19) small, (20) tropic and (21) orchard fruit; (22) seed, (23) cotton, (24) rice, (25) hop, (26) hemp, (27) sugar cane, (28) sugar beet, (29) sorghum, (30) broomcorn, (31) flax and (32) nut crops; (33) nursery and (34) greenhouse stock and (35) area of crops under glass; (36) flowers and flowering and foliage plants and (37) medicinal and (38) aromatic herbs and plants.

Also the quantity and value of (39) milk, (40) cream, (41) butter, (42) cheese, (43) honey, (44) wax, (45) eggs, (46) wool, (47) mohair, (48) cider, (49) vinegar, (50) wine, (51) raisins, (52) prunes, (53) dried or evaporated fruits, (54) dried or evaporated vegetables, (55) maple, (56) cane and (57) beet sugar, (58) molasses and (59) sorghum, (60) poultry, (61) forest, (62) meat and (63) miscellaneous products, besides the numbers and values of all (64) cattle, (65) horses, (66) mules, (67) asses, (68) burros; (69) goats and (70) sheep and the numbers and values of all (71)

swine, (72) bees and (73) fowls on hand June 1, 1900, and the (74) total income from the farm during 1899.

A "farm," for census purposes, is all the land cultivated under one ownership or management, whether in a single body or separate parcels.

The farm schedule will provide for taking (75) the number of pureblood animals by breed and (76) "cows kept for milk" and (77) "cows not kept for milk," separately. It will also gather statistics of (78) home-made, while the manufactures schedule will gather statistics of (79) factory-made cheese and butter, thus separating the two.

Crops, animals and products raised, consumed, sold or on hand, and farm, crop and live-stock values will, generally speaking, be taken and classified in such a way as to give North and South, East and West, regardless of conditions, seasons or customs, a reasonably full and fair exhibit of the productive strength of the nation, if the farmers shall furnish to the enumerators the information necessary to do so.

Of course, statistics relating to age, nationality, sex, conjugal relation, education, school attendance, citizenship, profession or trade, birth-place, birth and death ratios, etc., etc., of all classes, will be taken by the Divisions of Population and Vital Statistics on separate schedules. As to manufactures of all kinds, large and small, in the city, and in the country, the census law says:

The inquiries relating to the products of manufacturing and mechanical establishments shall embrace the name and location of each establishment; character of organization, whether individual, co-operative or other form; date of commencement of operations;

character of business or kind of goods manufactured; amount of capital invested; number of proprietors, firm members, co-partners, or officers, and the amount of their salaries; number of employes, and the amount of their wages; quantity and cost of materials used in manufactures; amount of miscellaneous expenses; quantity and value of products; time in operation during the census year; character and quantity of power used, and character and number of machines employed.

But since agriculture is the backbone of the nation—the foundation of the national growth and prosperity—its products constituting the chief item of our export trade, it is of deep importance that the farming communities thoroughly co-operate to make the coming census of their wealth and output full and accurate. If they shall not, the reports thereof must necessarily be defective, and all conclusions therefrom misleading and false.

The desired completeness and accuracy, however, can not be secured by the activity of a few; it must come from the sincere and active help of the farmers and producers of the entire United States or not at all.

In order to be ready for the census enumerators, who will begin their field work on Friday, June 1, 1900, every farmer should prepare, as early as possible, a written record of his acres, crops, livestock, sales, values, etc., so that he may stand side by side in the next census reports with the business man, who, unlike most farmers, keeps a full set of books showing his transactions, profits and losses in reliable detail.

Persons in any community, especially the foreign-born, who cannot read and write the English language or do so with difficulty, should receive, through their English-reading neigh-

bors, such suggestions, information and help as will enable them to be equally well prepared to furnish the items which the census enumerator will require.

The superintendents or managers of public institutions which own or lease and cultivate lands, such as agricultural colleges; state universities; experiment stations; state and county hospitals for the insane; city and county workhouses, and houses of correction; state reform schools for boys and girls; national soldiers' homes; State soldiers' homes; Indian schools; county and town poorhouses; homes for mutes, blind and other defectives; regular army barracks; light-house keepers; co-operative communities, and so on, will be called upon to report their crops and products in detail the same as private farmers.

Tenants will be required to give the size and value of the farms they rent or lease, and the value of the improvements thereon the same as if they were owners.

Farmers who move from one farm to another between the end of the crop year 1899 and the coming of the enumerator on June 1, 1900, should preserve and take with them, for the use of the enumerator, who will call for it, a record of the crops and products of the farm cultivated during 1899. Otherwise the statistics of that farm may be lost.

Enumerators will record as "tenants" persons cultivating lands for a fixed rental; working lands "on shares"; working lands in partnership with owners for a fixed rental; working lands in partnership with owners on shares; working rented lands practically in partnership with a third party (usually the store-keeper in the South who furnishes supplies for the season) by mortgaging their crops to him in ad-

vance; purchasing mere grass or pasture privileges, etc., etc.

Those who, for census purposes, will be classed as "owners," include individuals; co-partnerships; corporations; public institutions; heirs whose property, divided and undivided, is held in trust; persons foreclosed under mortgage but holding over to redeem; persons sold out for taxes but holding over for redemption; homesteaders who have not completed the five-year period of cultivation; persons who have not "proved up" by filing final papers, or have not finished complying with the terms of the timber culture act; pre-emptors who intend to pay cash for Government lands; purchasers of land on contract for deed where some of the purchase-money installments are unpaid; occupants of "no-man's lands," or of lands in unsurveyed or mountain regions where metes and bounds are wanting; actual possessors under clouded or controverted titles, and so on.

No information gathered by census officials will be disclosed to private individuals, or assessors, or tax-collectors, or rivals in business at any stage of the work. It will be used and published

impersonally—never in connection with the name of the person or corporation to whom it relates, or by whom it was given. The law on this subject is as follows:

Section 21—That any supervisor, supervisor's clerk, enumerator, interpreter, special agent or other employe, who shall, without the authority of the Director of the Census, communicate to any person not authorized to receive the same any information gained by him in the performance of his duties, shall be deemed guilty of a misdemeanor, and upon conviction shall be fined not exceeding five hundred dollars.

The law reaches citizens as well as officers, requiring them to give to the enumerators correct and full information, as set forth in the Census Act, and provides fine and imprisonment for "wilfully neglecting or refusing" to do so.

