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Wisconsin Farmers' Institutes

Milwaukee, Wisconsin: J. H. Yewdale and Sons Co., 1908

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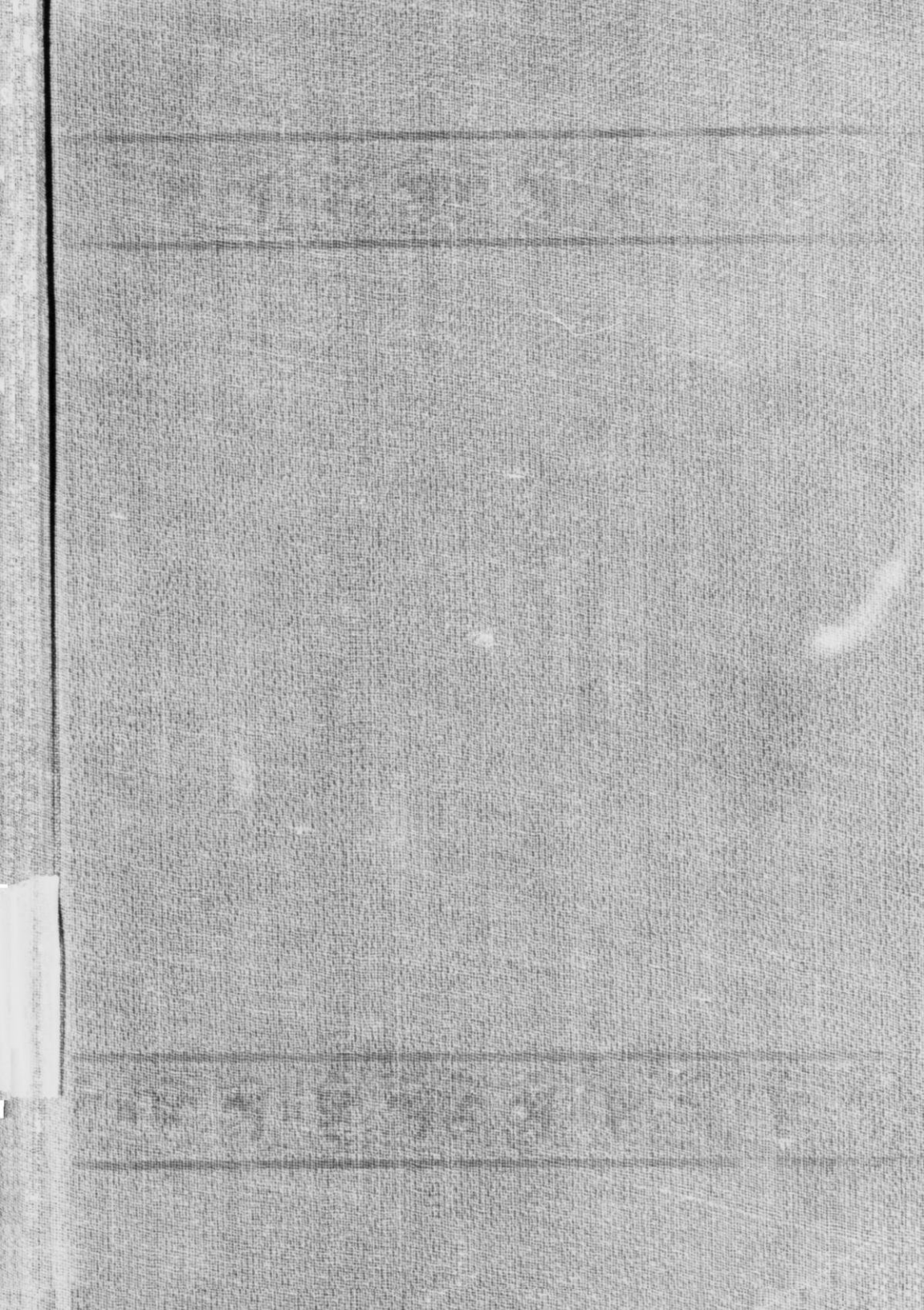
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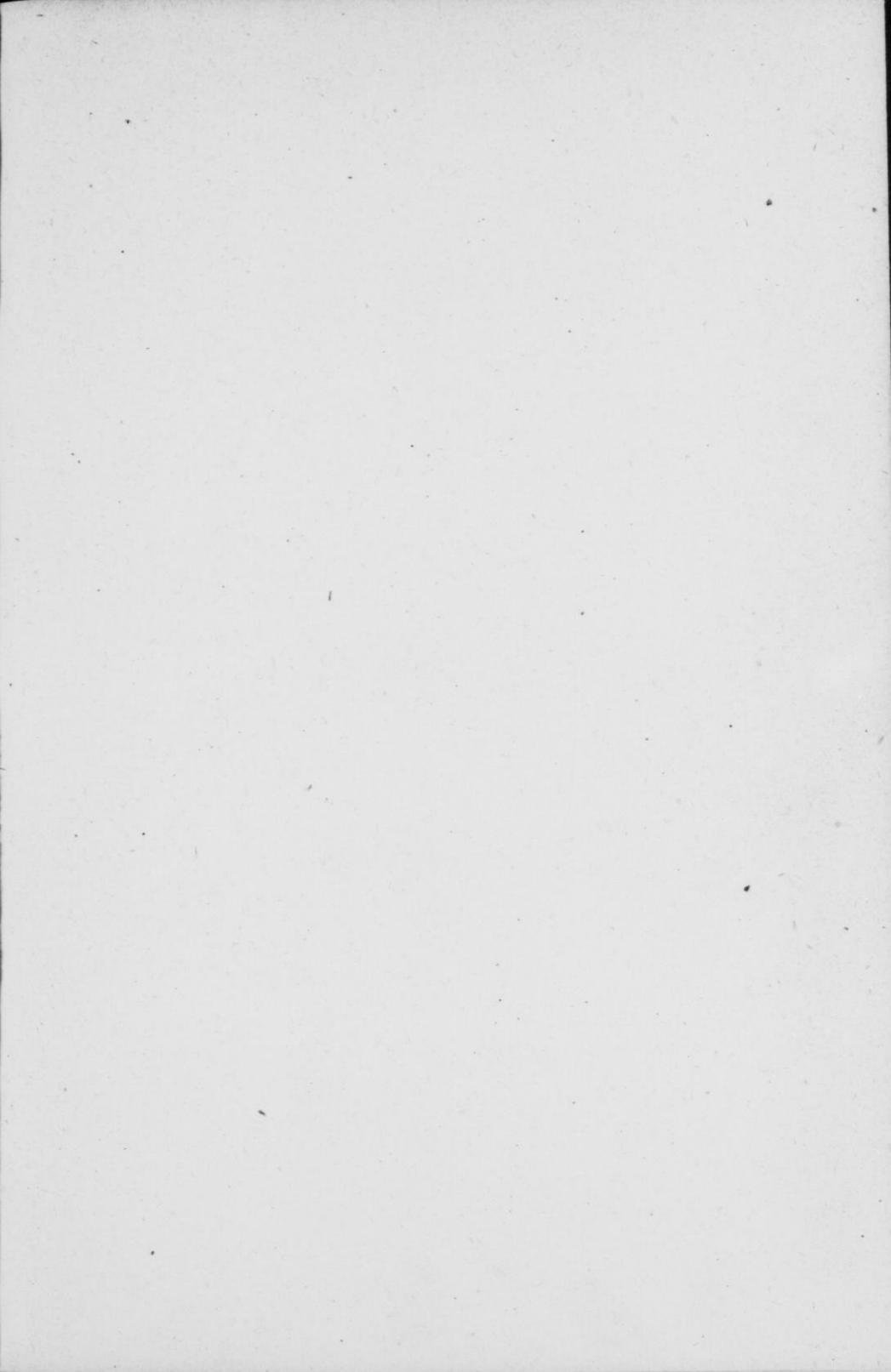
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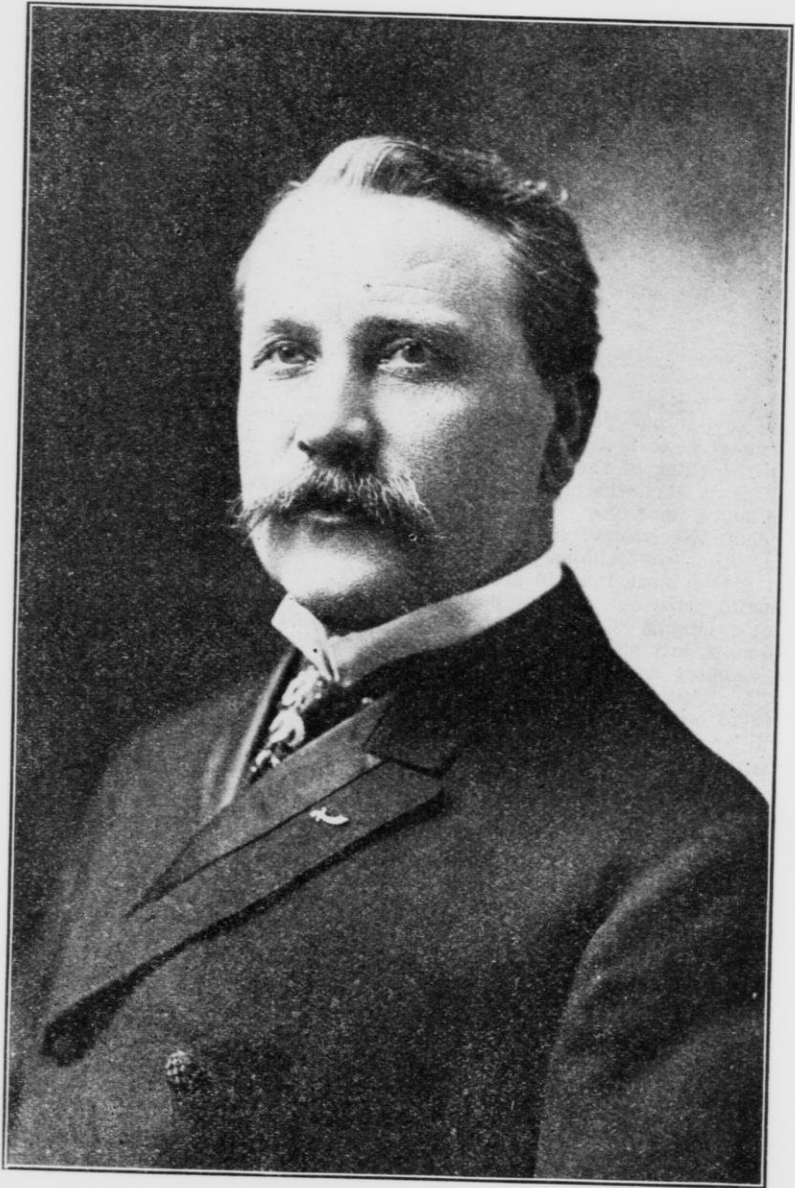
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THE FARMER AND NATION.

There is but one person whose welfare is as vital to the welfare of the whole country as is that of the wage-worker who does manual labor! and that is the tiller of the soil—the farmer. If there is one lesson taught by history it is that the permanent greatness of any State must ultimately depend more upon the character of its country populations than upon anything else. No growth of cities, no growth of wealth, can make up for a loss in either the number or character of the farming population. In the United States more than in almost any other country we should realize this and should prize our country population. When this Nation began its independent existence it was a Nation of farmers. The towns were small and for the most part mere seacoast trading and fishing ports. The chief industry of the country was agriculture, and the ordinary citizen was in some way connected with it. In every great crisis of the past a peculiar dependence has had to be placed upon the farming population; and this dependence has hitherto been justified. But it can not be justified in the future if agriculture is permitted to sink in the scale as compared with other employments. We can not afford to lose that pre-eminently typical American, the farmer who owns his own farm.—PRESIDENT ROOSEVELT.



Gov. James O. Davidson.

WISCONSIN Farmers' Institutes

A HAND-BOOK OF AGRICULTURE.



BULLETIN No. 22.
1908.

A Report of the Twenty-Second Annual Closing Farmers'
Institute, Held at Richland Center, Wisconsin,
March 17, 18, 19, 1908.

*"As years come and go industries of our country will prosper and decline,
fortunes will be made and lost, even government may change its form, but so
long as the world stands agriculture will be the foundation of national wealth
and prosperity."*

—AARON JONES.

EDITED BY
GEO. McKERROW,
SUPERINTENDENT

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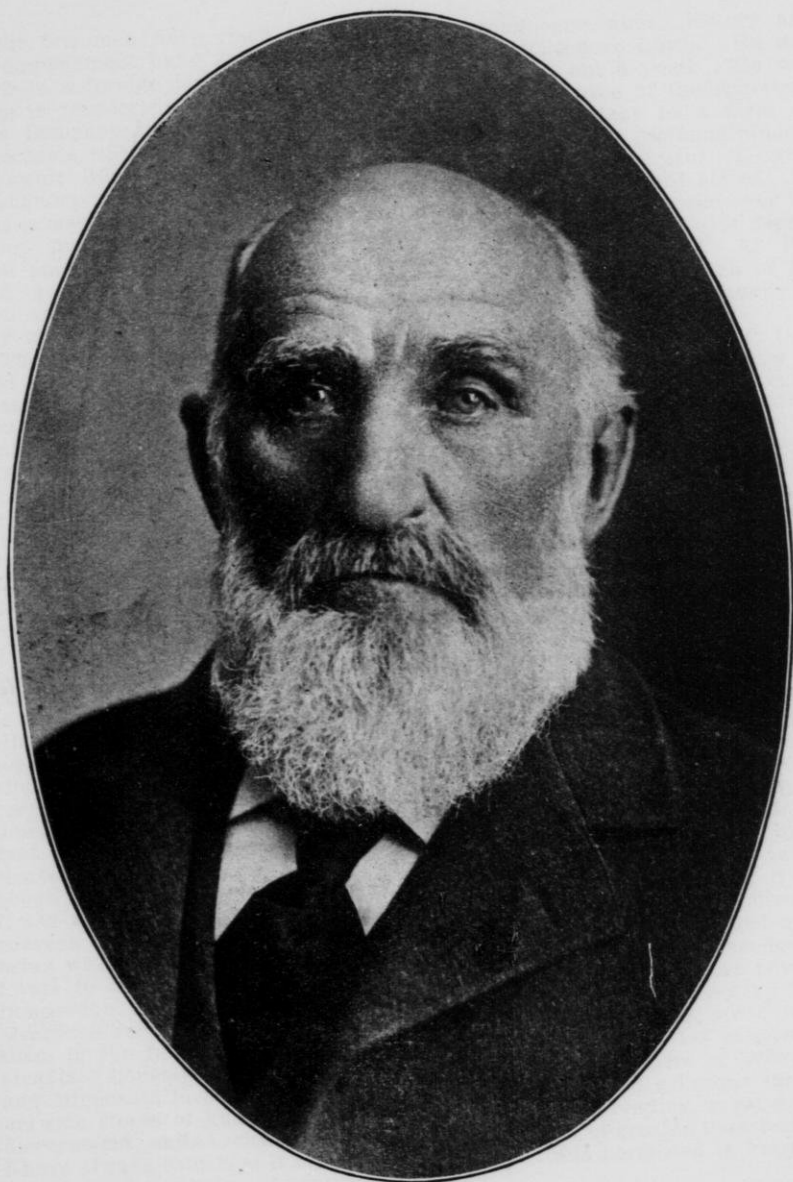
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Theodore Lewis.

LETTER OF TRANSMITTAL.

HON. W. D. HOARD,

President of the Board of Regents, University of Wisconsin:

SIR:—I have the honor of herewith presenting to you Bulletin No. 22 of Wisconsin Farmers' Institutes.

Most respectfully yours,

GEORGE MCKERROW,

Superintendent.

Madison, Wis., Nov. 19, 1908.

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MAY 25 1909

THEODORE LEWIS.

But few men have risen to agricultural prominence whose history and accomplishment have appealed to me more than Theodore Lewis. He was born in a foreign land coming to this country when but a youth. He was here in pioneer days. He was a plainsman and employee of the American Fur Company in the early fifties. He obtained his right to a farm on Wisconsin soil from the government. He became the most profound student of swine life I ever knew. He became a famous demonstrator of swine husbandry and a teacher to thousands of fellow farmers in many states. He was a man of profound knowledge, and deep insight. His influence over his fellow men was great. His life was simple, pure and honest. He feared God and loved his fellow men. His death was widely mourned. All this and more was Theodore Lewis. I cannot hope to adequately speak of the rich and beneficent life this man lived, but I am glad of the opportunity to pay my tribute to such a life.

Theodore Lewis was born at Duisburg on the Rhine, December 4, 1829, and died at the home of his faithful and loving daughter, Mrs. Ellery O. Masee, in Menomonie, Wis., November 16, 1907. He received but a scanty education in the schools of his native town; learned the trade of a silver smith between fourteen and eighteen years of age and then set sail for America. He landed in Milwaukee nearly penniless, having lost his trunk and nearly all his clothing on shipboard. He went to work in the pineries in 1848 at \$8.00 a month and walked, in the spring of that year, to Galena, Ill., where he was afterward employed for a time by U. S. Grant. Later he entered the employ of Nicholas, Prince of Nassau, who spent five years on the plains in hunting large game. He was hunter and scout for the Prince during that time and then entered the service of the American Fur Company. In 1855 he settled on a government claim in Dunn County. The town was afterward named Louisburg in his honor. To his discerning mind the rude, exhaustive system of grain growing generally practiced by the farmers of that day was greatly repellent. He saw nothing in it of hope to the soil or the farmer. After a few years of this wasteful method, he entered systematically upon the business of swine raising and made such a pronounced success of it as to attract the attention of Prof. W. A. Henry, who persuaded him to join the Farm Institute force which was just entering upon its beneficent work in 1887. Although speaking in English somewhat brokenly, so thoroughly was he saturated with his subject, so earnest, broad and intelligent was all that he said, that his talks were hailed with delight by all classes wherever he went. "There is a man who knows what he is talking about" was the universal comment. In the winter of 1895 I think it was, I was asked by the Massachusetts State Agricultural Society to deliver an address on dairying at their annual meeting in Boston. They asked me to bring with me a man who was skilled in swine husbandry. I persuaded Mr. Lewis to accompany me. When he gave his talk it made a most powerful impression and the audience plied him with questions for over an hour. Everyone recognized that a large hearted, large brained man stood before them in the full native quality of a large understanding of his subject and steadfast honesty. For years Mr. Lewis gave to the farmers of Wisconsin and Minnesota in particular, in farm institutes, a full and generous share of his rich stores of knowledge. He was a man of wide reading, great natural discernment, united with a wisdom of judgment that is greater than learning. I have always esteemed it my good fortune that I was permitted to know him for he was indeed, one of "nature's noblemen."

W. D. HOARD.

THE UNIVERSITY OF WISCONSIN.

Board of Regents.

Charles R. Van Hise, President of the University, *ex-officio*.

Charles P. Cary, State Supt. of Public Instruction, *ex-officio*.

State at Large, Magnus Swenson.

6th District, D. P. Lamereaux.

State at Large, W. D. Hoard, Pres.

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10th District, George F. Merrill.

4th District, Frederick C. Thwaites.

11th District, A. P. Nelson.

5th District, James F. Trotman.

M. E. McCaffrey, Secretary.

Organization.

The University embraces—

The College of Letters and Science.

The College of Engineering.

The College of Law.

The College of Agriculture.

The College of Medicine.

The Graduate School.

The Extension Division.

The College of Engineering embraces—

The Civil Engineering Course.

The Sanitary Engineering Course.

The Mechanical Engineering Course.

The Electrical Engineering Course.

The Applied Electrochemistry Course.

The General Engineering Course.

The Mining Engineering Course.

The College of Letters and Science embraces—

The College of Agriculture embraces—

The Experiment Station.

The Long Agricultural Course.

The Middle Agricultural Course.

The Short Agricultural Course.

The Dairy Course.

The Farmers' Institutes.

Home Economics.

General Courses in Liberal Arts.

Special Courses, which include:

Chemistry.

Commerce.

Pharmacy.

Music.

Training of Teachers.

The College of Law embraces—

A Three Years' Course.

The College of Medicine embraces—

THE FIRST TWO YEARS OF A MEDICAL COURSE.

The Extension Division embraces—

THE DEPARTMENT OF INSTRUCTION BY LECTURES.

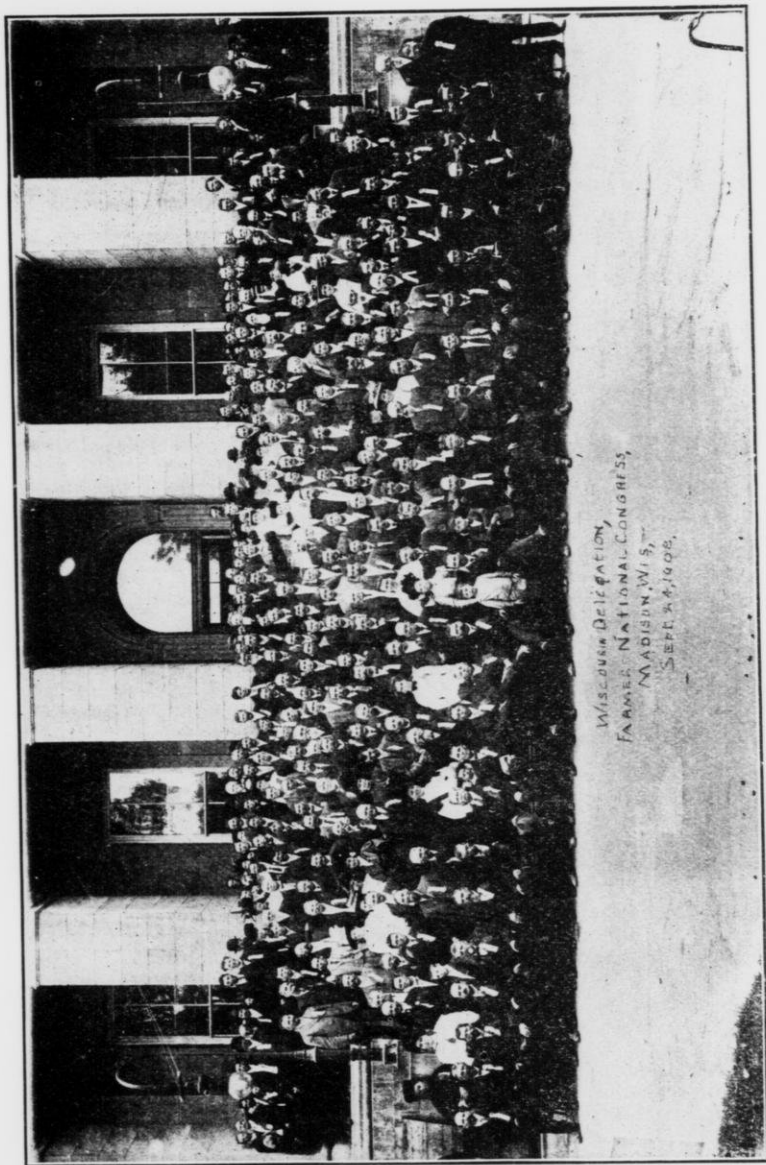
THE DEPARTMENT OF CORRESPONDENCE-STUDY.

THE DEPARTMENT OF GENERAL INFORMATION AND WELFARE.

THE DEPARTMENT OF DEBATING AND PUBLIC DISCUSSION.

Branches of Study.

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



WISCONSIN DELEGATION,
FARMERS' NATIONAL CONGRESS,
MADISON, WIS.,
SEPTEMBER 24, 1908.

Wisconsin Delegation, Farmers' National Congress, Madison, September 24, 1908.

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

Adequate accommodations are provided for the women's gymnastics by the construction of an addition to Chadbourne Hall, which has been fully equipped. This furnishes ample facilities for systematic courses for young women, and is under the immediate direction of a trained instructor. A new gymnasium is now under construction for the exclusive use of women.

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, Electrochemistry, and various forms of drawing are given; also shop work in wood, iron, brass, both hand work and machine work, machine designing, construction and testing machines.

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

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

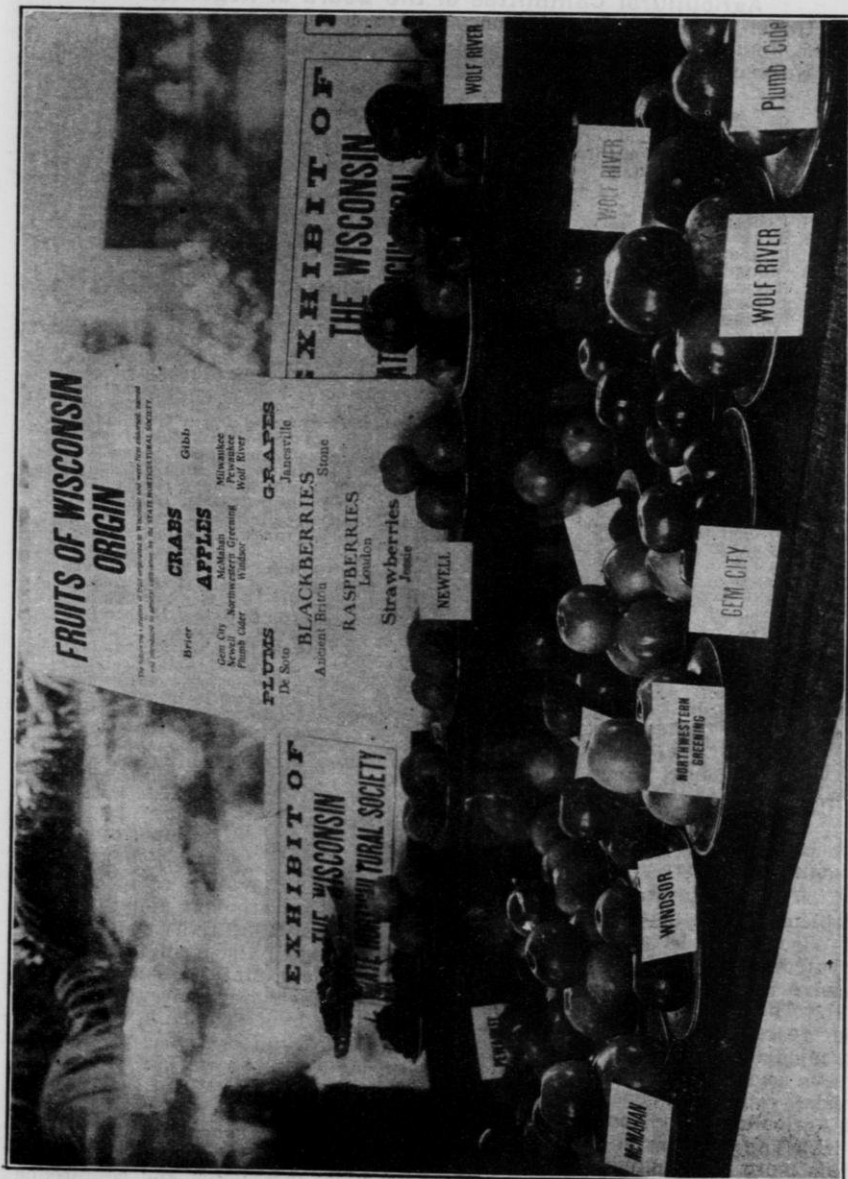
In Pharmacy:—Courses in Practical Pharmacy, Pharmaceutical Chemistry, Materia Medica, Pharmaceutical Botany and Practical Laboratory Work.

General Facilities:—The Faculty embraces three hundred and fifty-six 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, 135,000 volumes; of the State Historical Society, 295,000 volumes, including pamphlets; of the State Law Department, 45,000 volumes; of the city, 18,000 volumes, besides special professional and technical libraries, making in all more than 493,000 volumes, including pamphlets, thus affording very exceptional opportunities for reading and special research.

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

W. D. HIESTAND,
Registrar.



FRUITS OF WISCONSIN ORIGIN

The following is a list of the fruits of Wisconsin, as shown in the exhibit, and the names of the growers who raised them.

- FIVEMS**
 - De Soto
- CRABS**
 - Brier
 - Gibb
- APPLES**
 - Gen. City
 - McMahon
 - Northwestern
 - Plumb Code
 - Windsor
- GRAPES**
 - Jacquette
 - Stone
- BLACKBERRIES**
 - Albion
 - Briton
- RASPBERRIES**
 - London
- Strawberries**
 - Jessie

EXHIBIT OF
THE WISCONSIN
STATE HORTICULTURAL SOCIETY

Portion of Exhibit of Wisconsin State Horticultural Society at Wisconsin State Fair, 1908.

THE UNIVERSITY OF WISCONSIN.

COLLEGE OF AGRICULTURE.

Agricultural Committee of the Board of Regents.

W. D. HOARD, Chairman, Ft. Atkinson.	GEO. F. MERRILL, Ashland.
ENOS LL. JONES, Hillside.	ADOLPHUS P. NELSON, Grantsburg.
PLINY NORCROSS, Janesville.	PRESIDENT C. R. VAN HISE, <i>ex-officio</i> .

DEAN H. L. RUSSELL, *ex-officio*.

Officers and Instructors.

H. L. RUSSELL, <i>Dean and Director</i>	D. H. OTIS, <i>Assistant to the Dean and Associate Professor of Animal Nutrition.</i>
S. M. BABCOCK, <i>Assistant Director and Chief Chemist.</i>	IDA HERFURTH, <i>Executive Clerk.</i>
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A. S. ALEXANDER	<i>Professor of Veterinary Science.</i>
E. H. FARRINGTON	<i>Professor of Dairy Husbandry.</i>
E. B. HART	<i>Professor of Agricultural Chemistry.</i>
G. C. HUMPHREY	<i>Professor of Animal Husbandry.</i>
R. A. MOORE	<i>Professor of Agronomy.</i>
M. P. RAVENEL	<i>Professor of Bacteriology.</i>
E. P. SANDSTEN	<i>Professor of Horticulture and Economic Entomology.</i>
A. R. WHITSON	<i>Professor of Soils.</i>
F. W. WOLL	<i>Professor of Agricultural Chemistry.</i>
J. G. FULLER	<i>Assistant Professor of Animal Husbandry.</i>
E. G. HASTINGS	<i>Assistant Professor of Agricultural Bacteriology.</i>
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C. A. OCOCK	<i>Assistant Professor of Agricultural Engineering.</i>
J. L. SAMMIS	<i>Assistant Professor of Dairy Husbandry.</i>
C. W. STODDART	<i>Assistant Professor of Soils.</i>
H. C. TAYLOR	<i>Assistant Professor of Agricultural Economics.</i>
J. ACCOLA	<i>Assistant in Animal Husbandry.</i>
G. H. BENKENDORF	<i>Instructor in Dairy Husbandry.</i>
O. J. DELWICHE	<i>Assistant in Animal Husbandry.</i>
B. W. HAMMER	<i>Assistant in Agricultural Bacteriology.</i>
C. HOFFMANN	<i>Instructor in Agricultural Bacteriology.</i>
LOUISE JAHNS	<i>Assistant in Soils.</i>
E. R. JONES	<i>Instructor in Soils and Drainage.</i>
F. KLEINHEINZ	<i>Instructor in Animal Husbandry.</i>
J. C. MARQUIS	<i>Editor.</i>
G. MARTY	<i>Instructor in Dairy Husbandry.</i>
R. R. MARSHALL	<i>Assistant in Soils.</i>
M. MICHELS	<i>Assistant in Dairy Husbandry.</i>
J. G. MILWARD	<i>Instructor in Horticulture.</i>
C. P. NORGORD	<i>Instructor in Agronomy.</i>
A. J. ROGERS, JR	<i>Assistant in Horticulture.</i>
J. J. SINGLER	<i>Assistant in Agricultural Chemistry.</i>
H. STEENBOCK	<i>Assistant in Dairy Husbandry.</i>
A. L. STONE	<i>Instructor in Agronomy.</i>
W. E. TOTTINGHAM	<i>Instructor in Agricultural Chemistry.</i>
H. L. WALSTER	<i>Assistant in Soils.</i>
C. S. HEAN	<i>Librarian.</i>

Farmers' Institutes.

GEORGE MCKERROW	Superintendent.
NELLIE E. GRIFFITHS	Clerk and Stenographer.

1. The Agricultural Experiment Station is devoted to a study of agricultural problems. It is supported jointly by the general government and the State of Wisconsin. An annual report and frequent bulletins are issued and distributed free among the farmers of the State. Any Wisconsin farmer may receive these on request to Agricultural Experiment Station, Madison, Wis.

II. The College of Agriculture offers graduate instruction in agriculture, a four years' course leading to the degree of Bachelor of Science, a two years' or middle course, a short course, requiring two winter terms of fourteen weeks each, a dairy course lasting one term of twelve weeks, and a two weeks' course for busy farmers. Address Dean H. L. RUSSELL, College of Agriculture, Madison, Wis.

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



WISCONSIN FARMERS' INSTITUTE WORKERS.

Back Row: Mr. James, Mr. Coffland, Mr. Hopkins, Mr. Elliott, Mr. Martiny, Mr. Matteson, Mr. Aderhold.

Second Row: Mr. Imrie, Mrs. Kelly, Mr. Wylie, Mr. Bingham, Mr. Stiles, Mr. Bradley, Mr. Scott, Miss Cliff, Prof. Carlyle, Mrs. Armstrong, Mrs. Howie, Mr. Martin.

Third Row: Miss Allen, Mrs. Meredith, Mr. Goodrich, Gov. Davidson, Supt. McKerrow, Miss Griffiths, Mayor Keys.

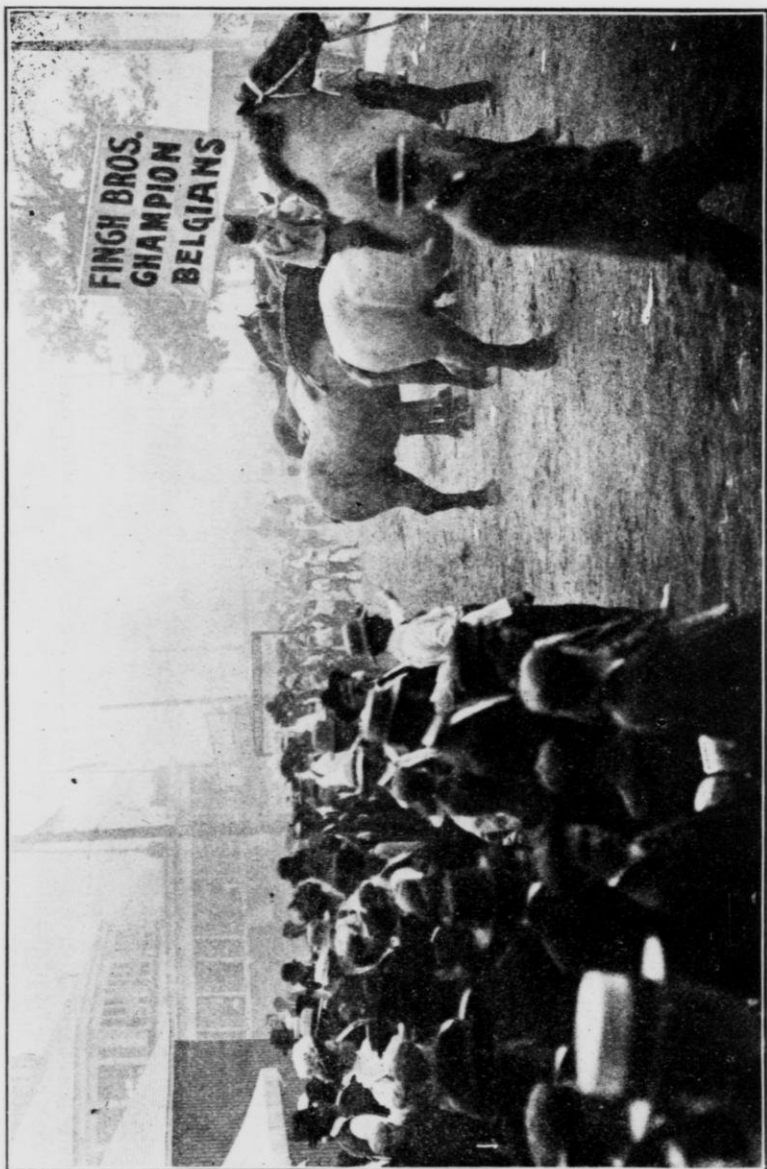
Front Row: Mr. Kirkpatrick, Mr. Griswold, Mr. McKerrow, Mr. Nordman, Mr. Scribner, Mr. Convey, Mr. Morton.

INSTITUTES, WITH DATES AND CONDUCTORS.

Date.	W. C. Bradley, Conductor.	L. E. Scott, Conductor.	F. H. Scribner, Conductor.	David Imrie, Conductor.	W. F. Stiles, Conductor.	E. Nordman, Conductor.
1908.						
December.						
8-9	Sarona	Clear Lake—	Bob Creek Hall	Frederic	Deer Park	Turtle Lake.*
10-11	Chetek	Hayward—	Flambeau	Kruger	Arland	Dresser Jct.*
15-16	Ashland*	Abbotsford	Rice Lake	Thorp—	Spencer	Plover.
17-18	Phillips*	Prentice	Bruce	Stetsonville—	Stanley	Rozellville.
1909.						
January.						
5-6	Wittenberg	Valmy	Antigo*	Coleman	Embarrass—	Cecili.
7-8	Iola	Wequiloc	Mattoon*	Harmony Cor.	Shiocton—	Suring.
12-13	West DePere—	Two Rivers*	Kiel	Sherwood	Brillon	Henrysville.
14-15	Reedsville—	Whitelaw*	Charlesburg	Cleveland	Rosecrans	Norman.
19-20	Boltonville	Salem	Fond du Lac*	Nenno	Horns Cor.	St. Cloud.—
21-22	Hales Corners	East Troy	No. Milwaukee*	Merton	Adell	Campbellsport.—
26-27	Fall Creek	Maiden Rock	Millston	Neillsville*	Glenwood—	Waumandee.
28-29	Eau Claire	Nelson	Taylor	Durand*	Eimwood—	Arcadia.
February.						
16-17	Ontario—	Coon Valley*	West Prairie	Gays Mills	West Lima	Oakdale.
18-19	West Salem—	Viroqua*	Genoa	Ferryville	Readstown	Glendale.
23-24	Woodford	Edmund	Baraboo—	Mt. Hope	Sauk City*	Arena.
25-26	Attica	Montfort	Cambridge—	Bagley	Spring Green*	Boaz.
March.						
2-3	Oregon	Browntown	Reedsburg	Brookfield*	Clinton	Parceville.—
4-5	Afton	Juda	Cottage Grove	North Prairie*	Millard	De Forest—
9-10	Fairwater—	Almond*	New Lisbon	Red Granite	Fremont	Pittsville.
11-12	Omro—	Juneau*	Endeavor	Saxeville	Hancock	Lindsey.

Twenty-third Annual Closing Institute and Cooking School, Mondovi, Buffalo Co., Wis., March 16, 17, 18, 1909.
 All inquiries relative to Institutes will be answered promptly.
 GEORGE MCKERROW, Supt.,
 Madison, Wis.

Cooking Schools conducted by Miss I. Adella Sater. (*)
 Cooking Schools conducted by Miss Edith L. Clift. (—)



Part of Horse Parade at Wisconsin State Fair, 1908.

PROCEEDINGS

OF THE

TWENTY-SECOND ANNUAL

CLOSING FARMERS' INSTITUTE

HELD AT

RICHLAND CENTER, WIS., MARCH 17, 18, 19,
1908

The opening session was called to order by Mayor J. M. Keys.
Prayer was offered by Rev. J. J. Wilson, of Richland Center.

ADDRESS OF WELCOME.

Mayor J. M. Keys, Richland Center,
Wis.



Mayor Keys.

The hour has arrived for the opening session of this much talked of Closing Institute for 1908, and it seems that the time-honored custom has been adhered to of asking the Mayor to make the opening address. I have often wondered why this custom so universally obtains, and have made up my mind that it must be for one of two reasons, either it must be purely out of respect to that particular office without regard to the fitness or qualification of the incumbent to make good, or it may be from the prevailing opinion that any one having held the office for any length of time must necessarily have become so thoroughly seasoned and accustomed to grief that he can stand punishment of almost any variety, even to acting

in the capacity of ice breaker for the speakers who are to follow him, but if any of the speakers who follow me today are considering the question from this standpoint, they are liable to get left, for I want to tell you right now that I am not going to break long enough or hit hard enough to crack very much of a channel in the ice.

It is certainly gratifying to note the many evidences on every hand that this meeting is going to be a great, big success; in fact its success was assured from the very day that Superintendent McKerrow announced that Richland county had been honored and Richland Center chosen as the place in which this meeting was to be held. The splendid exhibit that is now being arranged in every part of this building and up at the Woman's Department in the Woodman Hall, and this great ingathering of the people again demonstrate that the people of Richland county can always be depended upon when anything really large is required of them.

Ladies and gentlemen, I know of no better way of briefly expressing myself this morning than by offering a few congratulations. First, I want to congratulate the people of Richland county on the fact that a few of her wide-awake and enterprising citizens made up their minds last fall that Richland county was justly entitled to the honors of this Institute and they went to work in a business-like way and finally succeeded in pulling down the much coveted plum, and I want to assure the management of this great Institute work that every citizen of Richland county fully appreciates the honor conferred, and I believe they will, by their large attendance, manifest interest and hearty welcome extended, convince you that the honor has been most worthily bestowed. And I want to congratulate Superin-

tendent McKerrow and his associates on their good judgment in honoring so good a county as Richland county in choosing Richland Center as the place in which to hold this meeting. I am not in the habit of leaving myself out when good things are being passed around, especially when I am doing the passing myself. For that reason I am going to congratulate myself that I was born and raised upon a farm and that I can speak to you from a personal knowledge when I tell you I know of the joys and pleasures, and vicissitudes as well, of farm life, and pioneer farm life at that, for I have been a Richland county farmer for a great many years. It is now fifty years since I commenced handling milk on a long and well approved plan on a good farm down in the town of Buenavista, and although I left the home farm when I became of age, I have ever tried to keep in touch with the agricultural development of my own state, and especially in touch with the agricultural development of my own county, and there has not been a day since I left the home farm that I have been fully divorced from farm life and farm interests, and I am now looking forward, yes, anxiously looking forward to the passing of the next few weeks, when, free from all official cares, I can more fully enjoy again riding the pastures to inspect the sheep and cattle as they graze the tender blue grass which we all know the showers and sunshine of April and May will surely bring us.

I want to remind our home people this morning that upon this occasion we have the pleasure and privilege of extending a welcome to the largest and most distinguished company of guests who have ever assembled in our county. We not only have the very best talent and foremost advocates of advanced methods in agri-

culture and improved methods in live stock breeding in our own state, but we have like representatives from other states and Canada as well; a company of some forty Institute workers alone, composed of men and women who have not only made a name for themselves throughout the length and breadth of our great country, but many whose names are equally well known in every country of the globe where improved methods in agriculture and improved live stock feeding are known.

We have a distinguished guest with us today from a far-off western state, one whom we may well claim as our own, he having spent several years of his younger manhood as professor of animal husbandry in our own great College of Agriculture, and he pays us the honor of a visit today as Dean of the College of Agriculture of that splendid progressive state of the west—Colorado. I hardly need remind this audience that there are but few names more familiar in the agricultural households of our own commonwealth than that of W. L. Carlyle.

We have drawn upon a great agricultural state of the east, a state that produces almost everything from presidents and good preachers down to buckeyes and mulberries. We have drawn upon her for that indefatigable worker and writer whose graphic pen pictures of the many most interesting localities he has visited in our own country and the many countries of the old world have for years been a delight to the many readers of "The Breeders' Gazette" in Richland county, and how we all have enjoyed those matchless photographs from that wonderful camera of his. What a privilege it will be to meet him face to face and hear Joseph E. Wing himself tell us of Woodland Farm and his success with that most wonderful of all forage plants—alfalfa.

We all extend a most cordial greeting to Canada's representative at the meeting, Mr. Andrew Elliott of Galt. Although Mr. Elliott comes to us from a great country differing in form of government to our own, yet it is a great country with many interests in common with our own; in fact, we are one great common country with many interests in common, only differing as to forms of government and that high tariff fence of our own building, and that, you know, is liable to come down at any time, for in the event of democratic success in the coming contest we all know it will come down instanter, except for the ground rails, which will be left for revenue only. And just think of it, even our republican friends, yes, even a large majority of our present Congress, say they are not only willing but even anxious to take all these fences down, or at least take off several of the top wires, and are only waiting for "Uncle Joe" Cannon to give his consent, but I notice "Uncle Joe" is "It", for the time being at least, and when delegations of manufacturers, delegations from our great Union Stock Yards, live stock associations, and even delegates of newspaper publishers go down to Washington to plead with "Uncle Joe" to let them take these fences down, he smiles serenely, takes them to one side, and says: "Boys, look here, don't you know this tariff question is a H-E-L-L of a great, big question," and he still smokes up. Now, don't any of you dare to roast me for making this crack at "Uncle Joe" Cannon, for it is not of my own manufacture; it was only yesterday that I was reading this in a good, orthodox republican newspaper.

Time forbids my making individual mention of all the Institute workers we will have with us on this occasion. They are all worthy; our Wisconsin

workers most worthy of all, and I will only say the fact of their being here and their names appearing on these programs is sufficient guaranty that they are all men and women qualified to speak to you with a practical and technical knowledge of the topics assigned to them.

Tomorrow we will be honored with the presence of Governor Davidson and staff, and ex-Governor Hoard. I know the Governor's many friends and admirers in all parties in the county will be delighted to meet him. We all know of Governor Hoard; many of us know him personally, and all who do also know that there never was nor never will be but one Governor Hoard, for the simple reason that when his Creator had finally gotten him shaped up to his entire liking he found he didn't have the least little bit of that particular brand of good material left. I know his many friends in Richland county, and especially old friends of early Institute days will be greatly pleased to again have the pleasure of meeting him and hearing him speak.

On behalf of the local committee that arranged for this Institute, we have but little in the way of apology to make, except we all deeply deplore that we haven't an adequate audience room in our city.

Right here let me digress long enough to say a few words to our home people in this connection, and this is for home consumption only. I trust the manifest need of an adequate audience room on this occasion will be brought home to you so forcefully and pointedly that it may hasten the day when our city can rejoice in having an audience room in keeping with our commodious churches, our splendid schools, and our many well established business enterprises. My fellow citizens, this one fact I want to bring home to you with all the

force and emphasis at my command. The one outstanding, paramount need of our city today is a safe and commodious auditorium, and you good, sane, sensible, hard-headed business men and women ought not even dream of a public park until this long felt want has been provided for.

Our hotel accommodations are of the best as far as they go. We all know they will fall short of being adequate to this occasion, but this was generally known and expected. We have the satisfaction of knowing, however, that every Institute worker will be considered a thrice welcome guest in any of our pleasant homes, and I know you will find as many pleasant and well appointed homes in Richland Center as you will find in any city of our size on the face of the universe, and a hospitality that is unexcelled.

On behalf of this committee we extend our thanks and appreciation to the press and citizens of Richland Center for the splendid moral and financial support they have given this enterprise. We have all had to do with providing for enterprises of a like nature in our city in the past and have never known the people to give so freely and liberally as they have in this instance. I honestly believe had we asked for twice or thrice the amount of contributions they would have been as cheerfully and freely given.

In conclusion, on behalf of the good men and women, not only of Richland Center but of Richland county as well, I extend to one and all a most cordial welcome, and with pleasure present to this splendid audience Superintendent George McKerrow, now and for many years past President of our great State Board of Agriculture, and for the past fifteen years or more Superintendent of this splendid Institute work in our state.

RESPONSE TO ADDRESS OF WELCOME.

Supt. George McKerrow, Madison, Wis.

While your representative was giving us this eloquent address of welcome, I felt proud that I am a farmer, I felt proud that I am a citizen of the great state of Wisconsin, and I felt very proud that I am a guest of the greatest county and the greatest city—according to his version of the story—in the great state of Wisconsin.

To you, the citizens of Richland county, I wish to say that this Mayor of yours and the other gentlemen who have worked shoulder to shoulder with him in securing this Twenty-second Closing Farmers' Institute of Wisconsin, are a persistent lot of fellows; they gave me no peace of mind for some two or three months last fall until Richland Center secured this Closing Institute, and I presume it is very largely due to their persistence that this meeting is here today. I do not regret placing this meeting at Richland Center, notwithstanding your halls and hotels are not large enough for what we hoped.

Now, in opening this meeting this morning there are a few things that I ask you to bear in mind. First, the purpose of this meeting, like the purpose of every other meeting of farmers, is that of encouraging thought; not to make big farmers of us, as some people put it, but to make thinking farmers of us. Thought is the foundation of success in every line of life. True the farmer has to dig out his success with his hands directed by his eyes, and those eyes directed by his brain. The more we think about our business the more we will know about it, and the better we know our business the better we will do it, so

the purpose of this meeting is to set us all to thinking.

Another purpose of this meeting you will please bear in mind is to produce the material that will be edited into the Twenty-second Annual Farmers' Institute Bulletin. The farmers of Wisconsin know this Bulletin; the farmers of other states know this Bulletin also. Only a few days ago I received a letter from a North Carolina farmer, in which he said he had five or six of the latest Bulletins and asked for the one issued last fall containing the report of the last Closing Institute, and he wound up his letter by saying, "If you will only have an article in the next Bulletin telling us southerners how to cure meats, rather than to buy them from Chicago, I think you will have an all-around farmers' library, covering every topic that the farmer is interested in," and, if you will notice, you will see on the program for this meeting that we are to have the meat curing subject, and then we will have the circle complete.

This is the Twenty-second Annual Closing Institute, so the Round-up Institutes of Wisconsin are of age; they reached their twenty-first birthday last year; now in the swing of their full manhood they are here in Richland county, and from the indications before me this morning and the statements of your truthful Mayor, I know this is to be a fitting Institute for the first manhood Round-up in Wisconsin.

Now, we want to ask you who are here in attendance to help to the utmost in making this meeting a success. The best part of the Wisconsin Institute is that part which we term the discussion. To make these dis-

cussions a success it requires that every man in attendance, when a question is under discussion, shall bring forth by a question or suggestion of his own experience a point along that line lying nearest to his heart and nearest to his practice, so we will ask you all to be ready and free with your questions, to keep up these discussions so we may get the most out of them. You will also see from the length of this program that the mill must be kept steadily grinding to get this grist out, and we propose to get the grist out, toll or no toll.

Mr. Mayor, we thank you for your cordial words of welcome on behalf of the citizens of this city, and we feel assured that if we behave our-

selves fairly well that you will not incarcerate us in your lockup. You did not give us the key to the city, nor the wedge, therefore we judge that your city has no key, or, on the other hand, that we who have come in from outside need no key; the doors are all open.

The Mayor—You have the whole town at your service, sir.

Supt. McKerrow—Thank you. We will now open the business of this meeting, and I will call to the chair this morning to preside over the deliberations of the forenoon session and direct the discussions, one of our old Institute workers.

Thomas Convey, of Ridgeway, Wis., called to the chair.

CROP ROTATION.

David Imrie, Roberts, Wis.

We sometimes blame the early settlers for wheat raising and for exhausting the soil of fertility, but at that time markets for other farm products were poor, roads bad, and the farms a long distance from markets, so that under the circumstances perhaps they did the best they could at that time, as wheat is a crop that can be marketed at any season of the year and always brings cash, but now, with better markets nearer the farms, and better roads, it would be folly to still raise wheat exclusively, as the continued growing of one crop year after year exhausts the elements in the soil that go to make its growth, and as wheat is a crop that is universally sold, the fertility is sold also. The aim of the farmer is to raise the largest possible crops on his farm

and still maintain the fertility of the farm. All plants differ in their feeding capacity, as one requires more of a certain element than another. Again, one feeds near the surface, being shallow rooted, while another will send its roots down deep into the subsoil, using elements that the shallow rooted plant could not reach, and by bringing these elements up and storing them in the larger roots and crown of the plants leave them where the shallow rooted plants can use them; therefore, we must follow some kind of a rotation. This will differ according to the kind of farming we are following. At the present time, especially in Wisconsin, we are live stock farmers, and in most cases dairymen. This being the case, what kind of a rotation should

we follow to keep the farm in the very highest state of fertility?

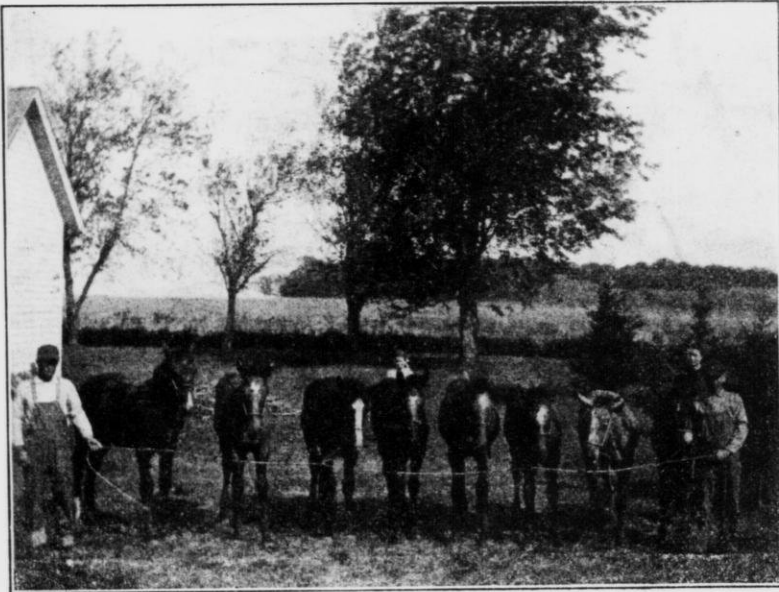
A Good Rotation.

Most dairymen keep hogs to use up the by-products from the dairy, and must have horses to work the farm, so they have a variety of stock. This being the case, they can use a great

ture, one-fourth in hay, one-fourth in small grain and one-fourth in corn.

Another Good Rotation.

Some twenty-five years ago we adopted a three-year rotation, which we like very much, having one-third of the farm in clover and grasses, one-third in corn, and the other third



Bonnie View colts of 1908, one of our regular crops.

variety of feeds. The rotation course will vary according to the amount of stock kept in proportion to the acres. If the farm is very heavily stocked, perhaps a four-year rotation is best, that is, first seeding one-half of the farm to clover and grasses, next year seed another fourth and break up one-half of the first seeding, or one-fourth of the farm, and plant corn; follow the corn with small grain and seed down again; make hay the first year from the first seeding and pasture the second year. In this way you will have one-fourth of the farm in pas-

in small grain, sowing clover and grasses with all small grain, applying the manure from the stable to the new seeding, spreading it thinly so as to cover all of the clover field, in this way getting over each field once in three years. This stimulates a good growth of clover and we know that clover is the plant that gives us something for nothing (it will beat Texas oil well stock or Grant county lead mine stock all to pieces), as it takes that most expensive element in the plant growth—nitrogen, from the air

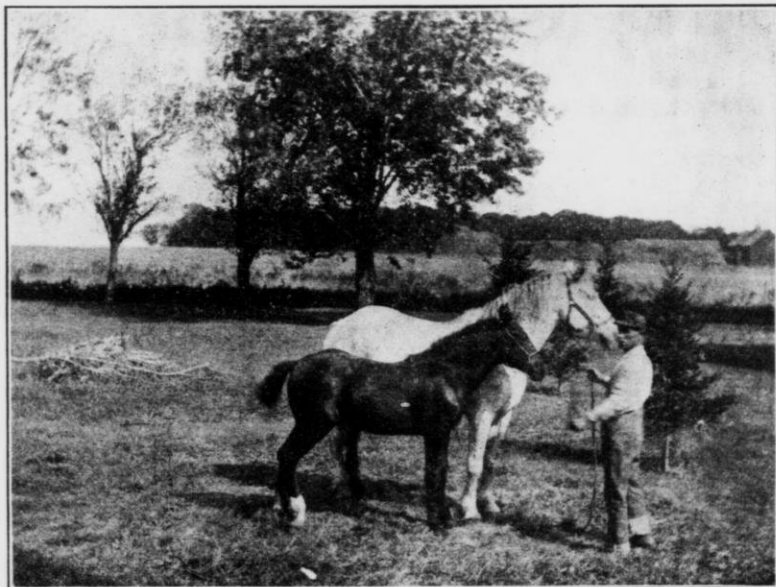
and leaves it in the soil for the use of other plants.

On the Experiment Station farm at Ottawa, Canada, mammoth clover was sown in the spring of 1894 at the rate of twelve pounds of seed per acre. It had put into the soil by May 25th of the following year 172.3 pounds of nitrogen per acre. This, at the mar-

is an ideal place to spread manure on a field of new seeding that has not been pastured the fall previous; there is a good growth of young clover and the stubble of the grain, which make a mat to receive and hold the manure.

Some Results of Systematic Rotation.

I have gone through the wheat



A good crop producer—Old Doll and her 13th colt.

ket price of nitrogen (fifteen cents per pound), amounted to \$25.84 per acre, and after this a heavy crop of hay. If this is not something for nothing I would like to know where you can get it.

Another reason why we like to apply the manure to the new seeding is that it is as far away from the oat crops as we can get it and that way the oats stand up better. And still another reason, the clover is ready to make use of the available parts of the manure as soon as the ground thaws out in the spring, thereby avoiding any great loss by washing, for it

farming stage (as a boy), and afterwards into live stock farming. At one time we had the soil pretty well depleted of the elements that wheat requires; the mechanical condition of the soil was also very bad. If plowed a little wet it was lumpy when it dried, would run together and bake after a hard rain; the humus had been worked out almost entirely; it was in such bad condition that some years it only produced ten or twelve bushels of wheat per acre and of very poor quality. We were obliged to make a change. We did so by adopting live stock farming and rotation of crops,

I afterwards bought the old farm and followed the same rotation (a three-year rotation). On the same fields that only produced ten or twelve bushels of very poor wheat per acre, we grew as high as one hundred bushels of oats and seventy bushels, or one hundred and thirty-eight baskets of corn per acre, without the use of any commercial fertilizers. Being in the dairy business and keeping a good many hogs, we bought a good deal of bran and shorts, which are both rich in elements needed for plant growth, feeding all the grain and hay raised on the farm, and returning the manure to the fields, we made this wonderful change. The soil was never lumpy after this nor baked after rains; it soon became full of humus, withstood drouth better, also wet seasons.

A rotation of crops will destroy a good many insect pests as they usually attack a particular kind of crop, and when the field is put into a different crop the following year they disappear or perish. It also helps to rid the farm of certain kinds of weeds that seem to thrive best with certain crops. It also distributes the farm work more evenly through the year.

I am satisfied after the experience I have had with several run down farms in Wisconsin that if the people will adopt a three or four-year rotation such as I have outlined we will have no abandoned, worn out farms in this state, as they have in the east.

DISCUSSION.

A Member—Do you prefer a three years' to a five years' rotation?

Mr. Imrie—In our case we prefer three years. If you have five years, would you have two small grain crops, one succeeding the other?

The Member—I would leave it longer in meadow.

Mr. Imrie—One object of our short rotation is that we want clover, and if we should leave it five years it would be timothy. You know clover is a biennial plant. We sow it this year and next year it produces a crop and then seed and that is virtually the end. You may have a little clover for a number of years, but you will probably have timothy, the second year some clover, and the third year you would have almost all timothy, unless you sowed some clover again.

Mr. Scott—Isn't there another advantage in getting over the farm more frequently with your manure? It seems to me five years would be a pretty long term to go without manure.

Mr. Imrie—Yes, I think so. If you went over the farm only once in five years, you would have to apply it a good deal heavier, and then the oats would lodge very badly.

Mr. Bradley—I think in some parts of the state you had better spread out that rotation a little, so that we don't cultivate this rough land quite so often.

The Member—I am thinking about the price of the seed.

Mr. Imrie—The price of the seed doesn't cut much figure with us in this way: The first time we cut the clover is always the heaviest crop, the difference will more than pay for the seed every year that we have to sow it. Another thing right here, first, the sod is turned under; if there is any clover gone to seed we turn that down about four inches deep, then when we plow it again in the fall we plow about an inch deeper, and there we have a lot of clover seed right on the top where it will grow the next time, so we don't have to seed as heavily as we would if we strung the rotation out further so as to have a five-year rotation.

Supt. McKerrow—Mr. Imrie, in the

question of short or long rotation when you are following clover or grass with corn, does the question of cut worms cut any figure between one year in clover and three years in clover?

Mr. Imrie—Yes, I think it would, although we have had no experience along that line, except with one field that I have, one eighty that I bought a number of years ago. It had been in June grass pasture for a long time and the cut worms destroyed the corn. We are not troubled with cut worms in our short rotation at all.

Mr. Goodrich—I believe that in this county considerable tobacco is raised. Now, where in your rotation would you bring in tobacco?

Mr. Imrie—If I were going to raise tobacco, I would raise it in a small way and bring it in after the clover crop. Perhaps it would be well, seeing you have to manure, to raise two crops. I have been in places in the state where they raised seven, eight, or nine crops of tobacco on the same piece of ground, the tobacco had taken off all that it could, and the next would be corn; oats wouldn't stand up. If I were raising tobacco, I would work it in the same as corn or potatoes.

Mr. Goodrich—I think that is right.

A Member—When would be the best time to break sod, in the fall or spring?

Mr. Imrie—With us we like it broken in the fall. We always have a good deal of work to do in the spring and if we try to do all the plowing in the spring it would put us back with our other work.

The Member—How deep would you plow?

Mr. Imrie—About four inches deep—that is, clover sod; the next time we would plow a little deeper, five or six inches, trying to get what we turn under, the humus of the clover that we turn under, and the crown of the clover plant up to the surface again.

The Member—Would it be a good plan to keep plowing it deeper until it is a foot deep?

Mr. Imrie—Not in our soil; we want to keep it right near the surface at all times.

Supt. McKerrow—What about the rotting of this manure?

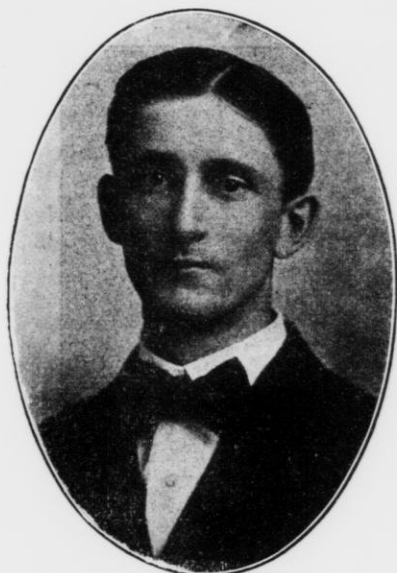
Mr. Imrie—It rots better near the surface, as everything does; a fence post rots near the surface. We want the heat and the air to help along decomposition.

Mr. Scribner—On our land we prefer the spring plowing, we like to haul out the manure during the winter and spring and turn it over. Mr. Imrie's soil is very loose prairie soil, possibly, and will pack down more through the winter.

Mr. Imrie—I hardly think there is very much difference in our soils. Ours is a very loose soil, it is clay soil. We haul the manure out during the winter and apply it to the new seeding, then in the spring there is an accumulation in the yard, so that is applied through the summer to the pasture, which is part of the corn field. We clean out the yards in the fall and that is all applied to the clover, then it is plowed under for corn the next year.

CORN: VARIETIES AND SEED.

A. L. Stone, University of Wisconsin, Madison.



Prof. Stone.

The question of varieties of corn is an important one in Wisconsin at the present time, for the best success will be obtained by using pure breeds of corn just as it is with pure breeds of live stock. The Corn Growers' Associations of the corn belt have established seven standard varieties, four of which are yellow and three white. They are of no value to Wisconsin except as they typify in their fixed type what a pure bred variety of corn is like.

Until very recently, no attempt has been made to grow any one variety in any large portion of the state. While spasmodic attempts have been made to breed and establish improved varieties, no concerted action had taken place until the organization of

the Wisconsin Agricultural Experiment Association in the winter of 1901.

With but few exceptions, the corn grown in this state was of a scrub or mixed type which had been brought in by the early settlers and repeatedly crossed.

There have been established two varieties of yellow dent corn which may now be classed as standards, bred by farmers who were far-sighted enough to see the value pure breeding would eventually have. Besides these two varieties, three have now been established by the State Experiment Station with the co-operation of the Wisconsin Experiment Association. These varieties will be taken up in the order mentioned.

Toole's North Star.

(Wisconsin No. 11.)

This variety originated as a distinct breed with the Toole Bros. at Baraboo, Sauk county, Wisconsin, and has been bred carefully and conscientiously for about twenty-six years. It now has its characteristics well fixed and is a very good variety for the southern and south central portion of the state. It yields well and ripens in about one hundred and twenty days under good conditions. It has a rich, yellow color, a good depth of kernel and fairly rough seed coat.

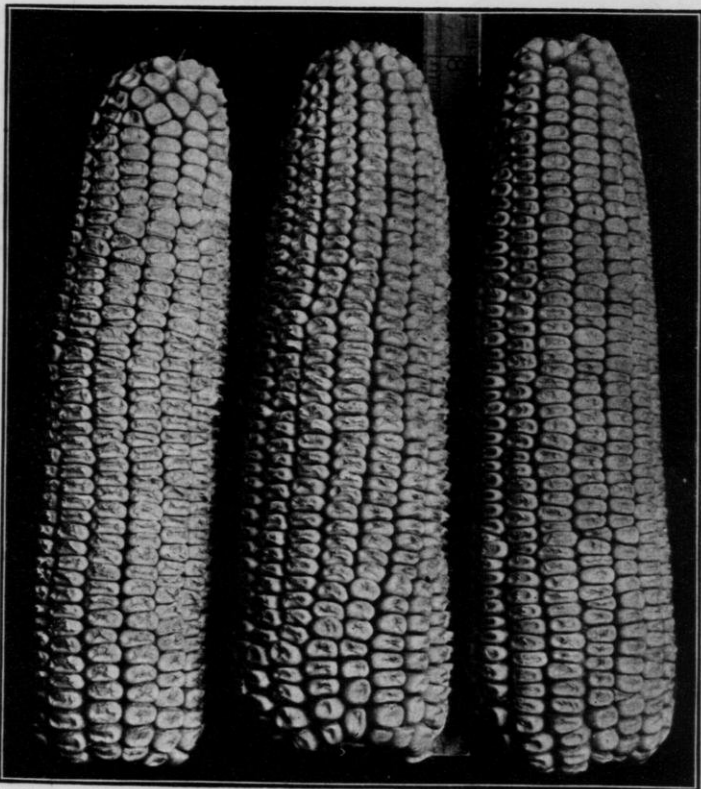
Clark's Yellow Dent.

(Wisconsin No. 1.)

Joseph Clark and Son, of White-water, Walworth county, Wisconsin, have spent several years of careful selection for a fixed type, which has

now become firmly established in this variety. It has a rougher seed coat, slightly deeper kernel, and a darker color than the Toole's North Star. It is also slightly later in maturing and is therefore better suited to the south-

Mine, one of the standard varieties of the corn belt, and Mr. Goddard did not seek to alter the type perceptibly, except to select ears with a smoother seed coat. The Silver King has the characteristic creamy color, size of



Typical Ears of Silver King (Wis. No. 7) Corn. Suitable for the southern and south central counties of Wisconsin.

ern portion of the state. Under ordinary conditions it matures in about one hundred and twenty-five days.

Silver King.

(Wisconsin No. 7.)

The Silver King is a selection made by H. L. Goddard, of Decorah, Iowa. It closely resembles the Iowa Silver

ear, and stalk of the Silver Mine, but its seed coat is not so rough and hence kernels not so deep.

It was first grown in Wisconsin in 1904 when Professor Moore of the Experiment Station, obtained from Mr. Will Banks, Burt, Iowa, seed enough to plant eighteen and one-half acres on the University Farm. The

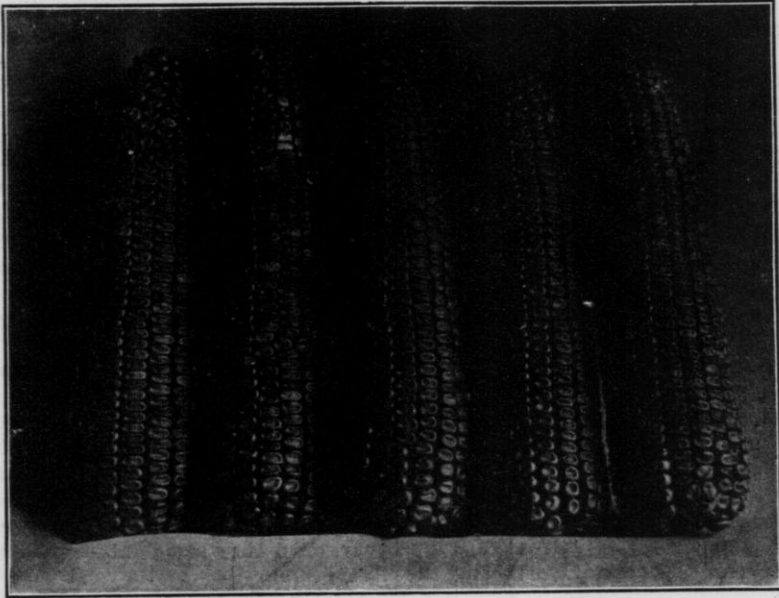
maintenance of a breeding plot and careful selection of seed from the stalk each year since its introduction had rapidly improved the yielding qualities of this variety, until now it surpasses in yield and general utility any variety grown in the state.

It is particularly suited for the southern and south central portion of

Early Yellow Dent.

(Wisconsin No. 8.)

The seed of this variety was secured from the Minnesota Experiment Station in the spring of 1904 and was there known as Minnesota No. 13. It had been bred for early maturity alone, without much attention being



Typical Ears of Early Yellow Dent (Wis. No. 8) Corn. Variety most suitable for the northern and "Lake Shore" counties of Wisconsin.

the state and has received wide dissemination through the medium of the Experiment Association. The corn is a white dent with medium sized ears, a medium rough seed coat, and as deep a kernel as its maturing period of one hundred and twenty-five days will allow. The stalks grow to a good height and being very leafy make this an excellent silage corn.

paid to other characteristics, so had no fixed type. Since its introduction into Wisconsin, however, great care has been taken to select toward a certain type and this is now becoming fairly well fixed in the corn grown at the Station Farm.

The ears are short, kernels shallow, but with a smooth to medium rough dent and a rather light color. It ma-

tures in one hundred days under most favorable conditions, and is a good variety for the northern and lake shore counties on account of its extreme earliness.

Golden Glow.

(Wisconsin No. 12.)

The Golden Glow is a cross of the Early Yellow Dent and Toole's North Star, using the Early Yellow Dent as the male parent and the North Star as the female parent. This means that all tassels were removed from the stalks of the North Star and the ears fertilized only by pollen from the alternate rows of the Early Yellow. The object of the cross was, if possible, to obtain a variety with almost the yielding power of the North Star and a maturing period approximating that of the Early Yellow.

While this variety has been grown but three years since the cross was made, a rigorous selection has greatly improved it and in the course of two or three more years a distinct type will have been established. The objects of the cross seem now to have been secured and when the type is thoroughly fixed this will make a fine variety for the central portion of the state.

These five varieties are all that at the present time may be called standard varieties for this state and are being grown extensively by members of the Experiment Association and others.

In general it may be said that the variety which will produce the greatest amount of mature corn in a given locality is the variety to grow in that locality, but it is well to be sure that the variety in question is the best one for the locality. Pedigreed or pure bred corn is as valuable in its place as is pure bred stock in its place and

just as breeders of live stock will pay more for pure bred animals, so will the farmer pay more for pure bred corn.

Seed.

There are certain important rules to be observed in regard to seed corn and its care. In the first place, every farmer should maintain a breeding plat. He should decide upon what variety is best suited to his conditions, then plant a seed plat of say twenty-eight rows, each one hundred and twenty-seven hills long. If the corn is planted three feet six inches apart each way, the above plat will contain just an acre and the yields thereof may easily be compared with those on the remainder of the field. Plant each row from a single ear, putting four kernels to the hill. This will necessitate planting by hand, as so small a quantity cannot be used in a planter.

At harvesting time it will be possible to compare the yielding power of the various ears, which to begin with, should be the best twenty-eight ears that could be selected from the available seed of the year before, or from that purchased, as you decide to use your own or some other variety. Every other row in the plat may be detasseled to prevent in-breeding to a certain extent. The detasseling should be done when the tassels are just coming out and before the anthers begin to open and discharge their pollen. Grasp the stalk firmly about a foot from the top with one hand; with the other take a firm hold on the tassel. A slight jerk will loosen the tassel and it may be removed with practically no injury to the stalk. This leaves alternate rows on which the ears must be fertilized by pollen from other stalks. All seed for the next year's breeding plat should then be selected from the heaviest yielding

detasseled rows, other things being equal. All the high grade seed from the breeding plat may be saved for use in the general field for the next year and thus the grade of seed on breeding plat and general field will both tend to improve from year to year.

In selecting seed from the rows in the breeding plat, care should be taken to select the ears directly from the stalks after the corn is thoroughly ripened but before severe frosts occur. By so doing, the size and vigor of the stalk, the length and diameter of the shank, and the position of the ear on the stalk can be noted and these are all important points. The stalk should not be too tall and clumsy, nor yet so small as to make poor silage. The shank should be medium length and not so large as to make hard husking, or so small that the wind will break off the ear and allow it to be wasted. The ear should not be too high or too low on the stalk, so it may be picked or husked without inconvenience.

The ideal place for the breeding plat is by itself, but if the neighbors insist on planting another variety, put the breeding plat either in the center of the general field, or on the corner farthest from the neighbor's field.

Not all the seed corn which it is desirable to save can always be secured from the breeding plat, or picked before it becomes necessary to cut the corn. In this case the corn should be husked, the seed corn selected and cared for before the coming of heavy frosts. No seed corn should be selected from uncovered piles which have lain in the field over night in freezing weather.

After the seed is selected, it should at once be dried carefully, either in a specially constructed corn curing room, or in any available room in which sufficient heat and ventilation

may be obtained. Of the two, the ventilation is perhaps the more important. The heat may drive the moisture from the corn, but if the moisture cannot escape, it remains in the room and real drying does not take place. In fact, instead of the corn's drying, the ideal conditions are furnished for its germination and growth and green shoots will begin to appear on the ears. On the other hand, if the ventilation is good, the moisture leaves the room as rapidly as it is driven from the corn and the seed will soon be properly cured.

Almost any room in which a small stove can be placed may be used for a drying room. A sheet iron screen should surround the stove, so the direct heat will not strike the corn. Too much heat at this stage is as bad as none at all. The corn can be placed on racks made for the purpose, or hang from the ceiling on stout cord or wire. But do not forget to have plenty of air circulating through the room.

After being thoroughly dried, the corn may be left in the drying room, or stored in some dry place. Corn absorbs moisture rapidly in damp weather, and may even become so damp that a hard freeze would injure its vitality, or perhaps destroy it completely. All trouble may be avoided by keeping a fire in the dry house during these damp spells. No matter how cold the weather, no damage will be done so long as the corn is kept perfectly dry.

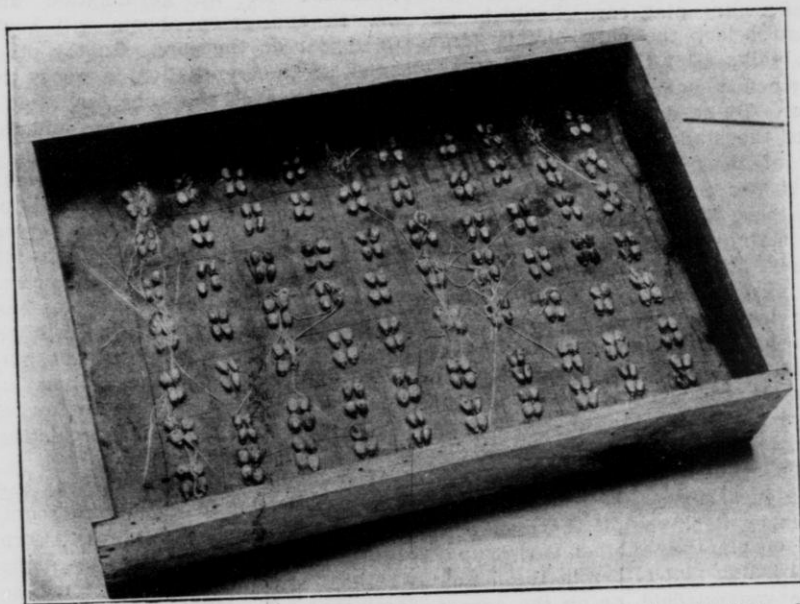
The Germination Test.

Corn cured and kept dry in this way will give a strong, vigorous germination and ordinarily would not need testing. But it is always best to make a germination test. This may be done by taking a hundred or more kernels from various ears in different portions

of the seed room and placing them in the small tester shown herewith. If some of the kernels fail to grow, it will be necessary to test every ear, and that may be done by using such a tester as is shown in the third illustration.

In this large tester, a compact bed

bered. After the squares are all covered, a flannel pad about twice as long and twice the width of the box is laid over it. Upon this is placed another layer of about two inches of well dampened sawdust, the sides of the upper pad are folded over, making a bag to hold the sawdust, and the



Large Seed Tester used in testing each ear of corn to be planted. The strength and vigor of the germination and growth determines whether to keep or discard the ear of corn.

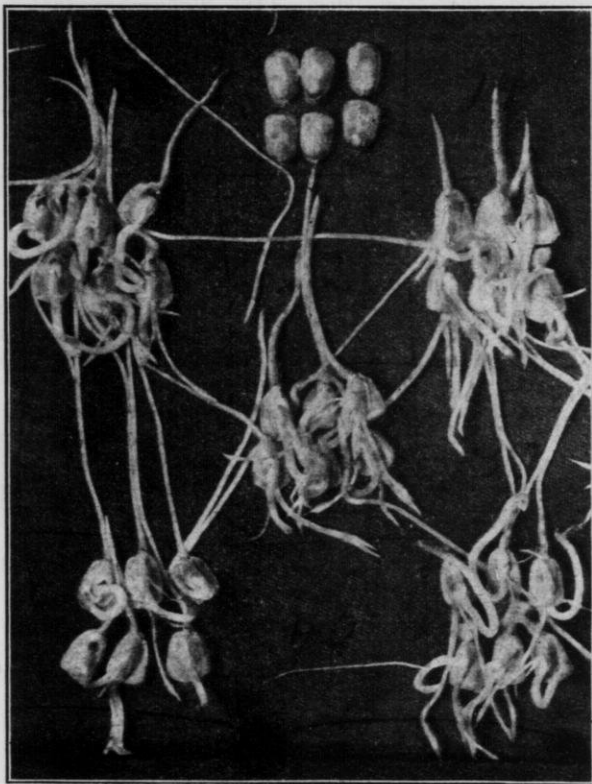
of well dampened sawdust is put in the bottom of the box. Upon this and tacked to the sides and ends of the box is a pad of heavy cotton flannel. This pad is marked off into squares large enough to hold six kernels in each. Each square is numbered and the ears to be tested are numbered to correspond with the numbers on the pad. Six kernels from tip, center and butt of each ear and from all sides of the ear are placed in the square on the pad from which the ear is num-

bered. After the squares are all covered, a flannel pad about twice as long and twice the width of the box is laid over it. Upon this is placed another layer of about two inches of well dampened sawdust, the sides of the upper pad are folded over, making a bag to hold the sawdust, and the tester is ready to set away, except for pressing the upper layer of sawdust down firmly, which should always be done. The dampened sawdust furnishes all the moisture necessary and the tester will not need attention for six days. At the end of this time, the germination should be well along and a count may be made. Any kernels which still show signs of germination may be left three days longer, but at the end of nine days the germination should be completed if

the environment has been a proper one.

While ordinary room temperature, or about seventy degrees F., is a good temperature, it may go much lower

have wide kernels and others narrow kernels. The ears should be sorted and those with wide kernels shelled by themselves. The same process should be followed with the narrow



A small section of the big tester showing the development of vigorous and weak kernels. One-sixth or 16 $\frac{2}{3}$ % of the corn has failed to germinate. Compute the loss to the farmer if the same ratio existed in his forty acre field.

than that without seriously injuring the germination.

Seed corn should be uniform in size and shape to drop the right number of kernels to the hill as many times as possible. It often happens that in the same variety some good seed ears

kernels. If the two were shelled together, they would not drop at the same rate and a poor stand of corn would result.

Planter plates should be fitted for each lot, labeled and put away ready for use at the proper time. A good

modern planter will drop four kernels to the hill ninety-six or seven times out of a hundred, where the seed has been well graded. There need be no guesswork about a stand, and therefore a good crop of corn, if these directions are followed, other conditions being favorable.

Then having chosen the variety desired, select and cure the seed with care, keep it dry, test it for germination, grade it closely, properly adjust the planter, and a good crop should result.

DISCUSSION.

Mr. Imrie—To what do you attribute the high yield in Wisconsin corn?

Prof. Stone—It is a little hard to tell. I think part of it may be due to the fact that our soils have not been cropped steadily to corn, possibly. Another thing may be that this Experiment Association has gone to work so earnestly to attempt to get better yields of corn and the reports coming in from the members of the Associa-

tion have shown that this No. 7 corn has yielded at the rate of ten bushels higher than the other varieties grown.

Mr. Imrie—Don't you think you can attribute it a great deal to the system of rotation of crops?

Prof. Stone—Yes, that is one thing which helps.

Chairman Convey—And the live stock and dairy industry of the state helps to keep up the fertility of the soil.

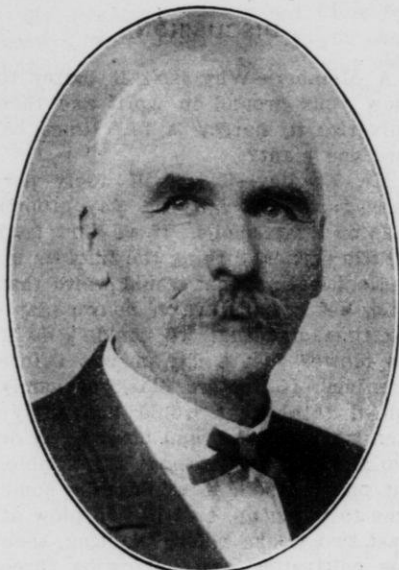
Prof. Stone—Yes. Their rotation down there in the corn belt is a little too short; something like the man who grew corn on the same field for years and he heard he ought to have a rotation, and he put it in timothy. While everyone knows that timothy is as hard on the soil as corn itself, the man was convinced that crop rotation was a failure.

Supt. McKerrow—Have you any data to show how large a crop in Wisconsin is grown from No. 7?

Prof. Stone—We have the figures; I do not remember them at this time.

CORN: SOIL AND CULTIVATION.

W. C. Bradley, Hudson, Wis.



Mr. Bradley.

Well, that's easy. Corn is the sunshine plant, the plant that brings happiness to man and beast, and, like the happy man, it loves sunshine, and the little seed likes a good, warm, soft bed, and a clean bed, and for a cover it likes a fine, mellow, rich soil, full of life giving fertility, the kind we make when we feed clover, bran, shorts, oilmeal and ensilage, full of nitrogen to give the plant as rich a green as the boys wear on St. Patrick's Day. Corn thrives best on rich, sandy loam or black loam, but a clay soil that is full of decaying vegetable matter to help keep it warm will grow good crops. If planted on hard, cold or lumpy ground, the little plant gets sulky and yellow and refuses to look green and happy. Such soils may be

rich in fertility, yet the plant will starve because its food is not available.

The Place to Plant.

A clover sod that has been covered during the winter or spring with good stable manure is the ideal place for corn. It should be plowed the last of April, harrowing thoroughly each day that which is plowed, then by disking and harrowing at intervals of four or five days and planting about the fifteenth to the twentieth of May, the ground will be warm and many of the weeds will be killed. I think half the corn in Wisconsin is planted before the ground is thoroughly pulverized and warm enough to receive the seed.

Mr. Stone has told you of the kind of seed to plant; an aristocratic seed, a seed with a pedigree who traces his lineage back to Leaming, Funk, Reed or some agricultural college. An aristocratic man does not sleep well in a bed with bed bugs, so this aristocratic corn seed does not rest well among weeds, but likes company of its own kind. Then this seed is like a boy, it does not like to work very hard for its living while young, so we must cultivate shallow and often, to keep the moisture from escaping, for the little roots get their living entirely from the water in the soil that comes in contact with the manure and the fertility is there made soluble and available for plant food. The soil lacks moisture when the fertility is not available; a soil full of grass roots and rotting vegetable matter is like a sponge and will hold a great deal more moisture than land lacking in humus. This has been thoroughly proven in

districts where they tried to use commercial fertilizer in place of manure; they found they had fertility enough, but could not make the land hold the water necessary for plant growth.

Frequent cultivation also tends to keep the ground warm and free from weeds.

Planting.

Ordinarily, I think we can grow more corn planted in drills, one kernel in a place, eight to ten inches apart, if the season is favorable, than to plant in checks, but sometimes when we get too much rain as the corn is coming up, the weeds get the start and we wish it were in checks, but this is not often.

I think the ideal cultivator on level land is the disk with a scraper behind that leaves the ground almost level and drags the weeds out, leaving them on top, but this cultivator will not work on hilly land without a pivot axle to change the position of the wheels. On light or loamy soils the weeder is an excellent tool, as it can be used until the corn is six inches high. On very level land and long rows, the two-row cultivator will save much time.

Corn that is to be cut for silage should be sown with rye or rape with the last cultivation, so the ground will be covered with a good feeding crop soon after the corn is removed, and keeping the ground shaded aids in breaking down the mineral elements in the soil, making them available for future crops.

Cultivating corn is like teaching children at school; if the environment is good, they develop a character that is productive of good; so with corn, if we remove the barren stalks and keep out the weeds, they form ears of good character rounded out with grain at both ends.

With good seed, good bed, good

companions, good food, plenty to drink, warm weather and sunshine, this great plant will make glad the heart of the planter.

DISCUSSION.

A Member—Why isn't it better to plow your ground in April and then pulverize it, harrow a few times before you plant?

Mr. Bradley—This will apply perhaps more especially on clay ground than on lighter soils. If we plow land a little earlier, turning the furrows up and cultivating, that would warm that land, get it quite warm before planting time, and that we couldn't do if we plowed just a day or two before planting. If it were black or sandy soil, I think that would not apply; then we could plow and plant a day or two after plowing without any trouble, but on clay soil, it would take some time to warm up, so I like to plow at least two weeks before planting, then this cultivating and harrowing three or four times before the planting helps to kill the weeds, and in that way we can keep our ground cleaner than by planting immediately after plowing.

Mr. Goodrich—How about plowing in the fall for corn?

Mr. Bradley—Well, Mr. Imrie says he likes to plow his land in the fall; my land is nearly the same as Mr. Imrie's, and yet I think I get along better plowing it in the spring. I have tried plowing in the fall and on our clay land, if it remains turned up from the fall, unless it is worked pretty early in the spring, the surface of the ground gets pretty hard, lumpy. If we could get on that clay land and disk it and drag it as we would for corn, and keep up that disking and dragging, then I think it would be all right, but if I have to let the land remain there in the furrow, it gets pretty hard and it is harder to get into

condition than if I had plowed early in the spring.

Mr. Goodrich—Isn't that where you make a mistake, in not disking?

Mr. Bradley—I know, but when you have a lot of corn to put in, you can't handle your grain land and your corn land at the same time, so we put in our grain first and the corn land must come in later.

Supt. McKerrow—Possibly you have made another mistake; either you have too large a farm or not boys enough to work it.

Mr. Bradley—There is something in that, too. You see we don't all have as level farms as Mr. Imrie has. On my farm I must leave the land in grass at least two years, because I don't want to handle it as often as I would if I were on more level land.

Mr. Imrie—Then I would say that perhaps your sod is timothy instead of clover; that is one reason perhaps that it is more lumpy.

Mr. Bradley—Well, it is not left more than two years and a great deal of it is clover sod.

Mr. Scott—Where do you apply your manure?

Mr. Bradley—On this grass sod for corn the following year.

Mr. Scott—In doing that, isn't it better to plow in the spring? You couldn't well manure that land and plow it in the fall.

Mr. Bradley—We get our manure on the land after we have taken the grass crop from it. I have an idea that the plowing under of this manure on our heavy clay grass soils helps to keep the land in better condition. I believe that the rotting of the manure in the clay soil helps to make available plant food that we could not get unless we had this rotting going on in the soil.

Mr. Imrie—We have always felt a

little that if we plow in the spring we have more trouble to prepare that land for the seed bed than if we plow in the fall. If it rains we can't plant on that spring plowing, but we can go right along with the plowing. This clover sod just turned down is not soddy; it is left in the fall just as we plow it and it is cultivated by going over it with a spring tooth harrow and it leaves it very fine.

Supt. McKerrow—I should call that clover stubble rather than sod.

Mr. Imrie—It is clover stubble, only taking one crop off and pasturing next.

Mr. Scribner—We practice the plan Mr. Bradley does in keeping our grass down two years, and sometimes if we get part of the field manured over we will plow that in the fall and the rest will be plowed in the spring. We have kept very close tab on the different plowings and we couldn't see any difference, whether it was plowed in the fall or in the spring, or we couldn't see any difference in the result as to when the manure was applied, whether in the fall or through the winter or in the spring.

A Member—Mr. Bradley, you didn't say how deeply to cultivate.

Mr. Bradley—I said shallow, field cultivation.

Mr. Imrie—And how deeply do you plant?

Mr. Bradley—That will depend something on the soil. I want to plant one and one-half to two inches deep, but I think that different soils require different conditions.

Mr. Imrie—Just deep enough to get the moisture is all right.

Mr. Roberts—There is usually a time between haying and harvest that I think is a very good time to cultivate corn. You have to maintain the moisture of the soil.

QUALITY OF SILAGE.

W. F. Stiles, Lake Mills, Wis.

The silo question has been agitated so long and so effectively that with the good dairyman and stock feeder it is no longer an experiment but an established necessity. The next step in the evolution of the silo is the problem of improving the quality of the feed. There are several factors in the growing and handling of the crop which have a greater or less influence upon the quality of the silage. The principal ones which I shall discuss that tend toward the improvement of the quality, are, first, the stage of maturity at which the crop is put into the silo; second, the development of the crop; third, the variety of the corn; fourth, the nature of the soil and the kind of a season, and fifth, the kinds of crops or plants grown. I will take for granted that the silos into which this feed is to be put have been constructed as they should be. If they are not, then it will be nearly impossible to preserve the feed properly if the crop is cut at the proper stage of its growth.

Maturity of the Crop.

The first two reasons given are by far the most important. If the corn for the silo is cut green, that is before it is properly matured, the silage will contain too much acid, and although the cattle will eat it, yet it will not produce as good results as that which is put in at the proper stage of ripeness.

The question is, What is the proper stage of maturity to make silage of the best quality?

Before answering this question, we must know what variety of corn is to be used. If it is some of the Dent

varieties, then the best silage can be obtained if it is cut for the silo when the larger part of the corn is just passing into the dented stage and the lower part of the stalk is turning from green to white. Silage made from the Dent varieties at this stage of development will contain much less acid and have a far more pleasant, aromatic odor than silage from these varieties if put into the silo in a greener stage of maturity. If the proper aroma of silage can be increased and the acidity decreased, then I believe the palatability will be increased, at least for a temperance cow.

There are a few conditions that we must observe if the crop is to be put into the silo at this stage of growth and make silage of the best quality.

One is that the feed cutter should be kept in proper shape, knives sharp and close to the cutting plate, and set so that they will cut the stalks in comparatively short sections. Then the silo must be perfectly air tight and of sufficient depth, in order to secure pressure enough in setting to draw out the air.

Much corn is put into the silo before it is sufficiently matured for fear of a frost. This in most cases is a mistake. Nearly ripe, frosted corn will make better silage than immature corn. Seventy-five per cent of the time the frost does not come, but instead the weather is just the kind to mature the crop.

Development of the Crop.

Next, and perhaps of equal importance, is the development of the crop. By development is meant the percentage or proportion of ears and leaves of

the crop. Now, we know that it is the function of most plants to produce seed to perpetuate themselves. This is especially true of corn. I believe a stalk of corn that does not produce an ear of some kind does not reach its highest development, either as a plant or as a food product. Thus the quality of silage can be determined by planting so that stalks and grain will bear a certain proportion one to the other. The condition of the soil, the kind of a season, and the varieties of corn will all be determining factors in regard to this.

As a rule, plant about twice as much seed as would be necessary to produce the largest amount of ears of good corn per acre.

Variety of Corn.

Another factor in determining the quality of silage, and which follows closely along in this same line, is the variety of corn used. By variety is meant Flint, Dent, Sweet and Southern, and not different types of the same variety. It is quite likely a fact that the Flint varieties will make a feed of better quality than the Dent or larger varieties, yet at the same time we must consider that the tonnage per acre, especially in the southern third of the state, will be much greater with the Dent varieties.

In selecting varieties, each farmer must decide for himself how much of quantity he is willing to sacrifice in favor of quality. As for me, give me the largest variety that will mature in my locality or section in the average season.

Effect of Soil and Season Upon Quality.

The kind of soil upon which the crop is grown makes a difference in the quality of the feed. Some will say we must plant upon the soil we

have. To be sure, but if your soil chances to be a wet or peat-like soil the growth of the crop will be big, but at the same time ton for ton it will not be as good silage as from corn grown on the higher soils.

The kind of a season will also have its influence; a season like the past one, when the crop did not develop normally, produces silage of an inferior quality.

Other Silage Crops.

Because about ninety-nine per cent of the silage in Wisconsin is made from corn, I have said nothing about other crops, and another reason is that in speaking of any subject I prefer to speak from experience. In a few sections of our state where peas are grown for the factory, the vines are preserved for winter feeding in the silo. The question of the value of different crops for silage is one that should be taken up and studied by our experiment stations, rather than by the farmer. Experience may be a good teacher, but she is usually an expensive teacher.

DISCUSSION.

Mr. Imrie—You spoke of the varieties. Isn't there a difference in the Dent corn? Some of the ears will ripen faster than others, and the stalks seem to ripen before the ear. Which would you select there?

Mr. Stiles—I should select a variety where the ears will ripen before the stalk, so we will get the ears sufficiently matured and the stalks will retain their moisture, and when it is put into the silo it will press down and help preserve the entire contents. Of course, the great difficulty in making silage of the best quality is that the stalks will get a little too dry unless care is exercised in packing in the silo. On the other hand, a great

deal of silage is poor because it is put into the silo too green.

Mr. Bradley—What is the character of this No. 7 in regard to its ripening; that is, the corn before the stalk?

Prof. Stone—The ears ripen first.

Mr. Stiles—I know there is a kind called White Cap Yellow Dent, where the corn is dented, and still the stalk remains green for quite a while, and that makes a very good variety for silage.

Mr. Imrie—We have a kind called Minnesota Dent and the stalk begins to dry. You will find that dented, however, when they are both matured, it will ripen up all right, but it makes a poor variety for the silo.

Mr. Goodrich—Does not the careful distribution of the corn in the silo, in regard to mixing the leaves and the corn, have a good deal to do with the quality of the silage? I have often noticed that the pieces of ears would all roll off to one side and the leaves to the other, and they would both be damaged, the leaves won't fill up enough and the ears won't pack close enough.

Mr. Stiles—It is very important to see that the silage is properly mixed in the silo. The leaves, of course, are much lighter, and if they collect, as they always do, in one place with the old-fashioned feed carrier, or you don't pay as much attention to the slides as you should, they will fall on one side and the ears on the other, while the man who is there sits down until the load is cut, and the ears roll off one side and the leaves on the other; and thus not packed tight enough the air will get in and it will spoil and mold.

A Member—How does a blower do to help?

Mr. Stiles—It would be all right if you collected it somewhere.

Mr. Scribner—Would you get as sweet ensilage from a blower as from

a carrier; wouldn't it have a tendency to tear the leaves?

Mr. Elliott—I don't think it hurts it. You get more compact silage and your hard pieces are broken up. If the grain is not thoroughly ripened, the moisture is in the milk instead of in the kernel, I think, but the scientific men never have been able to tell me whether I lose anything or not. The cow seems to be satisfied.

Mr. Bradley—I have used a blower for three years, and I don't like it as well as I do a carrier; the silage doesn't look so nice, the kernels are all blown to pieces and the soft kernels are mashed. The only advantage I can see with the blower is, though it takes less cleaning up, it is easier to handle, it takes twice the power.

Mr. Goodrich—That is the trouble—it uses up more power.

Mr. Scott—I want to ask a question about frosted corn. If you have a field of immature corn, don't you get a sweeter quality of silage to put it in after the leaves become somewhat dry than if you put it in right away?

Mr. Stiles—I cannot answer that, I don't know. We would like to put it in as soon as we can after the frost, because the frost breaks up the sap in the leaf and if we get dry weather after that the leaves blow away and they contain the best feed. I have seen it left two days in the field after frost and the leaves of the corn were nearly all blown away.

Mr. Scott—Where very immature corn is caught by the frost, the leaves do not blow away in a few days. I have found in the northern part of the state that our silage is sweeter if we allow those blades to dry somewhat before the corn is put into the silo. Now, what loss there is in having those leaves dry I do not know, but we get a sweeter product.

Supt. McKerrow—I understand that those things will be regulated by the

amount of sap there is in the stalk. If your corn is nearly ripened when it is struck by the frost, you will get it into the silo as soon as you can, but if it is quite immature, then you will allow it to remain longer?

Mr. Scott—Yes, that is it.

Chairman Convey—Those two gentlemen are speaking from two different standpoints entirely; one is in northern Wisconsin and the other in southern Wisconsin.

Supt. McKerrow—There is a possibility of frost coming early in southern Wisconsin to make these conditions just the same as they are found in northern Wisconsin.

Chairman Convey—They have not occurred in my recollection.

Mr. Roberts—Last fall we had frost that damaged all the corn in a measure; I had cut most of the corn that I wished to husk before I had filled my silo and the leaves were frosted. I put it into the silo and it is a very good quality of silage. Mr. Scribner has had many years of experience with silage, and he pronounced mine very good silage.

Supt. McKerrow—Wisconsin today is probably the great silo state of the Union, and I believe from what I have heard this winter that there are to be hundreds of silos built the coming season. I believe there will be twice as many silos built in Wisconsin in the spring of 1908 as in any preceding year, probably three times as many. Now, the question of the silo is a very important one, and I wish you would discuss for a few minutes the different classes of silos. Mr. Stiles, what kind of a silo would you advise building?

Mr. Stiles—You mean the material used in the silo, or the shape, which?

Supt. McKerrow—Both.

Mr. Stiles—I believe there is only one shape that should be used in most cases, and that is the round type of silo, and have it sufficiently deep so

there will be sufficient pressure on the silage to preserve it. It should not be less than thirty feet deep. The diameter of the silo will be regulated by the number of head of stock you are to feed from that silo. If you are going to feed about twenty-five cows from it, and probably ten or twelve heifers, then the silo ought to be thirty feet deep and sixteen feet in diameter. If you are going to feed more, it will be in that proportion. You can have your depth about a certain amount and then increase the diameter according as your herd increases up to thirty feet in diameter, which should be the limit. If you have more cattle, then requires more silage, it is better to put up two silos.

Mr. Bradley—I think it would be better to put up two silos rather than to go more than twenty feet.

Mr. Goodrich—Did you ever use a thirty-foot silo, Mr. Stiles?

Mr. Stiles—I have seen them sixty-two feet.

Mr. Goodrich—I know you have seen them, but you have seen some men that are not so wise. I had a good deal to do with one that was thirty feet in diameter, and I never would build another as big. Twenty feet is as large as I want to have to feed out of.

Mr. Stiles—Many of them I have seen have been about twenty-four feet in diameter, some thirty and some forty.

Mr. Bradley—What do you know about concrete silos?

Mr. Stiles—I know they are a good silo to build. Cement, I think, is the preferable type at this time, a cement silo is air-tight, it is strong, and in most cases it is better to put up a concrete silo than an old type of wooden silo, because lumber is so high and of such a poor quality that it rots out so quickly. A bricked-up cement silo seems to be the coming silo. In

some places where you have lots of stone and can dig down into the ground, it is advisable to make a stone silo, but not as a rule. In regard to the place in which to put a silo, I think you will find it advisable to dig down to a certain distance. If you are on a hillside and go below the stable floor six or eight feet, then your silage will keep better in the summer time and you will avoid the danger of freezing in the winter. You can also fill it deeper and take it out of the bottom of the silo better.

Mr. Imrie—Wouldn't you give a proportion in the diameter to the height?

Mr. Stiles—No, I don't think it is desirable to go above a certain height. It ought not to be less than thirty feet in height or depth in order to get sufficient pressure to preserve the feed. If you go fifty feet, you will either have to go down in the ground too far or way up in the air where it costs too much to fill it, and another thing, unless you are pretty careful about feeding, you will find more or less difficulty on the question of the freezing of the feed, so I think about thirty or thirty-six feet is the best height.

Mr. Scribner—My rule has been that the width of the silo should depend upon the amount of stock you want to keep and the height of the silo the number of days you want to feed out of it. If you are going to feed all the year through, you want to make a deeper silo. I always want to put up some for summer feed.

I want to say a word in regard to succulence. I don't think we have thought enough about the old cow and her comforts and likes. The time of year when we get the best returns from the old cow is in June, and if we can have June conditions all the way through, we have pretty nearly got what we want for milk production. I think the silo is a good deal like grease is to a threshing machine.

I used to run a threshing machine a number of years ago and I found out that one of the principal things about that threshing machine was that we had to have grease. This silage greases up the digestive system of the cow all the way through, makes it run easily. The most of us try to feed too much dry fodder to our cows. We feed timothy hay and corn meal and ground oats; these are all dry feeds that tighten up a cow's digestion, and silage comes along and loosens up the whole system.