Those wishing to make suggestions or ask for information concerning the pending census, should address the Director of the Census, Washington, D. C. Their communications will be welcome and will receive prompt attention.

INDEX TO ADVERTISERS.

	<i>Page.</i>
Acker und Gartenbau Zeitung.....	274
Agricultural Epitomist.....	282
Allen, M. T., Potatoes and Holstein Cattle.....	288
American Sheep Breeder.....	275
American Steel and Wire Co., Wire Fencing.....	Cover or 319
Arnold, A. A., Short Horn Cattle, Berkshire Swine, etc.....	300
Austin & Western Co., Road Machinery.....	313
Bradley, W. C., Jerseys, Poland Chinas, Shropshires.....	316
Breeders' Gazette.....	274
Chapman, T. A. Co., Dry Goods.....	267
Chicago & North-Western R'y.....	268, 269, 278, 279, 286, 287, 296, 297, 308, 309
Chicago, Milwaukee & St. Paul R'y.....	276, 277, 284, 285, 292, 293, 304, 305, 314, 315
Coe & Converse, Nursery Stock.....	267
Convey, Thos., Poland China Swine.....	270
Cooper, Wm., & Nephew, Sheep Dip.....	295
Cornish, Curtis & Greene, Dairy Supplies.....	301
Currie Bros., Seedsmen and Florists.....	316
Dairy and Creamery.....	282
Deering Harvester Co., Corn Binder.....	294
DeLaval Separator Co.....	Cover or 318
Dickinson Co., Albert, Seeds.....	270
Dowden Mfg. Co., Potato Diggers.....	289
Drake, H. B., Shorthorns, Poland Chinas.....	306
Farmers' Review.....	282
Farm, Stock & Home.....	275
Farmers' Voice.....	274
Fish Bros., Wagons.....	266
Fuller & Johnson Mfg. Co., Farm Implements.....	283
Fox, A. O., Shropshire Sheep.....	Cover or 320
Galbraith, Alex., Horses.....	301
Gardner & Kammerer, Shropshire Sheep.....	270
Genesee Salt Co.....	288
Hansen, Chris., Butter Color.....	316
Hoard's Dairyman.....	275
Illinois Central R'y.....	302, 303
Indiana Farmer.....	274
Minneapolis, St. Paul & St. Ste. Marie R'y.....	271
Montgomery, Ward & Co., Supply House.....	312
National Rural and Family Magazine.....	275
National Stockman and Farmer.....	282
Northwestern Agriculturalist.....	282
Ohio Farmer.....	275
Prairie Farmer.....	270
Scribner, F. H., Jersey Cattle.....	289
Skördemannen.....	274
Smalley Mfg. Co.....	307
Taylor, H. C., Jersey Cattle.....	294
Tschudy, F. & Son, Ayrshire Cattle, Chester White Swine.....	270
Vermont Farm Machinery Co., Dairy Supplies.....	317
Wallaces' Farmer.....	275
Wisconsin Central R'y.....	272, 273, 280, 281, 290, 291, 298, 299, 310, 311
Wisconsin Farmer.....	274
Wool Markets and Sheep.....	282
Wisconsin Agricultural College.....	306