Mr. Scott—I would like to know why Mr. Stiles says he wouldn't go above thirty-six feet high.

Mr. Stiles—There has to be a certain height in order to preserve the feed, and that is the main point to be considered.

Mr. Scott—I believe there is another reason. We have been talking about requiring a certain depth in order to have pressure. I hope nobody will infer that we don't propose to have good silage near the top of the silo. It should be all right, but I never saw silage that was over thirty feet in depth where the silage at the bottom was not very acid, and I think thirty-five or six feet is the limit on account of the great pressure in the bottom.

Mr. Stiles—And it can't be very much less in depth and press the silage down properly.

Mr. Goodrich—There has been nothing said yet about the stave silo. A good many of you know that I never have been very much in favor of the stave silo, and yet I realize it is the cheapest silo we can build, and while it is new, if it is kept properly hooped up, it will preserve the silage all right. I thought a little better of stave silos after I made a visit to the state of Indiana some years ago taking a cow census. I found a great many silos in Marshall county; they were all

made in Kalamazoo, Mich., and they were made cheaply and still they gave good service, and, strange to say, they had no roofs on them. A roof is not necessary on a silo, except in the winter time. Let the rain descend upon the silage and it will be all the better for it; the roof will be needed only to keep the snow out. They made their silos fourteen or sixteen feet by about thirty feet deep, and the silage was put right in from the top with a carrier or blower. You could fill it up full, and then to keep the snow off in the winter they had a cover that was run out onto some timbers that held it, and they could slide it back when the snow came.

Mr. Scribner—Mr. Goodrich spoke about the stave silo being the cheapest silo. I know a silo in Minnesota built out of cement or concrete sixteen feet deep by thirty feet, for about \$100.00. He had a great many hard-heads and he laid them in cement reinforced with barbed wire fencing, and I will guarantee that will outlast four wooden silos.

Mr. Scott—Mr. Martiny built a cement silo a few years ago about the time his wife's relations came to visit him, and he built it very cheaply.

A Member—I have known of their being built with tiling and air spaces between the tile, and they proved very satisfactory.

WINTER EGGS.

C. E. Matteson, Pewaukee, Wis.

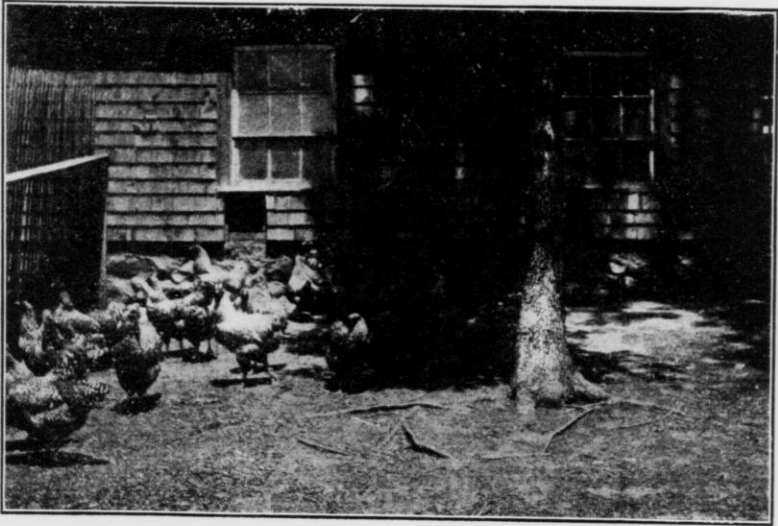
"He who gets no eggs in winter time makes nothing from his fowls," a paragraph repeated by our old veteran poultryman, Mr. James Rankin, of Southeaston, Mass., some twenty-five years ago.

When Mr. Rankin repeated those words in one of his famous lectures delivered at Madison Square Garden, N. Y., they created a sensation never to be forgotten in the poultry world. It was a revelation to most people who kept fowls in those days; even the most progressive poultrymen thought it a matter of course, that Nature must take its course, "eggs in spring and summer only." Not so today; times have changed; great wonders have been wrought, so that all practical poultrymen today produce but few summer eggs, because the demand is there and of course if he is a business man he will aim to hit the market at

all high points, and I might as well state at the beginning that what first stimulated the poultrymen to the production of more winter eggs was the broiler men; cold storage or packed eggs were of little use to the broiler men, thus fabulous prices were offered for the egg products from first hands in winter, and our poultrymen set their thinking caps to work to supply this demand. They saw at a glance that there was a gold mine in it if they could only get the goods. They tried hens under all conditions and ages, but were never able to have full control so that a steady flow could be assured in winter, when this demand was always greatest, but they discovered in all these trials that after a hen has once passed her first year she must have a rest in order to grow a new overcoat, and they also found that to be the most expensive time to keep

a fowl, because Nature is making a demand, not only to grow this new overcoat, but also to store up surplus flesh to tide her over the winter, which causes her to be a voracious eater and reduces her profits to a minimum, because all this time she is giving no returns for her board, but our old veteran mentioned above soon

we get out the pullets early; do not allow them to get stunted in their growth; give them full range after a certain age, and get them onto their perches just as early in life as possible. Much depends on that, you will never get full growth of feather without it, and a heavy overcoat of feathers is just as essential to a winter lay-



Breeding Pen of Yearling Barred Plymouth Rocks, on Poultry Farm of C. E. Matteson, Pewaukee, Wis.

found a solution to the problem. Being a broiler man himself, he put his machines to work right as soon as his broiler house was filled each winter and hatched out his store stock, so that the pullets had an abundance of time to mature before cold weather set in, so in a measure that solved the problem of winter eggs.

I want to say right here, I believe the greatest fortune that ever fell to me was the fact that I happened to be an early student of Mr. Rankin. He told me all this in a few words, so let us profit by this to the end that

er as bone and muscle; they all should work hand in hand.

Give the Fowls Plenty of Room.

Then again, right here I wish to state with emphasis,—never, under any circumstances, put any more of these thrifty young pullets into a given amount of space than you actually have room for. This I find to be one of the greatest mistakes made. People do not seem to realize that a fowl must have room; too much comparison is made to the other stock of the

farm, but it must be understood for all time to come that fowls, to make the best use of their food, must have room to exercise, and without it they are sure to waste your food. Their digestions will never have full strength without this exercise, first, last and above all things.

ly, by all means when getting out your young stock in the spring see to it that they are not permitted to be infected with vermin for a moment of their lives. Growth is what you are after above all things with the young stock, and you will never get it in full measure when your young stock



Feeding Time of the White Plymouth Rocks, at the Poultry Farm of C. E. Matteson, Pewaukee, Wis.

Vermin.

Build your houses with plenty of floor space, and have a sufficient quantity of light. See that the houses are aired out every day, do not even except Sunday, and see that your fowls are kept free from vermin. To my knowledge, no one has ever been successful in growing two crops on the same field at the same time, both are sure to suffer to a greater or less extent. If you are not vigilant enough to free the adult fowls entire-

ly is infected with vermin. Keep them off of the little ones by all means.

The old adage, "an ounce of prevention is worth a pound of cure," is a good one to apply here, only I wish to multiply its benefits several times by saying that one ounce of prevention is worth fifty pounds of cure. If it were only the saving of a little labor, I would not use the term so strongly, but it is the growth which we get on our chicks that I am after. Without that you never will be a full-fledged poultryman; in fact, I say with

emphasis that more people have been put out of business through lack of application on this one point than any one thing I know of. We cannot afford to allow our young stock to be stunted in their growth.

DISCUSSION.

A Member—Give us an outline of the feed.

Mr. Matteson—Well, in feeding stock in the winter time, for the production of eggs, of course we first must understand we must have a variety of grains, but that will not make a balanced ration, and that grain should be fed in such a way that it promotes all the exercise possible; then we must balance up that grain ration, which we understand is largely carbonaceous, and in feeding fowls for eggs, we have got to have protein, because the egg is largely formed of protein. For that reason they have got to have animal food, either in the form of milk, meat, or some of the different meat feeds we have on the market. Too much cannot be said in favor of milk in the care of poultry, and if I was only given an opportunity of having a choice between milk or meat, I would take the milk, because we can use it in so many different ways and in all seasons of the year, but we cannot expect quite as large a flow of eggs from the use of milk as where we use some of the forms of meat. I really condemn the practice of feeding soft food, especially where it is fed in the morning; it is almost sure to put your fowls into a sluggish condition, and if that condition is continued through the winter you haven't a healthy fowl, and that is one of the reasons why people do not get results by feeding fowls in the winter. They lay too much stress on what they feed and not enough on the way they feed it.

Of course fowls have got to have care.

Now, in regard to little chicks, I would like to spend more time on that point, because it is a very important point in our success. My feed for young chicks for the last two years has been considerably different from what it was before that, not because the other feeds were not successful, but I am raising more chicks and labor is quite a problem, and it was because of saving labor that I made the change. For the last two years I have fed about thirty-five per cent of the very best quality of hard flint corn that I can get cracked, about thirty-five per cent of the best spring wheat I can get, cracked, with about fifteen per cent pinhead oatmeal, and if the slightest symptom of bowel trouble appears I add a little cracked rice as a corrective; and besides that, finely ground oyster shells for the young chicks. I do not think we should rely upon oyster shells as a grit, either with the chicks or with adult fowls; they supply a great want in the health of the young chicks, and they need it, but I am certain that too much oyster shells, for adult fowls, are detrimental at hatching time.

A Member—Do you feed your feed dry to the chicks?

Mr. Matteson—Yes, I do. I followed up the moist feeding for a number of years, and if fed carefully enough it is a success, but I like dry feeding the best, being very careful that I never overfeed at any time, and feeding it in such a way as to promote exercise. We let our chicks come out when they get hungry and as soon as they commence looking for something to eat we feed them just a little right around the hover, just as soon as they learn to eat; then we gradually commence to work them farther away from the hover, out into their pens and then out into the yards. We have

learned that it is not a success to try to grow chicks as house plants, they must have exercise.

A Member—How many pullets would you confine to one house, and what size, and the size of the yard?

Mr. Matteson—I never would put over thirty-five or forty together. I like about six square feet for each fowl in a house, about one-third of the room for a roosting room, and that should be as warm and comfortable as possible; the other two-thirds should be the scratching shed. That does not need to be very high or very warm, not too much glass in the roosting room, because that gives you cold storage at night and heats up too much in the day time. During the day, as the sun strikes your windows, if you go in there you will find they radiate heat. You think it is nice and warm, and so it is, but in the night that condition is reversed, it radiates cold. One window to forty or forty-five fowls is quite sufficient. Put one or two windows in the scratching shed, they don't spend their nights in there and the radiation doesn't hurt. The houses I use for winter only are sixteen feet wide and fifty feet long. The house is never built without a yard.

Mr. Ellis—How is a burlap window for the front of your building?

Mr. Matteson—Oh, I don't believe I would recommend it. We hear a great deal of discussion about the muslin front poultry house. I object to this; I do not believe they are warm enough for the rigorous winters of Wisconsin, but the principal objection I have found to muslin fronts for the poultry house is that there is a whole lot of dust in the poultry house, those curtains get more or less dusty, and in a short time they are unsightly; I don't think they are practicable.

A Member—You wouldn't get light

through burlap as you would through muslin even.

Mr. Matteson—No, I don't think we could use burlap at all.

A Member—Do you feed your morning's ration in litter in the scratching pens?

Mr. Matteson—I do. I wish to place as much stress upon that point as any point I have made here today. My fowls' morning feed is not soft feed, and that is the reason I don't like the soft feed, it doesn't require the same amount of exercise. Our practice is to go out with about a pound of cracked grains, cracked wheat, cracked corn or screenings, or some kind of fine feed. The litter is in such shape that it goes down in, out of sight, and gets the fowls to work, gets their blood into circulation, and I lay more stress upon that than anything else. That is my objection to feeding soft feed in the morning, and then you are so liable to overfeed with soft feed. I use it every other day, but it is fed at night, not in the morning.

A Member—What would you use for litter?

Mr. Matteson—If I can get it, I prefer straw, but that is something I have hard work to get. I have had to use shavings this year, going nine miles to get them. Cut corn stalks are all right, anything that will make it necessary for them to get a lot of exercise.

Mr. Ellis—How do you ventilate your building?

Mr. Matteson—Well, I haven't a thorough system of ventilation in my poultry houses. Most of my buildings were built sixteen or seventeen years ago and all the ventilation I use is a thorough airing each day. Of course a thorough system of ventilation is all right. In any system of ventilation, you will remember that one hundred and fifty fowls need the same amount of ventilation that one cow

does, and the danger in putting in a system of ventilation is that you put it in on such a large scale that you get too much. I have seen a good many that showed frost outside and inside. I object very much to the top ventilator; it is one of the things that causes so much roup, because it produces a direct draft. You can start roup in any flock of poultry by putting your ventilator right over the fowls. I will give them three days when the weather is cold and the wind blowing and you will surely see symptoms of roup.

A Lady—You lay a great deal of stress on keeping fowls free from vermin. Can you recommend any system for doing that?

Mr. Matteson—We have three classes of vermin, you understand, the body lice, the head lice and the red mite; and we really have to use three different treatments. The body lice are on the body and I use insect powder for those. They live on the scales of the body and in the absence of these scales the skin of the fowl soon becomes hard. Insect powder is the best for those. The head lice are a different species; they are secreted in the quills at the base of the feather on the head and neck only, and for these I recommend some pliable oil. You see the reason we have to use an oil treatment is because these are secreted in the quills and the powder treatment would only get a few of those on the outside. Equal parts of kerosene and sweet oil applied with a sponge on the outside of the feather will penetrate these quills and catch them.

A Member—What kind of a floor would you recommend for sleeping rooms?

Mr. Matteson—I recommend an earth floor, not only for the sleeping rooms, but the whole house. If you want to put in a floor to guard against rats or other vermin that come out at

night, put that four or five inches lower than you want your real floor and then put earth on that. It will mix with the litter and manure and makes a splendid fertilizer. The earth floor is one of the summer conditions for which we are seeking.

To go back to the vermin. The mite is a different species, and they are to be found any place on the fowl, but only at night. They harbor in the cracks and crevices of the house, nest, boxes, etc. We have got to treat the house for those. If your perches are not nailed there as a fixture, and they should not be, and the nests are easy to get out, why there is no trouble. There is only one place I would ever use a liquid lice killer. If your houses are tight enough, so you can close them up and leave them for a couple of hours, sulphur will probably do the work all right. But let me say if you are going to make a success with your fowls, your houses will not be constructed in such a way that the mites are able to get into cracks where you cannot reach them.

A Lady—What are some of the symptoms of head lice?

Mr. Matteson—Well, I cannot say that head lice do any real harm in most instances. The real mission of the head lice seems to be to kill off our young stock in the spring and the symptoms are bowel trouble, drooping wings and death. They get on the jugular veins and it only takes a few days for them to end the life of your chicks. The thing is never to talk about treatment for a moment. What you want to do is to use prevention by applying the remedy to the mother.

A Member—Where do you get the best insect powder for body lice?

Mr. Matteson—I wouldn't say where to get it, but I would recommend the Persian or Lambert's. The only objection I have to the Persian is that it loses strength where it is kept until

it is old. I have not found the same objection to Lambert's, because it comes in sealed packages and it has always been a success with me. Recess to 1:30 P. M.

AFTERNOON SESSION.

The convention met at 1:30 P. M. Mr. David Imrie in the chair. Solo: Miss Vida James..

SWINE BREEDING.

George Wylie, Morrisonville, Wis.

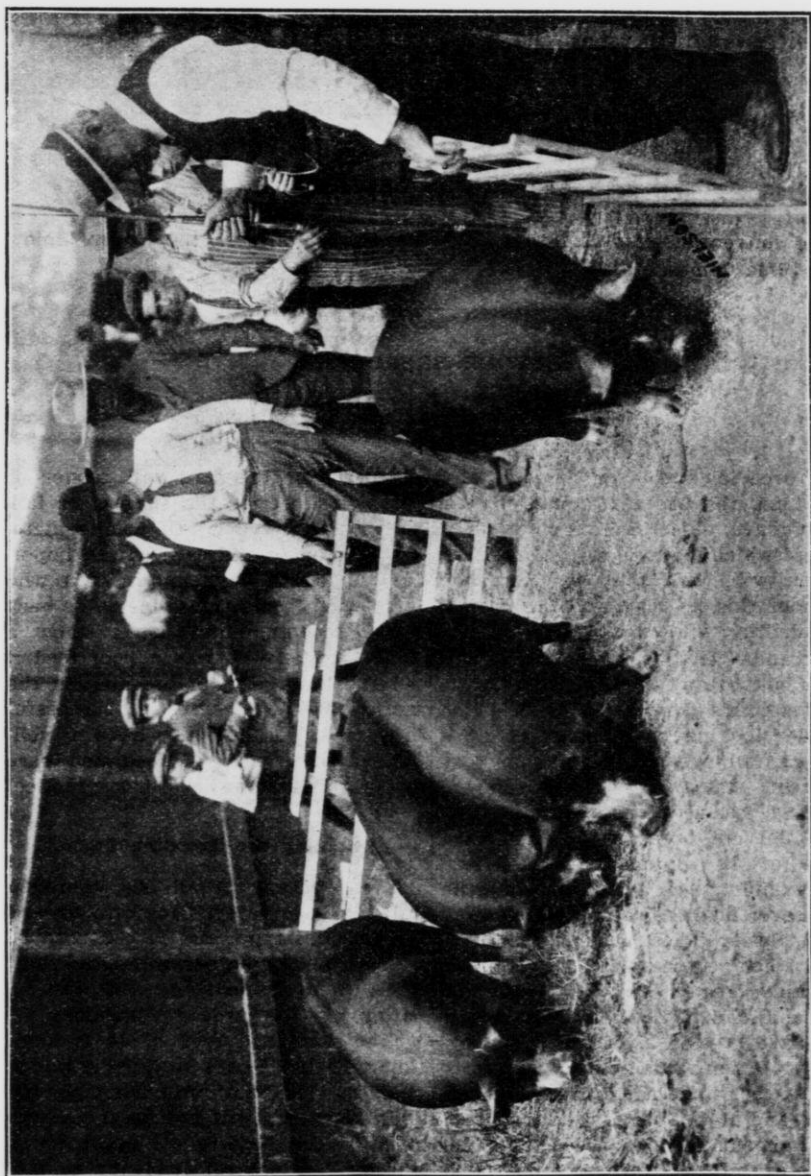
In breeding swine or live stock of any kind, the breeder should have a well-defined object in view, a point toward which to work, a type, an ideal, if you will, well fixed in his mind. Without this he may be likened to a ship drifting without a rudder; he may be stranded on the beach, but he will never get to any particular port. To illustrate this point farther: A swine breeder looking over the stock at a leading fair where swine from four different states were being shown, pointing to one of the exhibits said, "If I did not breed that sow I bred some of her immediate relatives." The exhibitor was a man of whom he had never heard. Later the sow captured Sweepstakes and an examination of her pedigree disclosed the fact that this breeder had bred both her sire and dam. That breeder had a well fixed type in his mind and recognized it among hundreds of others.

All hogs of the same breed are not alike, and it is this fact that makes improvement of any breed possible. There are different types of the same breed for the breeder to select from, and the intelligence and judgment used in the selection of the animals

reserved for breeders will sooner or later demonstrate the success or failure of the breeder. Of course methods of feeding and care cut an important figure. I have known men who were good feeders of swine to be very poor breeders, but I never knew a good breeder who was a poor feeder. All the knowledge of breeding in the world will not make a successful breeder unless you also have a well-defined knowledge of feed and care and put that knowledge into practice.

Selecting the Breeding Stock.

The tendency of all our improved animals is to revert backward toward the original type, and in the case of swine it should be borne in mind that, while there is no stock that can be so rapidly improved by judicious selection, care and feed there is none that will degenerate so quickly under neglect. The most promising pig for show purposes will not, as a general rule, be the best to set apart for a breeder. A natural tendency to fatness is necessary in the show pig, but pretty much all of our popular breeds as shown in these days have as strong



Pen of four Berkshires, winners of Champion Cup at Wisconsin State Fair, 1908,
owned by H. C. Taylor, Orfordville, Wis.

a tendency to lay on flesh as it is safe to encourage in breeding animals. The best show pig may come from the smallest sow in the lot, but it is not safe as a rule to select breeders from that class. We want the most size in the shortest time and we can safely forego a little of the fattening tendency, provided we secure ranginess and a tendency to growth in the prospective breeder.

I don't care how good the individual may be, if only three or four pigs were farrowed in the litter I would not reserve one of them for a breeder. Pigs of small litters are liable to show up good quite young, but you cannot afford to encourage a tendency to small litters by such selections. The per cent of pigs saved is usually small enough without breeding in that direction.

Our experience is that matured sows, as a rule, raise the largest pigs at a given age, and that it does not cost as much to keep one over a year as it will to raise one from a pig to a yearling.

Although we want our breeding stock rangy, we do not want them of the slab-sided, hard feeding sort that never get fat. There is not so much danger, however, in getting them too coarse as there is in breeding them too fine. The very fine boned, fancy kind, with constitution and vigor all bred out of them, are not a profitable kind to raise. It is much easier to breed unprofitable, fine ones than it is to breed profitable, coarse ones. I do not care how big a brood sow may be, provided she does not show too much coarseness, she will usually be the most profitable to breed from if bred to the right sire.

Swine increase so rapidly and reach maturity so quickly that the intelligent breeder can rectify mistakes and breed out faults several times with several generations of hogs, while the

horse or cattle breeder is waiting through years of patience to see the result of a single cross. This being the case, swine breeders, having the practical results of certain crosses so frequently brought to their notice, should be masters of their profession.

Choosing the Sire.

A breeder is never in greater danger than when he has bred his herd up well nigh to perfection and the question arises how to maintain that perfection, what to cross with next, where to get a sire of sufficient prepotency to hold the excellency already attained. In this case a young, untried sire is a fearful risk. He may be bred right, a good individual, but prove lacking in prepotency with such a bunch of sows as you possess. In this case, a tried and proved sire is a safer proposition.

Really prepotent sires are scarce and are being appreciated more now than formerly. When you find such a sire, do not be in a hurry to dispose of him. I once sold one after using him five years, only to find when too late that I had sold him too soon. With such a sire it will sometimes pay to buy sows to breed to him.

A good pedigree is a good thing if backed by a good animal. I have known breeders to pin all their faith to a pedigree leaving the individual merit of the animal out of the question. Sooner or later—usually sooner—breeders of this class come to grief. The greatest lesson in pedigrees and breeding generally since the advent of pure bred stock on earth was taught by the late Amos Cruickshank. After the days of Thomas Bates, the Shorthorn world had turned into "faddists," there were pure Duchesses, pure Kirklevingtons, pure this and straight that. It was an unpardonable sin to breed any family

other than in line. While the great mass of breeders on both sides of the water were working in this way, Amos Cruickshank, by a judicious system of out-crosses with only individual merit, backed by a good pedigree to guide him, produced a family of such excellence, individuality, constitution and substance, that in comparison the line and in-bred weaklings of the "fad-dists" almost looked as belonging to another breed, and yet, in the face of this lesson, today we find men talking "pure Scotch" and using an inferior animal because he is pure, when a cross of an animal of better individual merit and just as good a pedigree might be used with better results. Must the lesson be learned again?

In purchasing stock, don't buy anything inferior to what you already own; buy what suits you. It is cheaper to pay fifty dollars each for good ones than to take inferior ones at less than half the amount. I do not mean that high-priced ones are always the best, but select what you want, get it as cheap as you can, but get that or none.

To be successful in breeding even swine, it is necessary to have at least a fair amount of that uncommon article denominated Common Sense.

DISCUSSION.

Mr. Martin—I wish Mr. Wylie would answer the question, how to feed seventy-cent corn and twenty-five-dollar a ton shorts and sell the product at four cents?

Mr. Wylie—The answer is easy, a man can't do it.

Mr. Convey—Don't you think people are exceedingly foolish in getting out of their stock?

Mr. Wylie—That is where the mistake is. When stock is down there is a rush to get out, and when it is high there is a rush to get in. You want

to do the very opposite to that. If pork is low, that is the surest sign I know of that it is going to be higher, and if anything I would try to raise more pigs next spring than ever before. There was one occasion, not so very long ago, twelve or thirteen years ago, when we had a case of three-cent pork and fifty-cent corn; but that didn't last very long, and this won't last very long, simply because it can't. Everybody is selling off their stock; men that used to keep ten or twelve brood sows are keeping two or three now, and pork is going to be worth something some of these days, because no one will have any to sell. When will farmers learn that a staple article like pork cannot remain long below the cost of production?

Mr. Barley—Don't you think that with that four-cent pork, we can make more by feeding our hogs beets?

Mr. Wylie—Some beets are very good.

Mr. Barley—We fed twenty hogs on beets and put them onto the market without feeding them a bushel of corn and they netted us as high as three dollars.

Mr. Wylie—What did they get besides beets?

Mr. Barley—They got nothing, only there was part of the season we turned them onto peas to get them started; then we went to feeding them beets. They were spring pigs.

Mr. Wylie—Did you get a finish on them?

Mr. Barley—We got a finish on them.

Mr. Wylie—They got most of the finish on the peas, didn't they?

Mr. Barley—Oh, no.

Mr. Wylie—Don't misunderstand me now. I asked the gentleman the question, not because I do not believe in beets, beets are one of the best things you can feed a hog, mangels or sugar beets. I raise from a quarter to an

acre of mangels every year to feed my brood sows through the winter, but we do not feed them for any flesh forming qualities they possess so much as for the purpose of keeping the animal's system right; the tendency is to utilize the other feeds fed the animal to better advantage.

Mr. Barley—Do you cook those beets?

Mr. Wylie—No, sir.

Mr. Barley—We cooked our beets.

Mr. Wylie—What did your hogs weigh when you sold them?

Mr. Barley—They weighed over two hundred pounds.

A Member—How old were they?

Mr. Barley—They were May pigs sold early in the fall. They were fed all the time on beets. They wouldn't be able to go very far; they would lay down as if they were drugged. I had a pan that held twenty bushels that we cooked them in and they got the twenty bushels a day, partly sugar beets and partly mangels.

A Member—What are your views on in-breeding, Mr. Wylie?

Mr. Wylie—I would not practice it to any considerable extent. You don't have to nowadays. With in-breeding the tendency is always towards fineness, and in some cases toward barrenness, and it intensifies the defects as well as the good qualities. I would advise it only in the line of experiment, and our stations can conduct experiments along this line cheaper than the farmer. Life is too short unless you have plenty of money to work with.

A Member—Give us an outline of your manner of feeding.

Mr. Wylie—Well, it depends on what I am feeding.

The Member—Hogs.

Mr. Wylie—I feed brood sows entirely different from young pigs.

The Member—Tell us about the young pigs.

Mr. Wylie—I teach a young pig to eat as early in life as possible; throw a little soaked corn on the floor away from the sow and get him to eat as early as you can. If you have plenty of skim milk there is no trouble about it, but if you haven't that, take a little nice shorts, soak it between feeds and feed him in that way; feed the soaked corn always after feeding the shorts. When you have them fairly started to eating, a little oil meal or tankage is good. Do not feed too heavily on soaked corn to the exclusion of other feeds when the pig is young, or you will break him down. And do not try to raise hogs without pasture, always have a place where they can run to grass, clover preferred, if white clover, so much the better.

A Member—You wouldn't soak this corn until it was sour, would you?

Mr. Wylie—No, twelve hours, or until it is soft. Cooking does not add to the value of the feeds; all it does is to make variety. I have fed a great variety and I never have cooked anything, except in the way of supplying a change. Pigs like a change and it is mainly in supplying a change that there is any possibility of profit in cooking food for swine. The experiments up to date are all against it. Corn, shelled and soaked, in a measure takes the place of cooking, is about as effective as grinding and costs less.

SWINE PENS.

L. P. Martiny, Chippewa Falls, Wis.

There is a rather uniform or general plan throughout the state of building horse and cattle barns, but when it comes to building hog pens it is different. A great many hog breeders have their own characteristic plan of a hog pen and shelter for their hogs. While there are so many styles and types of pens, they may be divided into two classes: first, those that are built with the comfort and sanitation of the hog as the main object, and second, those with the comfort of the owner of the hog in caring for the hogs as the main consideration, the hogs welfare being secondary.

Some Characteristics of the Hog.

Before describing any plans, it might be well to consider the habits of the hog. The hog has certain peculiarities not found in our other animals. In the first place, the hog will keep its shelter cleaner than any other animal if given an opportunity. To keep them clean they must be kept in small pens in small lots and not closely housed or confined. The hog is inclined to build a nest for itself and make things as comfortable as possible, which is not characteristic of our other live stock. After stopping to think of the nature and habits of the hog, then we can begin to make plans for building for his shelter and care.

A Satisfactory Winter Shelter.

One of the best, cheapest, warmest, most sanitary and most comfortable means of shelter for winter protection that we have on our farm is made in the following manner:

Set two ordinary, good-sized fence

posts in the ground about ten or twelve feet apart, north and south if possible. On these lay a good, strong pole about sixteen feet long; then take poles about eight feet long and lay one end on this long pole that is placed on the posts and let the other end rest on the ground. Place these eight-foot poles about three feet apart on both sides of the long pole and then cover with straw by building the straw stack over this structure at the time of threshing, making the long way of the stack east and west and leaving the opening to this device to the south.

Where there is a large number of hogs to be sheltered, a series of these pole devices may be placed close side by side and the whole covered with one stack, or if you wish to keep the hogs in smaller lots make more settings at threshing time.

I have found this about as good shelter as I ever used, and all that is necessary is to see that the hog can get under this device, and he will be well sheltered in a clean, warm and comfortable manner all winter.

Another Good Shelter.

Another style of pen for shelter that is very economical is the A-shaped, movable hog pen. We build these eight feet square and about seven feet high to the peak. In building this style of pen, practically all the lumber used is eight feet long. We use two by eights on the sides and two by fours on the ends for the bottom of the frame. Then we use two by fours for rafters and ridge pole, also use two by fours between the rafters, both at the ends and sides, to nail the sheet-

ing to. We first sheet up with half inch lumber that is made by re-sawing ordinary undressed inch boards. This is covered with good tar paper and sided up on the outside with shiplap, running the boards up and down.

In our pens we place a window about two feet wide by three and one-half feet high in one side of the roof, placing this pen so the window will be to the south in the winter and to the north in the summer.

Still Another Good Movable Pen.

Another style of movable pen is to build it shed shaped, making it eight feet square, two feet high at the rear and six feet in front, placing a door and window in the front side. This pen will have the advantage of having a higher door, so that the attendant may walk in the pen, but the A-shaped pen has the advantage of requiring less lumber to build, less cubic feet of air space in proportion to the area of the floor, and a stronger structure, on the principle that a triangle is stronger in form than a rectangle.

Either of these pens may be made with a detachable floor. This floor should be made of two-inch plank spiked to two stringers, the plank being cut so the frame of the building will fit outside and rest on the stringer, and the stringers should be long enough so one may fasten a chain to them for the purpose of moving them from one place to another.

The advantages these pens have over the large hog houses are, they can be kept cleaner, the hogs will keep them cleaner themselves, they are warmer, the cost is considerable less for sheltering a given number of hogs, and they can be located wherever desired. One of the disadvantages of these pens, if it may be called a disadvantage, is that it is not practicable to feed the hogs in these styles of pens.

The Large Hog House.

Another style of pig pen is the large hog house, where hogs are sheltered, feed cooked, prepared and fed to the hogs in the same pen. I do not consider this use of this pen practical, because where hogs are kept in a large hog pen they are usually very filthy, the beds for the hogs wet and cold, even if the bedding is changed every day. These large hog pens usually belong to the class of pens where the man's comfort and convenience is given more consideration than the hogs' comfort.

Where one has a large number of hogs to feed, it may be practical to build a large hog pen to feed in and thus not be subjected to cold, storms, mud, etc., and have an easy and quick way of feeding a large number of hogs, but this is as far as the utility of the large hog pen should go, except possibly if one wished to use it at farrowing time, putting a single sow in a pen.

There are several styles of large hog houses, all of more or less merit and all having some advantages over the other. One very good type is to build twenty-four feet wide with a feed alley through the center, with pens and feed troughs through the center, and troughs and feeding pens on both sides of the alley. The pens may be eight feet wide and open out into small yards.

Another style of pen that I believe would be very practical for feeding a large herd would be a circular pen fifty feet in diameter. In the center have a circle sixteen feet in diameter for feed cooker, feed, etc., then have eight alleys three feet wide radiating from this center to within three feet of the outside. This would make eight pens. The entrance to these pens would be at the ends of the feed alleys. By this arrangement doors may

be used so the hogs may go in either pen on both sides of the feeding alley, feeding slop from both sides of the alley. I believe more hogs can be fed in a given area and more area enclosed for a given expense than in any other style of pen. This style of pen would also be handy to feed in, as all feed pens would be the same distance from the center where the feed is prepared.

Another advantage of this pen would be that it could be placed in the center of a lot and pasture lots could be built by building fences that would radiate from this pen and the lots could be made as large as desired by extending the fences farther out.

In the location and construction of any of these pens, good drainage should be secured. Draughts of air under all pens and sleeping quarters should be avoided, or rheumatism in the hogs will be the result. The hog will stand lots of cold on his back, but cold under him is fatal.

In conclusion, keep in mind, when building any kind of pens for hogs, the old adage, "A good bed is half fed."

DISCUSSION.

Mr. Goodrich—What kind of a floor do you like in your large hog houses?

Mr. Martiny—If I was going to build large hog houses, I would perhaps put in a concrete floor and cover it with boards, but I would not spend much on having large hog houses for sleeping quarters for hogs; where you keep hogs in large houses, they will always be filthy and troubled with rheumatism, because they won't keep themselves as clean as they do in a small pen.

A Member—What is the objection to a concrete floor for the feeding pen?

Mr. Martiny—I think it would be a good thing; in fact, I think it would be one of the most sanitary.

The Member—And what is your objection to it for the sleeping pen?

Mr. Martiny—Where the bedding would get pushed away and the hog come in contact with the cement floor, the animal would get cold, because concrete is a good conductor of heat or cold, and that would bring on rheumatism.

Mr. Elliott—You shouldn't let them get the bedding away.

Mr. Martiny—That would bring us back to the large hog house again. A concrete floor would not be practical in one of those small hog houses and if you had a concrete floor in a large hog house the floor would be wet, damp, most of the time. We have had cement floors, but we have always had them covered with plank.

Mr. Elliott—I never had mine covered and I never saw any harm from it. How would it do to have just a corner for them to sleep in and cover that with boards?

Mr. Martiny—Perhaps that would be practical. But I do not like the idea of feeding and having them sleep in the same quarters, because that is going to make filthy hogs.

Mr. Elliott—Did you ever have elevated sleeping pens?

Mr. Martiny—No, I never did. Have you?

Mr. Elliott—Yes, and I like them.

Mr. Bradley—What do you mean by that?

Mr. Elliott—They simply walk upstairs to go to bed. Yes, you may laugh, but it is no laughing question. Those pigs enjoy a clean, high, airy sleeping pen, the same as you or I would. When you elevate hogs just about twenty inches or so, you have them away from the general floor and away from the dirt and filth, and they like it. My pigs, every single one of them, learn to go up there and sleep there and they keep it perfectly clean.

I am a great believer in the sleeping pen and I am also a believer in the cement floor, and I believe we have no more rheumatism with the cement floor than you fellows with the plank floor. I have six inches or an elevation there and the manure is dropped down between the cracks and saved. Our pens are cleaned out every day and we save all the droppings of the hogs during the winter time. Certainly, if I have a sow drop her young early in the season, then I have that cement floor covered. Everything is sanitary and clean and I believe we get the largest amount of profit from the feed that our animals consume.

A Member—How do you make your stairway?

Mr. Elliott—The first elevated one I ever made, I was busy with it just when milking time came. I was just finishing that stairway when my wife came through, and she said, "What are you doing?" I said, "I am making an upstairs bedroom for the pigs." "How are you going to get them up there?" Well, all I did was to place a slanting fourteen-inch board, putting slats across it and fastened it, and when we came in from milking every individual pig was up there and they were lying there comfortably and happy.

CURING MEATS.

Thomas Convey, Ridgeway, Wis.

Curing meats on the farm does not ordinarily seem to be a matter of much importance, and yet it may be the source of a whole lot of satisfaction the means of saving money, and can bring in considerable revenue. This season affords a good example of the possibilities in the business. Pigs sold for very low prices; last fall I saw one lot of twelve weighing one hundred pounds each sell for thirty-six dollars. The dealer did not want them, as he hardly knew what to with them. Those pigs fed two months and made into home-cured pork would go on a market I have never known to be over-supplied, as the fellow who crowds the market in the fall is usually a buyer of cured or fresh meat the following summer. In this country people are getting to think they can afford to live well; in fact they are living as well as the market permits. Fruits, dairy products, eggs and

meat, if really choice, bring fancy prices. The market has improved wonderfully the last twenty years and the end is not yet in sight. The farm that has reputation does not have to look long nor far for a customer. Some of the old fellows have found that out and more of the young ones will. Regular customers and good prices are essential, but are always obtained where quality is high and uniform, and the latter is very essential; people do not like to be deceived and always resent it.

Some General Rules to Follow.

Pork is the only kind of meat I intend to discuss, and it is the only kind I know anything about anyway. The nicest is obtained from one hundred and fifty pound hogs on an average. We never butcher old stuff, as the meat is too coarse. Breed does not

have as much to do with quality as most people think. Feed has a great deal to do with it, and exercise.

Considerable skim milk is one of the best of feeds, also middlings, oil meal, gluten feed. Always have a good pasture and do not feed too much corn, although the latter is essential and may be fed more generously on pasture and with skim milk.

Do not chase or worry an animal before butchering. If you do, you need not expect the meat to keep well. This is a matter of very great importance which is generally ignored. Where an animal of any kind is worried and excited before butchering, rigor mortis, or the stiffening of the muscles after death soon sets in, soon departs, and decay begins at once. It is almost, if not utterly impossible to save the meat from an overheated animal.

Kill in frosty weather, cool thoroughly for one or two days, but do not let the meat freeze. Fresh meat contains a large per cent of moisture, and freezing affects the texture. I may be mistaken about this, as I do not know positively.

Fresh meat is like fresh milk, it takes up flavors or odors very readily. For that reason we apply sugar, pepper and saltpetre. For the first treatment they are mixed and applied like salt, being rubbed in slightly, using about two ounces of saltpetre, two of pepper, and two to three pounds of sugar per hundred of meat. Those no doubt have curative properties, but the sugar and pepper are used more to give flavor. Too much saltpetre hardens the fibre of the meat. It is allowed to stand one or two days, then the salt is used. The meat receives a moderate amount of salt well rubbed in. We do not use as much salt as formerly, as too much salt does not leave so nice a meat flavor. In ten days to two weeks it is salted lightly

again. It should be packed where the surplus brine will drain off, on a table, or in a box that is not water-tight. In a month after killing we are ready to hang meat up to smoke and dry. Little fire and much smoke should be the rule, as the meat should not be overheated and should be dry and firm before being put away.

We clean oats and pack the meat in them, not letting pieces come together. Put in a cold, dry place, usually a grain bin, away from the warm side of the barn. Bran or chopped hay would do no doubt as a packing material. Care should be taken to put away on a dry day. When the atmosphere is damp, the meat takes up moisture, so it is no rainy day job. It will mold with too much moisture, and even a dry mold will ruin flavor.

In cutting up we leave carcass in six pieces. First cut down back through flesh from outside, then through ribs on both sides of back bone, cutting lightly so ribs and back bone can be removed, the meat will be smooth and all the lean meat possible left on sides. Use a saw where possible and leave smooth cuts and nice shaped pieces.

DISCUSSION.

A Member—Do you pack in oats after smoking?

Mr. Convey—Yes, we do.

The Member—How do you kill your hogs? Shoot them?

Mr. Convey—No, we stick them.

A Member—You say you do not want to chase them?

Mr. Convey—We do not want to run them all over the yard.

Mr. Scribner—Did you ever try paraffine to preserve meat?

Mr. Convey—No, I have not.

Mr. Scribner—I have tried everything, oats and salt and everything else, and I think paraffine is the best

thing I ever used. We kept meat this summer until October. We just hung them up after paraffining them.

Prof. Carlyle—Mr. Convey, how long do you smoke your meat?

Mr. Convey—About two or three weeks. We like to get it put away before the warm weather comes, and that should be done on a dry day.

A Member—How long do you leave it in salt after the last salting?

Mr. Convey—Altogether we let it stand about a month.

Mr. Bradley—How long after the hogs are killed is it before that preparation is put on?

Mr. Convey—It is immaterial. We like to have them killed from one to two days before we do anything with them; then we put on the sugar and saltpetre and let it stand a day or two, providing we have plenty of cool weather, to give them time to get cured.

A Member—What do you smoke with?

Mr. Convey—I prefer green hickory smoke; it makes the nicest kind of smoke.

A Member—How are corn cobs?

Mr. Convey—Fairly well, but hickory smoke is the best.

A Member—How about liquid smoke?

Mr. Convey—I never have used it. I want the drying as well as the smoke. I presume you would get the flavor with the other stuff, but you do not get the drying.

Prof. Carlyle—Wouldn't it be easier for the average farmer to brine-cure his meats?

Mr. Convey—I do not like the results so well. With the right handling, of course, good results have been obtained, but you find more difficulty with the brine salting than the dry salting.

Mr. Martiny—I follow the formula issued by the Government for curing

meats on the farm. It is about four pounds of salt and two pounds of brown sugar, and I mix this up strong enough so it will support an egg; I keep stirring till the egg will come to the top, and I use thirty-gallon stone jars for putting the meat in. We use very little saltpetre.

Prof. Carlyle—There are little glass brine tests that you can get for fifty cents, just the same as a dairy thermometer, and anybody who is curing pork in the brine should have one of those, he can hardly afford to get along without one of those tests, because that is where most people make their mistakes. My wife has one of those little tests, and she has a preparation we got from an old mountaineer up in the Adirondacks, I don't know what it is. This tester, of course, is to tell the strength of the brine.

A Member—Mr. Martiny, what time do you kill your meat for summer?

Mr. Martiny—We killed our meat for summer about two weeks ago. We like to kill it a little earlier than this, so that in about two weeks from now we begin to smoke it, before the flies come.

The Member—I kill mine in the latter part of April. You don't use this liquid smoke?

Mr. Martiny—No, I do not. A very nice smoke-house can be made by taking a wagon box or a common box, and taking a sheet iron stove and putting a pipe through this box; it makes a very cheap smoke-house.

Mr. Scott—We like the hickory or corn cob smoke better than the liquid smoke. We are a little bit afraid of this preparation, we do not know what it is.

Mr. Martiny—I wish Mr. Convey would explain how he cuts up this meat.

Mr. Convey—We cut it straight down the back from the outside and down the ribs from the inside, and

remove the back bone as carefully as we can. We cut out the hams and shoulders and we leave the whole side together in one piece of meat. However, that would not be the proper way of putting it on the market for bacon.

Mr. Martiny—Doesn't that make a pretty big, awkward piece to pack?

Mr. Convey—We have a grain bin to pack it in. We do not find it awkward, because we have ample room.

Mr. Elliott—Have you ever salted it and rolled it up tight with pins?

Mr. Convey—No, but I shall certainly try it, because I think it will be all right. A great many people want to get all the salt they can in their meat, but it ruins the flavor to get too much salt in.

Mr. Martin—I can see the difference in the point of view between Mr. Martiny and Mr. Convey on these big pieces. Mr. Convey has a family of about twelve and he can use a pretty big piece of meat.

Mr. Convey—It is a matter of convenience in handling. We prefer to leave it together. We sell quite a lot of meat and we cut it as the parties want it.

Mr. Martiny—With low-priced hogs and the high price of meat at the butcher shop, could the average farmer create a demand for good cured

meats in his home town by curing in this way?

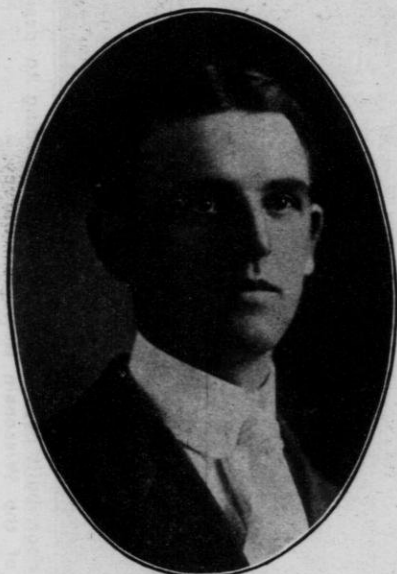
Mr. Convey—I know he could, no question about it. In fact all over this state there are good markets, your neighbors will gladly buy it of you. The main thing, of course, is to have something that they like. Another thing about it is, you do not want to put it on the market too early in the season. We wait until mid-summer, or about threshing time, and the customers will telephone and come after it and be glad to get it and pay almost anything you ask for it if it is nice, and your old customers will remain with you.

Supt. McKerrow—We have an example of that in the Jones sausage manufactory at Fort Atkinson. That has grown up to a big scale from small beginnings, because people like the Jones sausage, even across the water.

Mr. Elliott—In the line of preserving meats, those of you who have a bunch of sheep and are in the habit of killing some of them in the summer time and in the fall, just try this: Take and cure and salt the hams of the mutton just the same as you do your pork hams. Dry them nicely and find out what nice things they are. I do not know anything more tasty. Try them. They are just the same as dried beef, you know.

BRIDGES AND CULVERTS.

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



Mr. Hirst.

The subject of highway culverts and bridges is one that interests or should interest us all. Every one of us cross them in driving, and pay for them in our taxes, so we have both the interest each one of us feels in his personal safety and the interest we feel in our personal pocket books to justify us in requiring good and economical culverts and bridges. When they are improperly built, it is more or less our personal fault because we have not taken any personal interest in the subject and have not encouraged the authorities to spend enough money to get safe and economical structures, or in some cases to get structures of sufficient span. It is

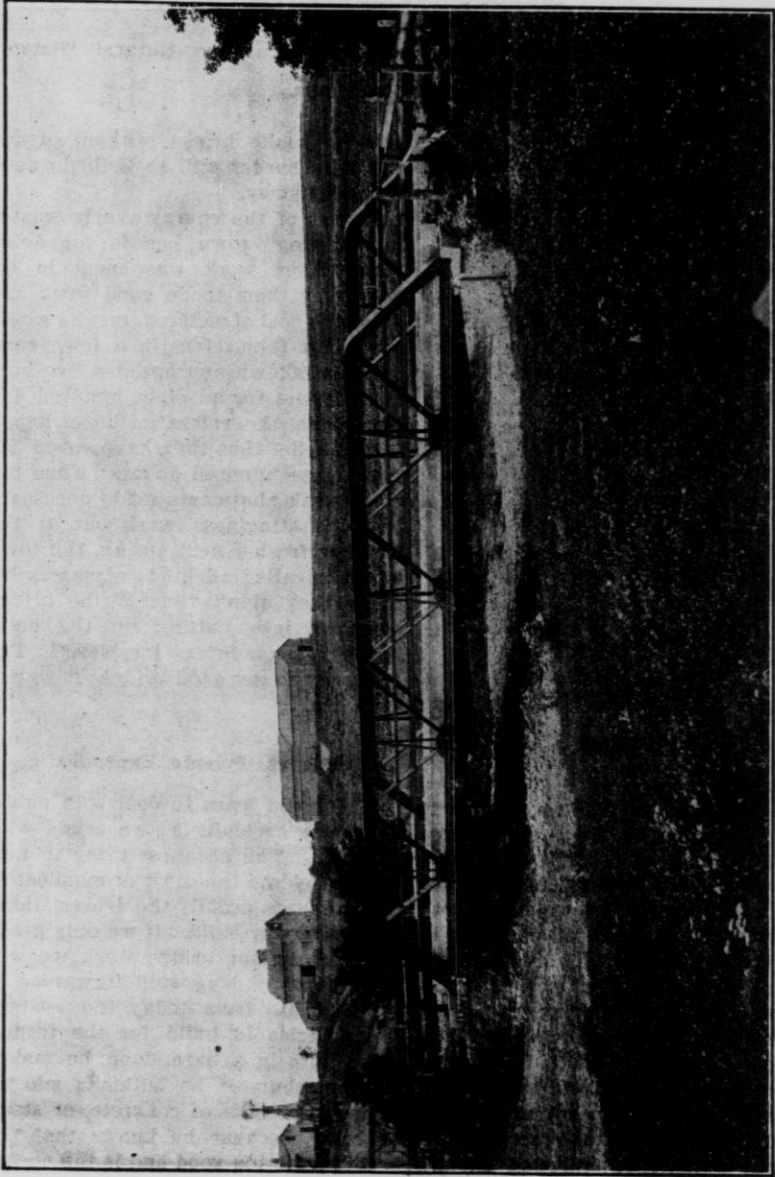
hard to make bricks without straw, and it is harder still to build bridges without money.

If part of the energy yearly wasted in "cussing" town boards for doing poor bridge work was spent in encouraging them to do good work and erect the best structures, results would speak for themselves in a few years.

When a town appropriates five hundred dollars for an eight hundred dollar bridge, the voters go home happy in the belief that they have saved the town three hundred dollars; when the poor, weak abutments made necessary by such stinginess wash out at the first big freshet next spring, the town board is called all kinds of names because they didn't "bunco" the bridge company into putting up the eight hundred dollar bridge for \$499.98. The only way to get good bridges is to pay for them.

Public vs. Private Expenditure.

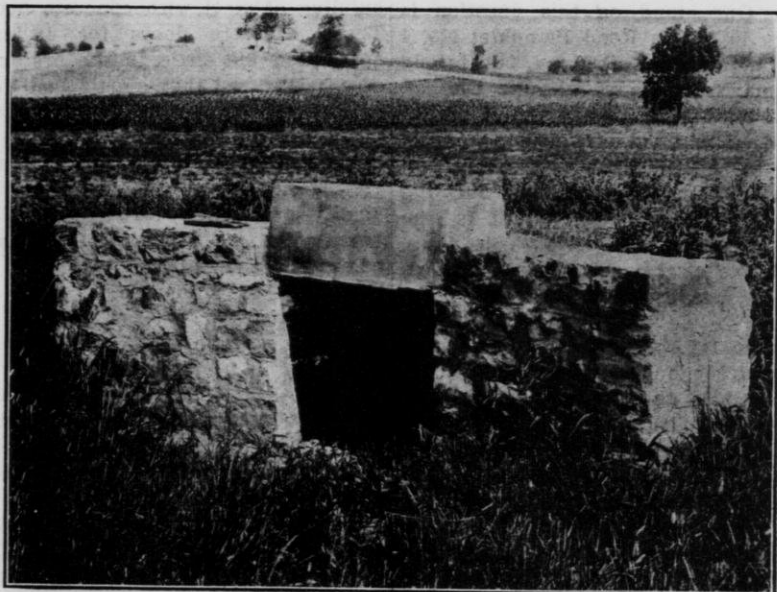
We should learn to deal with public money as carefully as we would with our own. The cheapest thing in first cost is seldom the most economical in the end; it is usually the dearest thing we can buy or build. If we only grasp this fact in our bridge work we will have taken a long step forward. In working his farm today the modern farmer tries to build for the future. If he puts in a barn floor, he makes it of cement; if he builds a silo he is apt to build it of concrete, or stone or brick, because he knows that the best is none too good and is the cheapest in the end. Why not use the same methods in our culvert and bridge work?