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36 New Railroad Towns 36

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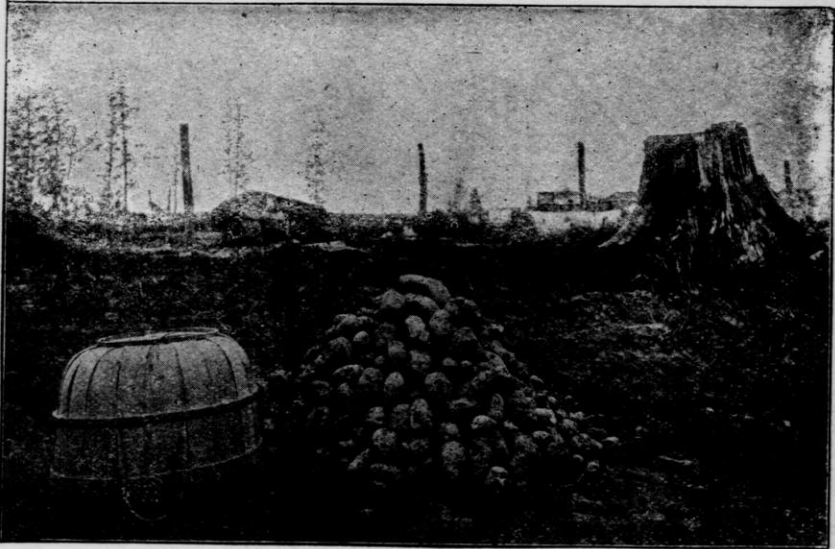
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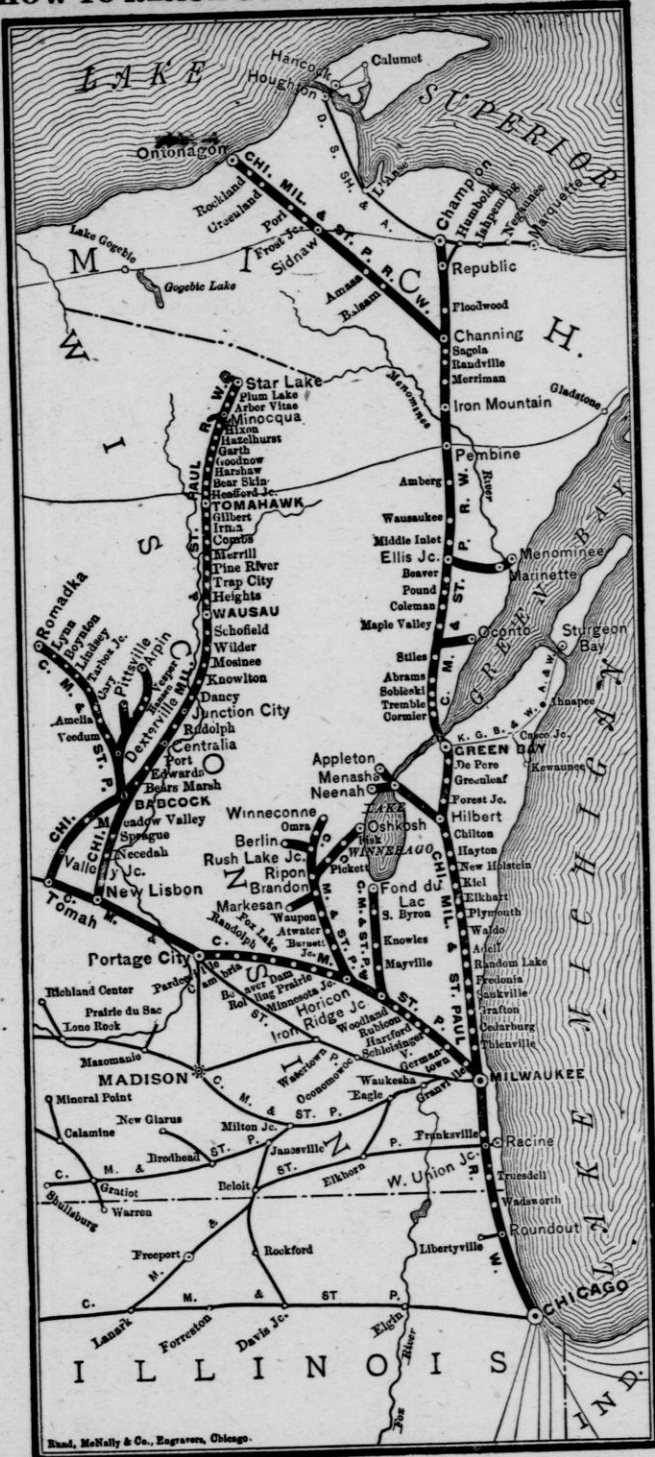
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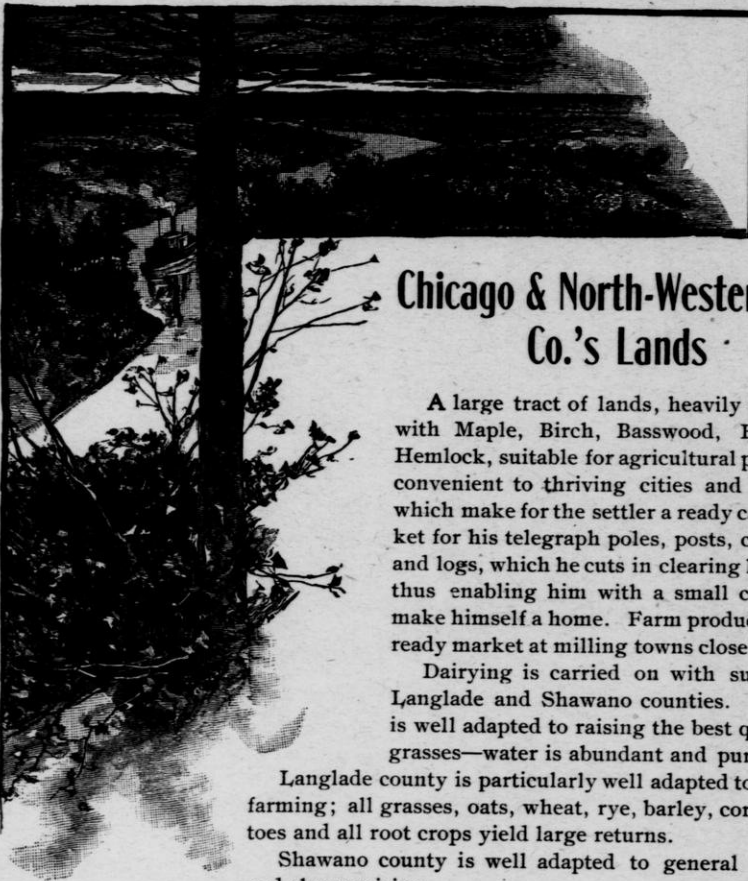
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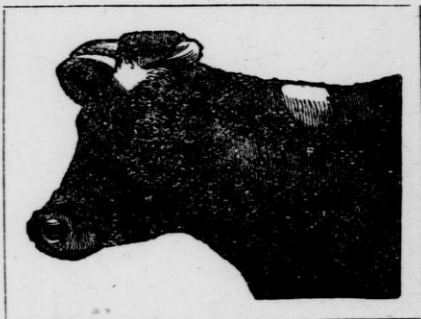
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Burbank .. Early Ohio .. Rural New Yorker .. Scotch Regent .. Ohio Jr. .. Peerless
Rutland Rose ... Early Rose ... Carman No. 3 ... Early Market
Triumph, or Stray Beauty ... White Hebron, Early,
(originated in Waupaca County)

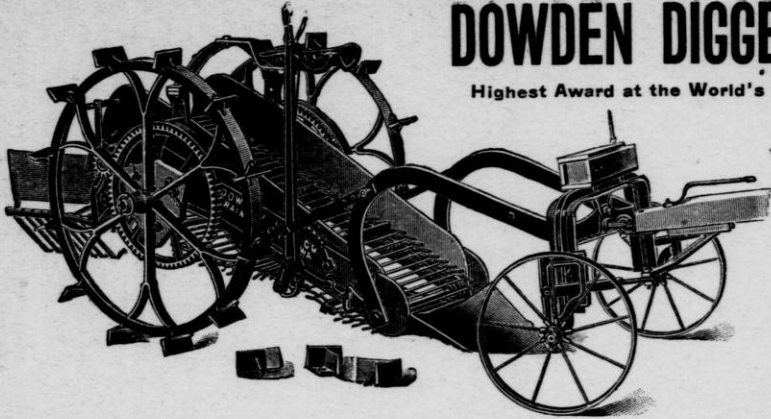
Correspondence Solicited.

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DOWDEN DIGGER

Highest Award at the World's Fair

An Elevator Digger that Cannot be Excelled.

Simple, strong and easily adjusted to any soil, and can go any depth desired. With our twenty-four-inch shovel you can be sure to get all your potatoes. Send for our 32 page catalogue.

DOWDEN MANUFACTURING CO.
PRAIRIE CITY, IOWA.

PROSPECT HILL FARM JERSEYS

No. Cows milked 1899, 24
Actual money received, . . \$2,320.82
Average per head, \$97.00

**THIS IS FOR CREAM
ALONE...**

**ARE
STILL
IN....
THE
LEAD**

**Young Stock
FOR SALE**

F. H. SCRIBNER
ROSENDALE, WIS.

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WISCONSIN CENTRAL RAILWAY

— BETWEEN —

CHICAGO

MILWAUKEE

MANITOWOC

AND —

HURLEY	IRONWOOD
BESSEMER	ASHLAND
SUPERIOR	DULUTH

JAS. C. POND..

GENERAL PASSENGER AGENT
MILWAUKEE.....WISCONSIN

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SHEEP LANDS IN NORTHERN WISCONSIN

The following is an extract from an article by COL. L. D. BURCH, editor of the "American Sheep Breeder" in the September 1899 issue of that paper:

"The region visited lies about 350 miles north of Chicago, along and tributary to the Wisconsin Central Railway, and embraces an area of about 3,500 square miles, covering the Counties of Price and Ashland and contiguous portions of Bayfield and Iron Counties. This great district forms as nearly an ideal sheep country as any the writer has seen in a quarter century of almost constant travel between the great lakes and the snowy range, and from Manitoba southward to middle Texas."

Men interested in sheep raising are requested to write for further information to

W. H. KILLEN,

Industrial Commissioner Wisconsin Central Railway Co.,

....MILWAUKEE, WIS.

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HOMES FOR TEN THOUSAND PEOPLE IN WISCONSIN.

In view of the present condition of affairs in this country it is the highest wisdom for those who have never had a farm or a home of their own, and who are dependent upon weekly wages, to make a determined effort in their own behalf and find some desirable locality where they can build a pleasant home for themselves and their children.

It has been many years since such special inducements as are now being offered served to attract the people of limited means to leave the city, where expenses multiply on every hand, and make a place for their declining years in the country. Life in town is a hard and never-ending struggle for the poor man. Wages are low, and, besides, every avenue of labor in the cities and manufacturing centers is already over-crowded. For this reason thousands can scarcely earn sufficient money to supply the actual wants of life and are, in consequence, glad to turn to agricultural pursuits.

In choosing a farm it is of primary importance to select a location that will insure for the crops a ready access to the surest and best paying markets.



A Wisconsin Cabbage.

On the western shores of Green Bay, an arm of Lake Michigan, and extending for many miles west and northwest, there is in this area hundreds of small lakes of clear water, and containing many sparkling streams that course their way down to Lake Michigan. Several years ago this entire district was an almost unbroken forest, but the axe of the lumberman has steadily cleared away the larger timber, and many fine farms have sprung up in the wake of the lumber industries. To-day there are thousands of acres of unoccupied land there, of wonderful fertility and purchaseable at a small price and on the terms suitable to those in search of homes.

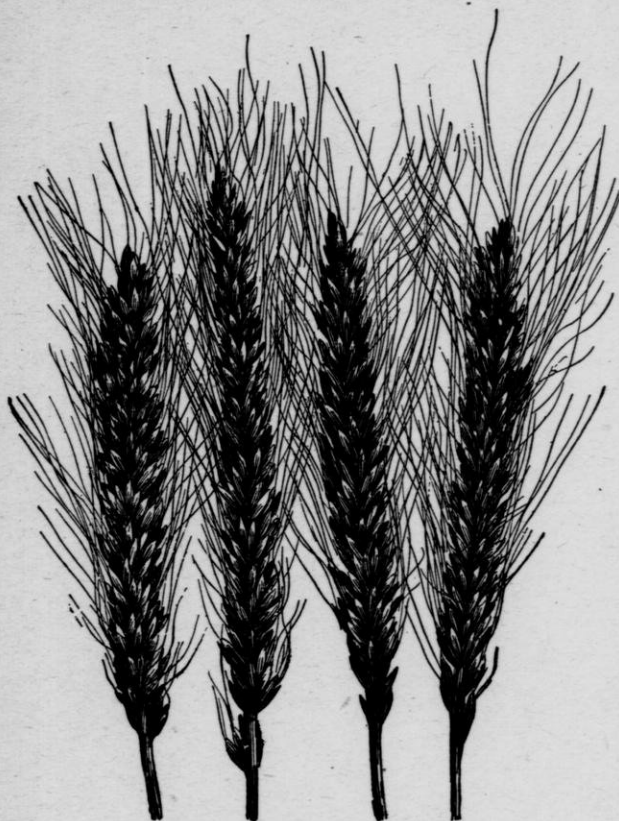
The greater part of this land had the large pine timber removed from it in earlier days, leaving the smaller timber to grow, while the hardwood, tamarack and cedar timber has been untouched, as in earlier days it was not considered worth cutting. At the present time, however, cedar is, if anything, more 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 of 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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All kinds of small fruits are raised successfully in this district, strawberries in particular growing luxuriously; and, as the location is a little north of the Michigan fruit belt, these products come into the market at a later date and, consequently bring better prices than if they were marketed during the

height of the season. Blackberries, raspberries, gooseberries, cherries and plums all yield well. The woods are full of wild berries of various kinds—blueberries, blackberries, and raspberries especially being in great abundance.

Corn, wheat, rye, barley, oats and other cereals are raised successfully. Potatoes, turnips, beets, onions and other vegetables yield abundantly, while the hay crop is probably the most profitable of any that can be raised, as the lumber camps have to ship in thousands of tons of hay annually to feed their teams working in the woods; in fact, the markets for all kinds of farm produce are of the best. For stock raising and dairy purposes there is



One of the Products of Wisconsin.

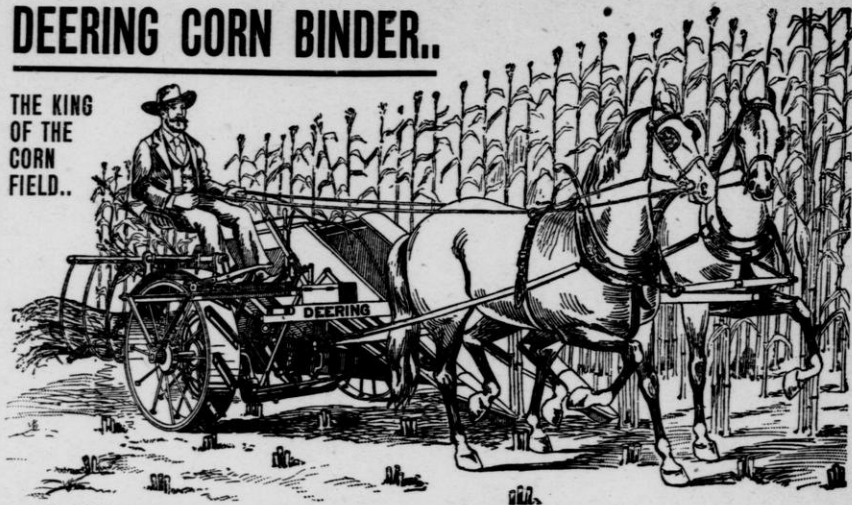
NO BETTER PLACE TO BE FOUND.