Forty-foot bridge with reinforced concrete floor, built near Janesville, Wis., according to designs of the Highway Division of the Wisconsin Geological Survey.

Let us interest ourselves in the problem and if the town boards are not putting up good, permanent structures, let us ask them why they do not. If they are not given money enough, help them to get more next time they construct a bridge. If they had plenty of money available and

if a concrete floor is not put in. You don't put wooden floors in your barns, why on your bridges? You don't often build stave silos, why wooden culverts and bridges? You don't build house or barn foundations of steel plates, why should we put in metal abutments to our bridges? Let us bring our



A well made culvert with masonry side walls and reinforced concrete top.
Made from plans furnished by the Highway Division of
the Wisconsin Geological Survey.

still got a poor bridge, let us ask them still more urgently, and if no good reason is given, when the next election comes around vote in a board more intelligent and progressive, or more honest, as the case may demand. Keep insisting that only the best is good enough or cheap enough.

Use concrete whenever it can be used. It is the cheapest material in the long run by long odds. If building a steel bridge, take no apologies

bridges up to the standard of our farms; make them modern and make them to last.

Don't let your town boards build a useless bridge when a slight change in the location of the road would avoid the necessity of building any bridge at all. I find it interesting in driving along the road to look at road locations and bridge locations and see when and how they could be profitably changed. Try it in your driving, and

tell your town board your conclusions. You may save the town five hundred or a thousand dollars.

Economical Structures.

The question naturally arises, what does the Highway Division recommend for culverts and bridges in Wisconsin. Our stand on this question is given in full in Road Pamphlet No. 4 on Culverts and Bridges, but briefly summarized, it is as follows: No culvert or bridge should be built of wood. Metal culverts are too expensive to be used except in exceptional cases. When they are used, only the best should be bought,—that is, the circular cast iron pipe. This form, while the most expensive in first cost, is the cheapest metal culvert in the end. We do not approve of corrugated metal culverts. They must rust out quickly and are nearly as costly as wood in the long run. Use salt glazed vitrified clay pipe only when plenty of covering and freedom from standing water can be obtained. We believe that concrete or stone culverts are best anywhere. They are usually cheaper than any form of manufactured pipe, even in first cost, and are indestructible and everlasting. They can be built by any man with an ordinary brain, with tools found on an ordinary farm. Properly built they will not crack from freezing, heave from frost, rust, rot, decay or wash out; and with all these virtues concrete has few, if any, faults. Directions for mixing concrete and building these culverts are found in the pamphlet on Bridges and Culverts, which can be obtained free of charge from the State Geological Survey at Madison. We believe the day is rapidly coming when nothing else will be built for spans up to thirty feet or even more. These concrete bridges have no wooden floors to renew, no steel

to paint and no backing to rust or rot out. They cost somewhat more than steel bridges of the same span, but one lasts twenty-five to fifty years and the other two hundred and fifty to five hundred, and then is as good as the year it was built. Which should we build?

For larger bridges we believe in building of steel with concrete floors. These concrete floors for ordinary spans add but little to the first cost of a bridge and they should last longer than the steel work, instead of being renewed every five years or so, as plank floors have to be; and lumber is getting higher in price and lower in quality each year. What may it be twenty-five or fifty years from now when you are still putting plank on the floors of steel bridges you are building today?

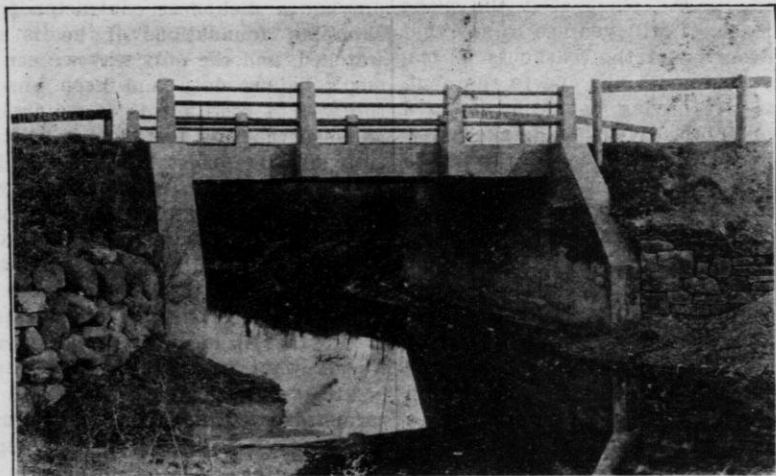
Whatever type of bridge you are building, put in good foundations. We are opposed to sticking eye beams in the ground, putting plank or steel plates behind them and calling it an abutment; and we are just as much opposed to putting in tubes with the same sort of backing or with approach spans. Put in good masonry abutments either of stone or concrete, carry them down to firm foundation, and you will have an abutment that will outlast many steel bridges. They cost more in the first place, but stone or concrete don't rust or rot, settle, or wash out, when properly built, and makes a permanent improvement, while legs or tubes at best only last as long as one bridge.

Assistance Offered.

I have briefly stated what kind of structures we believe should be built, and now the question arises, what can the Highway Division do to help the towns to get this kind of a structure. We have established a bridge depart-

ment and will design for town or county boards concrete bridges up to thirty foot spans and steel bridges up to one hundred foot spans. On bridges larger than these we will check the plans submitted by the bridge companies and see that they are properly designed to bear the loads they are to carry. These serv-

must eat, sleep, and pay railroad fares just as our men do, some one must pay their expenses, and their salaries in addition, since they are paid by the bridge companies, while ours are paid by the State. This cost is, of course, added to the bids made on the structure and the town must pay it. Lots of objections will be urged by



Twenty-foot flat top, reinforced concrete bridge near Madison, Wis.

ices will be free to the bridge officials, except that owing to our small appropriation we will be forced to charge up to each town the traveling expenses incurred by the engineer in visiting the bridge site for the purpose of making the necessary examination to determine the span needed and the character of the foundations. These expenses will in no case be very large, as we intend to so arrange his trips that no long jumps will be made.

Some of you are probably thinking, "We can get the bridge companies to do this designing and it won't cost us a cent," but it only takes a moment's reflection to make it clear that since bridge companies are not run for charitable purposes and their men

the bridge companies against our doing this kind of work, but we have assurance from most of the good ones that they will welcome a change from the present chaotic system of letting bridges to a system open and above board which puts them all on an even basis.

We can protect the town boards by naming in advance of the letting a fair price for the bridge, by furnishing plans and specifications by which all bidders will bid on the same structure, by checking the details submitted by the successful bidder, and by inspecting steel bridges after they are built to see that they have been built according to specifications. More we cannot do until state aid for roads

and bridges becomes a fact in Wisconsin.

Inspecting Work.

In conclusion, I want to say a few words about inspecting foundation work as it goes in. It is useless for us, or anyone else to design proper abutments if they are not put in according to the plans after the plans are made. I will venture to say that three-fourths of the washouts of masonry abutments are due to the abutments not having been put in to a proper depth. We should take a lesson from the parable of the house built on the sand and carry our abutments down to a good solid foundation. We don't want to build on sand and mud and have the rains descend and the floods come and have them fall, but rather build on the firm base that holds forever. If you haven't a good foundation, make one by driving piles, but get it at any cost within reason. In building any bridge, see that the foundation work is inspected by some intelligent, honest and reliable man as it is put in. You do not have to get an engineer; just get an honest man; if you cannot find him right off, buy a lantern and imitate Diogenes. Put him on the work to see that the foundations are carried down to a proper depth, the mortar or concrete well mixed, and the dimensions on the plans followed.

It is useless to have the bridge committee inspect the abutments after they are completed; what they see is not the important part of the structure. It is the part out of sight below the ground which supports the weight and whose failure is the cause of washouts. Twenty-five or fifty dollars is well spent in inspection if in the end it saves you a two thousand-dollar bridge.

The town boards should be support-

ed in having these inspections made, instead of being blamed for wasting public money, as is sometimes the case. The depth to which foundations are carried is one of the most important points about the bridge, and we can never be sure we get what we pay for unless we see it and measure it.

The best contract in the world won't prevent a dishonest contractor from skimping foundations if he is not watched, and the only way we can do our religious duty and keep him in the way of rectitude is to watch him and see that his feet do not slip. I call myself honest, but I wouldn't trust myself not to skimp just a wee bit if I wasn't watched, and I would feel a great deal safer if I had a good inspector there to keep me straight.

Let us insist that when money is spent on a bridge some one is there to see that it is spent properly, and we get what we pay for. This stitch in time may save a bridge, and to paraphrase the old saying, sometimes for want of an inspector the depth was lost, for the want of depth an abutment was lost, for want of abutment the bridge was lost, for want of a bridge the horses were lost, for the loss of the horses the town board paid five hundred dollars, and built a new two thousand-dollar bridge.

Let us plan good bridges, build good bridges and pay for good bridges, but above all, let us see that they are good bridges before we pay for them.

Every good citizen owes it as part of his public duty to interest himself in this road and bridge problem and see that better results are obtained than has been the case in the past. The only way conditions can be bettered is by an intelligent public interest in this movement exhibited by everyone. Let us hope that such an interest will soon become apparent.

DISCUSSION.

Mr. Goodrich—Is there sometimes a failure in making good concrete bridges and culverts because of the concrete not being properly mixed, or the cement not being of a proper quality?

Mr. Hirst—Yes, I think that is the principal cause of failure, the fact that it is not properly mixed; and another thing, when gravel is used it is usually not screened. We believe in screening gravel for concrete. You do not have to throw away the sand you screen out of the gravel, you simply put it back, but screening it out and mixing together again assures you of the fact that you get a good, even mixture all the way through and it cuts out the weak spots.

A Member—Why is it so many of the farmers are placing boards on top of the cement?

Mr. Hirst—I think that is to keep the stock from catching colds from the dampness; it is not because it is not strong enough to bear the weight. It is some hygienic reason, surely. It is slippery, too.

The Member—I think it is not as slippery as plank.

Mr. Hirst—You will have to take up the stock question with somebody else.

Supt. McKerrow—That will come up later.

Chairman Imrie—Would you have any covering on these concrete bridges and culverts besides the concrete?

Mr. Hirst—I would prefer to have about twelve inches of dirt; it prevents the wear and any sudden shock.

Chairman Imrie—Does frost have any effect on concrete when it is green in bridges?

Mr. Hirst—If you lay it in very cold weather, the concrete is kept warm

by mixing with hot water, or the mixture is mixed with salt, so that it cannot freeze before it sets.

Mr. Bradley—What is the advantage of a flat top rather than an arched top on small culverts?

Mr. Hirst—We build these culverts flat topped because they do not take the headroom to get the same area of water way for bridges of the same span, and the amount of concrete is less. It does not take as much excavation to put down the abutments, because the abutments do not have to be so heavy, and an additional advantage is you do not have to make so much filling to get up to the top of the bridge. Flat top culverts are ideal for flat places.

Mr. Bradley—How many inches of concrete covering should there be on an ordinary iron bridge where it is properly reinforced?

Mr. Hirst—It should be about six inches.

Mr. Bradley—How far from the surface would you have your reinforcement?

Mr. Hirst—The reinforcement is placed as close to the bottom of the floor as you can get it, usually about a time and a half the size of the rod you use from the bottom.

A Member—Do you use round rods or square bars in reinforcement?

Mr. Hirst—I do not think it makes much difference. We prefer square rods, either twisted or corrugated, for ordinary spans.

Mr. Goodrich—Will the rods corrode and finally break where they are in cement?

Mr. Hirst—No, sir, they get in better shape than when placed, rusted rods will even become clean when placed in concrete. It is practically air tight and there is no oxidation, which causes rust.

GOOD ROADS.

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



Mr. Hotchkiss.

Good roads are always interesting. There are very few of us who will confess to a particular liking for rough or muddy roads. We all want good roads, but our main trouble is that we want them just badly enough to wish that the other fellow would build them; we do not really want them badly enough to spend very much of our own grey matter and elbow grease in making them. This laxity of purpose in regard to our roads is responsible for most of the ill-considered and misdirected efforts to improve them and the consequent great waste of time and money. The expenditure of more money is not so much needed as the more careful

spending of what we are at present putting on our roads.

In building roads, there are three important steps: 1, Location; 2, Construction; 3, Maintenance.

Location.

In hilly country the securing of easy grades is very important, and hills must be avoided wherever possible. The bail of a pail is no longer, you know, when it lays flat than it is when it stands upright. The importance of the grades is particularly to be borne in mind when we begin to improve the surface of our roads. Let me give you an example to illustrate this. An ordinary twelve hundred-pound horse exerts enough to pull to move a load and wagon weighing three thousand pounds on a first-class dirt road at a rate of two and one-half miles an hour, and can keep this up ten hours a day and six days a week. On hills a horse can pull for a short distance two and one-half times as hard, but even pulling this hard he can only take twelve hundred pounds, or forty per cent of the three thousand pound load up a six per cent grade, a rise of only six feet in a hundred, if the grade had a first-class macadam surface. In this case it would not seem necessary to provide a macadam surface on the level so far as heavy loads were concerned, if the hill was not cut down.

We have to load for the hills, not for the level stretches, and so in a hilly country the first thing to consider is to cut down the hills. In doing this, the cheapest method should be pursued. I have been over roads in

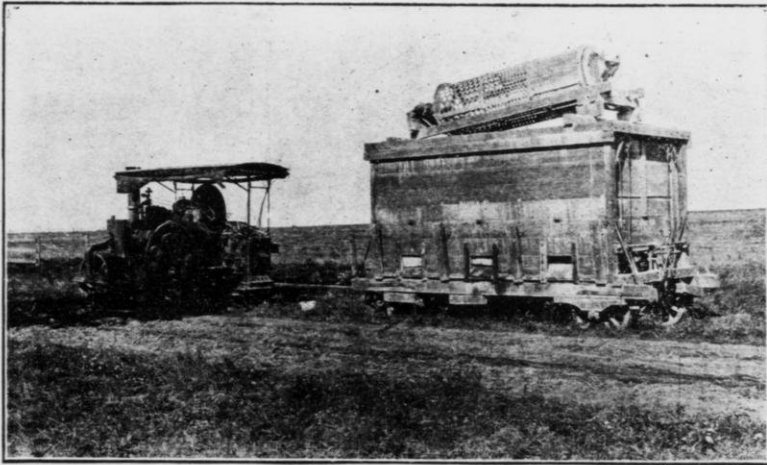
this county where cuts costing hundreds of dollars could have been avoided by leaving the straight line and building the road around the hill rather than over it.

Construction.

The most important principle of good road construction is proper drainage.

a good crown with the road machine, and good ditches to carry the water to the natural drainage channels. This is all that can be done, unless we desire to put a surface on our road.

The cheapest surface that can be provided for a road is clay for a sand road, or sand for a clay road. In either case the surfacing material should be plowed and thoroughly dragged, so as to mix the clay and



Steam roller and portable bin, a government outfit which built the Rock county road shown herewith.

Sand roads are at their best when damp, so we provide some means to keep them so, either by covering with straw or hay or sawdust, or by protecting them with trees and brush. We do not build a high grade on a sand road, but leave it as flat as we can and not have the water stand on it in puddles.

Clay and loam roads are best when they are dry, so we provide means for the water to get away quickly. If the ground is springy and very wet, we provide tile drains to get rid of the water below, and we get rid of the surface water by giving the road

sand. A little care in this extra mixing to make it even will save a lot of money, for the road will wear full of chuck holes if the mixing is not done evenly.

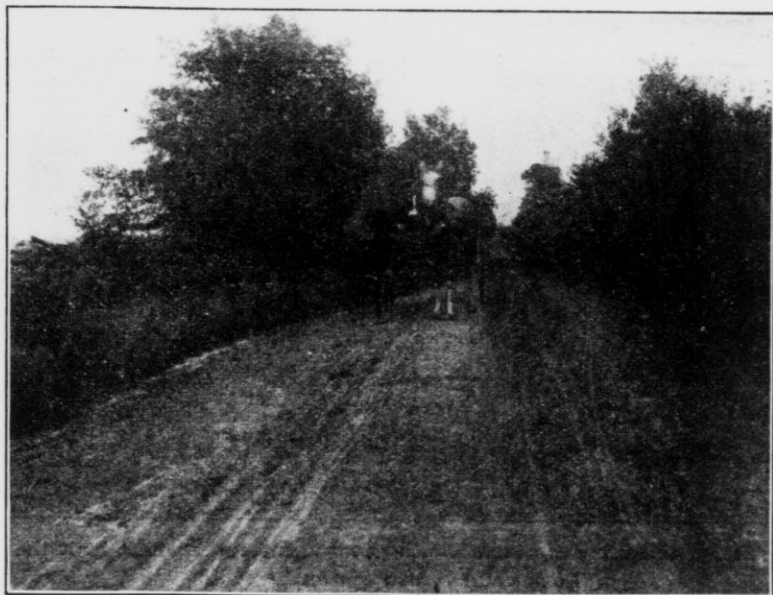
The only other practicable surfaces for country roads are stone and gravel. The best way to build these is to use common sense; to put the stone on so it will stay where you want it, and pack it down hard so it will have a smooth surface for travel and shed the water to the ditches.

The best thing to do is to make a trench as deep as you want the stone and having a bottom rounded up just

like the surface is to be. The dirt walls to this trench form shoulders to hold the stone or gravel in place.

The best and cheapest way of compacting stone or gravel is to use a steam roller. Horse rollers are too light, and are expensive to operate. But steam rollers are not available in most towns and are too expensive for

on teams, of course, but it is the only way to get the road packed quickly. If you can't do this, the next best thing is to start at the farthest end of the road and after dumping a load drive the empty wagon clear to the end of the stone before turning around. This won't pack it nearly as well as the other method, but it will



Road at Waupaca, Wis., worked with split log drag.

a town to buy, so most towns must do without them until the counties buy them, as La Crosse and Rock counties have already done. When there is no steam roller available, the stone or gravel must be packed by travel, and the best time to do it is when the road is under construction. If you will dump the first load nearest the place you are hauling from, and after spreading it make every following load drive over it, you will have it fairly well rolled by the time your road is finished. This is a hard thing

be better than nothing at all.

As to the width and thickness, it may be said that six to eight inches of well compacted stone or gravel will wear better than a foot of poorly laid material. The width is a feature that will vary with the amount of travel, but there are few roads that need a greater width than nine or ten feet with the present travel. It is not necessary to provide sufficient width of hard surface to turn out on, as the dirt shoulders will answer for this purpose, and it is necessary to get

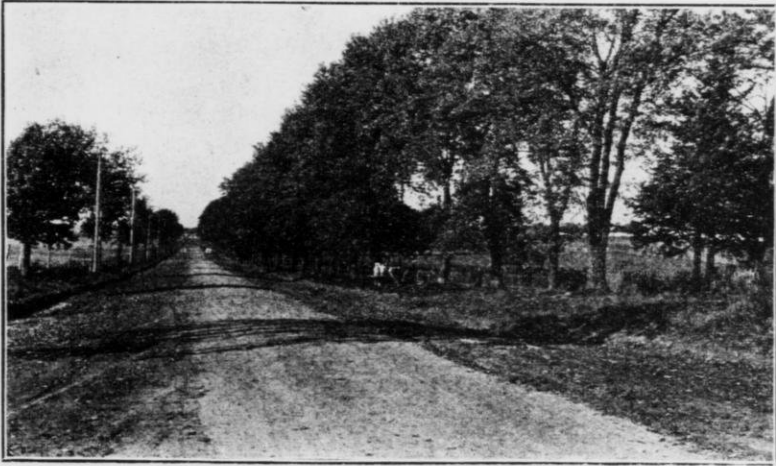
all the length of hard surface that we can. It is better to build two miles of nine foot road than one mile of sixteen foot road.

Maintenance.

Stone and gravel roads must be cared for the same as any other kind, and it is just as true here as any-

can be done. It is drawn along the road at an angle so as to move a little mud towards the center. This wet clay or loam is thoroughly puddled and packed down into the ruts, leaving a smooth surface that bakes hard in the sun and wind just like your clay fields bake when they are worked too wet.

A continuation of this dragging for



A Macadam country road built by the U. S. Department of Agriculture in town of Clinton, Rock county, Wis.

where else, that a stitch in time saves nine.

The majority of our roads must be made of earth for a longer time than any of us shall live, and all that we can do for them in the way of construction is, as has been stated, to provide proper drainage. What is needed most by our dirt roads is a cheap method of maintaining them.

The split log drag furnishes just such a cheap means of maintenance. It is made as shown in the cut, and is so simple and cheap that every farmer having a clay or loam road can have one. The drag is used after a rain when the soil is wet and but little else

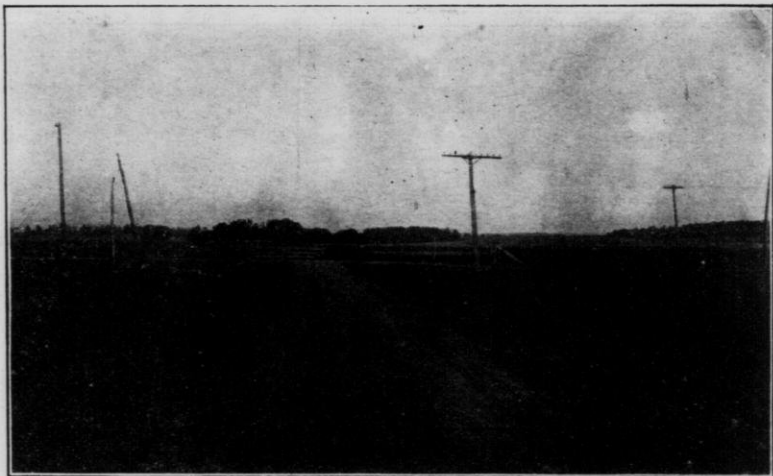
a few years results in a thick surface of hard baked soil, baked down layer by layer and thoroughly packed by the wheels of the wagon. Such a surface is impervious to water and it is hard to form ruts in it, so the water runs to the ditches quickly and the road is dry in a short time after a heavy shower, when an ordinary rutted clay road would be nothing but a succession of puddles. The drag will do more for our clay and loam roads, and do it far cheaper, than any other method of maintaining them.

The First Step Towards Good Roads.

The first thing to do if we are ever

to get the good roads we want is to secure a public interest, which means your interest and my interest, a public interest which really desires good roads enough to be willing to spend some personal time and money in building them. The Highway Division of the State Geological Survey has adopted as its motto, "A Dollar's

care for their forty miles of dirt roads, towns have about sixty miles of road, of which perhaps twenty may be called main traveled. If they had put half their money on these twenty miles of first-class stone or gravel road, by this time they would have had it all built and paid for. They would have had left enough money to care for their forty miles of dirt roads,



Gravel road built in Rock county by Highway Division of Wisconsin Geological Survey. As a result of this work and that done by the U. S. Department of Agriculture Rock county now owns two steam rollers and is building 25 miles of improved roads this year.

Worth of Road for Every Dollar of Tax," and when this becomes the purpose of every tax payer we will get good roads very shortly. We are spending enough money now to get far better results if the money were more carefully expended. We do not urge the spending of more money, but the careful expenditure of what we already spend.

Many towns in the last thirty years have spent over one hundred thousand dollars on their roads. Supposing they had started out with this in mind and had planned out their work. Most

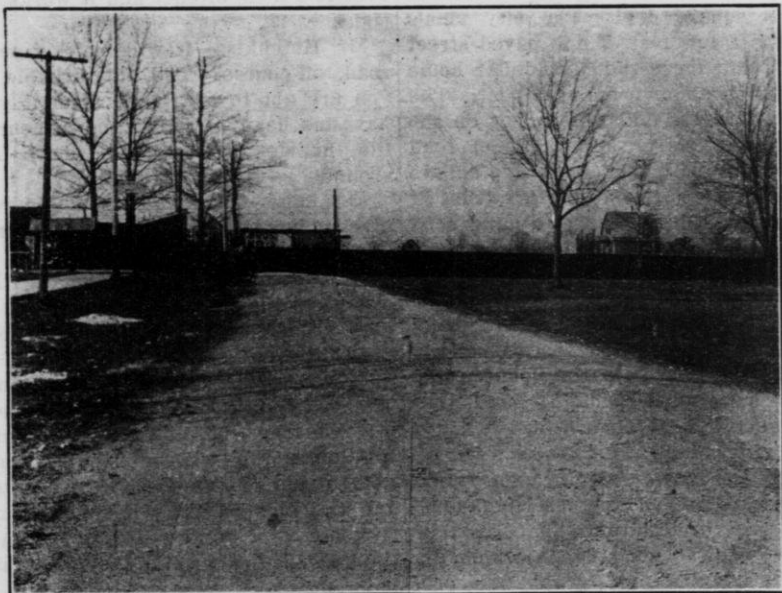
if it had been carefully expended, practically as well as they have been cared for.

Such a result as this requires careful forethought and that determination of the tax payers, to get a dollar's worth of road for every dollar of tax. It requires sufficient business head and public spirit to spend two dollars for some permanent improvement where something could be gotten for one dollar that would last till the next town chairman was elected. There has been too much of the feeling on the part of the town officers

that "I'll do the cheapest possible thing without regard to durability and let the next man replace it," when by spending a little more money for the first cost of a piece of road or a concrete culvert, it would have been done for good and the expense of the town of continued renewals altogether done

part of our bad roads to our system or to our officers, the main blame is due to ourselves, and we will never have good roads until we get that strong Public Sentiment which demands A Dollar's Worth of Road for Every Dollar of Tax.

The next thing needed for the build-



Demonstration road built by the Highway Division of the Wisconsin Geological Survey at the Wisconsin State Fair, 1907.

away with. But we cannot blame the town officers for this. We are to blame ourselves, for we have made their official lives dependent on this sort of thing. We have complained if our taxes were a dollar higher, even though the extra dollar has possibly been spent in building a stone or concrete culvert or in draining a bad piece of road, a thing that we will never have to pay for again, but which has been a continual source of expense in the past.

So, although we may blame a small

ing of good roads is outside assistance in paying for them. It is rapidly becoming recognized that it is not just to ask the farmer to build good roads unaided, for others are just as much benefited as he is and should pay their share. The people of the cities and villages are anxious to have the farmers come to them often to sell produce and to buy things for consumption on the farm. The railroad and express companies are benefited very materially by the increased business that such ready means of access to

town brings them. Such being the undisputed fact, it is only just that they should help to pay for those good roads that mean good business to them.

It is often said by some people that the cities and villages maintain their streets without assistance and the farmer should do likewise, but this is not a square deal. The city man's lot has a few feet of fine paved street that for a three thousand-dollar home costs him about a dollar a year. The three thousand-dollar farm has on the average a quarter of a mile of road that costs the owner about five dollars a year. It seems, therefore, that if the country districts are to build good roads that are of benefit to the business of the cities and villages, it is only fair for them to bear a part of the cost. Progressive cities are realizing this and are in many cases subscribing liberally to help the country districts build good roads.

County aid, through which villages and cities help to pay for country roads, and State aid, through which the railroads and express companies, etc., help, are therefore only part of a just, equitable system in which everyone bears a part of the cost proportioned to the benefits derived.

In conclusion it may be said that we will never get the good roads we ought to have until there is a strong public sentiment demanding "A Dollar's Worth of Road for Every Dollar of Tax," and until everyone interested, cities and villages, and the State, as well as the farmers, pays a just share of the cost.

DISCUSSION.

Mayor Keys—What heft of steam roller would you recommend?

Mr. Hotchkiss—A ten-ton roller is all right. A five-ton roller is rather too light; it doesn't bring as much

pressure on the road per inch of width of tire as an ordinary wagon. Unless you are using the very hardest material, a twenty-ton roller is too heavy. I think it is best to use a lighter roller on all our Wisconsin roads.

Mr. Marty—We use an eighteen-ton roller. We use it for stone and go over it a little oftener and it works all right.

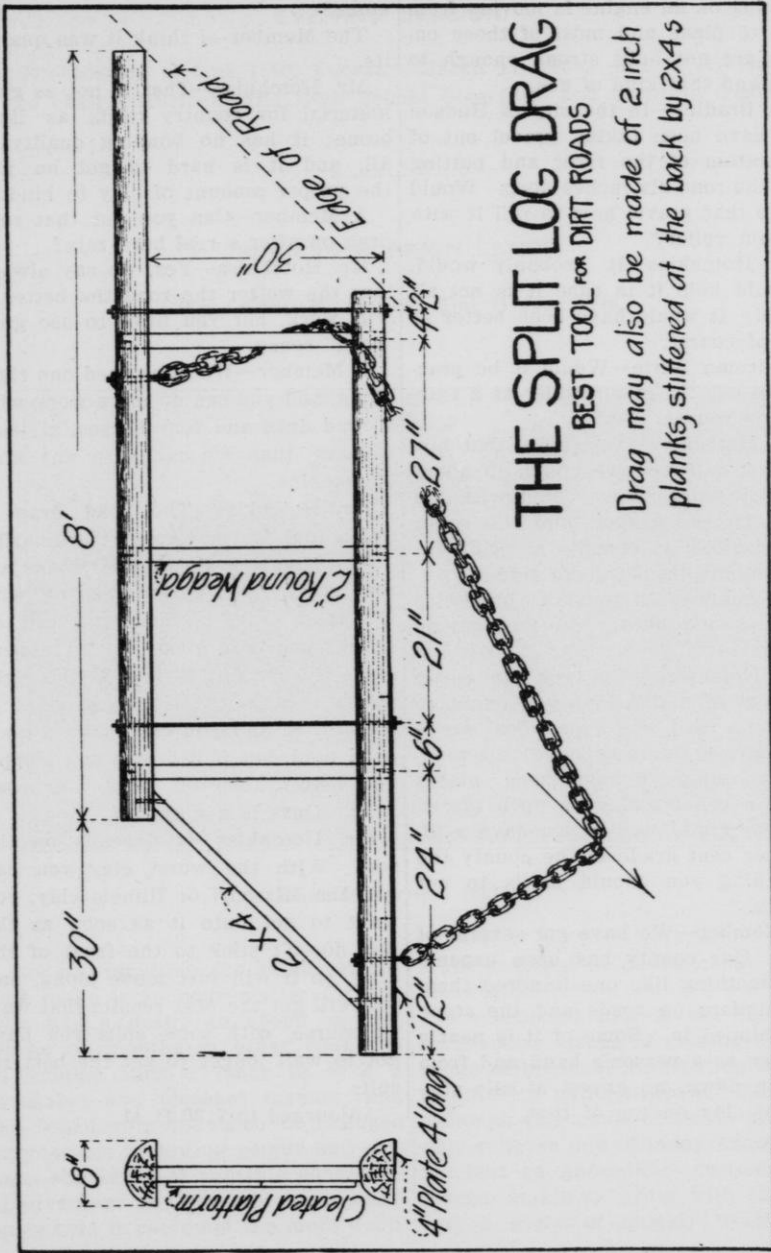
Mr. Hotchkiss—It will make a good road, of course. The only trouble is you are apt to break the bond if you have too heavy a roller, and of course the heavier roller costs more all around.

A Member—What advice would you give us in regard to the use of a traction engine?

Mr. Hotchkiss—It is first-class, the cheapest thing you can get to pull a road grader. When it comes to rolling, however, it is pretty difficult to do a good job with a traction engine. The great trouble is that the wheels are not very wide and are flat. Your traction engine will build a flat road without any crown to shed the water and the lugs on the wheel dig it up so you cannot get a satisfactory bond. It is a fine thing for drawing a grader, however.

A Member—Have you ever seen a traction engine made for the purpose of grading roads with a wheel made for rolling roads?

Mr. Hotchkiss—I never saw one of that kind. There are a number of traction engine companies who make road rollers which are practically nothing but a heavy traction engine with smooth wheels on it. I never had any experience with that kind of a roller, but I have talked with a number of road engineers who have used them, and they say that it takes three men to run them; that you have got to have one man to fire, one man to run the engine, and another man to come along with a basket and pick



THE SPLIT LOG DRAG

BEST TOOL FOR DIRT ROADS

Drag may also be made of 2 inch planks, stiffened at the back by 2x4s

up the pieces that fall off. The hardest thing on an engine is moving from place to place and most of those engines are not built strong enough to withstand that kind of use.

Mr. Bradley—In the city of Hudson they have been taking gravel out of the bottom of the river and putting it on the road six inches deep. Would it help that gravel now to roll it with a steam roller?

Mr. Hotchkiss—It probably would. It would help it in case it is not all packed. It would have been better at first, of course.

Chairman Imrie—Would it be practical to use the steam roller as a traction for your grader?

Mr. Hotchkiss—Yes, I did that myself last fall and we could do about as much work as we could with ten teams on the grader, and the roller walked along as steadily as could be, not jumping from side to side.

A Member—Can you work hills with those steam rollers? Can they get up a hill?

Mr. Hotchkiss—Yes, you can go up any sort of a hill that you ought to have on a road, and a good deal worse hill than you ought to leave on a road, with a roller. I have seen places where a roller had gone up a fifteen per cent grade, and if you have a fifteen per cent grade in the county the first thing you should do is to cut it down.

A Member—We have got several of them. Our county has been expending something like one hundred thousand dollars on roads and the stone was shipped in. Some of it is nearly as large as a person's hand and from that on down, no gravel at all; simply put clay on top of that.

Mr. Hotchkiss—What was it, limestone?

The Member—I think it was quartzite.

Mr. Hotchkiss—That is not as good material for country roads as limestone; it has no bonding quality at all, and it is hard to get on just the proper amount of clay to bind it.

A Member—Can you put that road drag on after a real hard rain?

Mr. Hotchkiss—Yes, we say always that the wetter the road the better it will work, but you have to use good "road" sense.

A Member—We have used one right along, and you can do more work with a road drag and four horses, at least we can, than we can with any kind of machine.

Mr. Hotchkiss—The road drag is not a tool for moving dirt ordinarily.

The Member—But if your roads are real muddy, you better keep off with the road drag, because you will do more harm than good. In my experience, if your dirt is just at the right stage, then is the time you want to go onto it, and you can make a good hard road, but if it is wet and sloppy, you better keep off with your road drag. Ours is a clay soil.

Mr. Hotchkiss—It depends on the soil. With the worst clay you can get, the Missouri or Illinois clay, you want to get onto it as soon as the dirt doesn't stick to the front of the drag, so it will just move along, and you will get the best results that way. Of course, with some soils you have got to wait longer to get the best results.

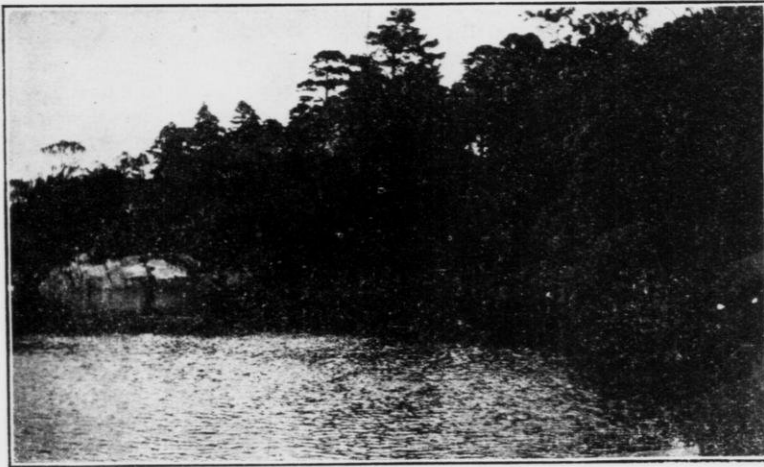
Adjourned to 7:30 P. M.

EVENING SESSION.

The session met at 7:30, Tuesday, March 17, 1908. Mr. W. C. Bradley in the chair. Music by the High School Glee Club and Institute Quartette.

SEEN IN FOREIGN LANDS.

Mrs. Adda F. Howie, Elm Grove, Wis.



Lake Killarney, Ireland.

Modern facilities for rapid transit now make it an easy matter for one who has a desire to spend a few weeks or months in other countries to indulge such a fancy in both a profitable and pleasant manner, and the broadening influence of changed impressions regarding people and customs should be of valuable educational advantage to those who have previously held in contempt the more deliberate progress of development in the old world.

A conducted tour is not the most satisfactory means of gaining a wider range of personal information relative to different nationalities and lands, for, although this mode of travel undoubtedly relieves one of many annoyances incident to unfamiliar customs and places, and may bring with little effort a store of quickly evaporated,

mechanically served lore, there are so many delightful byways into the homes and hearts of lovable, genuine people that are never penetrated by the average bustling, rushing tourist, that the strongest impressions brought back from such a trip do justice to neither race nor country, but as a usual thing are drawn from exasperating experiences with tricky cabman, obsequious hotel clerk, or shrewd shop-keeper, who, in perfect keeping with the business principles of any nation, regard the profligate tendency to display and disburse as a distinctive American characteristic, and one to be encouraged for their greedy benefit.

The marked contrasting attitude of the going and returning tourist is noted by any steamer official, who generally falls into the habit of studying human nature, and consequently, after years of service on an ocean liner is eminently fitted to wisely comment on the enthusiastic bearing of the restless, money-laden traveler when he is about to set foot on alien soil and the subdued, cautious passenger of a few months later. It will be a fortunate thoughtfulness that will have provided him with a return ticket, for his limited supply of cash will be doled out in sums that bespeak a wide range between the amount of tips bestowed on the outward going and home-coming voyage.

Outward Bound.

Nor is the time spent in transit from shore to shore without benefit to the bustling, nerve-strained American, for, despite the days when the only relief from the sight of crawling, creeping waves that break in foamy bubbles against the sides of the hurrying steamer, may be a school of flying fish, a whale, or the persistent shark that brings a dread foreboding

to the superstitious sailors, there comes a feeling of peace, of rest and satisfaction, that even the wireless messages, seeking out those whose purses are equal to the demand, cannot dispel; the quieting effect of relief at being shut off from the turmoil of an active struggle.

After a day or two of awed bewilderment, the novice rouses sufficiently to take a passing interest in occupants of neighboring deck chairs, and speedily finds the monotony of pounding engines and crunching waves forgotten in the pleasure of meeting delightful people whose present object in life follows in the same lines, and, with an exchange of plans and experience, a friendship may develop that will reach with happy memories and joyous hopes far into the future.

Games of shuttle cock and magic ring furnish exciting amusement for participator and on-looker, while music and the many meals, together with the complicated task of figuring passing hours by the stroke of bells and the eager rush to inspect each newly posted sailing record, play an important part in banishing time between the waking and sleeping hours. And when at the end of such a day one sees through the darkness of a swiftly coming night the mighty, mysterious waters stretching out on all sides, and then climbs into the narrow, rail-guarded berth, it is with the mingled feeling of helpless subjection and the sturdy confidence of a long abiding faith that God watches over all.

Regret is found defying exultation when the gang plank is ready to echo the tread of departing footsteps, and conflicting emotions that come with a long cherished and about-to-be-realized ambition crowd heart and brain.

Through the Emerald Isle.

The first view of Ireland presents a most beautiful scene and brings force-

fully to mind the significance of the name "Emerald Isle," for every tree and vine and shrub fairly revels in verdant vegetation. One who has grown up with a fixed belief that the people of that land are thriftless and slovenly, will experience a rapid change of ideas when they gaze upon

of different domains. Among them I saw several stately war ships and two formidable torpedo boats. The first impression of Queenstown is a most pleasing one; a clean, thrifty, quaint and beautiful city, is this vestibule to unexplored territory beyond.

From Queenstown to Cork one pass-



Abbotsford, the home of Sir Walter Scott.

the fertile fields that are seemingly in the finest stage of cultivation. Indeed, it is such an awakening shock to one who has accepted without question long settled traditions, that in referring to a history of prosaic facts where Ireland's agriculture at one time is credited with being the best in the world, the country and its people quickly take a long stride upward in a claim for admiration and respect.

In the beautiful, land-locked harbor of Queenstown are usually to be found many strange craft, bearing the flags

es through a fine section of farming country; nearly every field is bordered by substantial stone walls, many of them built in solid masonry and some of them topped with neatly trimmed hedges of hawthorn. Curious stucco houses with tiny windows and thatched roofs are frequently to be seen. Massive stone bridges, with arches picturesquely covered with ivy, crossing streams here and there, make a landscape unsurpassed for artistic loveliness, and one instantly feels the spells cast by the fairies and gnomes

that are believed to hold night revels in every enchanted field and glade.

Beyond Queenstown lies Cork, and no one would think of ignoring so prominent a city. A Blackrock and Trivola tramcar passes through a most charming part of the place, and the neat dwelling with freshly whitened steps and brilliantly burnished door brasses, with lovely flower-strewn yards and genial people, left a pleasant memory.

Eight Irish miles beyond Cork lead to the renowned Blarney Castle, and as a matter of course the native jaunting car is used as a means of conveyance. The Castle itself is almost indescribable and would require a far more fluent pen to in any way do its magnitude and massiveness justice. Its commanding location and symmetrical architecture was certainly a triumph of brain work in the fourteenth century, and its present grim, forbidding appearance inspires a weird feeling of awe to the beholder. A narrow winding stair of stone, with niches in the wall at frequent intervals to accommodate those who would pass another on the way, leads to the top of the stronghold, and one not accustomed to the place could easily become lost in the labyrinth of small rooms and gloomy cells with secret passages running here and there above and below the level of the ground.

The location of the famous "Blarney Stone" would well cause a thrill of horror to creep up and down the spinal column of a timid person who had ever secretly cherished a longing to test its magic, for one must lie upon his back and stretch far out across a chasm before he can press his lips to the potent talisman. Courage as well as athletic ability is required to do this, as a slight giddiness or miscalculation would surely result in a plunge on the huge rocks that lie more

than a hundred feet below. A few of the reckless have accomplished the feat, but the many who turn from the ordeal content themselves with the comforting rumor that the genuine stone is in another part of the building. It is distinguished by a carved leaf of shamrock and is beyond the reach of the most venturesome tourist. However, the castle is well worth taking a long journey to see and its ruined walls and stone paved cells furnish a theme for speculation as to the purpose and occupation of this regal stronghold.

Killarney, immortalized in story and song, reaches out arms of unlimited fascination, and not the least of these allurements is a coaching trip which leads through the picturesque gap of Dunloe, for nowhere are better roads to be found, and it is claimed that the taxes levied to insure the perfect condition of these same highways are one of the principal causes of rebellious discontent. Notwithstanding this unfortunate drawback, the trip is a most delightful recreation, and although a drizzling rain is quite apt to bear one company, no one in Ireland ever stops for rain; they don rubbers and a cravenette coat, and, when a sudden shower causes an undignified scramble for umbrellas, the driver cheerily remarks that its simply "Kate Carney's blessing" that is falling on their heads.

Six miles by coach and then the ponies, led by guides, bear us through winding paths, up hills and through glens, where tiny lakes of crystal water reflect purple bunches of heather that hang in royal splendor on the mountain side; trickling streams rush down the hillside and hurl themselves in foaming ecstasy into the broader and more placid waters that border the way. At all too frequent intervals the magic spell of the exquisite scenery is broken by the piping voice

of a vender of souvenirs, who insists on exchanging trinkets made from native bogwood, fruit or boutonnières of heather for the coin that shall bring more substantial necessities. A beverage of "Mountain Dew," with the innocent tint of milk and the suspicious odor of a stronger stimulant, is temptingly proffered for refreshment, and the man whose horn awakes responsive echoes from the mountain side, with the photographer who in-

that the ponies might be idle has compelled tourists to employ this less comfortable mode of transportation. At the park a row boat with four oarsmen will be on hand for the fourteen mile row through the river and chain of lakes. This trip also includes the exciting feature of shooting the rapids.

In short, while one might dwell long upon the individual charms of Ireland's rural holdings and the pleasing



Dryburgh Abbey, where the tomb of Sir Walter Scott is located.

delibly identifies one with the attractive landscape, are eager to do service for a recompense.

This Gap is bordered by a mountainous range, varying in height from two thousand to nearly twice that number of feet. The road passes by the beautiful lake, wherein, a guide will insist, St. Patrick banished the serpent, and that the reptile still daily begs to be released. The potent little "wishing bridge" is crossed, and when an elevation of over eleven hundred feet is reached a gradual descent is made. At no place would the road be impassible with a cart, yet the fear

features of substantially built cities, at no place did I see striking evidence of the dire poverty of this happy-go-lucky nation, for well tilled farms and neat, attractive cottages gave a thrifty look to what seemed to me one of the most beautiful countries on earth.

A Glimpse of Scotland.

If one takes passage at Strainer, it will require scarcely more than an hour and a quarter to cross the Irish channel, and here will be found a train waiting to bear passengers to Glasgow. It is interesting to note

how short a space of time will in so marked a manner change the entire characteristics of people and place, for the dress, dialect and features have no semblance to the inhabitants of the Emerald Isle, and one quickly recognizes the fact that unseen boundaries are designated in a more forceful manner than by puny dividing lines of water or wall. The way lies through the famous country of Ayr and on all sides, thickly dotting the Scottish meadows, may be seen magnificent herds of the cattle that have brought prominence to this section of the country.

At Ayr, the temptation to visit the home of Robert Burns was yielded to, and the humble cot which was once the abiding place of that great poet will offer much that is interesting in the shape of simple and curious furnishings, also a stroll to the "Old Brig O'Doon" and a stop to view the ruin of Alloway Kirk with its peaceful graveyard, where may be seen the modest slab that marks the last resting place of Burns' father. The shadows falling in weird figures in and on the worn, dismantled sanctuary, call to mind the inspiration that set Tam O'Shanter's mare flying with fear-spurred limbs adown the attractive highway.

Yes, the influence of such surroundings must have been a powerful factor in shaping the poetical career of Robert Burns, for one far less gifted with ability to weave fanciful imagination into pleasing rhyme will feel the harmony that pervades this ideal spot.

To the historian, as well as to the wayfarer, Glasgow opens up a wealth of valuable treasures, and it is here where we find defying time and warfare the magnificent old Cathedral. It was erected in the eleventh century and was the only church left standing in Scotland after Cromwell's raid. At that time the windows were brok-

en, but have since been replaced by fine specimens of stained glass. The ancient crypt beneath the church is dim and damp and musty, and time-worn tombs give silent evidence of the erosion of passing years. Many note-worthy persons have been buried here, but the obliterating effects of age and mold have made it difficult to decipher names and dates.

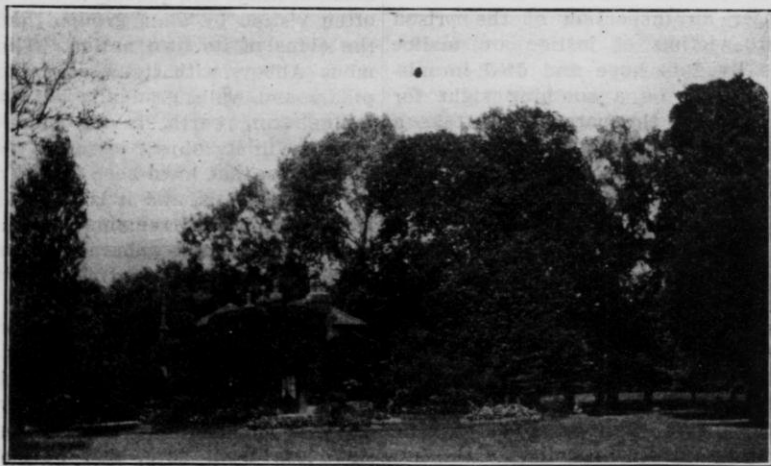
In Edinburgh one feels an almost irresistible desire to linger, and a loyal Scot may well take pride in this enchanted city. In short, a wee bit o' boasting is given cheerful excuse after even a superficial stroll, for the location is ideal and streets and squares are profusely adorned with artistic statues and monuments, erected in grateful or affectionate recognition of praiseworthy lives and deeds of popular men.

Here is to be found the Royal High School, and, like other prominent institutions of this country, its beginning dates back several centuries, during which time many distinguished men have received their early training within its walls. King Edward VII was once a pupil and in a little glass case in one of the assembly rooms may be seen a copy book written in the boyish hand of Sir Walter Scott. The writing is clear and gives evidence of labored effort. Beside it is a strap of leather, slashed at the end and having a well-worn appearance,—a mute acknowledgment of the mischievous tendency of youth in bygone ages and of the ready discipline meted out by stern tutors. Without doubt, Sir Walter's childish fingers have tingled under the cutting blows of this very "taws."

The pupils range in age from five to eighteen years, and the innocent faces of infancy look sadly out of place among the somber walls of massive, ancient masonry. One feels a longing to cuddle some of those titled

young noblemen in motherly arms and plump some of them down into some sunny, cheery kindergarten, where a tiny lunch basket and all manner of amusing games would lead them step by step into a place of real joyous education. On the way from buildings to class rooms, many tiny pupils, hampered by books and tablets, are met, yet they bravely struggle through a respectful form of salute, for the Scot regards courtesy as one of the

view of the surrounding country, and, were it not for the crude though regal emblems used in decoration of the tiny bed chamber with its paneled walls and open grate, it would be difficult to understand why a queen, even in slumber, should be confined in so limited a space, for scarcely more than eight feet would mark its widest boundaries, and its irregular form would prevent other than the most meagre furnishings. It was in this



A lovely spot in Kensington Gardens.

primary and principal factors in civilized education.

It is in Edinburgh that Rock Castle rears the ponderous walls that are bursting with storied incidents of feudal days. The stone paved court, where soldiers once drilled and where soldiers are drilling today, was formerly the scene of numerous executions. The wee chapel where devout Queen Meg dwelt in devotion still treasures the modest altar of that day. From the courtyard a stone stair leads to the royal rooms and here Queen Mary's apartments are found. The large one commands a magnificent

room that King James VI was born and later on history records that he became James I of England. The room contains a queer little window, jutting out over the ledge of rocks, and it was from this casement that Queen Mary lowered the young prince in a basket, more than a hundred feet below, in order that he might be secretly baptized in the Roman faith. It was a hazardous proceeding in more ways than one and shows the courageous and undaunted spirit of the woman, who unhesitatingly endangered the life of her babe in obedience to the dictates of her faith.

The crown room, with its flashing brilliancy of jeweled crown and regalia, that were last used at the coronation of Charles II, is closely guarded by soldiers, a glass case and iron railing giving additional protection to the valuable gems.

The armor room is one of the most unique. Ancient flags and antique armor bedeck all space, while many mailed manikins stand in formidable array in this banquet hall where Cromwell was once feasted.

After an inspection of the prison where victims of justice or malice have lived in hope and died in misery, it will be a soothing sight for one to scale the parapet and take a look at the tranquil city that lies in peaceful grandeur below.