The grasses are sweet and grow luxuriantly during the summer season. Nearly everything in the way of crops can be raised in this county and all can be sold at the highest market price from the fact that the vast lumbering interests require much more farm produce than is at present produced or will be produced for many years to come. Thousands of carloads of farm products are annually shipped into this part of the country, consequently the farmer who takes advantages of this opportunity will be able for many years to dispose of his crops almost at his door at the highest city prices, without having the trouble of shipping them to the larger markets.

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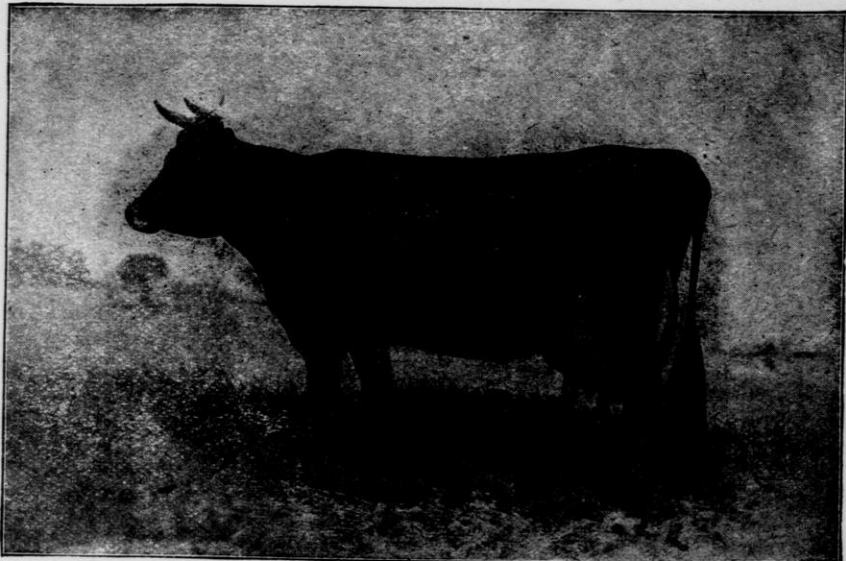
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THE KING
OF THE
CORN
FIELD..



The DEERING is the only Corn Binder that binds like a grain binder on a horizontal table.
 The DEERING has a perfect butt adjuster and can shift the band for any length of corn.
 The DEERING is light draft, equipped with roller and ball bearings throughout.
 The DEERING is perfectly balanced, free from neck weight, and has all levers within easy reach of the operator.
 The DEERING is "King of them all" in opening up a field, picking up down corn, saving the ears, making a square butted bundle and sparing the team.

DEERING HARVESTER COMPANY.. (A CO-PARTNERSHIP) Chicago, U. S. A.



TEASEL, 74,358. RECORD, 20 POUNDS, 4 OUNCES.

Only living daughter of **BROWN BESSIE**, Champion Butter Cow at the World's Fair. Full sister of
 **RECORDER, 29,239**, The Head of **THE BROWN BESSIE HERD**.....

Bred and Owned by **H. C. TAYLOR.**

BROWN BESSIE HERD, ORFORDVILLE, WIS.


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Sheepmen 'Look'!!

THE WORLD RENOWNED, UNEQUALLED & POPULAR

COOPER DIP

CURES
SCAB,
PREVENTS
DISEASE.



**KILLS TICKS
AND LICE,
IMPROVES
THE WOOL.**

Mr. Geo. McKerrow writes October 18, 1898:

"I have used your dip with the best satisfaction for the past five years. The 78 sheep shown by Geo. McKerrow & Sons at the Omaha Exposition, winning 89 prizes, over \$1,000, were all dipped with Cooper Dip. I should be perfectly willing to have you use my name as endorsing your goods, and to have you state these facts."

COOPER DIP

Puts the flock in the pink of perfection, eradicating all insects and keeping them at bay for a lengthened period.

**LEADING DIP OF THE WORLD
FOR 60 YEARS...**

**SUPERIOR TO ALL LIQUID AND
TOBACCO DIPS**

50c packet makes 25 gallons; \$2.00 packet makes 100 gallons.

INCREASES YIELD OF WOOL

If local druggist cannot supply, send \$1.75 for \$2.00 packet to

**F. S. BURCH & CO., 178 Michigan Street, Chicago,
CHAS. BAUMBACH CO., Milwaukee, Wis., or
NOYES BROS. & CUTLER, St. Paul, Minn.**

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MANUFACTURERS

Contemplating establishing plants or branch factories in the West, will find it to their interests to inquire into the many advantages offered by a location on

THE NORTH- WESTERN LINE

CHICAGO &
NORTH-WESTERN
RAILWAY



This popular Railway reaches with its 7,997 miles of road the famous
**Water Powers, Coal Fields, Iron Ore Ranges
Hard and Soft Lumber Districts**

— LOCATED IN —

**Illinois, Wisconsin, Michigan, Iowa, Minnesota, South Dakota
North Dakota, Nebraska and Wyoming**

And by traffic arrangements with other railways, 7,350 stations located on 41,000 miles of railroad (one-ninth of the entire railroad mileage of the world and one-fourth of the mileage of the United States); and has on its lines more industries than any other western railroad.

For further particulars, apply to

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PERSONALLY CONDUCTED EXCURSIONS
LEAVE CHICAGO EVERY THURSDAY

CALIFORNIA 3 IN 3 DAYS

ALL MEALS SERVED IN DINING CARS.
PALACE DRAWING - ROOM SLEEPING
CARS AND TOURIST SLEEPERS ARE RUN
THROUGH TO SAN FRANCISCO, LOS
ANGELES AND PORTLAND WITHOUT
CHANGE, LEAVING CHICAGO DAILY


— VIA THE —

NORTH-WESTERN LINE

CHICAGO & NORTH-WESTERN RAILWAY

..... VARIABLE ROUTE TOURIST TICKETS

Allowing privileges never before accorded can be obtained, together with full information, upon application to any Ticket Agent, or by writing.