If one is in the mood to penetrate the royal sway of by-gone ages, he will wend his way through old Edinburgh to Holyrood Castle and carefully note all along the route dwellings whose once aristocratic tenants have given place to the lower classes that have taken eager possession without stopping to remove the emblem of bear, crest or crown that indicate the exalted standing of the former occupants.

A halt at the old parliamentary building, and the tangible ghosts of past councils will rise up to proclaim ownership, for there, walking to and fro, in wig and gown, are the self-same figures, as to garb, that were wont to meander through this court in the early days of Scottish history. Embedded in the outside pavement is a brass tablet in memory of Knox, the great reformer, and nearby the awesome stony heart, wrought in small pebbles, marks the place where public executions were once conducted.

Farther on the home of Knox is found, with its fanciful gables and significant religious inscriptions. For

a small consideration one may enter and view the cherished relics of a man who feared neither royalty nor death, but gave voice to his convictions regardless of consequences.

The famous White Horse Close is now the untidy abiding place of washerwomen, workmen and unkempt children, and it will require a strong flight of fancy to people it with statesmen of other centuries.

Holyrood Castle, once the enchanted home of kings and queens, is now more often visited by alien groups than by the clans of its own nation. The famous Abbey, with its weather-beaten pillars and walls gradually but surely fading from earth, is far more impressive in its object lesson of decay than those that have been restored by modern artisans, and it is here where repose the mortal remains of some of the most notable characters in a world's history. A long flight of stone steps leads to the rooms above and the picture gallery, where the faces of ancient kings and queens, princes and men of distinction look forth from age-worn and vandal-scarred canvasses. The big audience chamber opens its doors from here, and beyond is Lord Darnley's living room, dressing room, and the little private staircase leading up to Queen Mary's apartments. In this tapestry-hung dressing room is still to be seen Lord Darnley's shield, boots and armlets of steel. Above these rooms are those once occupied by Queen Mary, and on entering the door a brass plate in the floor designates the spot where Rienzo's body lay after he had been found hidden in the tiny closet of Queen Mary's bed chamber. Here, too, is to be seen the bed with its time-worn covering on which King Charles II rested, dreamed and tossed. A massive state couch, that even now looks as though it might afford a comfortable reclining place, Queen Mary's bed, in its

tattered drapings, is in perfect keeping with this pleasant, roomy bed chamber, but would have filled all space in the wee sleeping room of Rock Castle.

The walls are hung with priceless, rare, old tapestry, and numerous portraits. In Darnley's room the picture of his mother is given the place of honor above the mantel, while that of his wife and queen is in a window niche nearby. It is said that the pictures are hung the same as when Lord Darnley occupied the rooms.

Holyrood is indeed a perfect treasure vault of historical interest to those who wish to trace the erratic and impulsive course of a royal career. A writer who gives a concise history of the life of Scotland's unhappy queen deals leniently with her shortcomings and is evidently in sympathy with one possessed of many desirable qualities, but whose up-bringing was undoubtedly the cause of much anguish to herself as well as to others.

Yes, Scotland can offer much that is attractive to citizen or stranger, and above her charming rural landscape, her heather strewn glens and wonderful chain of lakes, will rise up in glowing radiance Edinburgh, one of the most fascinating and beautiful cities in the world, yet none could turn away without wishing to take a brief peep at Melrose Abbey and Abbotsford.

Coaches that roll over smooth, broad roads, through charming agricultural districts, where every inch of the way suggests pleasing glimpses of substantial fairyland, will bear one to the entrance gate of Abbotsford, once the home of Sir Walter Scott. It is still kept in much the same condition as when the great writer was living, and it is indeed a rare treat to be permitted to look through the beautifully decorated rooms, where much exquisite carving is to be found on ceilings

and casings. Most of the designs have been faithfully copied from those used in embellishing Melrose Abbey. In a wondrous collection of priceless souvenirs is the veritable crucifix that was carried by Mary, Queen of Scots, on her way to the scaffold, also a bit of her gown, and on the wall there hangs a most grewsome picture of her shapely head with pallid features after execution.

The library is filled from floor to ceiling with rare and valuable books and in every part of this historical dwelling may be found remarkable relics and rich furnishings. The place is now owned by a great-granddaughter of this well beloved and honored poet.

When near Dryburgh Abbey, where the tomb of Sir Walter Scott is located, one is obliged to leave the coach and proceed over the more than half mile distance on foot. A long, swaying suspension bridge hanging high over deep, murky waters, bears the intimidating inscription: "No more than ten persons can be on this bridge at the same time," and the journey across in single file proves a nerve-straining tax on a cowardly traveler, who will breathe an expressive sigh of relief when the narrow, swinging path is crossed in safety.

The broken walls of the Abbey in the ideal setting of vines and lofty forest trees, makes a marvelous old ruin, and it is held sacred by providing a final resting place for Scotland's noted writer. Several other members of his family are also buried here.

At Melrose Abbey one of the most remarkable ruins of the old world may be found; the smoldering tombs of royal rulers and other noted personages, among them the well preserved grave of Michael Scott, the wizard, and here, also, in the most conspicuous place, is buried the heart of Robert Bruce. The spot is perpetually

decorated with freshly gathered thistle and bloom characteristic of the country.

This grand old ruin dates from the eleventh century and was partially destroyed or badly mutilated during the notable raid of Cromwell. It is said that the monks who had reluctantly opened the doors to welcome the distinguished warriors had been indiscreet enough to ring the monastery bell in token of their joy when the impious guests had taken their departure, and that the exultant tones of the bell were not misunderstood by the soldiers within hearing distance. They returned and after a riotous destruction of sacred objects, ended the visit by setting on fire the building that had afforded them shelter, and the smoke-begrimed walls of today speak eloquently of the dastardly outrage and the heroic struggle that must have been made to preserve this holy sanctuary.

Some Impressions of England.

Nothing less than a coaching trip in June through rural England will serve to satisfy one who has had even a brief glance at the country, for, with the delightful charm of varying scenery, the broad expanse of well-tilled farms, broken here and there by staid, quaint villages, with an architecture marking every age and stage of this country's development, there is an unlimited amount of joyous anticipation that is readily realized in town or field or forest, and the ever-ready coaches, with strong, sleek horses and slightly comfortable seats, are an excellent means of aiding over-tired limbs and flagging energies.

At delightful Keswick, with its many pleasing attractions, will be found the largest manufacturing plant for lead pencils in the world, and it is near this place that the falls of Lodore splash in all the noisy abandon

described by the poet. From here, on the way to the English lakes, the smallest church in England may be seen smuggled amidst the foliage of the tiny burial ground that surrounds it. At Grasmere, in the old cemetery, is an unpretentious stone bearing the name of Wordsworth, and at nearly every turn some ancient church or moss-grown rock revives a memory of some life or incident of the past.

Chester, with its magnificent old Cathedral, dates so far back in the feudal days of England that Julius Caesar has handed down to the present generation a marvelous achievement in the solidly built, massive wall still surrounding the old city. One may walk on the broad road bed at its top for three miles in circling this wonderful guard of defense. A slightly and interesting point on the way is King Charles' Tower, for from this prominent outlook the King saw his powerful army defeated, yet the peaceful pastures and skillfully cultivated fields of today will so effectually blot out the vision of warfare that the little stone tower, with its up-to-date post-card vender, alone reminds one of ancient battle horrors. The streets are unique in having shops located one above the other, and there are so many curious relics of past grandeur, that, taken all in all, Chester is one of the most alluring spots in Grand Old England.

On the road to Kenilworth, Grey's Cliff House and what is said to be the oldest mill in the world will merit a share of attention. For more than fifteen hundred years, this remarkable building, with its crude, faithful mechanism, has day after day and generation after generation sent forth the produce of its labor. It is located in a beautiful, picturesque valley with a fine view of Lord Percy's magnificent home in the near distance.

At frequent intervals along this con-

stantly traveled route will be pointed out some memorable spot where an objectionable subject irrespective of rank, has been beheaded, this severe penalty having been meted out either as an object of justice or spleen.

In the little hamlet of Kenilworth stands a small, shabby inn, above the door of which is a royal name and a little lower down a tablet stating that Queen Elizabeth had made that place her residence when on her way to the famous Castle.

Kenilworth, in all the dignity of its slow decay, is a magnificent ruin and is credited with being the only one in England that has not in some measure been restored. In one tower is readily to be found the small, stone-paved room where Amy Robsart was concealed by the fickle Leicester, and even now one may walk about the identical esplanade where Queen Elizabeth was taking her constitutional when she discovered the hiding place of her lower ranked rival. One sadly ponders on the injustice of the punishment that was effectual so far as Amy was concerned, but, as is usually the case, even in this age of enlightenment, the real wrongdoer escaped.

After strolling among ruins and crowding one's brain with ghostly ruins of other days, it is certainly refreshing to enter a castle that is still in all the glory of a noble habitation. The Duchess of Warwick makes her home in Warwick Castle, and it is indeed a royal abiding place, with its imposing approach and solidly built structures. For a small fee, which is given to charity, strangers are permitted to visit many of the finest rooms, in which are to be found rare collections of ancient and valuable relics. In the armory is the coat of mail once worn by Cromwell, and numerous other metal guards that have protected those quite as distinguished

in a world's history. The beheading knife, or double-faced sword, has a prominent place on the wall, a harsh reminder of the fate of those who were unfortunate enough to incur the displeasure of a mightier foe. A clumsy revolver of the sixteenth century would be difficult to carry concealed in the hip pocket, and rows upon rows of crudely constructed implements of warfare bespeak a fierceness of nature rather than a delicacy of skill in wielder and maker. From this formidable though interesting arsenal, it will be a welcome change to pass into the room of Queen Anne with its original draperies and exquisite inlaid work. Pictures by the old masters are to be seen everywhere, and the entire space in one room is nearly covered with choice paintings by Van Dyke; rich tapestries adorn the walls, and on all sides may be seen the lavish evidence of wealth and taste.

The little chapel wherein the family gather for divine worship, while simple in plan and construction, is glorified by the sunlight that filters through stained glass windows of the sixteenth century. In every respect Warwick Castle fulfills one's ideals of grandeur and elegance, for it is such a harmonious blending of the old and new that the fine, life-sized portrait by Sargent of the present mistress is in perfect accord with the many pictured faces and costumes of the varying generations of several centuries.

The peace and loveliness of the modern rural England is in no way dispelled when one enters the world's metropolis, London, with its vast acreage of parks that are real recreation grounds for its seven millions of inhabitants, with the unpretentious homes of its courteous, nature loving people of all classes, with its ever polite and best organized police force in the world with its immense traffic

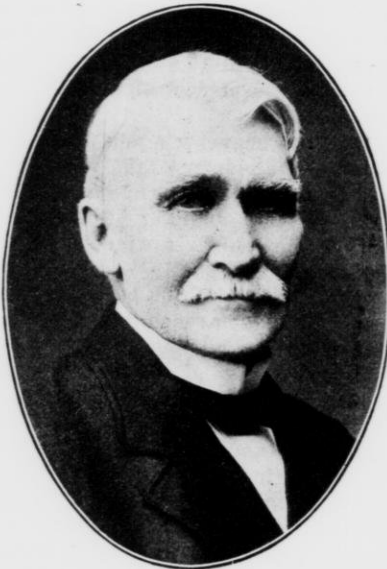
so scientifically managed as to command the respect and wonder of all nations, with its boundless wealth of attractions always ready to cater to every taste or whim. It is a puzzling matter to decide where to begin to chronicle the interesting features of such a city, and a still greater problem for a writer whose life span may be limited to a thousand years to know where to stop, and as the Institute Bulletin is issued in one column only, it may be well to halt in Kensington Garden, where many hap-

py, sweet mannered children are joyously rollicking among the flowers and grand, old trees, over verdant grass plats that have been closely cropped by flocks of gentle, handsome sheep, and where no prohibitory admonition of "Keep Off the Grass" is in evidence; where the rippling waters of the Serpentine reflect the smiling faces of contented lovers, where city and country are so graciously blended that they seem to meet in a firm and hearty hand-clasp.

Music, South Side Orchestra.

THE VALUE OF AN EDUCATION.

Prof. Chas. L. Harper, Madison, Wis.



Prof. Harper.

Did you ever go to a good circus or menagerie? Did you watch the trained seals as they balanced the light but large balls on their noses, tossing them into the air, catching

them again, and then tossing them from one to the other with a skill and precision that not one in this room possesses and which it would take any one of us many months and an infinite amount of care and patience to acquire? Did you watch the trained horses as they gave the darkey cakewalk, or waltzed better and more gracefully than many of our country boys? What did you think of that troop of elephants that came marching into the ring waltzing, going through a quadrille, firing guns, grouping themselves in seemingly impossible groups, and balancing their huge bodies on their two hind or fore feet much better than the average school boy can walk on his hands? How interested you were in the skill exhibited in the trained pig that could pick out the letters of the alphabet, or by the use of movable figures tell the time as indicated on a watch. We wonder at the unusual and unnatural skill shown by these animals, each after the fashion of its own training, but few of us have stopped to inquire into the value of this training, or the method by which it is given. We simply

say "wonderful" and there let the matter rest, but the owners of these creatures place a definite value upon each of these accomplishments, and the more tricks any one of them can perform the greater the value from a commercial point of view. The seals on their rock islands in the ocean are worth but a few dollars for cage purposes in the menagerie, but when they, in addition, can astonish you with their wonderful performances in the ring, their values are measured by hundreds of dollars.

The horse that runs in your pasture may be considered dear at one hundred dollars, but when he can waltz and give the cake-walk in fine style in time to music, he is cheap at one thousand dollars. The elephants also have become enhanced in value many times, and the value of a trained pig would paralyze a Chicago hog buyer if he had to pay the difference between trained and untrained pork.

Now, what makes the difference in the money value of these different animals under the different conditions? The horse and the pig when in the pasture, the seals in the sea, and the elephants in the forests of Africa or India have changed but little, if any, in form, shape or weight, by their new environments, or on account of their new and strange accomplishments; the difference in value is commercial only, and it is measured by the amount of training or education required, and which increases the original or first value manifold. So much for the value of training or education as applied to the lower animals.

The Value of a Boy.

Now what is the value of a boy? I mean the value of a boy thirteen or fourteen years of age? Did you ever stop a moment to think of putting any commercial or money value on

your boy? I have heard many a farmer say his thirteen-year-old boy was worth as much as a hired man. Now the hired man happens to have quite a restricted and definite value from the standpoint of the employer and is usually placed at from twenty-five to thirty-five dollars per month, according to his character, industry, intelligence, carefulness, and his ability to do things. A man just over from the old country, who has never been used to farm work farm property and the care of stock, has a low value placed upon his time and services; a good, healthy Short Course boy just graduated from the school at Madison is likely cheap at forty dollars a month for ten months, if not for the entire year.

Now fathers and mothers, do you measure the worth of your boys in the same way that you do the worth of the hired man or your help about the house? If so, it is not a difficult matter to put a reasonable value on him. If he is worth as much as a thirty-dollar-a-month hired man, and his keep in clothes, he has to you a commercial value of perhaps six hundred dollars per year, if he does not get sick or hurt, or, in other words, he represents a capital value or investment of twelve thousand dollars bearing a five per cent interest rate, not counting any cost for the thirteen or fourteen years you have been caring for him up to this time. This is, however, sometimes quite an item, and your boy must be healthy, strong, willing, temperate and intelligent to be worth six hundred dollars a year, and you are fortunate if he has not been a constant source of cost to you up to ten years of age. You will, I think, admit that I have allowed a high commercial value for your boy, higher than may be placed by your neighbors.

In the days of slavery, when the

auction block was a center of business interest in southern cities, it required a strong, young and intelligent negro to bring fourteen or fifteen hundred dollars. The dollar value upon that class of men was well fixed in those days, and good training, disposition, character and efficiency in the colored human machine had their value keenly recognized. I know you think this is a barbarous, cold blooded and unsentimental treatment of the question when applied to your boy, but nevertheless you or some of you will reckon that I have placed the value, six hundred dollars, too high when it comes to be applied to the boy of some neighbor, or some acquaintance in the city, for that other boy is rarely, from our point of view, without fault. We must always remember that the other fellow, or the other fellows, are more at fault than we ourselves are. Why, most of you will remember that in the very earliest history of the human family, old man Adam and his wife set the example that we have stuck to much closer in many cases than we have stuck to any other phase of our religion. One common point in human nature was quite permanently fixed when the Lord, taking Adam to task for experimenting with the fruit from the tree of Knowledge, received the reply: "The woman that Thou gavest me, gave me of the tree and I did eat." Some of the ladies will say, "Just like a man, trying to clear his skirts by throwing the blame on the woman." But what did the woman do when the Lord asked her concerning the matter? Why, she laid the blame on the serpent, and we have been religiously killing snakes ever since, but have failed to correct the habit of laying the blame or fault on the other fellow.

Years ago, when St. Paul, Minn., was a pioneer village, Indians were common in its streets. One bright,

early spring day a noble red man was riding proudly erect through the street. He was spied by a healthy boy just from school. The snow was just right for solid snow-balls. The combination, too, was a happy one from the standpoint of the boy; the others were not considered. Quick as a flash a solid snow-ball was fired at the proud Indian. It struck him squarely between the shoulders so hard that his equilibrium and his dignity were sadly disturbed. He immediately looked about to discover the author of the mischief. The boy was out of sight behind a friendly building. The Indian saw no one, but being civilized he immediately exclaimed: "Whoop! Damn Somebody!" Six thousand years between Adam and the Indian, but human nature the same, and we have no reason to think that there has been any great change since St. Paul was a village. It is simply another kind of Adam.

But coming back to the commercial value of the boy or the man. The commercial value is practically the only value placed upon him by your neighbor and the state, because mere sentiment does not, as a rule, count against the dollar. I find that some are worth more than others, even in the cold-blooded value of the state. There is a reason for this. I also find that in your own estimation some are worth more than others among the strangers you may seek for employment. There is also a good reason for this, and a natural and exacting business custom has fixed a standard whereby the value of the man or boy may be measured by you or the state. That standard is efficiency, and efficiency is determined by the standard American dollar, just as the weather temperature is determined from the zero mark on the thermometer. The standard in both cases is absolutely arbitrary, but nevertheless

the standard is fixed; in the one instance by the cold-blooded law of business custom and in the other by an arbitrary rule of science.

The legislatures and courts have also seemingly placed dollar values upon human life and human injury, and contributory negligence or inefficiency on the part of the injured is a powerful easement on the conscience and purse of the employing corporation in case of accident. For a long time five thousand dollars were looked upon as the maximum value of a man killed in the employ of or by a corporation, although a merely injured person could in some instances obtain more, by giving from one-fourth to one-half the amount received for services rendered by his attorney, who was not hurt at all, but needed the large percentage to compensate him for his skill, the result of a special training and education for his profession. But what if your boy is killed through the fault of some employer and by suit at law you should obtain some two or three thousand dollars? Should we for a moment believe that this sum should be recognized as any true value of the boy to his parents or to the state? Without stopping to think, you will naturally say "no," for had not the lad a prospect of many useful and prosperous years before him? The life insurance tables give him more than forty years to live if he is now twenty years of age and in good health. Of course these should be profitable years, and if he is worth six hundred dollars a year and his living, you can fix a commercial value of the life of a man from the standpoint of the state, for the state looks upon him as a producing machine, adding to the progress and material prosperity of the state, just as a thrifty dairyman looks upon his Guernsey or Holstein cow as a manufacturing plant, whereby a certain amount of

hay, corn, oats and bran and care can be turned into so many pounds of butter fat, worth so much per pound in the market, the price regulated by the Elgin companies down in Illinois.

By the way, have you noticed the statement that Colantha 4th's Johanna, a Holstein cow, has broken the record as an individual butter factory, having produced from certain amounts of feed and care (you must never forget for a moment that care, although a commodity not at all times purchasable on the market, is the one great factor or element in all production), a larger result than heretofore obtained? This is not because Johanna is bigger or prettier or more generously fed than hundreds of other cows in the state, but she is the phenomenal result of a special breeding; of the use of brains on the part of the breeder. The state welcomes such breeders and such cows, for they mean greater prosperity, and that is what the state needs and wants and is bound to have, if it is to be had, and that, too, from every possible source, from farms, forests, quarries, mines, hogs, horses, cows and men.

But the purpose of this paper is to deal with the case of the boy and man. We left you a basis for making a commercial calculation of the cash value of a boy or man. It is, however, not an average basis. It is probably low when applied to your boy, but too high when applied to some of the boys in your community, and as your boy grows older his value may diminish rather than increase. This has been true in too many cases. Habits may be contracted that depreciate his value, just as a spavin or a barb wire cut depreciates the value of a horse, the first by affecting his working power, the second by affecting his looks. Both have market values. Bad habits are like burs in the sheep's wool; mighty easy to get in, mighty hard

to get out, and a big reducer of the value of the clip, as well as a great deal of bother to the animal. There are too many bur patches cultivated for the good of this and other states, and it is curious the state is so slow about killing them off. The great trouble is, the cultivators of these patches have votes and there are so many of us in politics, or about to be, that we help cultivate them. We want to be elected so we may secure a good obituary, for the obituary route is the only one by which a good many people ever get to Heaven.

The Commercial Value of an Education.

But again to the commercial value of the boy or man, for they must be taken together. What is the dollar value of an education when applied to him? The question was asked me recently, "What are the average yearly earnings of a laboring man in Wisconsin, and how much more, if any, are the wages of the professional and better educated and trained classes?" Now this was a mighty interesting question to me, for I had given it some study for the last thirty or more years, until recently, and I was glad to take it up again and under present conditions. There are several here tonight who remember something of the conditions of forty or more years. They are quite different now, and they will be quite different again twenty years hence in this same community. Well, I took the question up, and after going into the matter quite carefully—but for want of time not so thoroughly as I would like—it became apparent that the average yearly earnings of the laboring man in Wisconsin were \$471.30 in 1905 and \$467.66 in 1904. These conclusions have been reached after a most careful investigation carried on by the State Bureau

of Statistics, covering sixty-two of the leading industries of the state, not including farming, dairying, stock raising, or any agricultural pursuit; taking the wages paid in 1,513 different establishments to a total of 85,436 employes, working on an average three hundred days during the year 1905, and 80,195 persons working two hundred and ninety-eight days in these same establishments for 1904. The average difference of the two years was \$3.64. Now I think you will admit that the basis from which the average yearly earnings of \$471.30 in 1905, the better year, is reached is a sufficiently broad and fair one. It was an unusually prosperous year, the industries were worked to their full capacity and practically for full time, there being but thirteen idle week days for each person. So much for the earning power of the man laboring by the day and who was paid an average daily wage of \$1.57.

The next thing to be determined was the annual average earnings of those who were employed at a regular salary. This was not to be determined from any of the state records; probably for the reason that persons who received salaries were not to be dignified as laborers. Happily for my purpose, the United States Government compiled some statistics for each state, showing the annual salaries or earnings of the salaried and professional classes. Judges, state and county officers, lawyers, surgeons, ministers, physicians, bookkeepers, teachers, etc., etc., were all included. There were over fifteen thousand of them and the average annual income was \$1,090.00 for each individual, or more than twice the average sum received by each laborer in some one of the sixty-two leading industries. These statistics lead to certain conclusions—first, that there is some cause for the increased income, and

second, that that cause is education and special training. It will be admitted that the salaried and professional people are, as a rule, no stronger physically, no more industrious or naturally capable, no freer from disease and ailment than their neighbors who earn their livelihood by daily employment. Then why the difference? The question can only be answered by assuming that the individuals who are employed at salaries are, as a rule, better schooled and specially trained. This conclusion seems reasonable, does it not? If so, where were they trained or educated, and how? Most of them, not all, were educated and trained in schools of some kind, some few educated and trained themselves in the school of Hard Knocks, but no matter where they got it, they had to have it, and what they obtained evidently makes the difference in the annual earnings, or, in other words, more than double the earning capacity of the individual; to be exact, gives the educated and trained classes \$2.31 to the other fellow's one dollar, or, in other words, one man as a producing or earning medium represents a commercial value or investment of \$9,426.00, and the other \$21,800.00, at five per cent per annum. Is this worth consideration at this time and under the present conditions? Are you interested as parents or as young men and women? Are you willing to pay the price to bring about the change?

Nothing has been said relating to any difference in amount of hardship incurred by the discharge of duties imposed by the different conditions; the independence of the individual; the generally speaking broader view of life and the world's activities; the social position gained; or the human enjoyment, purely animal it may be, that comes from being able to direct or lead, rather than from being directed or led, or, in other words, from "boss-

ing the job." These characteristics are selfish, they interest the individual more than they do the state, and I am talking to you largely from the standpoint of the state. The state is interested also in knowing that the less illiteracy, or more education there is, the less crime there is, and the less suffering there is, and for this reason the state compels the payment of a large sum in taxes for educational advancement and educational interests each year. Now, you do not pay your taxes for the fun of the thing; neither does the state compel the payment of taxes for the fun of the thing. No body of men is happier than the state administration when the levy of state taxes can be omitted. You see it makes good political capital for the "ins," who want to stay in, and poor political capital for the "outs," who want to get in. It makes easy campaigning, and is a good vote getter, because voters like it, and we all know you like the administration that saves you taxes. Votes count in an election, and the winning candidate can never, in his estimation, have too many votes, any more than John D. Rockefeller can, in his estimation, have too many dollars. They both count in the biographical sketches and the obituaries, if they don't anywhere else. But the taxes you pay are really an investment, and you want your money back, and then some. Now honest, don't you? Why, of course. It is just a matter of clean business, or at least it should be. But do you get your money back, and if not, who is to blame? Remember the anecdote of Adam, or the Indian. Do you get your money back, and then some, for your taxes paid for roads, bridges and schools? I mention these because they are so immediately under your control and near your homes. If not, why not? I may touch upon this point later. You must keep in mind,

however, that no money or effort can and should bring better returns, either to the individual or the state, than the money and effort invested in education. All you need to do is to husband the expenditures.

In order to give an idea of the apparent relation of education, or rather want of education to crime, I will quote from a paper read at The National Educational Association held in Detroit, Michigan, in 1901. The reader was the Secretary of the Indiana State Board of Charities. I am not aware that the same statistics are compiled for Wisconsin. The illiteracy in Wisconsin is 4.7 and in Indiana 4.6 persons in every hundred over ten years of age. By illiteracy is meant the number of persons over ten years of age who can neither read nor write. The conditions in the two states are about the same. The Secretary says: "The Indiana Reformatory at Jeffersonville receives young men, principally first offenders, between sixteen and thirty years of age. A study made of certain points regarding the last five hundred inmates brings out in a most striking way the facts determined by similar investigations previously made. It is generally recognized that the family relations of many of these people have been disturbed. One or both parents are dead or they live apart and there has been lack of home training. The largest proportion are notably deficient in education. Of the five hundred, sixty-six, or 13.2 per cent, are wholly illiterate; two hundred and fifty-one, or 50.2 per cent, had not reached the fourth grade in the public school, and consequently are practically illiterate so far as business is concerned, and but twenty-six, or 5.2 per cent of the five hundred had completed the eighth grade; 63.4 out of every hundred of these young men

were practically incapable of transacting or directing any business.

The stooping shoulders, awkward arms and shambling gait of these young men indicate plainly that they are deficient in physical training. Manual training has been neglected, four hundred and six, or 81.2 per cent, claim to have no trades. In these busy times when there is a sharp demand for workmen, two hundred and fifty-two, or more than half, were unemployed when the crime for which they were sentenced was dominated. Why were they unemployed? Because there was no demand for ignorance. Not one claims to have been under the influence of good associates. Evil associations lead to bad habits, and while it is not claimed that these habits were directly the cause of the crimes, it is interesting to note that three hundred and twelve, or 62.4 per cent, use liquor; three hundred and seventy-four, or 74.8 per cent, smoke cigarettes; four hundred and nine, or 81.8 per cent, use tobacco in some form. Of the five hundred persons committed, four hundred and forty were committed for crimes against property, and eighty-eight for crimes against persons. It is remarked incidentally that more than one-half of these never attended Sunday-school, and but one claimed to have any connection with a Young Men's Christian Association. The great lack of these young men is training, physical, mental, manual, moral and home training."

The Relation of the Home to the School.

But when and where could these people have received their training and education? This is an easy one.

Every state has a fine system of public schools and with few exceptions the school buildings are within

a reasonable distance of most of the children; teachers with fair academic qualifications are provided to give instruction and the school homes are in many instances more comfortable than the homes of the children. The state of Wisconsin has a system of schools unexcelled by any other state in the Union and of the 773,000 persons of school age but 24,000 live more than two miles from a public schoolhouse by the nearest traveled highway, and many of these live within an additional quarter of a mile, yet there is a general feeling that the public schools should do more than they are doing for the interests of the individual and the state. When one is benefited, the other is equally so.

We put into the public schools of Wisconsin for the year ending June 30, 1907, \$9,554,000. That is a pretty good sum, isn't it? There are more than ten thousand teachers employed and they worked on an average eight and one-third months in the school room during the year. In the cities the compulsory attendance law required each child between seven and fourteen to be in attendance at least thirty-two weeks, or one hundred and sixty days. This is a good term and most of the cities reported that about ninety-four per cent of the children complied with the law. In the country districts, including the villages, the compulsory attendance law required an attendance of but twenty weeks, or one hundred days, and yet but seventy per cent of the children between seven and fourteen complied with the law. This is not a creditable showing for the country. It seems to show that the fathers and mothers in the country do not hold an education as valuable for the child as does the city father and mother. This only appears so. I do not think for a moment that it really is so, but the conditions are different. The child labor

law is made rather for the city than for the country, and it is quite strictly enforced. Two factory inspectors last year compelled the attendance of 2,047 persons of compulsory age. They were found in shops and factories where the parents had placed them in order that they might help the household expenses with their small earnings. It was generally the case that these children came from homes where the parents were looking more clearly after their own interests and comfort than the interests of their children, and furthermore, were themselves so ignorant that they did not comprehend the worth of school work and its value on the future. They are mostly new-comers from a country where education is at a low ebb, money is the great object, and the child of importance only as he can earn wages, beg or steal. Of course he takes to crime naturally and the Industrial and Reform School for Boys at Waukesha receives about three of these boys every four days. There they are under strict discipline, have an excellent school, good training, and it is surprising how many of these boys when discharged or liberated on parole do not need to return. Their education and training have been of value to them and a strong restraining influence for good, because it enables them to secure steady employment, an absolute necessity to law and order. No saying is truer than that "Satan finds some mischief still for idle hands to do."

But to return. I told you that but seventy per cent of the country and village children complied with the compulsory attendance law. This means that probably forty per cent of these children did not derive much benefit from the school because they did not try to do the work in a regular or intelligent manner. Here is just where many parents are at fault,

Children cannot understand what advantages are to be derived from an education, and arithmetic, grammar and language do not appeal to them wholly as pleasant pastimes. It is the duty of the parent to encourage children in their work, and in their attendance at school. The teacher is practically helpless without the co-operation of the parent, and she must have winning ways who can overcome parental indifference. And again, have you ever noticed that sometimes the parents set themselves up in active opposition to the teacher? This may never have occurred in your immediate neighborhood, but it is all too common in some districts. Why I have known of most strenuous opposition to a teacher simply because she boarded in the wrong place, or would not keep company with the great, hulking son of one of the district officers. Curious, isn't it? Why there wasn't any right place to board in the district, for if she boarded with Jones, Smith and his friends would be up in arms, and if she boarded with Smith, Jones and his friends would be the sadly distressed and injured parties. No wonder some teachers think human nature is a failure. Why just think of a year's term of school practically ruined, so far as benefit to the children is concerned; the school money thrown away; the taxes raised by the electors themselves wasted; the entire machinery thrown out of gear, just because Smith beat Jones or Jones beat Smith in a Sunday horse trade ten years ago. Why in the city of, years ago, when I was county superintendent, there were two school districts divided by Main street. There had been a quarrel between early prominent citizens, all good men, as to the election of a schoolhouse site. I tried my best to have these two districts united and a free high school established. Do you

think I could do it? Not much. Nearly every one seemed to think that it would be a good thing; there were two thousand people and all heartily interested in educational progress, but there was a hitch somewhere. I went to one of my friends, a professor, and laid the matter before him. He said, "Harper, it's no use to push the matter now; these districts will never come together and establish a high school until we have a few first-class funerals." They have had a good high school now for many years; the districts are united. It may be added that there was an abundance of flowers; the obituaries were all that could be desired; the present generation is happy, and let us hope the central figures in the necessary obsequies now have wings and are playing on harps of a thousand strings.

In order that we may reach anything like ideal conditions in school work, parents, teachers and school officers must be united in purpose and effort. Every right-thinking citizen realizes this as well as I do. Parents must be unselfish, officers true to the trust placed in their hands, and teachers wise, tactful and seriously in earnest, for this educational business is a most serious and vital business, for it has to do with the character, manhood and womanhood and the perpetuation of the state. Yet there is no business carried on by the state or community in which there is so much waste because of selfishness and indifference on the part of fathers and mothers. The state looks upon educational work as a purely business proposition. Too many fathers and mothers in this state look upon it as if it were bestowed upon them as a purely charitable institution from which they need not seek to derive any benefits for themselves or their children if they are so minded. Now there is not a business man, or wom-

an, in this country that goes into business or works out any plan but he or she is largely controlled in his thinking by the advantages to be derived. These advantages are usually purely commercial and measured by the dollar. A machine is to be purchased on the farm. The first question to be settled is, Will it pay? A carload of commercial fertilizer is to be purchased for the land. The first question to be answered is, Will it pay? Results in all these cases are taken into careful consideration and from the view point of the dollar. Now did you ever know any considerable number of persons in your community to sit down and carefully reckon on the dollar basis of the value of an education and the real dollar worth of a boy or girl? If you did and were furnished with the necessary data from which to reach conclusions, you were probably somewhat surprised at the results. Now if I tell you that a day in school is worth ten dollars to your boy, you will say in a moment, "Why, Harper, you are away off. How in the name of common sense can any such conclusion as that be reached?" Now I will admit that it does seem to be an absurd proposition and not capable of proof. It happens, however, that some statistics have been compiled that are probably worth considering for a few moments. Now, statisticians are a cold-blooded race, and as a rule they compile statistics for the purpose of securing a basis upon which the results may rest. They are always considered dry and uninteresting, but bullets must be backed by dry powder in order to bring down the game. A railroad company takes in all the statistics relating to the economic conditions found in any territory from which they are considering the proposition of building a line; on this basis alone does the proposition stand or fall,

Some Pertinent Statistics.

The statistics to be considered at this moment are derived from a report from the state of Massachusetts. It is shown that there the average public school life of every boy and girl in Massachusetts is seven years, of two hundred days each. In this time they will secure a certain amount of elementary education. In fact, the average is within one year of reaching the high school. In order that this average may be maintained, it is essential that a considerable number of these boys and girls shall attend and complete the high school. This means that while a considerable number attend more than seven years of two hundred days each, another considerable number attend less than seven years of two hundred days each.

Now you will admit, I think, that if an uneducated man earns \$1.50 per day for three hundred days in a year, he does exceptionally well. What will be his earnings if he keeps it up for forty years? Simply multiply \$1.50 by three hundred and you will have \$450.00 for one year. For forty years you have forty times \$450.00, or \$18,000.00. Now in the early part of this paper I showed that the average wages of the eighty-five thousand laborers in this state employed in the sixty-two different industries and determined in the one thousand five hundred and thirteen establishments, was \$471.30. This makes an average daily wage of \$1.57. For present purposes we will assume it to be \$1.50. The total earnings for the forty years of constant employment is \$18,000.00. Educated and trained men as a rule are not paid by the day, as is the ordinary laborer, but by the month or by the year. Taking the United States over, counting the salaries of the presidents, of the supreme court judges, the presidents of insurance

companies, railroad companies, etc., we will assume that a thousand dollars a year is the general average income of the better schooled and trained class. (The statistics for these in Wisconsin show the average yearly earnings to be \$1,090.00.) Now in forty years the educated person will earn forty thousand dollars.

Let us assume that instead of an average of seven years attendance upon school, these persons have attended eleven years of two hundred days each, or a total of two thousand two hundred days, practically a Wisconsin Free High School Course. Subtracting the earnings of a laborer for forty years—\$18,000.00—from the earnings of a better educated or trained man for forty—\$40,000.00—and I have the sum of \$22,000.00 as the value of the superior education and training. Now it is a very simple problem to divide the \$22,000.00, the increased earnings, by the 2,200, the average number of days attendance upon school. The result is what? Ten dollars for each of the two thousand two hundred days; or in other words, a clear showing that in the life of the man his superior school work has for every day that he has attended been worth to him ten dollars in the aggregate. If you take as a basis of calculation the four additional years of 200 days each, or the completion of a high school course, the valuation of each additional day is \$27.50, or a daily lifetime increase of thirty-three and one-third cents per day.

Irregularity of Attendance One Great Menace to the School System.

Did you ever stop to think of it, fathers and mothers, that the statement to your children, "Oh, it does not make much difference whether or not you go to school to-day," is a serious mistake as well as false? It not only

affects your children, but it affects everybody else's child; in fact, the machinery of the whole school, if it is a good school, is thrown out of gear. Did you ever stop to think that you cannot keep your child at home for a single recitation but it works havoc to the school work of your district and the ultimate welfare of every child, as well as the state?

I spoke a moment ago about waste in school work. There are seven thousand districts in the state of Wisconsin and each one contributes more or less to the enormous loss of effort and money. Last year nine millions and a half dollars were expended in school work in this state. About five millions and a half were expended for school work in counties outside the cities under city superintendents. Three millions of this is expended in the strictly rural schools. The average daily attendance is about fifty-five per cent of the enrollment. This means that on the average the children are in attendance but half the time, or in other words, are absent every other day. This makes it necessary to work two or even three days in many instances to secure for the whole school the advancement that should be secured in one day. Let us assume that three millions of dollars are expended for the maintenance of the strictly one-room school. The waste is easily forty per cent, or annually one and a half millions of dollars. Is this good business sense? An annual expenditure of a million and a half dollars without any corresponding good results? It costs just as much to maintain your school for fifteen pupils as for thirty, the same equipment, fuel, etc., will suffice for the large number as well as for the smaller. You are tax payers and you do not pay taxes for the fun of the thing if you can help it. You desire an adequate return for your money.

The opportunity for securing it and securing it returned many times has been offered by the schools, but the people neglect to take advantage of the offer. As a rule, every one who invests a dollar wants a return of a dollar, but in this case thousands of citizens in this state are willing to take fifty cents for the dollar they have paid in taxes for maintaining the country school.

A Southern Wisconsin Teachers' Association was held in Madison last Friday and Saturday. Papers were read and speeches made, all having for their keynote the betterment of schools and school work. Last November some four or five thousand teachers met in Milwaukee for the same purpose. Other meetings like the one at Madison are annually held in other parts of the state. Conventions like these have been held for the last forty or more years and all have had papers read or speeches made criticising the defects in our public school system. Some say too much is attempted; some not enough; and some say not the right things; that there should be manual training, singing, drawing, physical culture, etc., etc., etc., added. Of course there are defects in our school system, although it seems probable that no other state in the union has so good a system as has Wisconsin, or one so well administered. Then, why do we not get better results, you ask. Just because of the gross irregularity of attendance of pupils in the six thousand five hundred country schools. No system however perfect in its planning and organization can proclaim itself what it should be until it is properly worked. Not a farmer in the state but would scoff at the idea of raising profitable crops fifty-five per cent corn or grain and forty-five per cent weeds. Absences of pupils are the big weeds in the educational field and to erad-

cate them the home is the place that must be struck, for through the home influence only, or through the working of a drastic compulsory attendance law, can the most serious hindrance to educational advancement be done away with. Every parent who sends his children regularly to school is directly damaged by the indifference of his careless neighbor and no machinery however costly can hope to show its efficiency unless regularly supplied with material upon which to work. The state recognizes this and the last legislature enacted a compulsory attendance statute with "Thou Shalt" written in unmistakable terms. Let us see why.

There are in Wisconsin, according to the United States census of 1900, 73,779 persons over ten years of age who cannot read or write the address on an ordinary letter envelope in any language. That's a good many, isn't it? "Well, I should say," you reply. Now what does this mean anyway? It means a good many things operating in a good many directions and upon a good many individuals and in not one single instance with any added profit or pleasure to the individual himself, to the family, to the community, or to the state. It means for the day laborer who cannot read, the commonest kind of work and the commonest kind of pay and the commonest kind of consideration at the hands of his fellow-men; to the family it means lack of comfort and desirable social opportunities and enjoyment; to the community it means communal loss and hindered development, and to the state an annual deficit in the amount of wealth produced and the amount of work accomplished. Whatever this condition touches it tarnishes. What would you think if this entire 73,799 persons were gathered in and composed one, two or three cities? As the census taker counts,

Grant, Crawford and Richland counties and four cities like Richland Center could be settled with these people and the census would not show a loss of population. Milwaukee and Dane counties are the only two counties in the state that singly have a greater population than 73,799. There are enough people in this class to make three cities like Madison without counting a single person under ten years of age and these make up more than 24.2 per cent of the entire population. Would anyone feel assured of the ability of any county or city existing under such conditions to care for its progress and government? Not for one moment. Permit me to call your attention to the significance of this illiteracy to the state. But do not for a moment understand me to say that all illiterate persons are non-progressive or incapable, or that all persons of fair or even unusual education are progressive or capable. Character is a mighty big element in efficiency. A spavined horse, no matter how well pedigreed or trained, is of small worth on a race course and stands a poor chance of wearing a blue ribbon at a county fair or a horse show. But we must ignore the exceptions and deal with the mass.

Assume that the average daily wages of these non-reading people is one dollar per day and that one-half of this class are men and women employed for three hundred days in the year. This is fair, isn't it? This makes an annual earning of three hundred dollars, as compared with the annual earning of four hundred and seventy-one dollars for each of the sixty-two leading industries of Wisconsin in 1905. The difference is one hundred and seventy-one dollars for each of the thirty-seven thousand persons, or a total of six million, three hundred and twenty-seven dollars; a sum equal to two-thirds of the amount expended

for the support of the country schools, the city schools, and the high and state graded schools, or more than one-half the cost of all the public educational work in Wisconsin, a state of which we are all proud because of her leadership in political and educational progress and whose significant motto is "Forward." Statistics are sometimes uncomfortable things to work with when they will not flatter our self-complacency. The above items do not take into any consideration the troubles, the losses and disappointments you meet with in your homes, in your workshops, about your barnyards and on your farms, because of the want of intelligent help, nor does it consider an equally large loss that must come to the cities from the same lack. The state is now awakening to the extent of the annual loss, as well as the discomfort and domestic unhappiness that comes from these conditions, and hence the existence of a drastic compulsory school attendance law.

Relation of Education to National Progress.

Nothing has yet been said of the relation of education to invention and a multitude of other things which we enjoy and to which we never give a second thought. Like Topsy in the play of "Uncle Tom's Cabin," we think they "just grewed." But that's just what they did not do; at least they did not come into perfection in a minute by any means. It took Edison a great many years to teach a phonograph to sing "Home, Sweet Home," and Bell to teach the telephone to answer your "Hello." There are comparatively few conveniences of today found in almost every home and on every street and farm that were known or common one hundred years ago. These are all the products of

brains and not ignorance. The self-binder, the corn planter, the gasoline engine and the steam thresher are brain products; the telegraph, the telephone, the railroad, both steam and electric, had their origin and development in the brain of some thinker; there are brains, and educated brains at that, back of every Clydesdale or Percheron or Carriage horse of which you are so justly proud; educated brains gave you Chester Whites, Durocs, Poland-Chinas and Berkshires in place of the razor-back, that, though it could outrun a swift horse, was not much in the pork barrel. Education has given you homes with more comforts than were ever known to Queen Elizabeth of England, or Empress Catherine of Russia, with all their power and glory. Methuselah has a record of nine hundred and sixty-nine years, but he was a kid by comparison with my friend Luther Basford, of Lancaster in this state, who is still living and who rode on the first passenger train in America. Methuselah saw but little change in his lifetime of nearly one thousand years, but what changes have been wrought in the lifetime of my friend Basford! Just consider sometime tomorrow the changes that have come into the conditions of living and travel within your own memories, you who have whitening heads. Six months of hardship and danger to California in 1860 and but six days of ease now and the distinguished honor of the company of the Pullman porter. So far as actual progress, saving of time and enjoyment of comfort are concerned, there are many here who have lived longer than record-breaking Methuselah, or old man Adam, who raised Cain when he wasn't Abel, and made an age-record second only to that of Methuselah.

Now I want you to remember, you who hear me and who are still alive

one-third of a century from today, that even this short period will make the last century a slow one. But back of all this movement for better things will be the educated brain and not mere muscle. And yet there is still a crying and urgent need for more and better general education, and in many cases a special education and training. But no special training of much value can be given before the child has had a good elementary or common school education. You cannot for a moment do away with the "little red school-house," or its equivalent, the centralized country school, with the town free high school to crown the work. An education with country surroundings, away from the allurements and vicious attractions of the city is the best general education that can be offered the American boy. It builds character.

Educate with a Definite Purpose in View.

Now, parents, one other point I want to throw at you and I want it to keep working in like a porcupine quill and to stay with you like a vaccination mark. The point is this: Have some purpose in view for your boys and girls. This purpose may be largely determined by the characteristics shown by the child in the home and school life. A healthy school life under healthy teachers gives direction to the purpose of many a child without any aid or interest from the home, because so many fathers and mothers never talk over or work out any life plan for their children, and if the homes and the schools do not give the ideals and mold character, the streets and the saloons will, and you know what that means.

There are thousands of high school pupils and many students in universities who are aimlessly pursuing the school courses without attempt at di-

rection or advice from any one toward their life work. The chief work of the common school is to teach the child to read a good newspaper aloud and intelligently. When he can do that he has a good general elementary education. He must have a fair knowledge of English grammar, arithmetic, history, civil government, geography, political and commercial, physiology, hygiene, orthoepy, foot ball, base ball and politics, just what the schools are attempting to teach. This ability will, if he cultivates the habit of talking thoughtfully and logically, make him a leader among his fellows and give him good standing, for he can soon gain a large store of knowledge.

Keep your boy and girl in school. Keep the absent marks from the school register. Give your teachers a chance to do good work in the school room every day and in every recitation. Stop the leak in the educational work, for it means loss and disaster just as much as does a leak in the dykes of Holland, or a leak from a gas vein in a coal mine. It does not make so much real difference to the community or the state just what the child is today, but it makes a tremendous difference what he is and what he is doing twenty years from now. President Roosevelt said in a few minutes' speech to the college students at Madison a few years ago: "Boys, it is all right to be a good half back or a good guard on a college foot ball team at twenty or twenty-two, but if the best that can be said of you at forty years of age is that you were once a good half back or a good guard you are a mistake and a failure in life."

Twenty years from now Wisconsin will need eighteen thousand teachers; principals, assistants, superintendents, college professors and presidents; thousands of lawyers, judges, physi-

cians, surgeons, pharmacists, nurses, ministers of the gospel, engineers, business men, contractors, county and state officers, editors, insurance and railroad officers, good, clean-cut politicians, devoid of selfishness, honest in motive and action, supported by a patriotic, intelligent constituency; tens of thousands of happy homes in the cities and villages and on the farms, the latter the homes of men skilled in building up and maintaining the fertility of the soil, one of the greatest problems before men, skilled in all departments of breeding and feeding, skillful in growing grasses, grains and fruits, with housewives happy in motherhood, skilled in household economy and domestic arts. Will your boys and girls be ready to meet the demand? If so, some sacrifices must be made and wisdom exercised by you for their welfare and progress. They cannot in their childhood days realize and know the duties and responsibilities that are in store for them in the future.

The first and greatest purpose to instill in a boy's mind is that he must be a clean man. Even though the father does not set the example, he can well advise his boy. If the boy shows a love for farm life, make that his ideal and give him the opportunities necessary to make him a success in his calling. If he shows a liking for scholarship, any one of a dozen or more professions are open for him, all honorable and worth while. As your boy grows in years and knowledge, consult and advise with him as to his ambitions for life work. There are dozens of men with families who have held positions as teachers at a thousand or so per year who have resigned their positions to complete a college course when they might as young men properly counseled have completed the college course before their life work began. You can easily

estimate the saving of time and money. The boy who works toward a fixed purpose has a thousand times the advantage of the one who wanders or stumbles through his boyhood aimlessly and without an ideal.

Old man Solomon gained a large reputation some thousands of years ago for extraordinary good judgment; his reputation still lasts. While some of us think that he rather overdid the matrimonial business, he nevertheless stands second to none for terse statements with reference to wisdom and knowledge. Some of his utterances are as follows:

"Wisdom is the principal thing, therefore get wisdom and with all thy getting, get understanding.

"She shall give to thy head an or-

nament of grace and a crown of glory.
"For wisdom is better than rubies and all things that may be desired are not to be compared with it."

I guess he is right about this, don't you? The fact of it is, I think we all agree perfectly upon this point, but we do not make education enough of a business. Is it worth while to school your children? Doesn't it pay, even in dollars and dimes without taking into consideration any other advantages? But the American people must work together and work unselfishly toward a common purpose and a common end if the integrity and glory of our form of government is to continue and grow in the centuries to come.

Adjourned to 9 o'clock, next day.

SECOND DAY.

The convention met at 9 o'clock, Wednesday morning. Mr. E. Nordman in the chair. Prayer, Rev. J. E. Cook, Richland Center.

BREEDING A PROFITABLE FLOCK OF SHEEP.

W. A. McKerrow, Pewaukee, Wis.

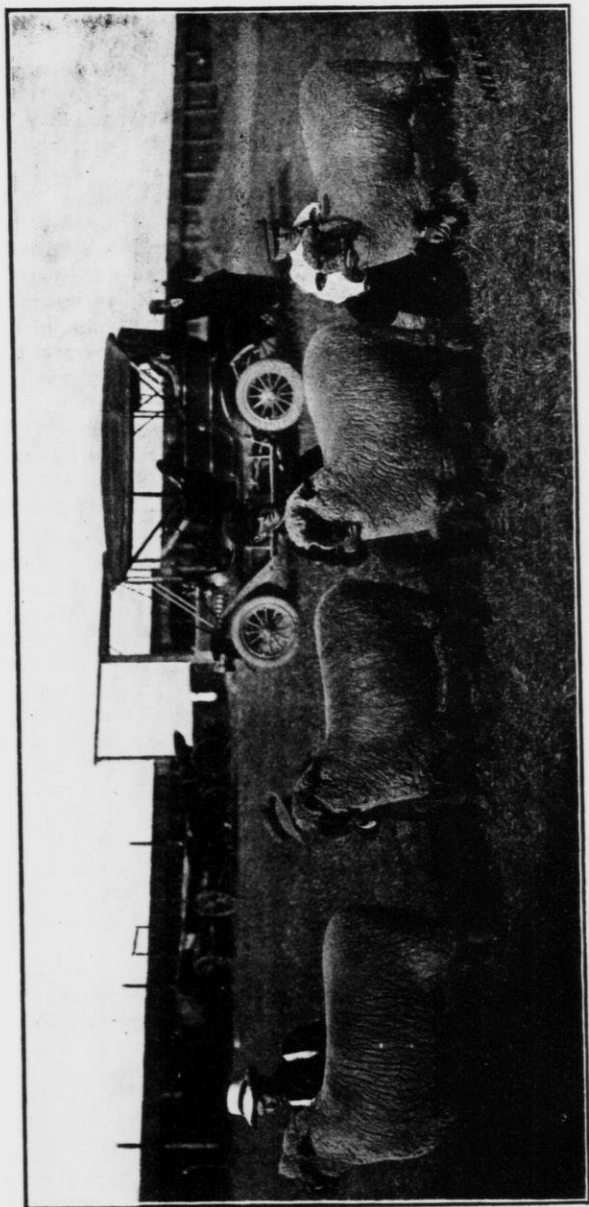


Mr. McKerrow.