W. B. KNISKERN, General Passenger and Ticket Agent  CHICAGO.

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ALONG THE LINE OF THE WISCONSIN CENTRAL RAILWAY IN NORTHERN WISCONSIN

The timber is hardwood, hemlock, elm, basswood, maple, spruce, tamarack, etc. of good quality.

The soil is a clay, loam and very productive.

The climate is unsurpassed, a healthy, dry cold in winter and plenty of rainfall in the summer.

The water is pure and in abundance.

The roads are good and there are many of them.

Schools and churches are well distributed.

Lands can be obtained at a low price and on easy terms.

Do not forget to write for Maps and Pamphlets containing further information to

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Land Commissioner Wisconsin Central Railway Co.,

....MILWAUKEE, WIS.

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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,

Land and Industrial Commissioner Wisconsin Central Railway Co.,

....MILWAUKEE, WIS.

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EASTSIDE STOCK FARM

Shorthorn Cattle
Lincoln Sheep and
Berkshire Hogs..



Also White Holland Turkeys, Peacocks 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 profitable for crossing on other breeds, quick of maturity. They stand at the top when mutton and wool are both concerned. Largest of the mutton breeds.

I like the White Holland for the reason that I can tell my own turkeys when my neighbors have dark-colored ones. They are very domestic and hardy.

I don't know that the Plymouth Rocks are any better than some other breeds, but they are good layers, of good size, so that when the minister comes around I can please him with a fine plump rooster.

Correspondence solicited.

Farm one mile from C. & N. W. depot.

ALEX. A. ARNOLD,
GALESVILLE, WIS.

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Cheese and Butter Making Machinery

—FOR THE—

CREAMERY,
CHEESE FACTORY
.....OR DAIRY

Hand and Power Separators .. Animal Tread Powers
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Send for Pasteurizing Machinery Catalogue
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(Formerly Galbraith Bros.)

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Breeder and
Importer of

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Suffolk Punch
and Hackney

HORSES



New importation of Prize Winners
arrived August 31, 1899. The largest
and best collection in the State. If
interested write for particulars.

BRANCH AT CEDAR FALLS, IOWA

T. F. MURRAY
Manager.

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Is the favorite line for

**WINTER
EXCURSIONS
SOUTH**

By its Solid Vestibuled train, the

**"Chicago and
New Orleans Limited"**



Illinois Central Railroad

You can reach Quickly and Comfortably

NEW ORLEANS

**Memphis, Vicksburg, Cairo, Jackson, Natchez,
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With connections for points in Arkansas, Texas, and the Southwest, for all points in Mexico, and for Los Angeles, San Francisco and the Pacific Coast via New Orleans, the only true Southern route.

Its Solid Vestibule Trains "The Diamond Special" and the "Daylight Special" running daily between

CHICAGO AND ST. LOUIS

Are the Very Best by which to reach

Hot Springs and Eureka Springs, Arkansas

And the Resorts of the Southwest.

The line running the "Dixie Flyer" through sleeping car line between **ST. LOUIS** and **JACKSONVILLE, FLA.**, via Nashville, Chattanooga and Atlanta.

For further particulars, address

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Between Chicago and St. Louis. Between each of the following cities—Chicago, St. Louis, Cincinnati, Louisville, Evansville—and Memphis, Vicksburg, Baton Rouge, Natchez, Jackson, New Orleans

THE CENTRAL MISSISSIPPI VALLEY ROUTE

MAINTAINS OVER ITS LINES

Fast and Efficient Through Passenger Service

Between Chicago and Rockford Dubuque, Sioux City, Sioux Falls. Between each of the following cities—Sioux City, Sioux Falls, Dubuque—and Memphis, Vicksburg, Baton Rouge, Jackson, New Orleans

Connections for all points beyond its
14 Important Gateways,
Viz.:

CHICAGO, ST. LOUIS,
NEW ORLEANS, CINCINNATI,
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DUBUQUE, CAIRO, PADUCAH,
VICKSBURG, EVANSVILLE,
MEMPHIS, SIOUX FALLS,
MADISON.

For Tickets, Rates, and all information apply to any Railroad Agent in the United States or Canada, or address the undersigned General Passenger Agent.

J. T. HARAHAH,
2d Vice-President.

T. J. HUDSON,
Traffic Manager.

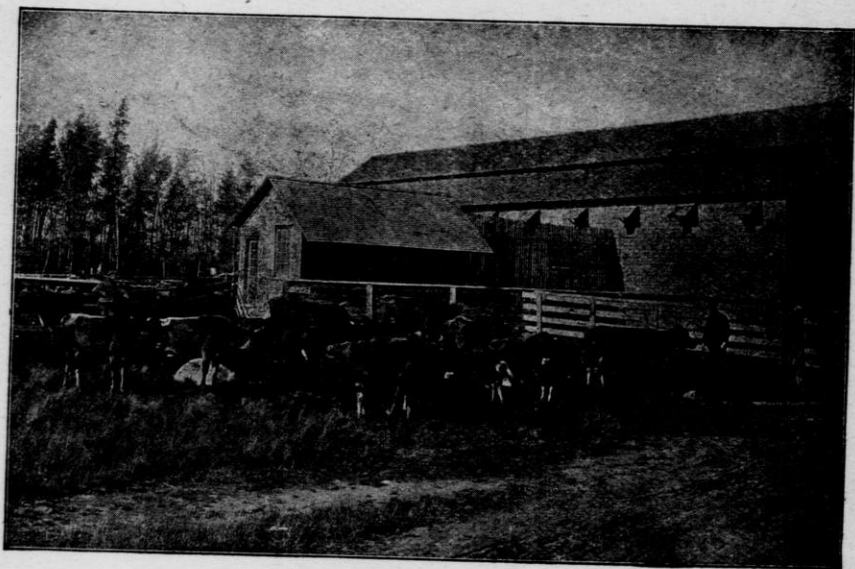
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Dairy Products in Wisconsin.