The topic of sheep has been given a place on the program of Wisconsin's 1908 Annual Farmers' Institute Round-up, and justly so. The consumption of mutton in the United States is increasing faster than the production. However today we are consuming but seven per cent of mutton in comparison with forty-six per cent of beef and forty-seven per cent of pork. We have a great percentage to increase before comparing favorably with our British neighbors. We have great reason to be-

lieve the middle west will produce more mutton in the future than in the past. Our western sheep ranches are being diminished in size, through irrigation, transforming the once great sheep grazing districts into agricultural farms. This transformation will throw sheep raising back onto lands of similar value in our own districts. The farmers of Wisconsin can grow sheep at a profit at present and past mutton and wool values, if we would give them the care and attention they should receive. However, a very interesting report given out by the Bureau of Statistics shows the sheep breeding industry is making favorable improvements. In comparing the value of all classes of live stock of January 1, 1908, to that of January 1, 1907, sheep are the only class which have increased in value, all other classes decreasing from two cents per head down.

This should be most gratifying to the American sheep men who have been raising the standard of our flocks. This increase is due to one factor, and that is better breeding. Flockmasters all over our country are beginning to recognize more and more fully every year the value of pure bred sires, and are also building up their foundation stock by retaining their best ewes. Scraggy, breedless scrubs are becoming less in evidence every year. It has taken a long time to prove to the sheep men of the country that it costs



Champion Flock of Oxford Down Sheep at Wisconsin State Fair, 1908, owned by
Geo. McKerrow & Sons, Pewaukee, Wis.

no more to maintain a flock of first-class grades than a flock of scrubs, and that money returns from better sheep.

It is a recognized fact that the most profitable sheep of today is the sheep that develops the large mutton producing qualities, together with a medium growth of wool.

It is not good policy for the average farmer to attempt to breed pure bred live stock; there is but one man in many fitted for breeding pure breeds. The average man should start breeding with good grades, if it be possible to secure them. Here he can use his best judgment in selecting his foundation flock and he must use especial care in selecting the type most desired, paying strict attention to uniformity of size, conformation, color and fleece. There are now in our country many flocks which have been bred from pure bred sires. These are the most desirable for the beginner to select from.

The Sire of Greatest Importance.

The selection of a sire is of the greatest importance in the breeding of a profitable flock; here is where we look for the improvement of our flock, and therefore the greatest care rests on the selection.

The ram to head the flock should be the embodiment of masculinity in every feature. The true ram's head should be deep and broad through the forehead, the nose broad, with a large nostril, making a spacious entrance for plenty of oxygen into the lungs. The eye should be bright and large, full of vigor. The neck of the impressive sire should be short and well set on, giving style and carriage. The shoulders should be smooth and evenly muscled, which will give him an even walk, a brisket well extended and broad. A ram with a straight top line, ribs well sprung and wide loin

and well muscled back, will find favor with the good judges, and a twist let down with good width.

The most important feature in the selection of a good sire is a wide, deep heart girth. When we have good width here, smoothness throughout is characterized.

His fleece should be of type corresponding to the breed selected. Density should not be overlooked in any of the Down breeds, with a medium fibre.

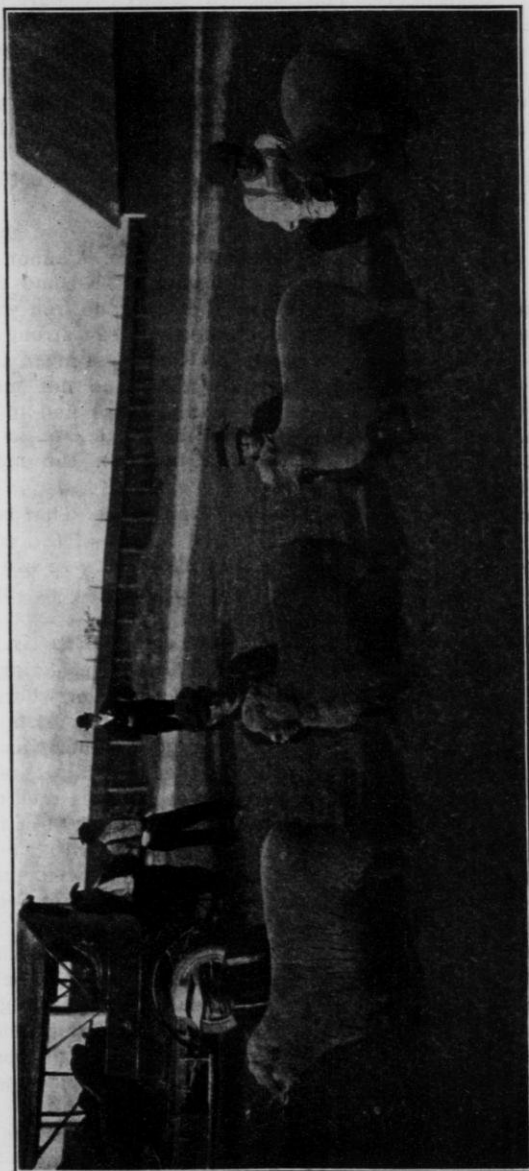
The sire should have plenty of bone; we find a ram showing a little coarseness will give better results as a sire than one of fine bone.

The finer points of breed type should be given strict attention by the pure bred breeder; however, they are not so essential for the farmer breeding for market.

Is pedigree of any importance? We find in this great dairy state, the breeders who are making the greatest improvement in milk production and placing their business on a paying basis are selecting sires with ancestry near the standard of production. The pedigree itself is of great importance, showing the animal has been bred from the best ancestry for several generations, and in most cases, tracing back to the highest development of British breeding. Such sires will leave their impression on the offspring in uniformity and general development. We find the western breeders, who grow and ship by thousands, are realizing the benefits derived by the use of the best sires money can procure. The lambs not only bring a higher price per hundred weight, but also make greater gains in the same period of time.

A Word About the Ewe.

A word regarding the selection of the ewe. The careful breeder always



Champion Flock of Southdown Sheep at Wisconsin State Fair, 1908, owned by
Geo. McKerrow & Sons, Pewaukee, Wis.

has a distinct type in mind and will select his ewe flock accordingly. The ewe of most value as a mother should not show too much coarseness, having fineness about the head, a bright, intelligent eye, medium bone, a straight, smooth top line, showing good mutton conformation, with deep, well-muscled leg of mutton. Here we must also seek a good heart girth. The fleece should be of medium fibre and density.

These are some of the points very essential in the pure bred flock. I could go on and enumerate a list of important factors in selecting show stock.

Wisconsin is the banner state in the Union. She has won more prizes at the leading shows of America than any state during the last ten years. Let us as Wisconsin sheep breeders try to produce the best sheep in the world; we have conditions favorable to produce profitable mutton.

DISCUSSION.

A Member—Can this wool be bred too fine?

Mr. McKerrow—You mean in our medium wool breeds? I think too much attention can be paid to the fineness of the fiber; when we have a very close, short fleece, we usually find that the sheep does not have the bone and the general development otherwise. I think we should not go too much for fineness of the fiber.

Mr. Bradley—Don't you think that sometimes the ordinary flock master makes a mistake in the selecting of a ram in trying to get hold of the fine points of his wool, say in selecting a Shropshire, having the wool well down over the eyes, that is, laying stress on that point rather than looking for a vigorous type of sheep? That being a minor point, might be overlooked for more strength in other places.

Mr. McKerrow—I think it is a mistake in many of our breeders in selecting for breeding from common ewes; they should pay special attention to the general development of the heavier lines, and to the development of the leg of mutton, rather than to pay special attention to finer points, the fine ear and the woolliness of the animal.

Supt. McKerrow—You spoke about a strong-boned sire. Cannot this be carried too far, to become a matter of coarse bone, or do you mean coarse bone when you say strong bone?

Mr. McKerrow—I mean strong-boned animals and I do not mean coarseness, although we find in selecting a sire that, as a rule, we do not get too heavy a bone on the medium wool breeds.

Supt. McKerrow—That is, you mean if you get a sire of the conformation you describe, that you are not apt to get too coarse a bone in that conformation?

Mr. McKerrow—Exactly.

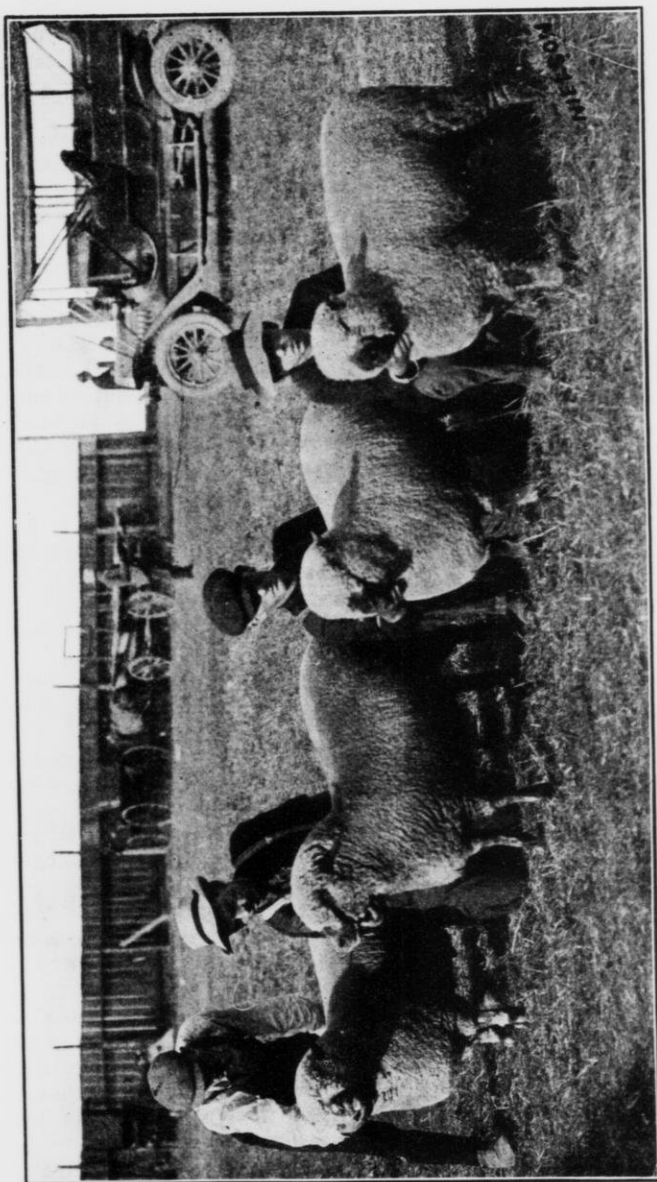
Mr. Bradley—In selecting sires from the south perhaps, or where they have been largely fed on corn, would you expect as good a bone as you would from farther north where they had been fed on grasses and clovers and rape and peas and feed of that kind?

Mr. McKerrow—No, we would not expect as good development in the bone when we are not feeding bone-developing feeds.

Mr. Bradley—You might have a larger bone, might you not?

Mr. McKerrow—We might have a larger bone, the coarse bone, but still the development of the bone depends a great deal on the feeds we are feeding to our flocks.

Mr. Bradley—Suppose we are selecting a Shropshire sire, is it well to select the very largest type of the breed that we may come across? Some people, I notice, will want the largest



Champion flock of Shropshire Sheep at Wisconsin State Fair, 1908, owned by
Geo. McKerrow & Sons, Pewaukee, Wis.

animal, perhaps rather taking that than something a little smaller.

Mr. McKerrow—I think we should select first of all for constitutional development and the development of the animal as an animal, then we should pay attention to the size. I think that when we get an animal that is of great size, it does not have the finish that a medium sized animal would, so we can go to extremes on selecting a sire in this way.

Mr. Imrie—Wouldn't it make some difference in regard to the ewes you have, whether you would select a sire that shall be coarse or fine?

Mr. McKerrow—Yes, a breeder should select this sire in accordance to the ewes with which the sire is to be mated. If he has ewes that are very fine, then he should pay strict attention to buy a little more coarseness.

Supt. McKerrow—But in any case, would you look for an exceedingly large sire, one that was a "sport," you might say?

Mr. McKerrow—No, we certainly would not. We would select a medium sized animal with good development throughout.

Mr. Imrie—You would like the large one though, if he still had quality?

Mr. Wylie—Is there any danger of getting them too big?

Mr. McKerrow—It depends on what breed you are selecting.

Mr. Scribner—I do not think a freak or "sport," as you call it, is half as apt to reproduce properly as the ordinary animals.

Mr. Roberts—I believe a man in selecting a sire to put at the head of a pure bred flock should select one possessing the truest and highest characteristics of the breed, good, medium type, but in selecting a sire to head a grade flock to breed for the market, he should select one that possesses the highest mutton qualities.

Supt. McKerrow—Don't you want that in the other?

Mr. Roberts—Sure, but you are looking for more of the finest breeding points in a sire heading a pure bred flock.

Mr. McKerrow—I believe in selecting pure bred that we should not lose sight of the mutton conformation. I believe that is where a great many of our American breeders are failing in the production of the highest and best types of our pure bred; they are paying too much attention to the finest development of breed type.

Mr. Imrie—Don't the big fellows win in the show ring if they have quality?

Mr. McKerrow—No, I do not think they do. I believe that the smaller types are the ones that are winning in the show ring.

Mr. Bradley—Perhaps it depends a good deal on who the judge is and where he comes from. It does depend on where the stock is grown and the locality that the judge comes from. The type that one man believes in in one state is not the type another man thinks is the best for his state.

Mr. Roberts—I think the judge should have a standard of excellence upon which to base his judgment, in his own mind.

Mr. Bradley—So do I, but your judgment and mine may be altogether different.

Mr. McKerrow—How is it breeders do not get together every so often and fix a type that they will call their standard?

Mr. Roberts—But in selecting a sire to mate a grade herd to, to breed up, we want to select for mutton qualities, to meet the market demand. It is mutton in that case and not fancy breed points.

Mr. McKerrow—You want to select for serviceability.

Mr. Martiny—What would you think of the idea of getting ordinary western

ewes to establish a grade flock in the state of Wisconsin, and possibly a pure bred Down sire?

Mr. McKerrow—We have found a great many breeders that have tried that same thing and they get excellent results. Of course it depends on the kind of farming you are doing. If you have abundance of grass you must select the sire with more size, so you can produce the most amount of mutton in the least time.

Mr. Martiny—Are there any objectionable features connected with these western ewes on ordinary farms?

Mr. McKerrow—Yes, we have a great deal of trouble I think in getting western ewes in Wisconsin without disease.

Mr. Imrie—Aren't they, as a rule, free from intestinal worms?

Mr. McKerrow—I think not; that is, I have heard of some large bands that have been brought into Wisconsin and kept free one season, and in the following season lost a large proportion.

Mr. Imrie—I am not a sheep man. In our section of the state, that is the western part of the state, the western ewes are very well liked on the farms. Occasionally they get scab, but I have not heard of any of them dying from intestinal worms, indeed the breeders there claim they are freer than the native stock. I know one lot of Montana ewes with one cross from a Shropshire ram that topped the market in Chicago.

Mr. Elliott—I think in deciding what kind of sheep we are going to breed to, we have got to look at the other end of the business, and ask ourselves what is the market? What is the demand of the market to which we wish to cater? My experience is that the day of the big, heavy, fat sheep is past. I know I can turn a bunch of lambs onto the market weighing, say, about ninety pounds. They are preferably dark-faced and dark-limbed, those

nice blockey, compact fellows, where the fat is evenly mixed with the lean; that is what the market wants. You go in with a carload of great big, white-faced, exceedingly fat lambs weighing one hundred and twenty pounds, and I will get about as much for my ninety-pound lambs as you will for your one hundred and twenty-pound. More and more as we get wealthier, we are getting to require more what we do want, and we are willing to pay for it without figuring just how many pounds it will weigh. A great many of the buyers want a leg of mutton and they do not want it that thick that they have to cut it in two before they cook it, and therefore a smaller, more compact, better finished sheep is always the more desirable.

A Member—I am not a sheep man, either, but I am interested in this subject. I am inclined to think from the discussion this morning that all you men are mutton raisers, that is, you are raising sheep for mutton alone. Is the mutton sheep the only profitable sheep? Have merinoes entirely been knocked out of the ring, or has the wool man moved out of the country, and isn't there any demand for fine wool any more?

Mr. McKerrow—We find with wool at twenty-five cents a pound and mutton or lambs at six dollars to seven dollars and a half per hundred weight, that it pays the average farmer better to try to produce a mutton sheep, with, of course, certain qualities of wool essential to the breeding of those types of sheep. But we find that the American farmer, with our present markets and past markets for the last ten years, must pay more attention to the growing of mutton than that of wool.

Mr. Scribner—Can we get a mutton carcass under a merino fleece?

Mr. McKerrow—No, that is impossible, of course, to get a good quality

of mutton under a very fine fleece, a fleece that is full of oil, as the merino is.

Chairman Nordman — What is the trouble under that very fine fleece; is it too much fat or too little fat in the carcass?

Mr. McKerrow—It is the lack of fat in the proper place, the same as it is in our dairy cattle. In feeding dairy steers, we find they will not put the fat in the proper place, and the same is true with fine wool sheep.

Mr. Martiny—You think then that a

Cotswold will make a better mutton carcass than a Southdown?

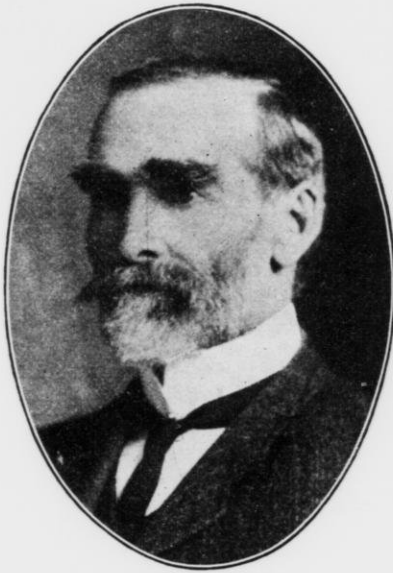
Mr. McKerrow—We have a fleece of wool that will fetch more on Cotswold than on our Southdown, but the quality of mutton is superior in the Southdown because there is not so much surplus fat in the carcass.

Mr. Roberts—Isn't it uniformly admitted in Stock Yard circles that the black-faced breeds are set off by buyers and sell the best, and have the nicest marbled mutton?

Mr. McKerrow—Yes, that is true.

FEEDING THE FLOCK.

Andrew Elliott, Galt, Ontario.



Mr. Elliott.

I am afraid when I read my paper that Mr. McKerrow will think I have got on the wrong scent. I fancy perhaps I was intended to talk particularly about the feeding of the sheep, but this reads "The Flock," and I include in the feeding of the flock all kinds of live stock, but I want to tell you men who have never handled sheep that I am a great believer in them. I have lost money in feeding cattle; I have made nothing from feeding hogs—sometimes, and even the dairy cow sometimes has partially failed me, but I have never handled sheep that they have not given me a good return for the money invested.

The great poet of old was a shepherd and it does seem to me that there

is something in connection with a sheep that tends to the elevation of mankind in general, and my friend, Mr. McKerrow, in particular.

In passing, I want to give you a little bit of Mr. McKerrow's reputation in Canada, because you know we have got to get away from home in order to get the right opinion about a man. We have lots of Americans come over to Canada to buy stuff, but Mr. McKerrow, in the estimation of my sister, fills an entirely unique position. He is the only man that ever went to my nephew's house to buy live stock that was not willing to do business on Sunday, and I want to tell you also that he religiously attends church when he goes over there, and I fancy when you get a man that won't do business on Sunday and goes to church, you are pretty safe in writing him a letter and asking him for what you want, depending upon his honesty to give you it.

While in the cotton region of the south, everywhere I hear it loudly proclaimed that Cotton is King; in the great corn belt, I hear sounding aloud the refrain, Corn is King; in the Dakotas and in Canada again, I hear arising to Heaven the glad proclamation that Wheat, the staff of life, is King, and I often, from some coterie of favored manufacturers, hear the loud-mouthed, brazen-throated, insistent call that the manufactories of the country are king.

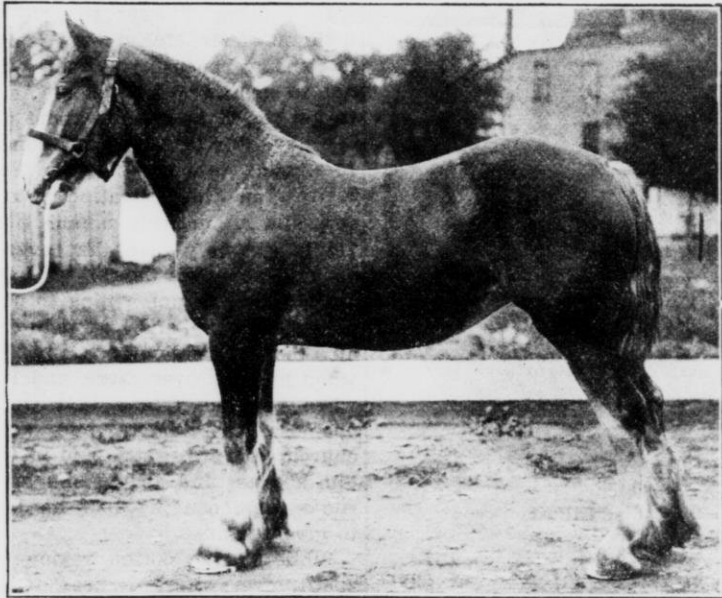
While none of these are entitled to that pre-eminence, all being necessary to bring about conditions that will bring prosperity to the nation, yet in point of value and importance, the grass crop of the country is infinitely superior to any grown on the land.

At the same time, it must be admitted that there is less attention paid to this crop than any that we grow. We have corn judging and seed selecting schools; we discuss how best to select our seed grains and prepare the soil for the reception of the seed; Government steps in and gives the

makes two blades of grass grow where one grew before is a public benefactor," and this is true in more respects than one.

Preparation of the Soil and Seeding.

In order to get a vigorous stand of grass, a light coat of manure should



Imported two-year-old Clydesdale filly, owned by Wm. Elliott, Galt, Ontario.

manufacturer special privileges that he may develop his work; experts are abroad at the call of the farmer to assist in fighting insect and fungus enemies of grains, but absolutely no concerted action has been taken to improve the value of this—the greatest of all crops.

When land has become impoverished and dirty from the growing of grain crops, it is turned out to grass; badly prepared, poorly seeded, impoverished, is it a wonder that the result is disappointing? It is said, "He who

be well worked into the surface with disk and harrow and the soil brought into the best condition, mellow but compact, and the seed sown as early in the spring as possible.

I prefer seeding on fall wheat, sowing the grasses in the fall and clovers as early in the spring as possible, to allow the spring rains and the freezing and thawing to cover the seed. Barley is the best spring grain with which to seed. If with oats, they should be sown thin, say about three pecks per acre, and as an additional

precaution they might be cut for hay if the season is unusually dry.

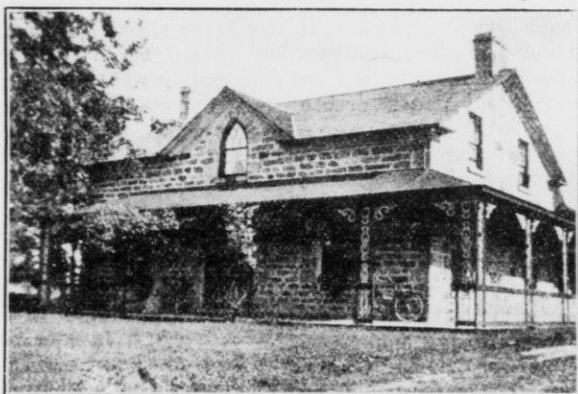
Only the very best seed should be sown; the very best is always the cheapest.

A variety of grasses are desirable. Sow, say, six pounds of red and two pounds of alsike clover, together with four pounds of timothy and six or eight pounds of orchard grass, and if inclined to be moist, four pounds of red top may be sown per acre. The native grasses will in all probability

The Permanent Pasture.

Many of us have some rough pieces that are in grass indefinitely, or we wish to establish a permanent pasture. As a rule, these receive no attention; pastured down closely at all time, stock allowed to roam over them at all seasons, they yield a small amount of inferior pasture, becoming infested with club moss and weeds.

Pastures should be gone over in the moist days of spring, all droppings



Farm Home of Andrew Elliott,
Galt, Ontario.

find their way in themselves. Under my conditions, I find fall wheat most desirable to seed with, sowing the grasses in the fall and clovers as early as possible in the spring.

I prefer to cut the first year for hay, as by so doing the plants become firmly established in the ground. The most serious mistake usually made is that of over-pasturing, cropping the plants so close that the root is exposed, unprotected, to the scorching rays of the sun and the freezing of winter. By over-pasturing the best varieties of grasses are killed and the coarser and poorer remain. It is a safe rule to have grass enough for three and only two thereon.

scattered, and should receive, as often as possible, a coating of barnyard manure, evenly applied and brushed in with iron harrow or brush.

Many permanent pastures are seriously reduced in value by allowing perennial weeds to obtain a foothold. Such weeds as Golden Rod should be spudded out, as they soon spread and reduce the value of the lot.

In the early spring, much good can be done by going over and cutting the top to pieces with a sharp disk, doing this thoroughly until the sod is well cut up, then sow over liberally with seed, such as the clovers, timothy, orchard grass, Kentucky blue grass, and also Black Medick ("Medicago Lupu-

lina"). This is a valuable plant to grow on rocky hillsides where the land is thin. After seeding, harrow well and pasture lightly the first season—better not at all.

The permanent pastures are manured and treated in this manner once in five years. No stock pastured on the newly treated pasture for that year means much more feed, very much more will be obtained in the subsequent four years than by close cropping year after year.

I would especially recommend orchard grass as a pasture grass. It grows rapidly, never taking a rest during the summer, and like timothy or blue grass seeds freely and is drouth resistant.

Supplemental Crops.

As a supplement to pasture in the fall, rape is especially valuable. Sown in drills twenty-four or twenty-six inches apart on well prepared land, it yields an immense amount of feed just when pasture is apt to fail, and is especially valuable for lambs, calves, hogs and young stock. It can also be sown in connection with rye on early fall plowing, or on corn previous to the last cultivation, giving a good bite before winter, and also covering and binding the soil against winter floods.

Some provision should be made for a succulent ration during winter months. This element of succulence promotes digestion and assimilation of dry foods, and a feed of this kind is worth much more to the animal than any chemical analysis will show. This succulence is obtained in silage, and the time is near at hand when the up-to-date farmer will have silage, not only as a winter feed, but also in summer to successfully tide over the ever recurring drouth. I firmly believe that a more general use of the corn plant in the shape of silage would, combined of course with the best of manage-

ment of dairy herds, double the milk output of every dairy farm in the state. Silage is also just as good and economical for fattening steers.

The various kinds of roots are also valuable for the same purpose. We sometimes hear it said that turnips contain so much water that the remaining food value is small. From the results found in feeding roots, it certainly is mighty good water a steer gets out of a turnip.

Feed to the limit; young stock should be pushed forward rapidly, no day being allowed to pass without adding something to their weight. It is poor policy to winter young stock in such a manner as to lose to a great extent what they have gained in summer. Dairy cows should be fed up to the limit of their capacity; it is only the amount of feed that a cow consumes over and above that which she requires to maintain her body that she is able to put into the milk pail.

Comfort is money in handling live stock, hence it is poor policy to burn up feed consumed trying to keep animals warm in a drafty stable, or in shelter of a barbed wire fence. Kindness and gentleness in handling also means a better return for food consumed; no animal will do well if it is fretted or abused. Give careful oversight; the proper time to prevent trouble is before it happens; in short, put heart and mind in the work and success is assured.

DISCUSSION.

Chairman Nordman—Now we are ready for questions regarding the feeding of sheep.

Question—What kind of sheep do you handle?

Mr. Elliott—I handle sheep two ways. I have a flock of home sheep, pure bred, dark-faced—I believe in pedigreed stock. The man who handles pure bred stock on the farm will

be a better man and a better citizen than he who is content to associate with scrub stock. I put my skill in breeding and development into that flock, but I also buy lambs to feed, following two methods, one feeding to sell about Christmas, the other feeding over until spring, probably about Easter.

I sow rape among my silage corn previous to last cultivation, about three pounds to the acre. This will make rapid growth after the corn is removed and by the middle of October will be thick and over a foot high. Sometimes we gang plow up wheat stubble and also sow rape with half a bushel of rye per acre, getting it in as soon as possible, say August 1st. This grows rapidly and gives a lot of late feed. These we call catch crops. This land trampled over by lambs, the droppings evenly scattered, gives grand crops of barley or oats the succeeding year. This will pay for the labor and we have pasture for nothing and the field cleared of weeds.

If a piece of land gets foul with thistles, grasses or weeds, we give it an early cultivation until about the first of July and sow about two pounds per acre of rape in drills, say twenty-six inches apart. This land, if cultivated carefully, will be thoroughly cleaned and give an immense amount of feed. Buying lambs when weaned and putting them on such food, usually gives good profit. An illustration. Six acres of rye was pastured off, plowed and sown with rape about July 4th; twenty acres of fall wheat stubble prepared and sown broadcast the first week of August. Early in October two hundred and fifteen lambs were put in this, having also the run of an old pasture field. The dogs got some five or six and one or two died. They were all sold before winter, yielded some four hundred dollars, or two dollars per head profit. This prof-

it was made almost entirely from a catch crop that left the fields cleaner and in better condition than they would otherwise have been.

Lambs pastured on rape during the autumn should not be carried through the winter. They get fat and do not gain as thinner ones would do. Better sell off for the Christmas market and buy a fresh supply for winter feeding.

The history of another bunch that were winter fed. In this bunch there were one hundred and eighty-five. Selling off the fattest ones, we brought them down to one hundred and fifty, that on shearing weighed eighty pounds. I rather like fall shearing if houses are comfortable. After selling wool, they cost three dollars per head, bought about November 1st and sold April 20th. I feed in small lots, grading them carefully according to size. "Why?" Because they do better; the smaller ones are not crowded out, they run around less and are quieter, and when offered for sale look very much better.

Feed:—Clover, turnips and care is the feed we depend on. Feed all the turnips they will eat twice a day pulped; they will not eat enough if fed whole. Just a little grain. Oats are the best single grain, a few peas and a mixture of bran. Just about a dollar per head of grain during feeding time. Give them a little more than all the clover hay they will eat. Our feed racks are simply boxes, say twenty-two inches wide, ten or twelve feet long and three feet high, strongly made, with close bottoms, upright slats seven inches wide, with a seven inch space. Into this the lamb puts his head up to the shoulder, wastes nothing and feeds contentedly. What clover is left after each feed we turn over to the young horses. These lambs weighed eighty pounds when bought and one hundred and forty when sold, leaving, after paying for

bran and grain, just about five hundred dollars.

"What did this represent?" Labor in attending to them, time that in many cases is spent by the farmers in sitting around the fire; the turnips that grew on five acres of ground, and clover hay from seven acres of land, a fairly good showing for time and land. Gentlemen, I have never seen the time when sheep would not pay and pay well. They are the only kind of stock that a farmer can buy in the autumn, give his note for at twelve months, and before the note is due pay for themselves and make a profit besides.

You have better markets here, as we have to meet a hostile tariff if we attempt to put our lambs into Buffalo, and you have the range to go to to get your lambs. We, in Canada, have discovered a means by which we can dispose of thousands of lambs to Americans without going through the formality of paying duty upon them, but I do not know that I am justified in giving the secret away. Our neighbors may find some way of getting back.

We have in our northern country a beautiful stretch of lake and mountain called the "Ontario Highlands." Into this great pleasure resort the Americans are flocking in yearly increasing numbers. They buy launches, they build expensive houses, they live in house boats. A year ago thirty-five thousand of them were carried into Muskoka alone. They eat lamb,—lamb regardless of price, as well as other foods of Canadian production, and carry the energy resulting from them back across the line.

The quality of Canadian lamb is said to be better than American. In many of the best hotels and restaurants Canadian lamb is quoted on the bill of fare. It is generally conceded that this superiority is due to the re-

sult of clover and roots in winter feed as against the heavier grain feeding of the American system, which gives a fatter but less juicy chop or roast.

Mr. Imrie—You say you divide your lambs up into bunches. How many do you feed together?

Mr. Elliott—I do not like over forty and I would rather have thirty—I would rather have twenty; the fewer you have in a bunch, the better they do.

Mr. Roberts—Doesn't that greatly increase the labor and cost of feeding?

Mr. Elliott—Oh, it does, but as long as I get a lot of money for it I don't care. Of course we try to do the work with the least possible labor, although that is not the proper principle. What would you think of a manufacturer who allows his factory to stand idle because he won't employ labor, when by employing more labor he could make big profits? Why, if we would only employ enough labor, this country would be like a garden, and it would pay all the time.

Mr. Roberts—But where are you going to get the labor?

Mr. Elliott—I have never seen the time when labor didn't come eventually; labor comes when it is needed.

Prof. Carlyle—What do you expect to put on your lambs?

Mr. Elliott—On that carload of lambs I made a gain of sixty pounds from perhaps the middle of November until after the middle of April. Go over the lambs with the shears and trim them before selling; it makes them look better. It does not put any more mutton onto them, but we are largely influenced by the appearance of the lambs, and they sold a little better on the market. We do not count much on the wool; in that case I only got sixty-five cents a head for the wool.

A Member—Weren't those lambs too heavy when you bought them?

Mr. Elliott—Yes, but they were the lightest I could buy.

A Member—We can buy them at fifty pounds in the United States.

Mr. Elliott—I am afraid they are wormy. I would rather buy them at that weight, too, but they must be western lambs to get them that light and healthy.

A Member—Don't you have lambs in your Manitoba country?

Mr. Elliott—None nearer than Alberta; we are going to get them. You cannot market lambs in the old country at over one hundred and fifty; over that weight they are sheep. There is always a difference of two cents a pound, if not more than that, between a lamb and a sheep. I sold a few big lambs a few years ago and there was quite a kick because they were too big, people wouldn't accept them.

Prof. Carlyle—Our lambs become sheep at one hundred pounds.

Mr. Elliott—I do not know whether a hundred pound sheep would pass for a lamb with us or not.

Mr. Imrie—You spoke of not liking to feed lambs that had been pastured on rape in the fall. How would it be about pasturing breeding ewes on rape?

Mr. Elliott—That is all right if you are prepared to run the risk, but I am a little afraid. There is more danger of bloat, ewes sometimes will bloat, lambs seldom. With me the great trouble is to keep my ewes thin enough. Clover is the very best feed, but we feed our ewes to quite a large extent on pea straw. If you are not too lazy to use that combination of two sticks that we call a flail, that is an ideal combination, pea straw that has been threshed with a flail.

Mr. Wing—Why is that better than machine threshed?

Mr. Elliott—It is not so broken up, is always fresh and not so dusty. Sheep do not do as well on machine threshed product, it doesn't last as long.

Mr. Wing—What is the best feed for a lot of breeding ewes that are going to lamb the middle of March, and two months previous to that?

Mr. Elliott—I would give them clover hay and some roots and a little bit of grain, but be sure to give them all the exercise possible, even if it is necessary to give them exercise with a trained dog—it will pay.

A Member—Have you ever fed silage?

Mr. Elliott—I never have fed silage. I once bought a bunch of ewes that had been fed silage, and they were not very satisfactory. I did not blame the silage, I think they had not been exercised.

Mr. Wing—How much do you call a little bit?

Mr. Elliott—I don't know. I feed my live stock with a large mixture of brains.

Mr. Wing—That is a hard thing to pass around.

Mr. Roberts—We have fed our sheep this winter about two, or perhaps two and a half pounds of silage per day per head, and we have had very good results from doing so. The ewes are dropping their lambs this spring with plenty of milk for the lambs, and we like a little of this silage very much.

Chairman Nordman—What do you feed besides silage?

Mr. Roberts—Clover, a little timothy hay and alfalfa. My ewes are fat enough without corn.

A Member—How does silage compare with roots?

Mr. Elliott—They both contain that succulence so necessary for the health of animals. I want them both. Roots clean the land very much better than corn. Perhaps there is more food value per acre in silage corn than in turnips or mangels. It is worthy of note, however, that wherever the best of live stock are reared on expensive land, roots are a large part of their winter ration.

GOOD FEEDING.

Supt. George McKerrow, Madison, Wis.

The subject announced for me to talk to is that of good feeding. I used to talk along these lines under a different heading, namely, "Economical Feeding," but it is really the same thing, good feeding is economical feeding, and both of these are scientific feeding, because science is only applied common sense.

At one of the Institutes in the northwestern part of the state, following one of our dry summers, hay was very scarce and high-priced all over this state, other feeds in proportion, I talked on this subject and at the close questions were coming thick and fast, something like this: Will it pay us to buy these high-priced feeds; hay at twenty dollars a ton; bran and middlings at twenty-five dollars; oil meal at thirty dollars, to feed the average dairy cow and sell her butter at twenty-three cents a pound? And I had to say: I do not believe it will pay you to feed these high-priced feeds to the average dairy cow this winter, but if you have a good cow it will pay to feed her. She probably will pay for the feed, but if you do not feed her well, she will dry up and cows are like men, they soon get into bad habits, and the next year when you ask her to produce milk for you she will dry up again; so keep her going.

I noticed at that time back in the audience a gentleman trying to get to his feet as if he wanted to say something and his neighbor evidently was holding him down by the coat tail, and the thought came to my mind that this farmer's wife couldn't come with him to the Institute, and therefore she told her neighbor that if John wanted to talk too much to hold him down as she would if she were there. I pointed my finger at this man and said,

"Do you wish to ask a question?" The neighbor let go and he jumped up and said, "No, I don't want to ask a question, but I like to tell you how I feed my cows very cheap this winter." You see that word "economical" struck him as meaning "cheap."

Then he went on to explain, "I not been very long a farmer, I been mechanic over in the old country; I been mechanic over in Minneapolis, but I got four boys and I think it better to go out in the country with the boys on a farm. So I come over here in this new country and I buy a farm, forty acre this new land, and I bring my wife and the kinder and we all work pretty good and we get pretty good clearing, and we get four pretty good cow. But this summer he was so dry and the grass he no grow and the corn he no grow and we get no hay. I got one piece pretty fat land and I sow some oats very early that grow pretty good, and I got a little oat straw stack and I think how I shall keep my four cows cheap this winter. I got no money, I can't buy this bran and oil meal. I think now I take some salt and water and go out and sprinkle that on the south side of the straw stack where it is warm in the mid-day, and then I let the cows out, and, by golly, they eat pretty good from that salt straw."

I couldn't help but say, "Next spring, my friend, you will find you have very cheap straw cows when you come to want milk." His neighbor bobbed up and turned his attention to his friend and neighbor, and he said, "Hans, you should no tell that, that is no good, it is better when you kill half them cows and feed the other half something."

After that little incident, I decided

that I would have to drop this term "economical," because it leads many people astray. We have too many feeders of live stock in the state of Wisconsin that are practicing economical feeding with only the thought of cheapness; too many animals are only getting the food of support and the food of support is wasted on every animal that does not get enough more feed to mean the food of maximum production—I say maximum production; probably I ought to qualify that and say maximum production for the good health and development of the animal.

It is possible in some of these great working efforts for world's tests we have done a little over-feeding, yes, a good deal of over-feeding. I do not want to be misunderstood as advising every farmer to feed his cows to produce one thousand one hundred and sixty-four pounds of butter in a year; as Mr. Gillett did with Colantha 4th's Johanna, but he should feed them so that they may produce the maximum and still keep healthy.

Down in the Elgin dairy district, Prof. Fraser, of the Agricultural College of Illinois, has just been conducting some feeding experiments upon the different herds of cows in that district. He has found that one-quarter of the cows being fed there are being fed at a loss.

Now, it is safe to presume that the cows of Wisconsin are no better than the cows in the Elgin district of Illinois. If one-quarter of the cows in Wisconsin are being fed at a loss, how much are we losing in this one-quarter?

It is estimated that the dairy products of this state are now between fifty and sixty millions of dollars a year. It is safe to say that one-half of that sum is spent in feed for these cows, or twenty-five millions a year. It is safe to say that the other live

stock in Wisconsin are eating up at least twenty-five millions more. A loss of one fourth of this fifty million dollars is twelve million, five hundred thousand dollars. Then, from recent investigation, we believe that one-third of a million dollars is being spent in condimental foods, patent medicine stock foods, if you please to call them that, because their manufacturers are not willing to submit them to the food test, and so they are medicines, and those men sell them under the name of foods. But we will discuss them as foods this morning.

Condimental Stock Foods.

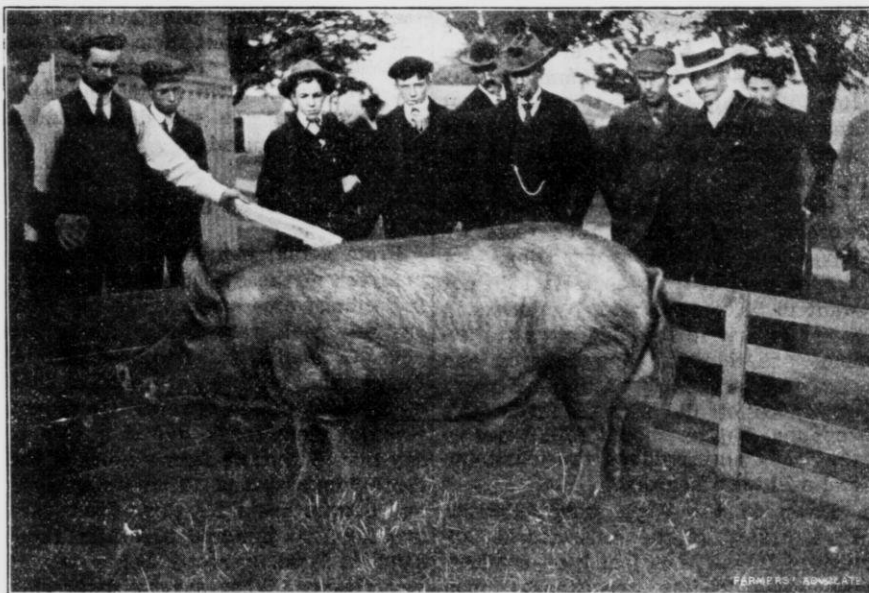
From actual experiments and from analyses of these foods, none of them in feeding value are equal to old process oil meal, very few of them are equal in feeding value to bran or middlings, and yet they are sold at five, eight, ten, fifteen, twenty times the price of these feeds and it is safe to say that Wisconsin farmers, out of the three hundred and thirty-three thousand dollars spent for these foods, are wasting two hundred and fifty thousand at least, a pretty heavy tax, if you please. What are we discussing these questions for any way? To set us to thinking. What do we think about this probable waste of twelve millions, seven hundred and fifty thousand dollars on the live stock of Wisconsin? It is for every man to think of his share of it for himself.

I am not here to say that one-quarter of the cows of Wisconsin are not paying for their feed because they are scrub cows, because there are a good many scrub feeders feeding some of these cows, and if some of these unprofitable ones were fed with more thought and intelligence, they probably would pay for their feed.

Now, in this matter of thinking, we were holding an Institute last winter

in Waukesha county, where some people think. We were discussing this question, and my friend, W. C. Bradley, thought I was not putting the question of condimental stock foods strongly enough, and Bradley started in with the enthusiasm he often shows upon some of these subjects, and

was late, and so the mail hadn't gone. Then he said, 'Get me that letter that I directed to a stock food company and let me have it.' I gave it to him, he opened it, took out some money and put it in his pocket with a smile. He said, 'There was fifteen dollars in that letter, and according to the way those



A well bred and well fed Tamworth bacon hog, bred by Mr. Elliott, of Galt, Ont.

when he got through condimental food stuffs were not as good as oil meal or bran, and some of them not even as good as marsh hay,—I guess—I noticed a farmer in the audience got up suddenly and walked out. At the close of that session, the post-master of the village came over to us with a smile and said, "Did you see that farmer get up and go out?" We told him we did, and he said, "It is something of a joke; he came over to the post-office and inquired if the afternoon mail had gone, and I told him, no, that the train

fellows over at the Institute talk I would have lost twelve of it, and so I am twelve dollars better off because that train was late.'"

There was a man that thought and thought quick, and if we can all think as quick as that, we will save money.

Now, I am not going to tell you how much our wives and cooks are losing on the food they give us fellows, because that might reckon up too much; Mr. Martin suggests that it might break up some families. This is the day of fads, and one of the fads just

now is breakfast foods. We have them under all colors and names; all made from some kind of grains said to be predigested and cooked and put up in nice packages and all costing lots of money, and yet over in Canada, where my friend Elliott lives, at the Agricultural College at Guelph, they have been experimenting on these breakfast foods, and the bulletin I received a few days ago tells me that none of these fancy breakfast foods are equal in nutritive value to the old-fashioned, plain oatmeal or corn meal. They also tell us that oatmeal ought to be cooked eight hours to be at its best for palatability and digestibility, wheat meals two hours, and this frightens our cooks, but of course in this day of the fireless cooker they don't need to be frightened. Everything comes to him who waits.

This question of feeds and feeding for animal and human is being much discussed; people are learning more about it, thinking more about it, as they should, and are constantly and steadily improving in good, economical feeding of man and beast.

Some Food Analyses.

Briefly this morning I am going to call your attention to the chart that is before you and to some of the terms that are used in reference to feeds and feeding. You notice such terms as protein,—proteids in the ladies' cook book. Now, what does it mean? Nitrogen or albuminoids, an element in foods, an element used in the animal economy in making muscle, in furnishing skin, hoof, hair and horns. It is necessary in the building up of the nerve centers, the brain, the spinal cord, and nerve tissues, in making the animal matter in the bone; and the scientists say that protein can be changed over if a surplus is fed into

the making of heat, energy, and even fat, and if this is true, you may at once say, why not feed all protein? But protein is the high-priced element in food stuffs and it would not be economical to feed all protein. Again, it is the general supposition that the changing of protein over into heat, or burning it up, requires an extra effort of the system, which is over-taxing and over-working it, so we will drop the subject of changing protein into heat and go on to the next term, which is ash.

What does ash represent in food stuffs? The mineral matter, the lime, the iron, the magnesia, sulphur, etc. Now, is that of any value as food? Yes, for your pigs. A hog's stomach can handle even wood ashes in sufficient quantities to add a great deal of strength to his bone, but the stomach of the horse, the cow and the sheep cannot handle ashes in sufficient quantities to add materially to the strength of bone without injury to the stomach. So we will drop the question of furnishing wood ashes to any other animal than the hog. But all animals must have enough ash, even the dairy cow. If I were to burn up here today ten pounds of oats, ten pounds of corn, ten pounds of clover and ten pounds of timothy in separate vessels, I would find more ash where I burn the oats than where I burn the corn. That demonstrates that oats is better to furnish mineral for your growing animal, to build its bone with than corn, also more ash where I burned the clover than where I burned the timothy, and so clover is better than timothy to build the animal's bone.

We find that feeds that are rich in protein as they grow, as a rule, are rich in ash. We are feeding manufactured foods, different kinds of gluten meal, and gluten feed, for instance, the by-product of the corn from which

glucose is manufactured. Gluten feeds are very rich in protein, but somewhat low in ash.

It strikes me that a feeder who is buying gluten feed for the sake of the protein, and it is very rich in this valuable, necessary element, should just stop and consider what he can feed with it to furnish the necessary ash. It might be well in some cases to buy part bran and part gluten, because bran has a surplus of ash, more than is really needed with the average animal. Your dairy cow is putting ash into her milk to build the bones of her calf, and the growing animal is putting it into his bone. If you will feed clover hay and alfalfa, of course you don't need to buy bran to put with your gluten, because those two feeds are very rich in ash. But the farmer should think and balance up what is lacking in one feed with that which carries a surplus in another.

Fats.

The use of the fat in foods is somewhat limited. It may produce fat again, but we presume that the fats are used mainly in making heat and energy quickly, and lots of it. The Eskimo lives up in the cold climate near the North Pole, and so long as he lives there his system craves a lot of fat, but you move him down by the equator and he becomes a vegetarian. Carbohydrates, sugars and starches make fat, heat and energy also, but more slowly and in much less quantity.

These things cost something in Wisconsin; some fifteen years ago, when labor was cheaper than it is now, and land less valuable, we figured this out. We found then that protein in the stock foods grown on the farm cost one and one-half cents per pound; fats three and one-half cents per pound,

and one-half cent for carbohydrates. The scientists tell us that sugars and starches will make as much heat per pound as protein and only cost one-third as much; fats make two and one-fourth times as much heat and energy as either protein or carbohydrates. On this basis, our scientific men have figured out what they term a balanced ration, and they tell us that every time we feed a pound of digestible protein we ought to feed six pounds of digestible carbohydrates, and yet that is not just exactly true, because we have multiplied the fats by two and a quarter and added it to the sugar and starches. But what do we know about it as practical farmers? Do we know anything? Are we going to leave it all to the scientific men to figure out and take their figures without question? No, we ought to keep track of these things by our own experience and demonstrate by the feeding of the sheep, pig, calf, cow and horse whether the scientist is right or wrong, because it is said that even the scientists sometimes make mistakes. Many things taught as true science when I was a boy in school are not taught today; even some of the things taught when Prof. Carlyle, who is younger than I am, was at school, have been changed.

The Balanced Ration.

Now, if you were only going to have one kind of grain to keep your animals growing and doing their best in health and production, what kind of grain would that be?

A Member—We always say oats.

Supt. McKerrow—Yes, all over Wisconsin and in other states, they have always answered that question when I have asked it in the same way, and even over in Canada and Great Britain, I have always received the same answer to that question, oats. Now,

why? Because practical feeders have demonstrated to their satisfaction that oats do these things better than any other grain, and oats are practically a balanced ration. The ratio being one of protein to six of carbohydrates, protein enough to make the muscle for the young and growing animal, and carbohydrates sufficient to supply fat, heat and energy. You must remember that the dairy cow, whose life business is to furnish food for a young animal, her calf, should be fed the same kind of a ration as a young, growing animal.

Prof. Carlyle—How about alfalfa?

Supt. McKerrow—That is narrower, being about like peas, one to three. You fellows out west got a little too fast when some of you claimed alfalfa a perfect food in itself.

Mr. Goodrich—They need a little of our corn.

Supt. McKerrow—Yes, I saw a little corn from the east at the Experiment Station at Fort Collins. It is all alfalfa and pure air around there, but they did raise a little corn around in the corners to mix with the alfalfa, or shipped in a little from Nebraska and Kansas.