THE word "Wisconsin" in connection with creamery products is synonymous with "excellence" in the butter and cheese markets of the world. The State is fortunate in comprising among its agricultural population a large body of thorough dairy farmers from this country and Europe, conversant with the best methods and ever ready to adopt improvements. There is hardly a state in the Union where the people do more to encourage agricultural institutions bent upon promoting the spread of knowledge of correct methods.



Along the lines of the **CHICAGO, MILWAUKEE & ST. PAUL RAILWAY COMPANY** dairy farming is reaching the highest perfection.

The efforts made by Wisconsin dairymen during recent years to avail themselves of the richness which nature has bestowed upon the State have been untiring, and as a result Wisconsin butter and cheese is to-day famed far and wide. For further information, address.

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Gen'l Passenger Agent, C., M. & St. P. R'y.

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The name of the Chicago, Milwaukee & St. Paul Railway has long been identified with practical measures for the general upbuilding of its territory and the promotion of its commerce, hence manufacturers have an assurance that they will find themselves at home on the company's lines.

The Chicago, Milwaukee & St. Paul Railway Company's 6,300 miles of railway, exclusive of second track, connecting track or sidings, traverses eight states, namely:

NORTH DAKOTA.	MINNESOTA.	NORTHERN MICHIGAN.
SOUTH DAKOTA.	IOWA.	WISCONSIN.
Express Passenger Trains Fast Freight Trains Throughout	MISSOURI.	ILLINOIS.

which comprise a great Agricultural, Manufacturing and Mining territory.

The Chicago, Milwaukee & St. Paul Railway Company gives unremitting attention to the development of local traffic on its lines and, with this in view, seeks to increase the number of manufacturing plants on its system either through their creation by local enterprise or the influx of manufacturers from the East. It has all its territory districted in relation to resources, adaptability and advantages for manufacturing. Specific information furnished manufacturers in regard to suitable locations. Address,

LUIS JACKSON,

Industrial Commissioner C., M. & St. P. R'y.

660 Old Colony Bldg., Chicago, Ill.

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SHORT HORN CATTLE.

MILL BROOK STOCK FARM
REGISTERED SHORT HORN CATTLE OF THE
BEST FAMILIES



Young Hamilton 123084 by Imp. Duke of Hamilton 2d 107363 at head of herd. Choice young bulls for sale. Poland Chinas of the choicest strains. Stock well bred and good individually, for sale at prices that are right.

H. B. DRAKE

Beaver Dam, Dodge Co., Wis.

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The College of Agriculture, University of Wisconsin,
offers instruction as follows:

The Long Course, lasting four years and leading to the degree of B. S. in Agriculture. ❁ ❁ ❁ ❁ ❁ ❁ ❁ ❁ ❁ ❁

The Short Course, covering two winter terms of 14 weeks each.

The Dairy Course covering one winter term of 12 weeks.

Instruction in Agricultural Chemistry; the Physics and ❁

Mechanics of the Farm; Horticulture; Feeding, Judging

and Management of Live Stock; Veterinary Science; the

Economics of Agriculture; Farm Carpentry and Black-

smithing; Farm Bookkeeping, etc. 21 teachers; over 300

students in attendance in 1898-99. ❁ ❁ ❁ ❁ ❁ ❁ ❁ ❁ ❁ ❁

The college is maintained jointly by the United States and

the State of Wisconsin. ❁ ❁ ❁ ❁ ❁ ❁ ❁ ❁ ❁ ❁

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For illustrated circulars address

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SMALLEY

1900

Cold Weather Line

Up-to-date implements
for up-to-date farmers.

Cutters for Ensilage and Dry Fod-
der with corn shredding
and corn snapping attachments.

Badger Round Silos any size or
capacity.

Farm Powers Farm Engines, 2,
4 and 6 horse pow-
er; Tread Powers for 1, 2 and 3 horses;
Sweep Powers, 1 to 8 horses.

Wood Saws Smalley and Battle
Creek self-feed drag
saws, circular saws, and bolting mills.

Grinding Mills Single and double
gear sweep mills
for ear corn; pulley mills for small grain.

Root Cutters, Corn Shellers.

Catalogue, also silo booklet for 1900 mailed
free, with special introduction prices, if you
name this paper.

SMALLEY MFG. CO., Sole Mfrs.,
Mantowoc, Wis.

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**NO
CHANGE
OF
CARS . .**



**TO THE....
PACIFIC
COAST**

**IF YOUR TICKET READS
VIA THE...**

Chicago & North-Western Ry

First-Class and Tourist
Sleepers through with-
out change, every night
from Chicago

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FOR HOMESEEKERS' RATES

To a large number of points in Northwestern Iowa, Western Minnesota, Northern Wisconsin, Northern Michigan, North Dakota, South Dakota, Nebraska, Kansas, Colorado, Utah, Wyoming, Idaho, British Columbia, Manitoba, Montana, Oregon and Washington, call on agents.

**CHICAGO & NORTH-WESTERN
RAILWAY**

Mention "Farmers' Institute Bulletin" when writing to advertisers.

NORTHERN WISCONSIN OFFERS OPPORTUNITIES TO MEN OF MODERATE MEANS

By paying \$50.00 down a settler can get a contract for 40 acres of timbered land from the Wisconsin Central Railway Company and when clearing this tract for cultivation can pay for the same from the sale of the timber, and at the same time comfortably support his family.

There are saw mills, planing mills, stave, heading and hoop factories, and tanneries at the different stations, always offering ready employment at good wages.

The logging and bark camps pay good wages, and give opportunities for work both winter and summer to those desiring it.

A poor man who obtains a small farm in this country has every chance to get ahead.

Write for Pamphlets and Maps to

W. H. KILLEN,

Land Commissioner Wisconsin Central Railway Co.,

....MILWAUKEE, WIS.

Mention "Farmers' Institute Bulletin" when writing to advertisers.