I once heard a gentleman over in Canada make this statement: He said, "Feed has had a very marked effect upon developing different classes of people, and to demonstrate this I ask you to go in your imagination to the Highlands of Scotland with me, to the cold, bleak districts, where animals grow slowly; the sheep and cattle are small, the horses are small, running down to the Shetland ponies, and yet when you look at the people you find them as large in bone, muscle and brain as you find the people of the low land, and why? These Highlanders have been very particular how they raised and developed their children for many generations, they have seen to it that they have been well

fed on bone and muscle-developing food, a balanced ration, oatmeal, and when there has been a shortage of oats up there, they have imported from England and from the lowlands to feed the children and develop bone, brawn and brain, but they allow the animals to shift for themselves. On the other hand, you go down to China, where they are living on cheap, starchy foods, lacking in ash and protein, as they find it in the cheap rice, and you find a people lacking in bone, muscle and brain."

An Irishman in the audience stopped the speaker—over in Canada they will do most everything, as you have seen this morning, they have characteristics. This Irishman in the audience said, "Hold on there, how is it with the Irishman? He is pretty bony and brawny and brainy too, as well as your Scotchman, and he has been raising his childer on starchy foods, praties mostly." The speaker said, "I am glad you asked me that question as I am an Irish lad meself, pretty well grown on the ould sod; the Irishman is smart enough to balance up the starch in the praties with the protein in the skim milk and the buttermilk." Now, when my friend Convey was being reared, there was a little shortage of skim milk in the "ould country."

I didn't tell you this to make you laugh, though a laugh is a good thing, that is what keeps Wylie fat, but I want to impress this fact upon you, if you cannot have oats enough to feed, there are other feeds you can balance up with and all be as smart as the Irish.

Now, the question every one of us should ask himself is, what kind of crops can I grow that I may have a ration that will furnish these elements, protein and ash, in sufficient quantities to my dairy cows and all other young growing animals, and balance up the carbohydrates in our

cheaper corn, silage, timothy and straws and cheap feeds of other kinds? That is what we should think about.

Can we grow alfalfa? According to all these scientific gentlemen, and the cow and other animals, alfalfa is a plant that will balance up our corn if we can only grow it, and it is being grown in different parts of Wisconsin. So that is another thing to think about.

How can we grow more clover? Because that helps balance these rations of corn, cheap corn silage, straw and timothy. So that is another thing to think about.

Now we will briefly run over this table. The narrow rations are those with a surplus of protein (muscle builders). Cotton seed meal, instead of being balanced in the proportion of about one to six like oats, is very narrow, one to 1.3; linseed meal one to 1.7. Either of these fed with corn, which is nearly one to ten, will balance more than their own weight in corn. Skim milk, one to 2.8, will balance considerable corn, and to get the best out of it should be fed to pigs with corn. Peas, one to 3.2, you see are rich in the muscle or lean meat elements.

When I go over to Great Britain, I often walk into the meat shops and I see bacon with the prices attached to the different kinds; Irish bacon, Danish bacon and Canadian bacon, and that marked "U. S." Whenever I see those letters "U. S." when I am away from home, I say that means us, me included, and you may be sure I am proud of the United States of America, but when I look at the prices on that bacon I am not so proud, because they are the lowest of all. You ask me how that is, just as I ask the man over there, and he answers me, "Because it is not so good." "Why isn't it so good?" "Because you make your bacon too much out of Indian corn;

there is too much fat in proportion to the lean." The Canadian bacon has been creeping up in price until it stands nearly side by side with the Danish and Irish bacon, and why? Because over in Canada they make their bacon largely out of skim milk, peas and a little barley. A few years ago, when the bulge in the bacon market came, those smart Canadians over there got smart—they can get smart as well as the Yankees—but they got smart that time and began to buy corn from this side of the line and feed it to their bacon hogs, and one told me a year or two later that the bacon buyers got smart too and wouldn't buy their bacon hogs, so it is one Canadian beat another, as it is over here. But to continue with our chart.

Wheat bran one to 4.6. This was the old process bran. Clover one to 5.2. On the other side we see some of the wide or fat, heat and energy producing foods. Barley one to 7.2; wheat one to 7.4; rye one to 8.2; corn one to 9.7; timothy one to fifteen. Quite often a farmer asks, "Which is the better, timothy hay or clover hay?" It depends altogether on what you are going to feed it to, whether the old horse—timothy is all right for him, his muscle is all grown already, or the colt that needs something with more muscle and bone producer in it than timothy, and for him clover is far ahead, to build his bone and muscle. Every young growing animal must do his growing while he is in the growing stage, or the growing age, and for that reason protein and ash should be fed to him while he is young. The first year of the colt's life is the most important year, the time when he should grow his muscle and bone the fastest. Many a colt has been born in the state of Wisconsin from a parentage and ancestry that should grow him into a sixteen to eighteen hundred-pound draft horse, and by lack

of bone and muscle building elements in his feed the first year he has been stunted down until he comes out a thirteen or fourteen hundred-pound cheap chunk, and is worth from fifty to one hundred dollars less than he would be if he had had the right kind of feed put into him in the first year

If you make her eat all of it, she would do no better than she would on timothy hay, and in that case should have other protein foods to balance it the same as when feeding timothy.

Oat straw, one to 27.4, represents a very coarse, woody class of feed, but some can be fed for filling. They

FEEDS

TERMS:— PROTEIN, ASH, FATS, CARBOHYDRATES, SUGAR, STARCH
 OBJECT:— Muscle, BONE Fat, Heat & Energy.

Cost in Wisconsin:—Protein, 1.5¢ Fats, 3.5¢ Carb., .5¢ per lb.

BALANCED RATION		PROTEIN	to	CARB.
OATS	1	1	to	6
	1	1	"	6.2

NARROW.		PROTEIN	CARB.	WIDE.		PROTEIN	CARB.
Cottonseed Meal	1	to	1.3	Barley	1	to	7.2
Linseed	1	"	1.7	Wheat	1	"	7.4
Skim milk	1	"	2.8	Rye	1	"	8.2
Peas	1	"	3.2	Corn	1	"	9.7
Wheat Bran	1	"	4.6	Timothy Hay	1	"	15.0
Clover	1	"	5.2	Corn Fodder	1	"	15.8
				Oat Straw	1	"	27.4
				Turnips	1	"	11.3

Age of Animals, Individuality, Climate, Exercise, Digestibility of Food, Variety, Succulence.

Chart showing terms used, cost of nutritive elements, proportions of same in a balanced ration and a few of our animal foods; also some of the things to be especially considered in feeding animals.

or two of his life. You can fill him with fat afterwards, but you cannot grow bone and muscle after he has passed the growing stage.

Next we have corn fodder, one to 15.8. Of course where your cow picks out the leaves of your corn fodder and leaves the rest, she is getting a ration about in proportion of one to seven or eight instead of one to fifteen. The leaves of any plant are its protein part and that is where you get the most out of your corn fodder.

should not have too much concentrated food, two-thirds in a general way of the whole ration should be roughage and one-third concentrated food with the growing or dairy animal, but every animal or man should not be fed exactly alike; each should be fed according to their own individuality.

A Member—Have we the analysis of the leaves of the corn fodder?

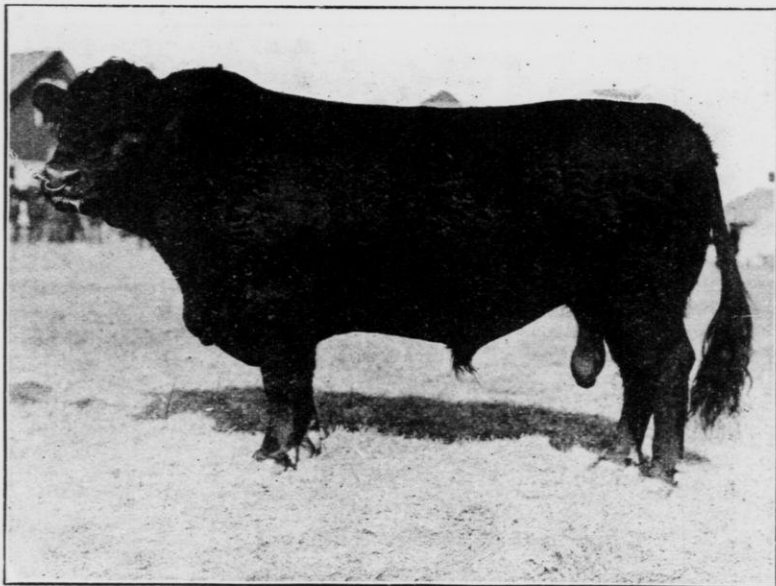
Supt. McKerrow—Not many analyses have been made, those that have been show about one to eight, and

they were made just on this question of why corn fodder was better than timothy hay.

Turnips, one to 11.3, represent the opposite to oat straw. They represent a very watery food, and I wonder if a man couldn't pump water out of his well more cheaply than to pump

constipated condition of the system. In that consists the great value of roots and ensilage.

Now then, when our animals get older, how should they be fed? An old horse should be fed differently from the young, growing colt, so the age of the animal cuts a great figure



Champion Galloway Bull at Wisconsin State Fair, 1908.

water out of the ground with his turnips?

Mr. Elliott—Never, never.

Supt. McKerrow—If our Canadian friend, Mr. Elliott, didn't raise these turnips to keep him at work through the summer he would get as lazy as any Yankee and he would fatten up like my friend Scott here.

But it is true that all these watery foods are very digestible foods, all roots and other juicy foods are very digestible, and while they do not carry a very large amount of nutrition in them, they all have a cooling effect on the digestive tract overcoming a

as to how we should feed him. When I was younger I used to take a great deal of pride in matching up a good team of horses; I used to take some pride in driving them, and in feeding them, taking care of them; that was before I got so lazy; the boys do it now, I don't have to. But I never found two horses that I wanted to keep in the same condition, that is, to keep them in nice form, that I could feed exactly alike. One had to have a little more grain or a little less than another, and occasionally I have found one of a nervous temperament that I could improve a great deal by feed-

ing a more fattening ration of corn, partially, instead of all oats. I have found some very nervous animals that we would feed one-half corn, and they would fatten up and lose part of their nervousness and work much more satisfactorily. So if you want to get the best out of every horse, you must feed him according to his individuality, and the same is true of dairy cows in particular. It is very seldom you can find two dairy cows that can be fed exactly the same amount of feed in the same proportion, and there should even be some variation in the feed of nearly all animals, because some are inclined to fatten up so much more quickly than others, and they should be fed a little narrower ration. We should feed according to the individuality of each animal, or person.

There has been an experiment carried on out in Iowa that illustrates this point better than I can illustrate it in any other way. In feeding steers one winter, they found a high grade Jersey steer that was making the same gain per day for the feed consumed as a high grade Hereford or beef steer. These steers were taken down to Chicago and sold to Mr. Swift's buyer and an individual price put on them. This Jersey steer was priced at four dollars a hundred, while the beef steer, that had made no greater gain for food consumed, was priced at six dollars and twelve and one-half cents per hundred, two dollars and twelve and one-half cents a hundred more. This Jersey steer opened up very fat, according to the records the fattest steer for loose tallow that was ever killed in the world, so far as records go. The beef steer, when opened up, did not have near as much fat on the inside, but when they made the cuts of choice meat along the back and ribs, there the beef steer was much thicker, he put his fat in in layers, he had marbled up the lean

with little streaks of fat, and the old Englishman who cut them up said it made his mouth water, and he said, "Ah, fine beef." It was good enough to go to their best consumers; while the Jersey meat was not marbled up and finished, and when they came to figure up the returns from this Jersey on the cheap tallow and cheap meat, they found he had not paid a profit on his feeding and was sold high enough at four dollars per hundred weight. When they figured up the other steer, who had gone through that experiment side by side with the other fellow and had made no more gain for the food consumed, and that was sold for six dollars and twelve and one-half cents a hundred, there was a good profit shown, and he was none too dear at six dollars and twelve and one-half cents per hundred weight. They had both gone through college, but showed far different returns on their education.

The difference in those two animals was in their individuality. The steers couldn't help it, because that individuality came to them by a line of heredity. This Jersey steer had been bred for generations along the line of putting everything possible into the milk pail. The poor steer couldn't put it into the milk pail, and so he did the next best thing; he couldn't put it into butter fat and he did the next best thing, put it into fat that they make butterine of in Chicago. The other steer had been bred for generations to develop a wide back, to put layers of lean and fat along that back and to marble up his lean so it was juicy and toothsome; he could do it, and it counted for him in this contest. So much for individuality.

What lesson should that teach to the farmers of Iowa and Wisconsin, too? That you should not try to make beef out of dairy steers. If you are

going to make beef, get animals with a beef tendency.

On the other hand, over in Minnesota, a little later, they were carrying on an experiment with dairy cows. It was rather a strange experiment. They fed the dairy cows on wheat and prairie hay, because wheat and prairie hay were so low in price that winter in Minnesota that wheat was only bringing forty cents a bushel and prairie hay about four dollars a ton after it was baled, and the Experiment Station concluded that they would teach the farmers a lesson as to how they might get more out of that wheat and prairie hay if fed to dairy cows. That ration was wide, of a fattening nature. This cow, I think, was cross-bred, Jersey-Guernsey, as I remember it. They fed her on wheat and prairie hay, a ration as wide as one to ten, and yet she milked, she couldn't get fat, she turned everything into the milk pail, and she paid one dollar and forty cents for that forty-cent wheat and fourteen dollars a ton for four-dollar hay.

On the other side of the alley was a dual-purpose cow that had made good records in other experiments, but when she got such fattening food she couldn't resist the temptation to put flesh on her back and when she put it on her back, it didn't go into the milk pail, and she dried up some, so that she paid eighty cents for the forty-cent wheat, and instead of paying fourteen dollars a ton for that four-dollar hay, she paid eight dollars. What was the difference? Individuality. I have already said all animals should be fed according to their individuality.

There were some other tests on these cows made there, with fairly good records for this dual-purpose cow, but they were tests where she had been fed a narrow ration where there was no temptation to get fat. You must

feed according to individuality if you are going to get the best out of these animals; every good feeder understands that. Those are some of the things we need to think about.

Climatic conditions cut a figure in feeding an animal. If you have to feed animals out in the cold, it will take more of this warming feed. Mr. Elliott says it is cheaper to keep cold away from the animals than to feed it out of them. Of course animals that are exercising will take more of these heating feeds to keep up their supply of energy.

The digestibility of food stuffs cuts a great figure, but I have already spoken of that in the matter of succulent feeds. They help other feeds to digest. Alfalfa that is cut when the first blossoms show here in Wisconsin, clover cut not later than the full bloom, either of these is much more digestible than these same plants cut after the woody fibre has developed. It makes it harder for the animal's stomach to get the nutritive elements out after it is locked up with the woody fibre, so we should consider digestibility in getting our crops ready for feeding purposes, especially in cutting our hays and corn fodders, making our ensilage, etc.

We have often seen in feeding show animals on a good ration, that some of them would practically stand still, quit developing, and we have helped that by changing the kind of feed, or sometimes simply by changing the form of the same feed. They take a new start and go on and do better.

These are a few of the things we should all consider and think about, and if we will consider and think about them, this discussion will do us some good.

DISCUSSION.

Mr. Goodrich—Does anybody object to my talking a little?

Mr. Convey—We can tell better after we hear you.

Mr. Goodrich—This is perhaps the last time you will be obliged to listen to me, so I hope you will be patient.

The chemist has done wonders for the farmer, especially in the line of feeding stock. I know there are some old, grizzled fellows that sneer at the scientific part of it, but the chemists have been able to tell us what the elements are in the production of the animals, and we know that whatever an animal produces comes from the feed, so that it must be found in the feed.

Now, the chemist analyzes the milk of the cow; he finds what it contains, and then he analyzes the feed and the cow must have the necessary elements in the feed. For instance, the cow must have a certain amount of protein to produce the casein in her milk; if she doesn't have it, she cannot produce the milk. Now, here is the timothy hay; some man puts the question if timothy is good feed for a milch cow. It is good if you provide her protein in some other food, but with timothy hay with only 2.8 per cent of digestible protein and a little corn meal, a cow cannot produce much milk. If a man should tell me he had a cow that he fed on timothy hay and four or five pounds of corn meal a day and that she gave a large amount of milk, do you suppose I could believe it? I couldn't believe it any more than I would believe that big man I see over there in the audience if he should get up here and say to us, "My wife has made me a pair of pants that fitted me, all out of a half a yard of cloth." Your wife never did it, I don't care what you say, and the cow never produces milk unless she has enough protein in her feed to make casein. That is a self-evident fact.

And yet the chemist doesn't know it all. I do not know whether I ought to say this, here is Prof.

Carlyle; I believe he is a chemist.

Prof. Carlyle—That doesn't know hardly anything.

Mr. Goodrich—The chemist doesn't know it all; he can tell what is in the feed, and he has helped the farmer wonderfully in experimenting; the farmer without the help of the chemist would have to blunder along and try this feed and that feed and find out in that way, but he can experiment intelligently with the help of the chemist, and so we are glad that we have got chemists, but the old cow knows more than the chemist; the feed has got to be submitted to her first after the chemist has told you what there is in it, and it must be palatable to her or she won't eat it; it must be easily digested, or she can't use it; it must be healthful or it will make her sick.

Just a few days ago a man brought into Fort Atkinson a carload of some kind of stock food. I do not remember just the name of it, but some of them bought it, and we saw a certificate of analysis that was on it; twenty-seven per cent protein, and the other things, and it seemed to be all right. But what was the matter? When it was submitted to the animals, they wouldn't eat it. Now, what good was that food? The man that was selling it said, "Oh, you can teach them to eat it by putting in a little of some more palatable food." I do not believe it; I believe you could get it down in that way, just the same as you can get medicine down a child by mixing it up with something that is real good, but I do not believe that food of that kind will ever be the kind that will give a cow an appetite, that she will like. I will quit now, Mr. Chairman; you needn't look at me.

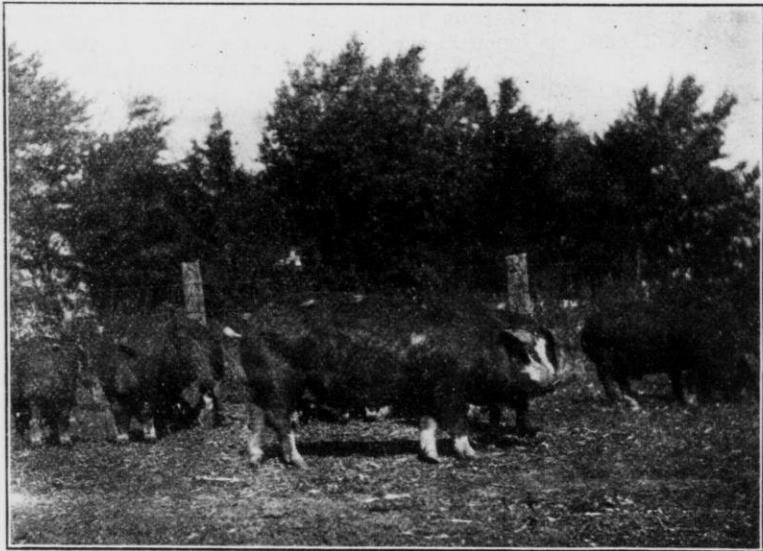
Chairman Nordman—I am sure we all like to hear Mr. Goodrich, the old veteran Institute worker of the state of Wisconsin, but we will have to go on with our program because our time is limited.

IMPROVED LIVE STOCK.

R. E. Roberts, Corliss, Wis.

The proper and natural inquiry of the present time, that should confront every farmer and stock grower before he takes up any line of production, improvement in breeding, or investment of any kind on the farm, is, Does it pay? Does it pay to raise any

stances when the farmer or breeder has the ability to stay in it and to work for a fixed and clearly defined purpose. The breeding of live stock has become more and more a business of system and methods; the hap-hazard, hit-or-miss way, without any defi-



Growthy type Poland Chinas.

kind of live stock on the farm? Yes, the raising of live stock is, and always has been, one of the most successful branches of farming, as we must grow live stock to keep up the fertility of our soil, and it is our duty to leave the soil in all its fertility to the following generation, and in many cases better than we received it. But it depends entirely upon the method by which the work is carried on. The raising of live stock has been successful under any and all circum-

nite aim in view, in live stock growing has proved a failure. In passing over our state, if one will glance over the farm animals on a majority of the farms, one cannot but notice a large per cent of inferior individuals, representing an infusion of blood of many breeds upon the same farm. They lack character, uniformity and quality. This existing condition is due to the unstable attitude of the farmer in not selecting wisely and staying with a particular breed first chosen, and

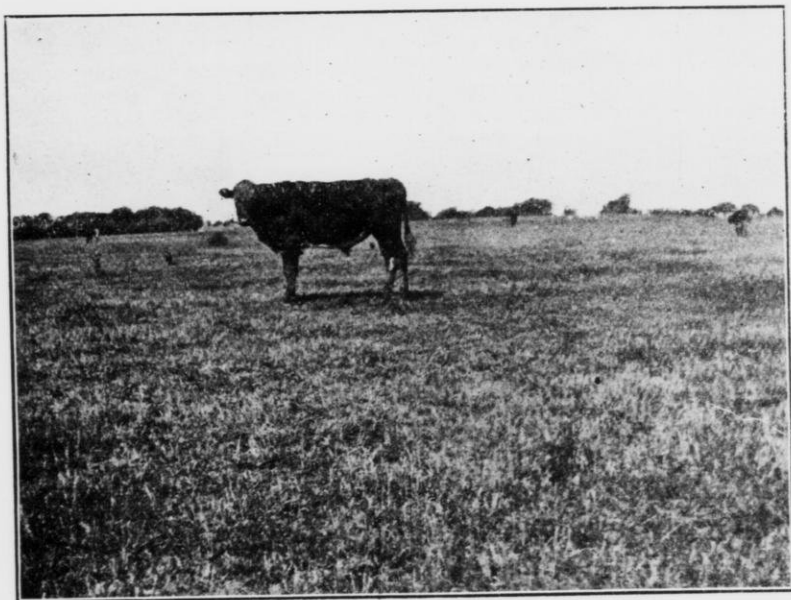
not having clearly fixed in his mind the purpose for which the animal is bred, and where it is, I must say is often easily diverted.

How to Improve the Live Stock.

Our farmers when selecting their seeds and grain to sow and plant, endeavor to secure the best, remember-

stock, bred for no particular purpose, at an actual loss. Think of this waste of effort, and the vast amount of good feed going to waste annually, when the very reverse would be the result if this improvement of our live stock were given the little attention its importance demands.

They do not seem to realize that



Unprofitable scrub type seen on many farms.

ing "Whatsoever a man sows, that shall he also reap"; also when buying farm machinery they demand the best and latest improvement, in order to do the most efficient work and secure the greatest saving in time and labor. Then after exercising all this care in selection of seeds and cultivation of the land with the most improved devices, taking advantage of every opportunity along this line, they will feed the year's crop of high-priced feed, from high-priced land, into an inferior, worthless, low grade class of

when one sows seed of low grade, inferior stock, he shall harvest inferior stock. The stock grower, who, at the present time is using a scrub sire upon his farm, is away behind the times, in fact, he is asleep at the switch. Recognizing this fact, there is but one way to improve our live stock to produce high grades for a special purpose, of a fixed type and quality, and that is we must use a pure bred sire. Heredity is recognized as the foundation of animal breeding, or the law that like begets like. If this

were not so, the breeder would be like a mariner at sea without a compass, he would not know in what direction he was drifting. The old adage, the sire is one-half of the herd or flock, is true when both sides are pure bred, but where the herd or flock are of common or inferior breeding, the sire is a great deal more than one-half of the herd; he is practically the whole of the herd, as we look to him for all the improvement. For instance, the mating of two pure bred, a pure bred dam and a pure bred sire, taking one hundred for a basis, they contribute fifty per cent each in type, form and quality to the offspring, but where the breeding stock are of common or scrub breeding, mated with a pure bred sire, the offspring of the first cross will represent in type, form and characteristics of the breed of the pure bred sire at least seventy-five per cent or points in improvement, but in blood elements they are half bloods.

The following table will convey what I wish to illustrate in this grading-up process for five generations.

**Taking One Hundred for a Basis.
Pure Bred Sire.**

Blood elements in improvement.	Type form and Characteristics.
1st cross $\frac{1}{2}$ bloods	75%
2nd cross $\frac{3}{4}$ bloods	90%
3rd cross $\frac{7}{8}$ bloods	95%
4th cross $\frac{15}{16}$ bloods	97%
5th cross $\frac{31}{32}$ bloods	99%

Inferior or Scrub Dam.

Type form and Characteristics.	Blood elements Remaining.
1st cross 25%	$\frac{1}{2}$ bloods
2nd cross 10%	$\frac{1}{4}$ bloods
3rd cross 5%	$\frac{1}{8}$ bloods
4th cross 3%	$\frac{1}{16}$ bloods
5th cross 1%	$\frac{1}{32}$ bloods

How quickly, easily and cheaply, a farmer can improve and grade up his

live stock, that, for all practical purposes, are as good as pure bred, in whatever line of stock one wishes to raise, simply by using a pure bred sire of the same breed generation after generation, until the inferior or scrub blood has been eliminated by the use of the pure blood, to the extent that no evidence can be seen of it in the highly graded up animals of the fifth cross. I believe if all the farmers now raising low grade stock, would have a fixed purpose in breeding, by using a pure bred sire of the breed that would meet their requirements, the improvement obtained in the third cross, or seven-eighths blood grades, would enhance the value of the live stock in this state fifty per cent with no increase in numbers; however, with the use of good, pure bred sires, note the qualification, good, pure bred sires, as poor, pure bred sires are as detrimental as good ones are beneficial.

In order to reach the highest standard of excellence, we must cull out, or eliminate all unprofitable or inferior animals from the breeding stock. By diligently pursuing this method, there is no limit to the possibilities of improvement in our live stock in all classes and for all purposes.

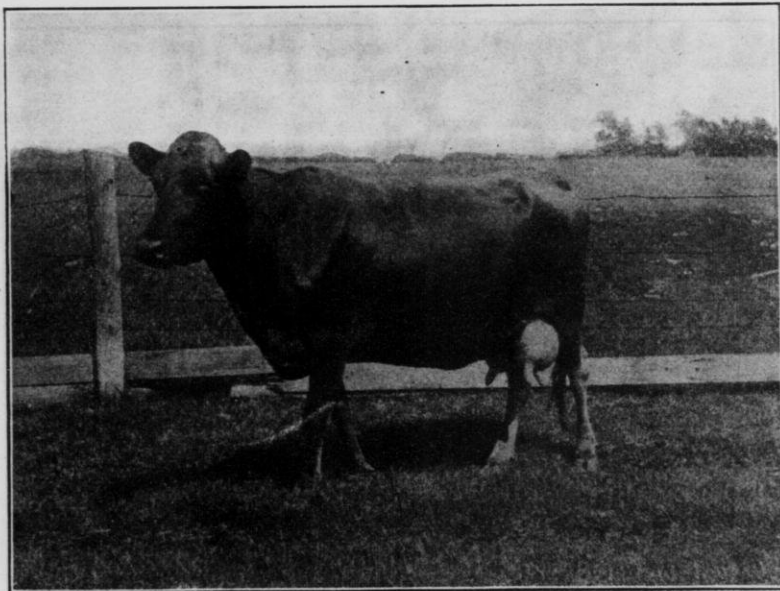
Grade Sires.

A mistaken idea that is very misleading and practiced by many farmers is the use of a grade sire to grade up their herds or flock. If those who use grade sires would recognize the laws that govern breeding, they would not use them. The temptation to use them, however, is on account of the low price for which they can be obtained and the semblance they bear to their pure bred sires. In case a one-half blood grade is mated with scrub breeding stock, there would be three parts of scrub blood to one part

Improved blood. In this event, improvement would be impossible. Take a grade sire, the product from a second cross, a three-fourths blood grade, mated with scrub breeding stock, there would be in this union five parts scrub blood to three parts improved blood. The work of improvement has made no progress. Even with a grade

they do not possess that power to transmit the desired or breed qualities and improvement to their offspring.

On the other hand, in this process of grading up or improving our live stock, the pure bred sire has that power, from a long line of pure bred ancestry, of transmitting to his offspring his breed characteristics, traits



One of the working Jerseys.

sire from the third cross, a seven-eighths blood grade mated with the scrub breeding stock, there would be nine parts scrub blood to seven parts improved blood, scrub blood still in the majority and improvement held back, as this scrub blood is wonderfully prepotent.

These facts should demonstrate the fallacy of using grade sires for improvement or grading up our live stock, for in them breed, prepotency and characteristics have not been fully established and fixed; therefore

and individual excellence with a remarkable degree of certainty, as breed characteristics, uniformity of type, quality and production in live stock are the triumph of persistent and long line of straight breeding, while the use of a grade sire will only lead to degeneracy or scrubs.

Criss-cross Breeding.

Another mistake I wish to speak of and one that is extensively practiced, is this criss-cross breeding. For instance, this indiscriminate mixing of

dairy and beef breeds of cattle, working on the old fallacy that the highest quality and quantity of milk, butter and beef can be produced from the same animal by combining these breed traits. To illustrate: A farmer wishes to grade up his herd to get more butter fat. He will then secure a Jersey sire, but not being well grounded

Now he has a combination consisting of scrub blood, Jersey, Holstein and beef blood all jumbled together into one animal, and as each of these three improved breeds have tendencies that have been bred for centuries for an opposite purpose, with this contention and confusion of blood in an animal, what can a person reasonably expect



Pair of Shropshire lambs.

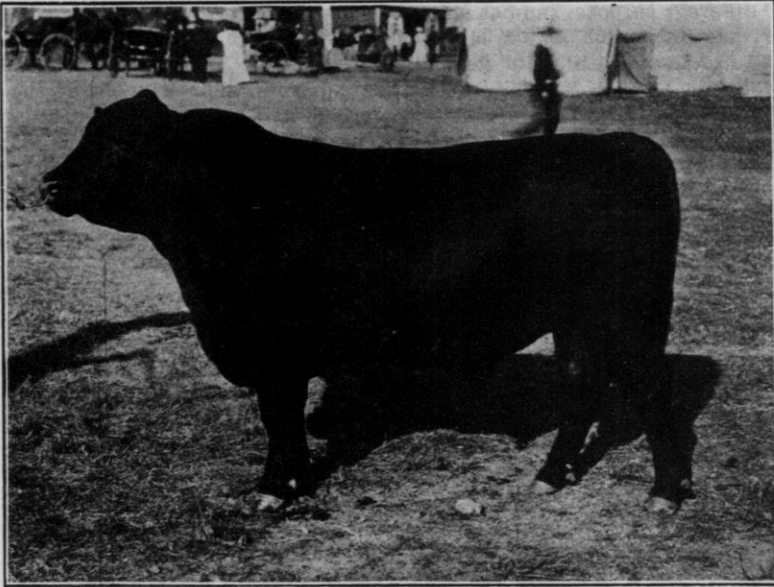
in his decision in choice of breed, when selecting a sire for the second cross he will secure a Holstein, to increase the quantity of milk, expecting by this combination to secure a dairy herd that will produce a high quality and a great quantity of milk, when the reverse is invariably the result. This disappointment usually leads to another and radically different cross; he has now a beef idea in his head, as this dairy bred stock do not sell well upon the market, so he secures a beef bred sire to get more meat.

them to do? They cannot produce butter fat, milk or beef in paying quantities, so the farmer who is trying to merge into his herd the best qualities of all breeds is simply producing a variable, typeless, nondescript, mixed herd from which nothing definite can be secured on a paying basis. At the end, after a series of such crude crosses, the herd, from the very nature of the work, are no better than when he started; they are simply a herd of mongrel scrubs.

In closing, to improve our live

stock and be successful in the work, we must have a definite aim in view. Decide upon a breed that will suit your needs and, as no one can serve two masters, stay within it; always secure good, pure bred sires, possessing individual excellence of their breed. By being persistent in the work for a few years, the live stock

not. If they were pure breeds there would be a detriment. If they were grades, and you crossed the Jersey and Guernsey, those two breeds do not differ so much in their production and characteristics, they harmonize well together. In crossing two pure breeds, you certainly destroy what breeders have been years in perfecting, breed



Champion Angus bull at Wisconsin State Fair, 1908.

upon our farms will show decided evidence of good breeding, as quality comes through inheritance.

This method of procedure will elevate the live stock industry to a higher plane, and a paying proposition, then scrub stock will be merely a subject of history.

DISCUSSION.

Mr. Scribner—Would there be any benefit in crossing a Jersey on a Guernsey?

Mr. Roberts—No, sir, there would

characteristics, or fixing the breed type, and I never could see any advantage in crossing pure breeds, as all the various breeds have attained a high state of excellence in adaptation to the ends for which they are intended.

A Member—If you had a herd of Jersey cows that you considered good and they were not registered at all, but were very nearly full blood, would you consider it an advantage to get a Guernsey sire?

Mr. Roberts—No, sir, I would prefer

to get a good Jersey sire, as good as I could get, and maintain a uniform, high grade herd of Jerseys.

Supt. McKerrow—Mr. Roberts, very often herds grading up from such foundation stock as the gentleman speaks of have been carried right along one line and the owner has come to the conclusion that he wanted a little different type, possibly for a little different purpose, and has started from that foundation and bred off in other directions with quite good results, hasn't he?

Mr. Roberts—Yes, sir, providing care and good judgment are exercised in the work.

Supt. McKerrow—Mr. S. Huston, of Kenosha county, had high grade Jerseys and he crossed with Guernseys and kept on grading as long as his herd was maintained.

Mr. Roberts—There is not any conflict to speak of between those two particular breeds, they harmonize well together, and they are the only two of the dairy breeds that will.

Supt. McKerrow—I was going to ask you if in crossing, where there was a wide difference in characteristics, there was not danger of not getting them to blend for some time?

Mr. Roberts—There is; some never do.

Mr. Wylie—What evidence have we that this man, instead of crossing from Guernsey to Jersey and from Jersey to Guernsey, if he had kept on with his Jerseys, wouldn't it have been all right? I maintain that he made a mistake.

A Member—Haven't some of the best steers we have ever got been cross bred steers?

Mr. Roberts—Yes, sir, but they were bred for the block or market. The experiment stations have cross bred two pure breds of beef strains and have fed them in such a manner that they have been winners at the In-

ternational, but we cannot recommend cross breeding to the average farmer.

Mr. Imrie—Haven't they done the same thing with sheep at the Experiment Station?

Mr. Roberts—Yes, sir, but the breeders have been working for years in protecting and perfecting different breeds and the average farmer cannot improve upon them, to his advantage.

Supt. McKerrow—In the main you are right, but there are exceptions to all rules. In Great Britain the great majority of their winners at the different stock shows are cross breds. The point I wish to make is this, if a man after grading up along a certain line becomes fully satisfied that that is not the type of animal he wants, won't you allow him to start off on the other line? Won't he be as well off to start with those high grades as he would be to drop clear back to strictly scrub stock for the foundation stock?

Mr. Roberts—Certainly he would.

A Member—There are some men that want to change about every three or four years.

Supt. McKerrow—Mr. Roberts buried that fellow in his paper, and he is buried face downward.

Mr. Convey—Well, I can only say that if I found I had made a mistake of that kind, I would unload altogether and start out on a different scale, and a better plan. Those mixtures are bound to be hash anyway.

Supt. McKerrow—What would the merino sheep breeders of Wisconsin have done had they stuck to the old merino? Some of them did, and they admit they lost money by it. They had common sense enough, most of them, to see that there was something better. They began grading up and some of the best flocks today in Wisconsin are graded up from a merino foundation by use of some of the Down breeds. Some of our best producing

cattle have been graded up along Jersey lines, along Guernsey lines, along Holstein lines by starting on what were practically pure bred cattle of some other breed, and the same thing can be done again. But this mixed crossing, where a man took his merinos and crossed first with long wools and the next time with short wools and the next time with another type of short wools, certainly has made hash, and everybody condemns that. We do not suppose there is anybody in this audience silly enough to think that is what we are advocating.

Mr. Roberts—What Mr. McKerrow has said is absolutely true in regard to grading up sheep. The distinct character of the fine wool breeds of sheep naturally invited crossing at that time with the low price of wool, and the great difference in adaptation to fatten, and in the quantity and quality of the meat. It suggested that a wise intermingling of the blood of the mutton breeds would produce a profitable sheep to those farmers possessing them, and the cross proved very satisfactory, and those that have pursued this grading up process in one line by the use of good mutton sires, have greatly improved the character of their flocks, securing a sheep of larger size, wider in the back, and possessing excellent mutton qualities.

Mr. Bradley—Jersey blood is very potent and it would take a man a long time to breed it out if he had it in his herd.

Mr. Roberts—Yes, sir, and so is the Holstein blood. I want to say a word about this cross breeding in regard to steers that have won out in the show ring. In all those cases they have been bred for the block or market and for the purpose of being fed to win out, but when it comes to keeping cross bred animals upon the farm for breeding purposes, it is an absolute mistake. as one will be grading down

instead of up. But what I wish to impress upon the great mass of live stock growers is the importance of this sure improvement of their herds and flocks, as at this day and age, to be successful in live stock growing, one should strive to raise good individuals of a chosen breed, possessing type and quality, as the prime steer, sheep, hog, or the heavy producing dairy cow are not sired by a scrub sire, nor are they obtained by careless, indifferent, criss-cross, unpromising attempt at animal breeding, but are secured by using sires, of one of the various excellent breeds whose ancestors were bred, reared and adapted for the special purpose in view.

Supt. McKerrow—It is not only the steers and sheep in Great Britain that are winning, but the great bulk of the meat in Great Britain is made from cross bred or grade animals. The little Welsh sheep found in the Welsh hills, the cheviots in the Scotch hills, these are taken down to the farm and cross bred and their offspring goes to the block. We want Wisconsin to have as good sense as those British farmers. We haven't pure bred stock on the female side to draw from, although the question was raised in the sheep discussion about western ewes to produce lambs along that same line. Western sheep are in the sense of being western sheep pure bred, but we must cross breed them to get the best results.

Mr. Roberts—You and I do not differ after all.

Supt. McKerrow—Certainly not.

Mrs. Howie—I also was in England and I also took note of their breeding, because it was of deep interest to me, and I noticed that no intelligent breeder ever crossed a beef breed with a dairy breed. By careful selection and care he took his beef breeds and made them into dairy cows.

He gave them all the care you ought to give a good dairy cow, and he always selected his sire with the idea of never sacrificing the milk qualities for the beef strain. At Penrith, in Westmoreland, and in Cumberland county, where they have a reputation for skillful breeding, I found a fine herd of cattle that would give ten thousand pounds of milk a year, some of them drying up two months in the year, and others wouldn't go dry at all. Now, really that is a milking strain, but when I saw the care and skill exercised in the selection of these animals, I didn't wonder that they had beef and dairy qualities under the same skin.

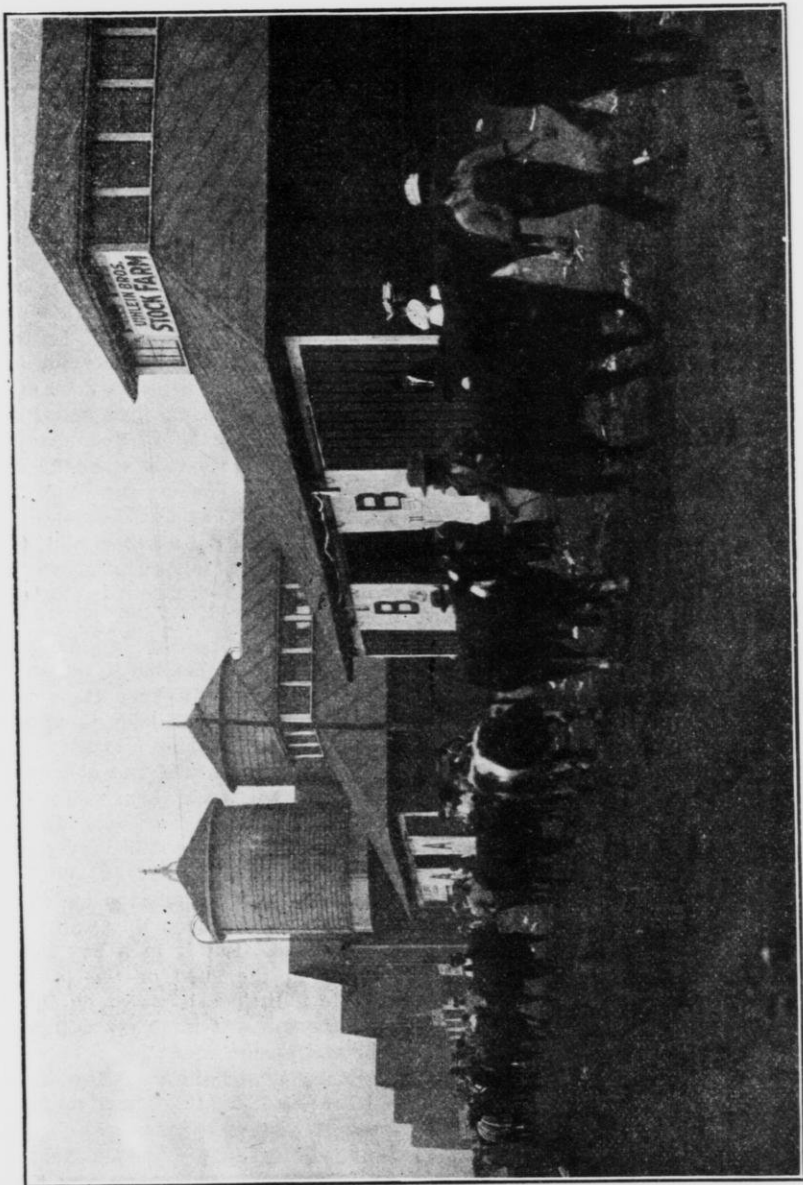
Mr. Wing—I had almost forgotten something I wanted to say about parasites on sheep in listening to this very interesting discussion.

I want to say I do not believe you should try to mix up your breeds of live stock in Wisconsin, although, as Mr. McKerrow says, in Great Britain nearly all the breeding of live stock shown at the shows is cross bred. Dorset ewes are bred to South Down rams, everything there is cross breeding in the final end, and they do produce winning beef steers, a lot of them. I am living in a country where we do not make milk and butter, but we do make meat, and it is true that for the production of meat, cross breeding is good, but you want to kill your heifers as well as your steer calves, you do not want to save the females.

I was up in Scotland last winter, and it came over me all at once that I had a very curious illustration to confute my friend, Q. I. Simpson, with. He can talk to you all day on rejuvenation by hybridization, he has made a study of why it is that the best races of animals are made of crosses, the offspring being more vigorous than either the father or mother. Over

there in Britain there were English people very much cross bred. Why, the Romans came there and the Saxons came down and the English people are all mixed up. Yet you go down in the farm regions of southern England and the farm laborers are so small they are almost dwarfs. Then you go up to Scotland where the people are "pure bred" and there are great, lusty fellows, giants almost; there were great, fine women with rosy cheeks and bright eyes, broad shoulders. I remember one bonnie Scotch lassie, I looked at her in admiration. I said, "I am sorry, but I am married, but I have a brother who is not." She looked quite interested. "Ah, Mr. Wing, does he resemble you?" I said, "Yes, I fear he does." She said, "Isn't that too bad?" Anyway, I was going to write to my friend and tell him what I thought about these pure bred Scotch people. Then I made some inquiries about Scotland, and I found to my dismay and astonishment that there were very few pure bred people in Scotland and they were way back in the Highlands; that the Norsemen came and settled there and that a lot of those big fellows with yellow hair and giant frames were nothing but transplanted Danes and Swedes, not Scotchmen at all.

But to get down to the business of the moment. While there is a great deal of virtue in the idea of rejuvenation by hybridization, yet I knew this experiment to have been made. A friend of mine with a lot of old Shorthorn cows descended principally from the Bates' strain, found the calves of these cows a little hard to fatten. His neighbors down in Illinois had that Bates' blood and they had inbred for a long time, but we won't go into that now. These cattle had lost some of that wonderful stamina that the Bates' cattle are known to have possessed, they had lost some of the



Part of Cattle Parade at Wisconsin State Fair, 1908.

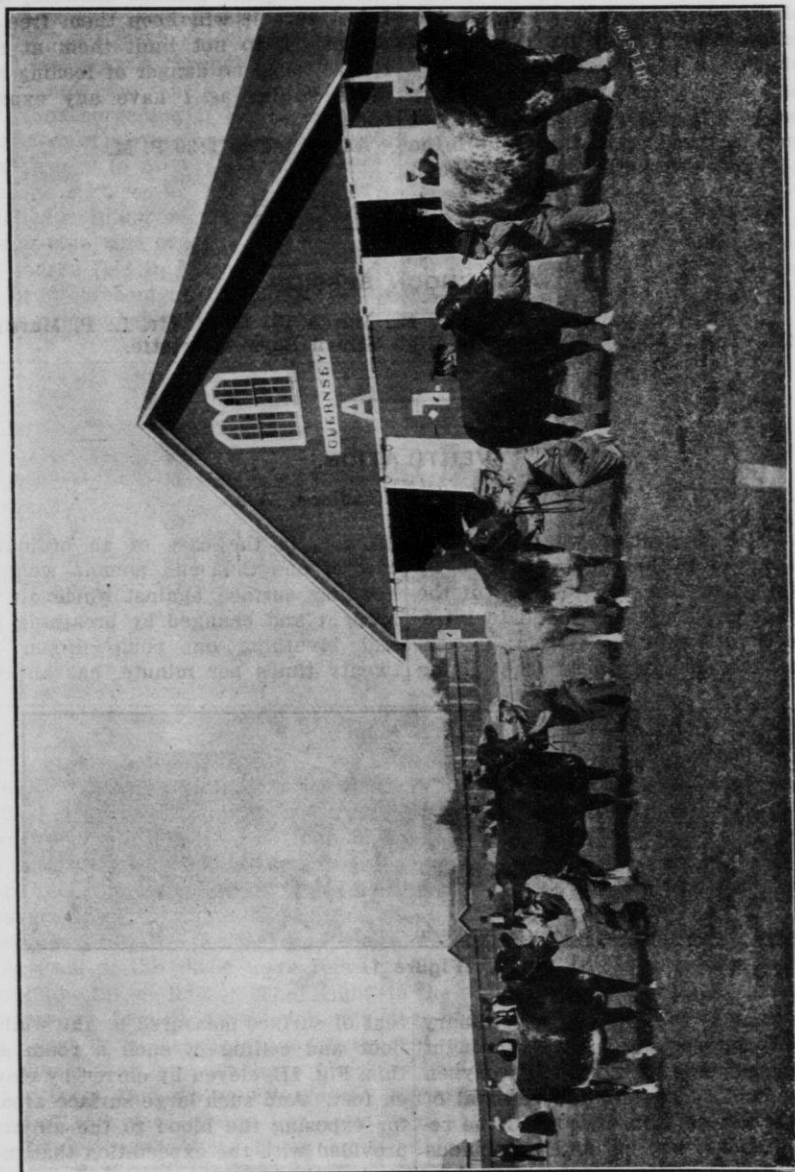
power to assimilate and digest food, they were hard feeders, and this friend said, "I think I will have to resort to cross breeding to make any money. I think I will get me a Hereford bull and I will get a good one." He did. This man I will say lives in a blue grass country. He looked at the old cows and his old heart weakened, he thought to himself, "Isn't it a shame I have got to lose all this long line of breeding that I have gone through, by crossing the breed and making a lot of Hereford grades? I am going to give these cows another show; I am going to have a fine Shorthorn bull, just as good as this Hereford." He got it, and when the Hereford calves came, they were "cracker-jacks," low and level and blocky, and the fat hung on them without any trouble. Then the Shorthorn calves came and they were a little better! Now, what had he done? He had got him a Shorthorn bull almost as far remote in relationship as the Hereford bull was, and yet he was a Shorthorn, and he had made a "rejuvenation by hybridization" and kept within his own breed. What I say is, unless you know you are going to send all the heifers to market, do not cross breed, unless you want to grade up, but do not in-breed anyway.

I am going to talk a little bit about worms in sheep. That isn't a very pleasant subject. I am not surprised to see a man getting up to go. Hold on, brother, it is going to be a good thing that I am going to tell you. If you had gone around through the country as much as I have and seen the number of lambs that were dying and wondering what was the matter and how many you were going to save, you would be interested, or if you ever looked out on these hills and saw them covered with happy flocks of healthy lambs playing on the hillsides, fat as butter, and nothing the matter with

them, you would appreciate what a serious thing this parasite in sheep is. It means millions and is going to mean more millions right along as time goes on, because western ranches are being eaten up and the pasture taken up by settlers. I made forty-five miles one day in Washington through a country that once had been a great sheep ranch, and now there is not enough grass in the forty-five miles to feed a horse. The west has got to go out of the sheep business and we have got to grow them for the market, that is all.

We have thought of this problem of parasites down in Ohio a good many years and we have learned two things of value; one is that if you have patience enough you can keep your lambs in the hurdles and they will keep well. You can put them in a dry lot and soil them and they will keep well, but there is probably no use telling you that, because it is too much trouble.

But the other thing is easy, you can teach these lambs to chew tobacco, and that will keep them well. Tobacco not only will keep them well, but I have the testimony of very careful men, veterinarians and shepherds, too, that it will make them well if they are sick. You do not need to buy Star plug or fine cut, the very cheapest kind of tobacco will do; you can get waste tobacco, tobacco stems, or waste leaves, tobacco dust, anything of that kind. Put it in a box in the barn or in the shed or the pasture, sprinkle a little salt water on it and teach them to eat it. They will come to love it even better than people do; they chew it and they swallow it and they are eager for it. I have no doubt some of you have seen the way a sheep will take to chewing tobacco and it doesn't seem to do any harm whatever. I cannot give you much personal experience on this point, be-



First Prize Shorthorn herd at Wisconsin State Fair, 1907, owned by F. W. Harding, Waukesha, Wis.

cause the thing was only announced last year. This veterinarian, Dr. H. P. Miller, who has worked it out, has been working with it many years and he is sure it has proved a good thing. You can buy this waste tobacco very cheaply, probably a cent a pound, put it in a box and sprinkle a little brine on it and the lambs will come and

take hold of it, and in a short time become regular tobacco chewers, and I feel sure it will keep them free of worms. I do not limit them at all. I have found no danger of feeding too much so far as I have any experience.

Adjourned to 1:30 P. M.

AFTERNOON SESSION.

The Convention met at 1:30 P. M., March 18, 1908. Mr. L. P. Martiny in the chair. Music, Selection by High School Boys' Quartette.

VENTILATION.

Prof. F. H. King, Madison, Wis.