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 LOOK-
ING FOR GOOD OPPORTUNITIES : : : : : :

Do not hesitate to write for further information to

W. H. KILLEN,

Industrial Commissioner Wisconsin Central Railway Co.,

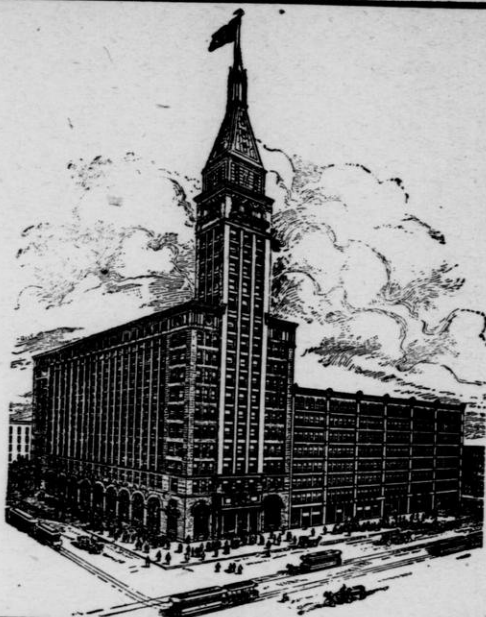
....MILWAUKEE, WIS.

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Our General Catalogue

AND

Buyers' Guide



IS THE MOST COMPLETE ISSUED BY ANY HOUSE IN THE WORLD. It has more than 16,000 illustrations, about 60,000 quotations of prices, weighs 3½ pounds, and contains nearly 1100 pages. There's nothing you wear or use but is listed in it; and the prices quoted place you in a position to buy from us, in large or small quantities, at wholesale prices. We do not sell this General Catalogue and Buyers' Guide; we give it away. Every out-of-town caller who visits our store is presented with a copy. It costs 27 cents in postage to mail it. We want you to have a copy, and will be pleased to send one to you if you'll send 15 cents to partly pay the postage or expressage. It will tell you what you should pay for everything. You will have more than a million-dollar stock of goods to select from, and when you learn what we offer goods for, and compare our prices with what you are paying, you will open your eyes in astonishment. We guarantee goods as represented. If you don't find them so, you can have your money back as soon as you want it. On request, will tell you just what your goods will cost laid down at your station.

Send for our General Catalogue and Buyers' Guide; it's the key that will open the door of prosperity for you, and will save you dollars where you spend cents to get it.

MONTGOMERY WARD & COMPANY

Michigan Avenue and Madison Streets

Originators of the
Catalogue Business

CHICAGO

Mention "Farmers' Institute Bulletin" when writing to advertisers,

How To Get Good Dirt Roads

IN YOUR TOWN, IN YOUR COUNTY, IN YOUR STATE OF WISCONSIN.

That's what you want to know, isn't it?

Gen. E. G. Harrison, the United States Government Road Expert, says that WATER is the road's greatest enemy, but

IT IS A COWARD.

It will run whenever it gets a chance.

GIVE IT A CHANCE.

Grade every foot of your roads so the water will have to run away, and

KEEP THEM GRADED,

for they won't stay that way.

Traffic wears them down. That's where they differ from stone roads. That's why they require more attention.

HOW TO DO IT?

WITH MACHINERY.

The only way it ever has or ever will be done.

You can not do it properly or economically by hand, or with plows and scoop scrapers, and if you could **it wouldn't stay done.**

A Modern Road Machine will build a perfect dirt road out of any kind of soil, on the hills or in the bottoms, and even where the rocks and roots are so thick you would think it couldn't run.

It will build it so the water **will** have to run off, and that's all there is to it.

WHAT IS BETTER STILL,

It will keep it built, which nothing else will do.

Don't wait till the road gets flat on top again and full of mud holes, **but pare off the shoulders** two or three times a year with the machine.

Don't dig up the roadbed or fill it with fresh dirt in the fall, **but cut away the shoulders,** so the water can run off.

It Can Be Done For Almost Nothing.

A machine and four horses will "dress up" ten miles of **machine-made road** in a day.

You can put this plan into operation in your own town right away,

You can have the best kind of dirt roads,

You can keep them in perfect condition,

Without waiting for town meeting,

Without raising a dollar more tax,

Without dispensing with the labor tax.

HOW?

By letting the **Road Districts** buy and own and use their own machines and **PAY FOR THEM OUT OF THEIR LABOR TAX.**

How can a district buy a machine with its labor tax?

THE WISCONSIN LEGISLATURE PROVIDED THE WAY.

It understood the importance and value of such a method, and at its last session passed such a law unanimously, and it was immediately signed by the Governor:

The districts buy on five annual payments, so each payment will be small.

They can't pay more than one-half the road tax for the machine in any one year, so that even while paying for it they will have half their tax left to use it, which will do five times as much as the whole tax will without it.

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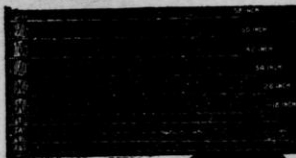
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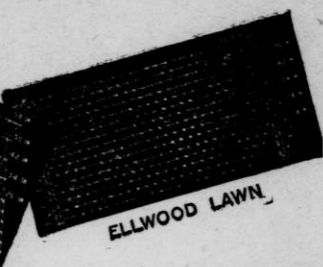
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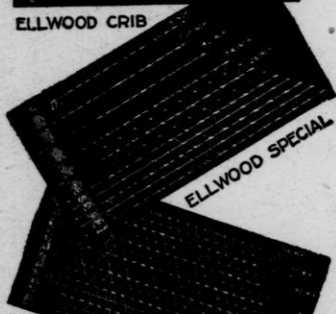
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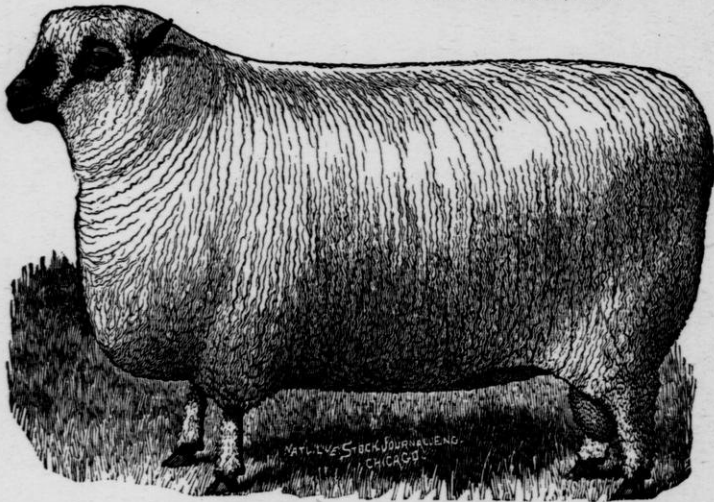
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