I desire to preface what I have to say on the subject of ventilation by calling your attention to some of the provisions Nature has made to introduce oxygen into the system; to ventilate the body tissues; the lining

So, too, in the case of an ordinary cow of one thousand pounds weight, her lung surface, against which air is brought and changed by breathing in and breathing out some fifteen to twenty times per minute, has an ex-

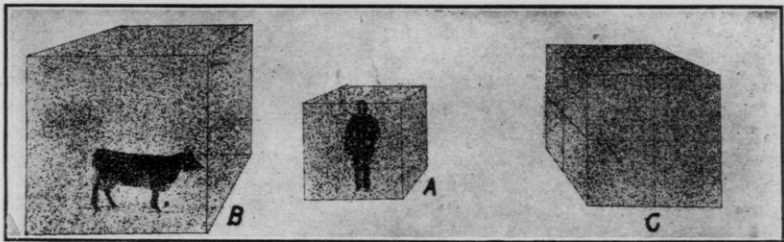


Figure 1.

membrane of the lungs of an ordinary person, against which air is brought for the purpose of introducing oxygen into the blood and for the removal of carbon dioxide from it, could it be removed and spread out as a continuous sheet, would cover a surface equal to that of this room, Fig. 1A, six by six by six feet, floor, sides and ceiling.

tent of surface measured by the walls, floor and ceiling of such a room as this, Fig. 1B, eleven by eleven by eleven feet. And such large surface areas for exposing the blood to the air are provided with the expectation that the air breathed has the purity of outdoor conditions.

Nor is this all Nature has done in

providing for the introduction of oxygen into the system. This 236 square feet of surface, speaking from the standpoint of man, is closely filled with blood vessels through which the heart pumps the whole blood of the body, thus spreading it out over 236 square feet of surface as often as once every twenty to forty seconds. Such enormous surfaces as 236 square feet of delicate lining membrane in the lungs of man, and of some fifteen hundred square feet in those of the cow, may at first seem impossible to provide in a space as small as the chest,

giving it sixty square feet; and so forty such partitions passing in each of the three directions would increase the inside area forty-fold, giving just about the lung surface for man and yet each of the sixty-four thousand small chambers so formed would be .3 of an inch on a side and so very much larger than the actual air cells in the lungs.

Now imagine the blood flowing steadily through a close network of capillaries, spread over all of the partitions in this box, and at the same time, by a bellows-like action, that

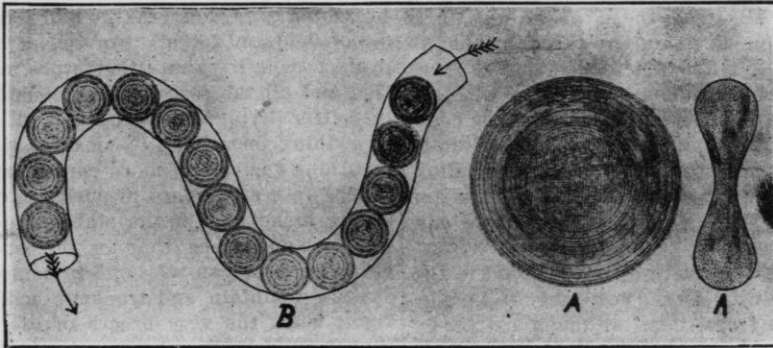


Figure 2.

but that such is possible may be understood when it is pointed out that a box like this, Fig. 1C, one foot on each side, has an inside surface of six square feet, one square foot for each of its six sides. Suppose a partition to be passed through the center of the box in each of the three ways represented by these lines. The eight chambers so formed have each six sides; each side measures one-fourth of a square foot and we have forty-eight of them, thus we have increased the interior surface of the box from six to twelve square feet. If ten such partitions were put through the box in each of the three ways, its inside surface would be multiplied ten-fold,

the air is drawn into and forced out of it fifteen to twenty times every minute, and you have a fairly truthful illustration of the principle and mechanism by which the blood of the body is brought continuously into fresh touch with a fresh supply of air.

There is another remarkable feature in the wonderful mechanism which Nature has found necessary to make sure that oxygen shall be brought to and carbon dioxide removed from the body tissues as rapidly as is needful. More than half of the volume of the blood is put into the form of circular cracker-shaped disks, represented here, Fig. 2A, called the red corpuscles, which give it its characteristic color. These

corpuscles are specially constituted so that they are able to strongly absorb oxygen while passing through the lungs, and exchange it for carbon dioxide when passing through the tissues, thus serving the purpose of so many conveying buckets which are being continuously loaded and unloaded with each round trip and yet without stopping. Moreover, to make sure that each one of these carriers shall be brought into close touch with the air before it can return to the body, and before it can leave the body tissues to return to the lungs, the diameters of the capillaries are made so small, Fig. 2B, that these absorbing disks are compelled to pass through them almost in single file with their two faces almost continuously in touch with the lining membrane of adjacent air cells, thus affording the greatest opportunity for the unloading of the carbon dioxide brought from the tissues and for the reloading with oxygen to be carried back.

These carriers of oxygen-food to the body tissues and of carbon dioxide-waste from them, although extremely minute, are yet so numerous that their aggregate total surface in the blood of an ordinary vigorous healthy man measures no less than forty-nine thousand square feet, more than a full acre. Think of the heart, with its seventy-odd strokes per minute, sending more than a full acre of absorbing surface through the lungs and passing it over more than 236 square feet of partition area in the ventilation chamber of the body once every twenty to forty seconds, and the air in this ventilation chamber changed fifteen to twenty times every minute! Nor is this the whole story of the structural arrangements and the mechanism of breathing by which the body tissues shall be fed oxygen and freed from their carbon dioxide waste, for it is at once clear that the flattened

shape of these blood disks, Fig. 2A, not only gives the largest absorbing surface, but at the same time provides the shortest possible distance across which these gases must travel to enter and leave the tissues.

Everything, therefore, points to the most imperative need of a thorough ventilation of the body tissues. But when we are brought to realize how superlatively efficient this mechanism for breathing is we can never afford to forget that it grew into its marvelous efficiency unhampered by any of the restrictions or constrictions imposed by fashion and when all of the breathing was done in the pure free air of field and forest. For those who project their lives into the future may God and all the forces which conspire to better living be permitted to do everything possible to make deep breathing easier and more certain and to maintain a standard of purity of air in the home and in the stable which closely approaches that in the open field; for how can we hope to combat disease, maintain and transmit bodily vigor, when the very breath of life is shut out from our bodies by false standards of dress and from our homes and stables by a lack of proper construction.

Air Breathed, Like Hay and Grain Eaten, is a Food.

It must be remembered that the air breathed, or which passes into the stove, the furnace or the engine, is as much a food and a fuel as is steak: hay and grain, or as is wood, oil and coal. This must be so, because for every pound of wood or of hay burned, there is required all of the oxygen carried in five pounds of air, or sixty-two cubic feet. To burn a pound of coal requires no less than 2.5 pounds of oxygen, and this is all that is carried in some eleven pounds of air, measuring more than 137 cubic feet; and

just as a strong fire in the furnace or the stove cannot be maintained without a large movement of air through the firebox, so is it impossible for the complete digestion, assimilation and utilization of food in the body to take place without deep breathing in pure air.

Amount of Air Breathed in Twenty-Four Hours.

The amount of air breathed during twenty-four hours by man and some of our domestic animals is given in the following table.

Air breathed in twenty-four hours.

	Lbs.	Cu. Ft.	Volume.
Man	334	425	8x 8x 8
Cow	224	2804	14x14x14
Horse	272	3401	15x15x15
Pig	89	1103	10x10x10
Sheep	58	726	9x 9x 9
Hen	2	25	3x 3x 3

From this table it appears that a horse must draw into and force out of his lungs on the average each hour 142 cubic feet of air, the cow 117, the sheep 30, and man 18 cubic feet. Stated in another way if it were necessary to supply air to our stock as we do water, a horse would require each minute seven full pails, the cow six, the pig 2.3 and the sheep 1.5 full pails of air, and these are the amounts required when it is supplied pure and fresh with each respiration, as would occur out of doors where there is a free air movement and where that thrown off from the lungs is at once borne away by the wind. Inside a dwelling or a stable the conditions would be very different, unless some means were provided to maintain a constant change of air at the proper rate.

Air Once Breathed Loses in Food Value or Sustaining Power.

Since air once breathed loses there-by about one-fifth of its contained oxy-

gen, and since there is thrown into it a large volume of carbon dioxide and a large volume of water vapor, it must be clear that its food value or power to sustain life is greatly reduced. Stating more specifically the changes which come to pure air once breathed, in the case of man, it must be said that air once respired has lost, on the average, 4.78 per cent of its volume of oxygen; it has acquired 4.35 per cent of its volume of carbon dioxide and has become saturated with moisture at the temperature at which it leaves the lungs, the moisture constituting some five per cent of its volume. Stated in another way; a cubic foot of once breathed air has lost more than ninety cubic inches of oxygen and has acquired more than seventy cubic inches of carbon dioxide and ninety cubic inches of water vapor. The oxygen has been decreased from a volume per cent of 20.94 to one of about 15.39, thus leaving in it only about three-fourths of its essential food element. This reduction of the oxygen content of the air, first by the direct consumption of it and, second, by its dilution through the addition of other ingredients and by its expansion due to rise in temperature, is the main cause of its loss in sustaining power. Indeed breathing becomes difficult so soon as the volume per cent of oxygen in the air has fallen as low as thirteen, so that breathing the air but twice would carry the volume per cent of oxygen below this limit, indeed as low as ten per cent if no fresh air were added. Beside the loss of oxygen from air once breathed and the charging of it with carbon dioxide and moisture it is still further disqualified for the purposes of respiration, because of the presence in it of a poisonous product thrown off from the system, which is known in sanitation literature as "crowd poison" and which is thought to give to air of over-crowded apart-

ments which are insufficiently ventilated its oppressive "stuffy" character.

Amount of Moisture Thrown Into the Air of Stables.

There is nothing, perhaps, which makes the need of a continuous and sufficient air movement through a stable more self-evident than a knowledge of the amount of moisture which is thrown into the air of a stable from the lungs and skin of its occupants and the volume of air which is required to carry out this amount of moisture and prevent it from condensing on walls and ceiling. A one thousand-pound cow throws into the air from her lungs and skin some 10.4 pounds of water during each twenty-four hours. Ten cows will put into the air 104 pounds in the same time, twenty cows 208 pounds, forty cows, 416 pounds and one hundred cows 1040 pounds, or more than a full half ton of water, which must either be carried out of the stable by air passing through it, or be condensed upon its walls and floor. If we could have absolutely dry air in a stable for one hundred cows, thirty-two by 175 feet with nine foot ceiling, this air would have to be changed as often as every forty-one minutes with the stable temperature maintained at fifty degrees F. in order that the moisture thrown off by the animals may be all carried off with no condensation in the stable. As a matter of fact, we never have absolutely dry air which can be passed through the stable, and in most parts of the United States it usually carries at 7 A. M., three-fourths of its full capacity, so that its ability to remove air from the stable is only one-fourth what has been stated. The case stands like this: with the outside air seventy-five per cent saturated and ten degrees below zero and with the temperature of the stable maintained at fifty degrees, the air of

a stable for twenty cows would need to be changed once every forty minutes in order to keep from condensing on the walls; if the outside air has a temperature of ten degrees with the other conditions the same, the stable would remain dry with the air changed once in every thirty-six minutes; while if the outside temperature were twenty degrees, it must be changed every thirty-two minutes. This more rapid change is made necessary by the fact that air at twenty degrees, when seventy-five per cent saturated, carries more moisture than it does when the temperature is lower, and for this reason it would carry less in addition out of the stable at a given temperature. If the stable temperature is maintained at forty degrees instead of fifty degrees, then, with the outside air at ten degrees below zero, the rate of change, in order that the walls and ceiling can be kept dry, must be such as to empty the stable every twenty-seven minutes instead of every forty minutes where the temperature of the stable is maintained at fifty degrees. So, too, if the outside temperature is ten degrees or twenty degrees, the stable must be emptied every twenty-three minutes, or every twenty minutes, respectively, to insure the removal of all the moisture thrown off through the lungs and skin of the twenty cows.

The dampness of basement stables, which is often observed and because of which they are often condemned as unsanitary, results from the simple fact that their walls are so much more nearly air-tight than is the case with the ordinary above-ground stables that the rate of air change in them is correspondingly less rapid and for this reason the moisture condenses in them, notwithstanding the fact that usually they are at a higher temperature, thus giving the air a greater water-carrying power. The dampness of the

basement stable is not a necessary condition. Proper and adequate ventilation will leave such stables with the air as dry and as pure as it is in those above ground. It should be emphasized here that because more air must pass through a cold stable in order that it shall remain dry, the warmly constructed stable, properly

portion of the actual weight of the food taken into the body than does the water and solids combined. The ventilation of the stable and of the dwelling should be understood as simply a means for properly feeding the occupants a sufficient amount of pure air and for removing from them that which has been exhausted and fouled.

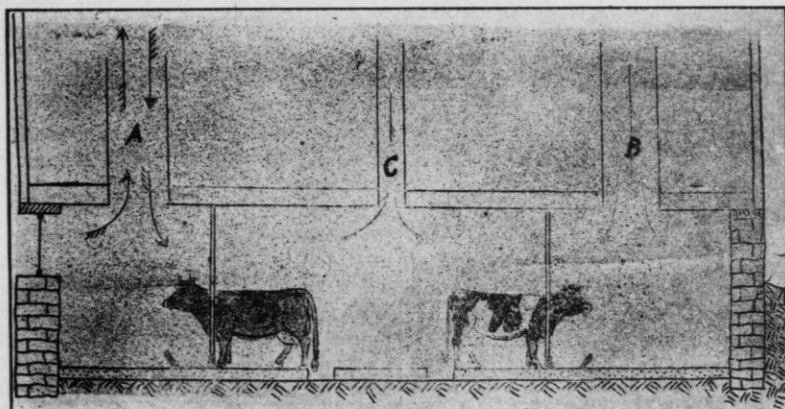


Figure 3.

ventilated, has a greater advantage over the stable of cold construction, for the reason that a larger volume of air may be kept moving through the warmly constructed stable and yet not have its temperature seriously lowered. This amounts to saying that animals can be better fed in a warmly constructed stable than is possible in those poorly constructed if the same temperature is maintained in the two, because it must be remembered that the air which passes through the stable forms a larger pro-

Insufficient Ventilation Reduces the Efficiency of the Occupants and Predisposes to Disease.

During my early association with the Wisconsin Agricultural Experiment Station, an experiment was conducted to study the effect of sufficient and insufficient ventilation on twenty milch cows. The conditions of the stable are in part represented on this chart, Fig. 3. It was a half-basement stable with an abundance of windows and which was provided with two hay chutes, A and B, and a ventilation

flue, C. The twenty cows were continuously in this stable during fourteen days, alternating two days with the hay chutes closed and then two days with them open, the trials being repeated four times. Following these trials the hay chutes were closed on three consecutive days, for the conditions of poor ventilation, and open on the following three, making fourteen days in all. The ventilating shaft, C, was never closed.

The feed eaten, the water drank, the milk produced and the cows themselves were weighed every day. It was found that practically the same amount of feed was consumed under good as under poor ventilation, but during the days of insufficient ventilation the cows drank an average of 11.4 pounds more water each daily and yet they lost in weight an average of 10.7 pounds each at the end of each poor ventilation period, regaining their weight when good ventilation was restored and this, too, when they were drinking less water. During the good ventilation periods, too, for each and every period, the cows gave an average of .55 pounds more milk per head and per day. At the end of the fourteen days when the cows were first turned into the yard, they exhibited an intense desire to scratch and lick their sides and limbs, doing so until the hair in many places was stained with blood. It was found on examination that during the interval of the experiment the skin had developed a rash in the form of hard raised points and that the rasping of these off caused the bleeding. In the case of these cows it seems clear that we had on the days of insufficient ventilation conditions not wholly unlike those which cause smoking in a lamp when the supply of air is partially cut off; the reduced supply of air in the stable made it impossible for normal tissue reactions to take place in the

body; it was impossible for the lungs to remove the waste products in the form of carbon dioxide and it seems highly probable that because of this failure some of the waste products were of a different nature, such as could be eliminated through other channels, and that this necessitated a stronger action on the part of the kidneys and perhaps of the alimentary canal as well, thus increasing the daily demand for water to the extent of 11.4 pounds per head. But notwithstanding this excess of water taken by the animals, they lost an additional amount of material from the body sufficient to reduce their weight by an average of 10.7 pounds per head at the close of each period of insufficient ventilation.

Let me call your attention again to the construction of this stable, Fig. 3, in which the twenty cows were housed when these observations were made. With thirteen large windows, it was better lighted than many stables; with its two outside doors and with a third door by a stairway leading to a floor above, and with a special ventilation shaft twelve by sixteen inches, never closed, it was better ventilated than many, if indeed not most, the dairy stables today. With the two large hay chutes opening upward from the ceiling and with no special provision for the admission of air into the stable, the invariable result was that in one or the other of the two hay chutes there was a down current, so strong on very cold nights that both hay chutes, at such times, were generally closed, but this resulted in securing the precise conditions which were intentionally established for the poor ventilation experiment. You will agree with me also that it is the common practice, especially on cold nights, to close hay chutes and similar openings for the express purpose of having the stable warmer. You will

agree also that whenever this is done the air on the following morning in the stable is extremely foul and often very damp, showing that the animals have been living during the night under conditions of insufficient ventilation.

Permit me to give you now a direct, simple, but positive demonstration of the unfitness of air once breathed for use again until it has been much diluted with that which is pure. Lowering this lighted taper into the two-quart Mason jar, you observe it burns with nearly the intensity it did in the open air, because through the up-going and down-going currents set up by the heat fair ventilation is secured. But now let me stop this ventilation by completely closing the mouth of the jar with its cover. The candle, as you see, burns with a rapidly diminishing brilliancy and in thirty seconds by the watch the flame has extinguished itself. The candle has spoiled for its own use more than a gallon of air per minute, sixty gallons per hour and more than two hundred cubic feet per day. Suppose you were burning in your room lights the equivalent of twenty-four such candles. These would vitiate the air for their own purposes and for yours at the rate of more than two hundred cubic feet per hour.

Let me now breathe gently into the jar through this rubber tube and at the same time lower the lighted taper into it. Its intensity of burning is at once reduced and now it has become extinguished. But air in which a candle will not burn or in which it burns with diminished brilliancy, is clearly not suitable for maintaining the normal functions of the body through respiration. Again let me fill the jar with respired air and allow it to remain for some time quietly with the mouth open. As I lower the burning candle into it, at the end of two min-

utes it again burns at first dimly and then is extinguished as the candle nears the bottom of the jar, showing that not yet has there been sufficient ventilation to restore living conditions for the candle, and showing that although the air was introduced directly from the lungs with nearly the temperature of the body, it nevertheless has not been displaced by the surrounding air. This demonstration makes it clear that in the ventilation of dwellings and stables, the out-going currents of air should be removed from or near the floor level. The noses of all our domestic animals and of ourselves are so constituted that the respired air is usually forcibly directed toward the floor; moreover, when at rest the used and vitiated air is left still nearer the floor level, so that if it or any portion of it has a tendency to remain where it is produced, as from the experiment with the Mason jar we see it does, it must be clear that unless some disturbing factors operate to establish convection currents, the tendency must be for the used air to accumulate near the floor level where it must be again breathed unless it is removed.

The extremely serious aspect of inadequate ventilation results not so much from its effects in diminishing functional activities and in depressing the vital powers in their ability to do useful work, as in its tendency to derange the order of chemical processes in the body, leading to the formation and accumulation of products in the tissues which render the individual whose functions are so disturbed peculiarly liable to disease, and especially to those of the zymotic or contagious type, such as cholera, small-pox, diphtheria and tuberculosis. Plant any seed in a too cold, over wet, insufficiently ventilated soil and it at once absorbs water; its stored food materials dissolve and unless oth-

er conditions favorable for germination are present this soluble plant food will be at once appropriated by the many micro-organisms existing in the soil and which are better able to thrive under the conditions surrounding the seed. The seed is robbed of its stored food, its vitality becomes lowered and either its life is destroyed, or it reaches maturity giving a limited yield. Likewise we should never forget that in the case of our own bodies and in those of our domestic animals there is continually a struggle for mastery between the normal living cells which constitute the various organs and the many lower life forms always present in the system as the seed are in the forest soil, simply biding their opportunity. Any condition, therefore, like that of an insufficient supply of pure air, insufficient or improper food of other kinds which must tend to lower the vitality or intensity of action in the cells of any organ is likely to place them at the mercy of the invading germs, which, like the weeds in the field, are simply biding their time to spring into overmastering supremacy, thus bringing disease and perhaps death as the result.

Rate at Which Air Should Move Through the Stable.

I have already pointed out to you that a large volume of air must move through a stable of twenty cows, continuously, in order simply to remove the moisture thrown off from the lungs and skin of the animals housed. But the rate of air movement necessary to maintain a dry stable, except at times when the outside air is very nearly saturated and the temperature comparatively high is not sufficiently large to maintain the proper amount of oxygen and to hold down to a sufficiently low limit the carbon dioxide and the poisonous exhalations from

the system. Practical experience has abundantly demonstrated that in order to maintain a sufficiently rapid change of air in a properly constructed stable for twenty cows it is necessary to provide a ventilating flue having a cross-section of four square feet, or two by two feet on a side, and through this the rate of air movement must be approximately three miles per hour in order to bring the fresh air in with sufficient rapidity so that the stable shall contain but 3.3 per cent of air once breathed. Put in the form of a table, the number of cubic feet of air which should pass through a stable is given here.

Rate at which air should enter and leave the stable or dwelling.	
For horses	4296 cu. ft. per hr., per head.
For cows	3542 cu. ft. per hr., per head.
For swine	1392 cu. ft. per hr., per head.
For sheep	917 cu. ft. per hr., per head.
For Man	537 cu. ft. per hr., per head.
For hens	35 cu. ft. per hr., per head.

To secure the necessary rate of movement through a stable for twenty cows, it requires a ventilating flue two by two feet inside measure through which the air travels continuously at the rate of 295 feet per minute, approximately three miles per hour; forty cows would require a flue twice this cross-section, or two of them; sixty cows, three; eighty cows, four, and one hundred cows the equivalent of five such flues.

Principles of Stable Ventilation.

The underlying principles by which such a rate of change of air in stables may be maintained without the aid of forced draft I can make clear to you by this chart, Fig. 4, where A represents a ventilating flue taking air from within a foot of the stable floor and carrying it up through the ridge of the roof, discharging it where there may be a free wind movement across the top of the flue. But it will be im-

possible for air to be carried out of the stable unless there is ample opportunity for air to enter it at the same rate at which it is desired the air should leave it. Provision for such entrance is represented here and here at B and B where the arrows show a current entering between two studding just above the sill on the outside and rising through the space formed by the sheeting, entering the stable at

intake openings, as would be the case if they passed directly through the wall at the ceiling. Then, by forcing all of the air to leave the stable from the floor level, only that which is coldest is taken out. At the same time the animals breathe the used air directly downward toward the floor, they are compelled to take in the new supply from near the floor level also and hence, for all reasons, the

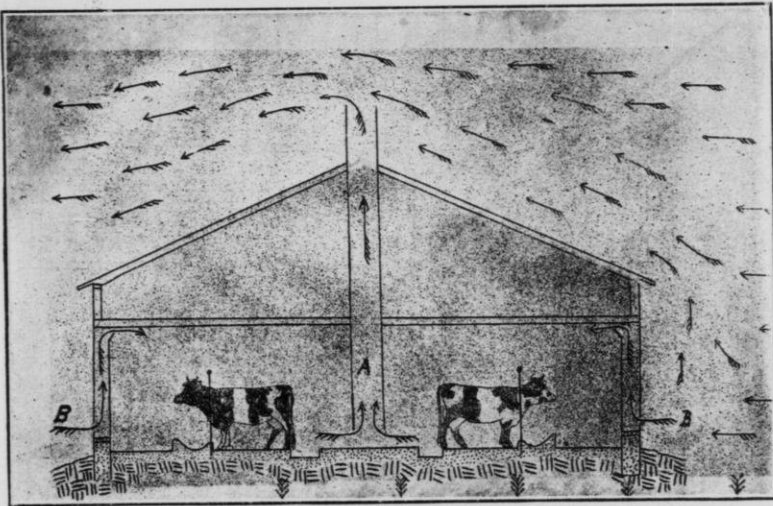


Figure 4.

the ceiling. When the stable is provided with an air-tight, warmly constructed ceiling, as should always be the case, the introduction of the fresh air at this level enables the waste heat of the animals to be utilized to the best possible advantage, the fresh air being mixed with that which has been heated, before dropping to the floor level, and this warmed by it. The whole ceiling, too, acts like a large radiator, throwing its heat down upon the floor and animals. By introducing the air low down outside, the warm air of the stable cannot be forced out by the wind through the

stable should be exhausted from the floor level, except in such times as its temperature may be too high.

The ventilating flue must be thought of as in every sense of the word essentially a chimney and every feature which is regarded as essential to a strong draft in a chimney must be incorporated in the ventilating shaft and every condition which would tend to make a poor draft in a chimney must be avoided in a ventilating shaft. Its walls must be air-tight; it must have sufficient cross-section; it should be as straight as practicable and it should rise well above the ridge of the

roof where a free sweep of air can pass across its top, which should be unobstructed by any close-fitting hood. The position of the ventilating flue may be at any convenient point, but the location should always be, if practicable, away from the walls and to-

proper position of the ventilating flues must be looked upon as just as important as is that of finding a place for the cows.

On this chart, Fig. 5, the ventilating flue is represented at the angle of the stable, A, but for efficiency in

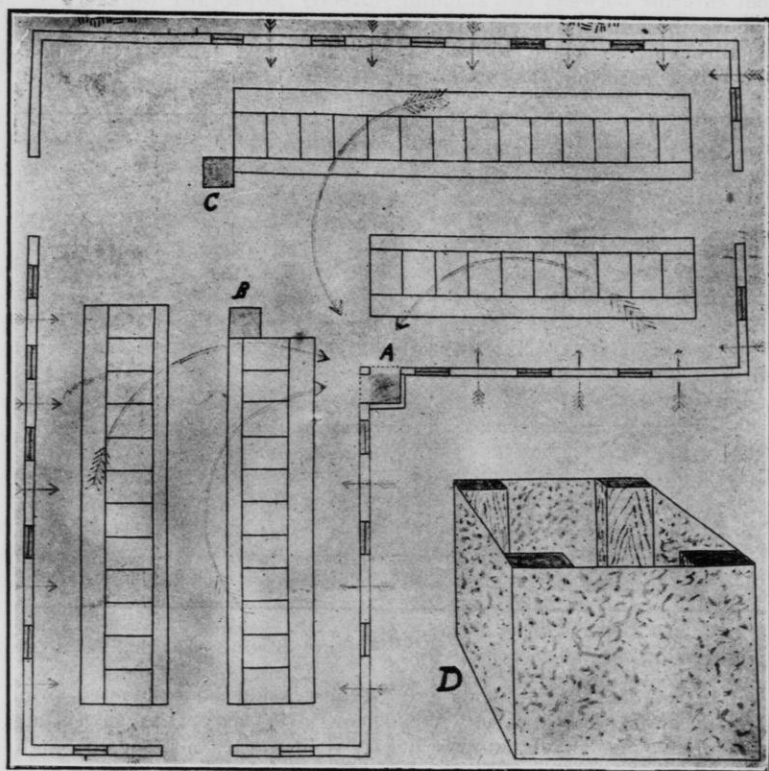


Figure 5.

ward the center of the stable. The ideal position, so far as effective draft is concerned, would be that represented in the chart, but such a position is not usually practicable. The best practicable position is to place the flue directly back of the manger, between two cows. This requires a little longer stable, but since ventilation is of such paramount importance, the

draft better positions for it would be B or C, because here the lower end of the shaft would be surrounded by the warm air of the stable, which would tend to make the draft in it stronger. In taking air into the stable, it is important to provide openings as far as practicable on all sides, as represented by the arrows crossing the walls in the chart. These open-

ings should have an aggregate, cross-section practically equal to that of the ventilating shaft. By having the openings on all sides it is possible thereby, not only to take advantage of the wind pressure to force air into the stable, but another very essential feature is gained which is made clear by the large arrows on the chart con-

comparatively stagnant air which they have rendered impure, but the tendency would be for the warmest air of the outer part of the stable to flow along the ceiling into this part, while a counter current would take place along the floor toward the ventilator and toward the other part of the stable, thus the air at this end of the

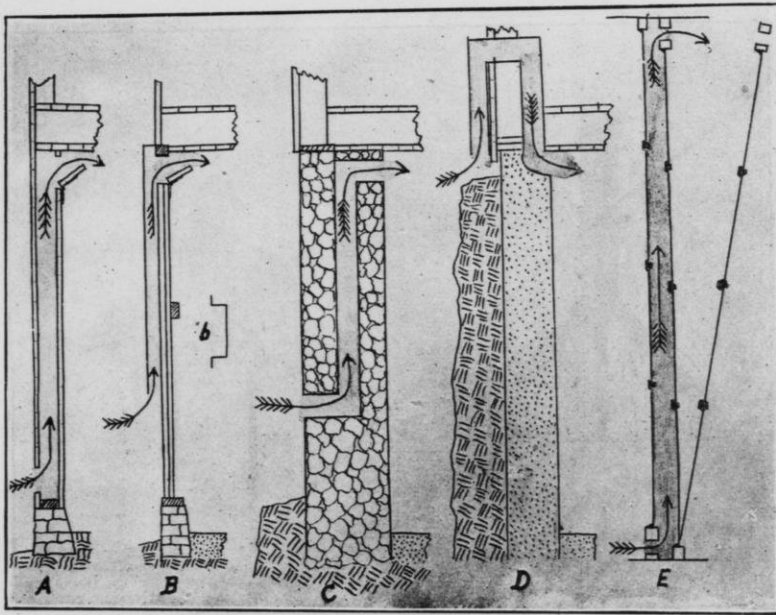


Figure 6.

verging toward the ventilator. As the air is drawn out by the ventilator, fresh air is forced in through all the openings around the wall and as this drops to the floor and finally makes its way to the ventilator, every animal in the stable is provided with a current of fresh air moving past it. Suppose there were no intakes at one end of this stable; the fresh air would then enter entirely by the other intake, while the animals at this end of the stable would not only be standing in

stable would be rendered doubly impure.

An excellent method of constructing a ventilating flue is represented at D, Fig. 5, which shows four two by fours set up at the corners of the ventilating flue and these are covered with galvanized iron nailed directly into the wood, using galvanized wire nails to prevent rusting. Galvanized iron is made in eight and ten foot lengths of sheets of various widths and weights, so that it is a very simple matter for

a carpenter to build such a flue. Of course there is no objection to the flue being made cylindrical, but such a construction will usually require the service of a tinner. I urge the use of galvanized iron for the reason that it makes an absolutely air-tight wall which remains permanently so. Where matched lumber and paper are used, the cost will be greater

trated the type of intake where the stable is sheeted inside and out, leaving hollow spaces between studding. At B is represented a method available where the stable wall is not hollow, selecting a sheet of galvanized iron of proper width and length, it may be readily shaped as represented in section at (b). This may be then nailed directly to the sheeting out-

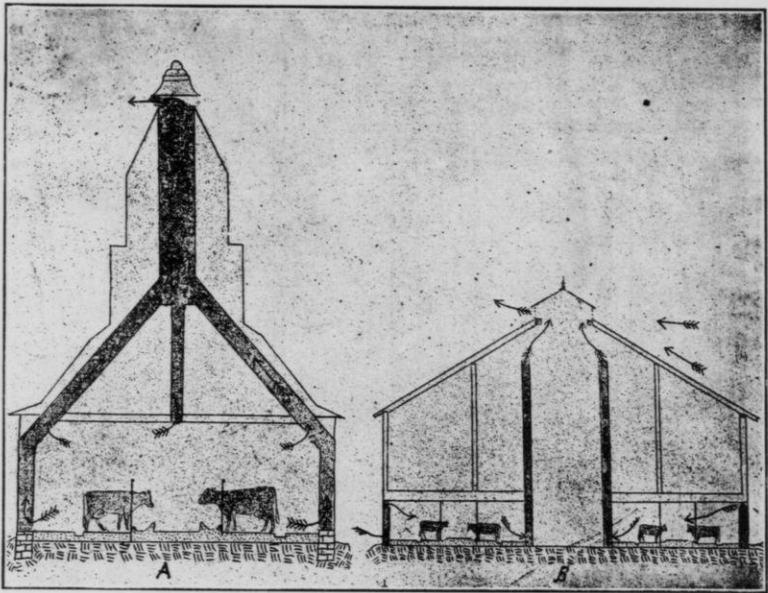


Figure 7.

and the tendency of the lumber to shrink and of the paper to decay will ultimately greatly reduce the efficiency of the flue. If it is desired to make the walls of the ventilating flue warmer, all that is required is to sheet the outer surface, covering the galvanized iron with matched lumber just as would be done if paper were used.

Different methods of admitting fresh air to stables are represented in Fig. 6 at A, B, C, D and E. At A is illus-

trated the type of intake where the stable is sheeted inside and out, leaving hollow spaces between studding. If it is preferred, such an intake may be nailed on the inside of the stable by simply reversing ends and providing an opening through the wall at the lower instead of the upper end of the intake shaft. At C is represented an intake built in a masonry wall. The simplest way to do this is to use drain tile of suitable size or else build a wooden flue and have this set and built into the wall as the

work of construction progresses. At D is illustrated one method of introducing air into a basement stable already built, where there is little free wall above the ground outside. This intake may be constructed in the manner described under B, making an opening through the wall at the place

mit the sash to tip inward, thus allowing the fresh air to enter over the top of the sash.

On the next chart, Fig. 7, at B is represented a cross-section of the barn in which this system of ventilation was first installed and for which it was originally designed. In this case the

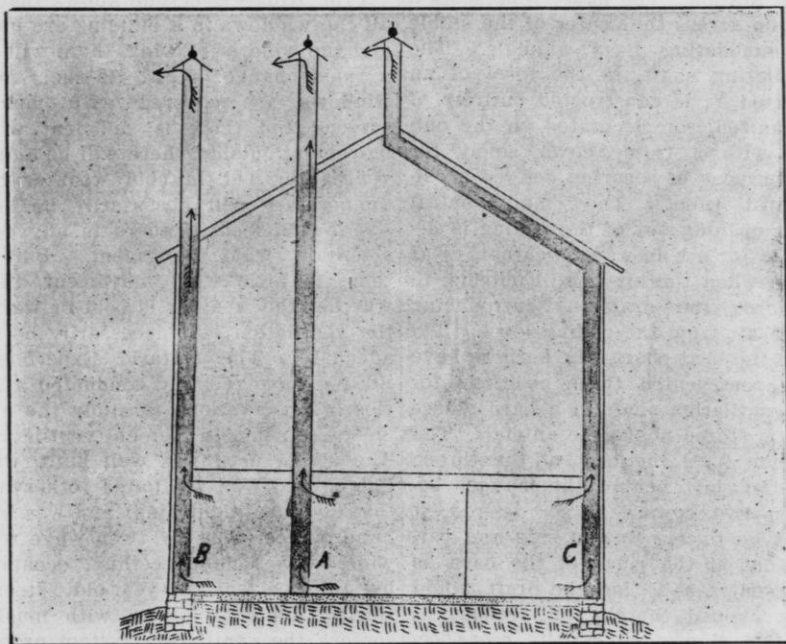


Figure 8.

where the two arms of the shaft are connected. The remaining illustration, E, shows how double windows may be made to serve the purpose of intakes. The outer sash is stationary and has a long opening cut in its wide bottom rail, thus providing an inlet for the fresh air from outside. The inner sash may also be stationary, having a corresponding slot cut in its wide upper rail; or the sash may be hinged at the bottom and the jambs constructed in such a way as to per-

barn was cylindrical in form with the silo in the center, the silo being built of half-inch lumber bent and nailed to studding inside and out, thus forming a series of straight flues kept warm during the winter by contact with the silage. To utilize these spaces as ventilating flues, a six-inch opening was left at the level of the stable floor and the spaces between the studding at the top were all left open. Thus were formed a large number of narrow but long ventilating

flues, the silo having a diameter of twenty-four feet and a depth of thirty-six. The escaping air rose directly and passed out through louvre openings in the cupola above. At A is represented the ventilating flues as they are installed in the dairy barn of the Wisconsin Agricultural Experiment Station. The figure represents a section across the center of the stable accommodating forty animals. The ventilating shaft, in the form of an inverted Y, is constructed entirely of galvanized iron decorated on the outside with a frame cover solely for the purpose of securing desired architectural effect. The small central shaft opening out of the ceiling is designed for use in warm weather, or at times when the air is still outside, to reinforce the draft by introducing warm air from the ceiling level.

On the next chart, Fig. 8, there have been represented three positions for the ventilating shaft in a barn where feed is stored above the animals. The position A is the best of the three; standing just behind the manger between two cows. If so desired, it could be turned to one side and carried out at the ridge of the barn as represented at C, but the draft would be weakened thereby on account of the two elbows, unless its cross-section was increased. A ventilating shaft as represented at B would be better than the form represented at C, but only for the reason that it is straight and requires less material to carry it to the same height and secure the same air movement through the stable.

Where more than one flue is necessary in a stable, they may be placed in pairs on opposite sides of and near the center of the compartment to be ventilated, or they may be placed one-third of the distance from either end and at the same time on opposite sides in order to secure a more even move-

ment of air through the stable and in order to avoid carrying the foul air in too large a volume past animals standing nearest to the ventilating shaft.

DISCUSSION.

Mr. Wing—What about muslin screens?

Prof. King—Everyone knows that if all the windows in a building are open and the wind is blowing, there will be a rapid change of air. If such open windows are covered with muslin screens and there is sufficient wind movement outside, there will be ample ventilation, but in cold weather the temperature will necessarily be low, too low, indeed, if there is any considerable wind movement. But if there is little wind movement, then whether the weather is cold or warm, the ventilation will necessarily be inadequate. The Ontario Experiment Station have recently conducted a series of observations to study the efficiency of muslin screen ventilation. The stable used was well built, well lighted and well ventilated (otherwise than by muslin curtains) and was one hundred feet long by twenty-five feet wide, with ten-foot ceiling, occupied by thirty-seven two-year-old steers. During the experiments with muslin screens the ventilation system proper was closed.

On each side of the building ten windows, 2.5 by four feet, with sash hinged at the bottom, were opened inward at an angle of sixty degrees with the floor. Five of these windows on one side and four on the other had the openings covered with the cheapest grade of gray cotton, costing six or seven cents per yard; four of the remaining windows on one side and five on the other were likewise covered with cheese cloth. This is what was observed: During a few warm days when the thermometer showed forty degrees outside and there was

no breeze blowing, notwithstanding eighteen windows were thus open, the inside thermometers registered eighty-two degrees, but as soon as the doors were opened the temperature began to fall and in a short time showed only a few degrees more heat than outside. Thus we have a clear demonstration of the resistance of muslin screens to the change of air in a stable. Prof. Grisdale's records show that on Dec. 26, when the 5 A. M. temperature outside was eighteen degrees and a breeze was blowing, the muslin screened stable had a temperature of thirty-six degrees and another stable with ventilating flues had a temperature of forty-seven degrees. The windows were then closed on one side and at 9 A. M. the wind became light, the outside temperature eight degrees, and the muslin screened stable had a temperature of forty-two degrees, while the ventilated stable had a temperature of forty-seven degrees. At noon the wind became calm, the muslin screened windows were all opened at 5 P. M. and at 11 P. M. this stable had acquired a temperature of sixty-two degrees, and is described as being "full of fog and dripping wet," while the other stable had a temperature of forty-seven degrees and the air was dry, the outside air being at this time two degrees. It is clear from such observations that the use of muslin screens should not be recommended as a suitable means for ventilation.

Mr. Aderhold—Is that inlet flue, second figure from the right, the proper inlet flue?

Prof. King—It is not a good flue, but is an admissible one. It is intended to represent one of the old basement stables with stone walls where, on account of the high bank, a proper intake cannot be provided.

Mr. Aderhold—Would it not be better if a larger flue was put in somewhere extending along the ceiling with

a proper opening a foot from that?

Prof. King—So that air comes down in various places? Such an arrangement is all right, but I have always followed the practice of making the arrangements for ventilation as simple as possible.

A Member—Do you prefer one large outlet flue to four small ones?

Prof. King—Yes, one or a few large flues is much to be preferred to a number of small ones.

A Member—And where is the best place to locate that?

Prof. King—If convenience is not considered, the best place is near the center of the stable, but convenience in getting the work done will usually prohibit the use of a central point. It does not matter so much where the ventilator is placed, so long as proper construction is adopted.

A Member—Is forty degrees a proper temperature for a dairy stable?

Prof. King—It is my judgment that a higher temperature than forty degrees is to be preferred, but there can be no doubt that forty degrees with an abundance of pure air passing through the stable is better than sixty degrees with the air in bad condition.

Mr. Imrie—In a living room where you have no ventilation but windows, which is proper, to lower the upper sash or raise the lower?

Prof. King—If but one is opened it matters little which. A better plan would be to lower one and raise the other, each a less distance.

Mr. Aderhold—In a house heated with steam or hot water, what is the best system of ventilation?

Prof. King—The question can hardly be answered briefly, but surely there should be some provision whereby air may enter and whereby it may leave the room.

Mr. Aderhold—Is it not the same with a furnace?

Prof. King—Certainly, but if the

house is heated by putting warm air into it, it must also be escaping somewhere.

Mr. Aderhold—You would not need so much ventilation, then?

Prof. King—Yes, you need the ventilation just as much, but it comes as a necessary result in warming the house. Where steam or hot water

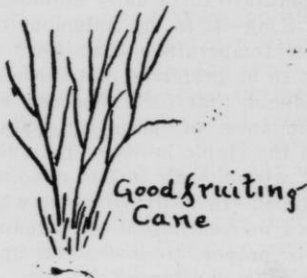
heat is used, the house may be warmed by simply circulating the air in the room. There is not necessarily any ventilation whatever. The little ventilation that is secured under such conditions results from the unavoidable leakage of air into and out of the rooms.

SMALL FRUITS.

J. L. Herbst, Sparta, Wis.

Farmers in general are beginning to realize the value of a well kept, small fruit garden. There was a time when very little attention was paid to the growing of small fruits, such as strawberries, raspberries, blackberries, gooseberries, currants and grapes for the home. Most farmers depended

it helps to make the home surroundings more pleasant and attractive; it shows that the farmer takes an interest in the welfare and happiness of his family. The small fruit garden is something that will instruct as well as interest the children. It is a place where, after the hard labor of the day,



Good fruiting
Cane



Poor fruiting Cane
Not pruned

upon the wild fruits for their supply, but as the land became cleared up and burned over, these have disappeared and rather than do without most farmers are growing to some extent some of the small fruits for the home supply, and well they should, for there are many advantages derived from a small fruit garden well arranged and taken care of.

Advantages Derived.

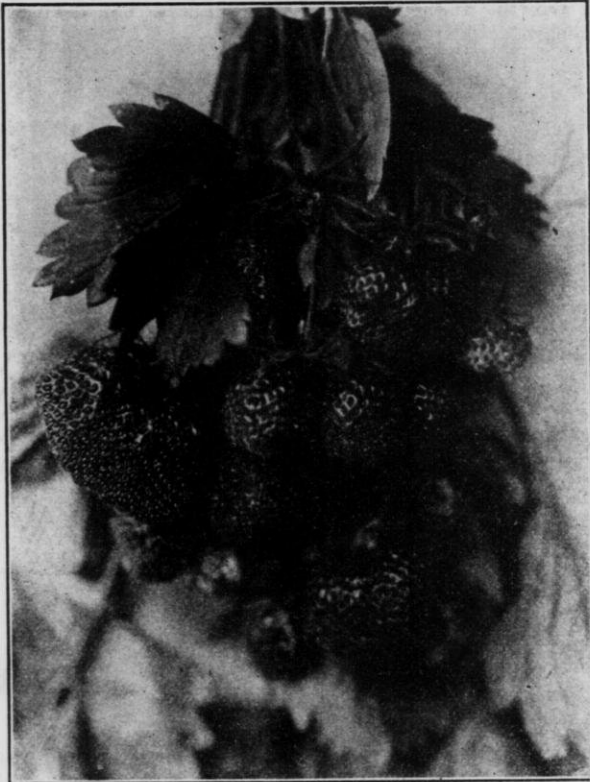
A small fruit garden well taken care of adds to the value of the farm;

the farmer can go for a little rest and enjoyment. By having a liberal supply of fresh fruit for the table, the cost of living is materially lessened, and will add to the health and happiness of the family.

How to Purchase Plants.

Each year there is spent by the farmers of our state vast sums of money in the purchasing of nursery stock from which but little if any benefit is derived; probably from the lack of knowledge of what varieties to

plant and where to purchase stock. Most failures come from planting varieties that are not adapted to the particular soil, location and climatic conditions. High-priced novelties are worked upon intending purchasers by distance, and less danger of stock being dried in transportation. Better results will be obtained with the cane fruits if plants are purchased in fall and buried during the winter. The injured roots will then be healed over



The Sparta Strawberry.
John L. Herbst, originator.

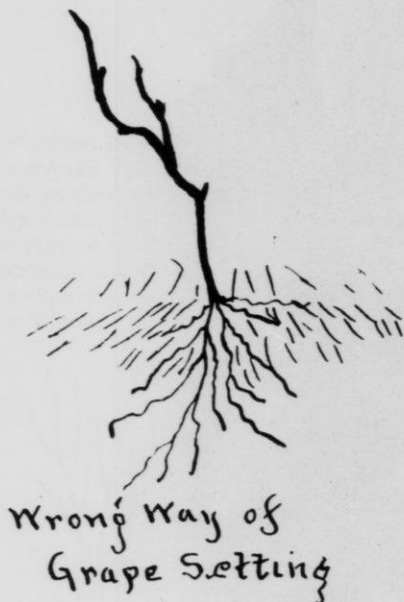
the smooth tongued nursery agent. They look good on paper and the talk the agent gives of some varieties makes them appear truly something wonderful. Better results can be obtained by sending direct to the nursery nearest you. As a rule, plants can be bought cheaper, they will be better adapted to your soil and conditions, than plants shipped from a and ready to start growth immediately when set out in spring.

Care of Plants When Received.

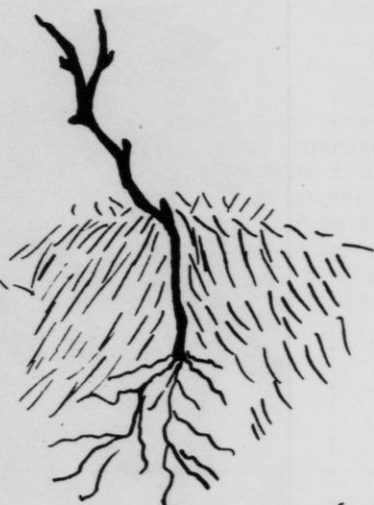
The plants should be taken care of immediately upon receipt of them. The nurseryman is blamed a good many times for the failures of plants to grow, when in a good many instances the fault is the purchaser's.

Immediately upon receipt of the plants, they should be taken home and placed in ground as soon as possible to prevent drying out. The common practice of letting plants lay around on the barn floor will soon dry out the roots, and they will not be in condition to start growth. If the land has not been prepared to receive the

same time. For instance, if we planted but one variety of strawberries, the season of this fruit would be much shorter than if we had planted an early and a late variety. It will give you ripe strawberries more days where an early, medium and late variety were planted than if an early one was planted.



Wrong Way of
Grape Setting



Right Way of
Grape Setting

plants upon their arrival, dig a trench and bury them well, to prevent drying out. If the roots seem to be dry upon arrival, dip in water before burying.

Varieties to Plant.

In selecting varieties to plant, we should aim to have a succession of fruit the entire season. By selecting early and late sorts of each variety of fruit planted, we not only extend the season of that particular fruit, but one fruit will lap over on the other and it will give you a variety at the

I would plant the old varieties that have done well in your section in preference to the new, high-priced ones being placed on the market.

For strawberries I would plant Beder Wood for early, Warfield, Haverland and Dunlap for medium, and Gandy, Sample or Aroma for late.

For red raspberries, King for early and Cuthbert for late.

For black raspberries, Conrath for early and Gregg or Nemcha for late.

For blackberries, Eldorado for early and Ancient Briton for late.



First Prize Exhibit of Wisconsin grapes at Wisconsin State Fair, 1908.

For gooseberries, Houghton for early and Downing for late.

For currants, White Grape and Victoria, or Red Dutch.

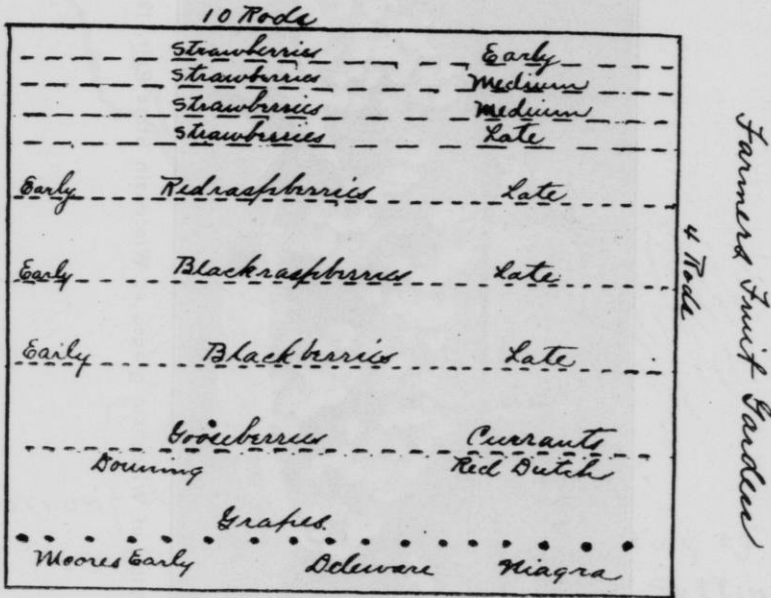
For grapes, Moore's Early, Delaware and Niagara.

Location of Fruit Garden.

Most any soil that will raise a good

hills, thus saving a considerable amount of hoeing.

Set the strawberries in rows four feet apart and two feet in the row; the cane berries in rows eight feet apart and three feet in the row; the currants and gooseberries can stand four feet apart in the row, and the grapes eight feet in the row.



crop of corn or potatoes will answer for the location of the fruit garden. It should be near to the house, convenient for the housewife, not that she is expected to care for it, but that she can better oversee the work that is to be done by other hands.

The garden should be laid out in long rows and rows wide enough to admit the use of horse and cultivator. Most of the work of keeping plants free from weeds can be done with horse and cultivator, and if plants are heavily mulched with straw, or any coarse litter, weeds can be kept down more easily around and between the

Care and Cultivation.

Allow the strawberries to form matted rows, leaving space between the rows in which to walk. Cover lightly with clean straw or marsh hay upon approach of winter to hold snow and protect from thawing and freezing spring weather. Remove the covering in spring when growth starts to space between rows, to act as mulch and keep fruit clean during rainy weather.

Nip the growing shoots of the cane fruits when eighteen inches to two feet high, to increase the fruiting surface of the cane. This also gives a

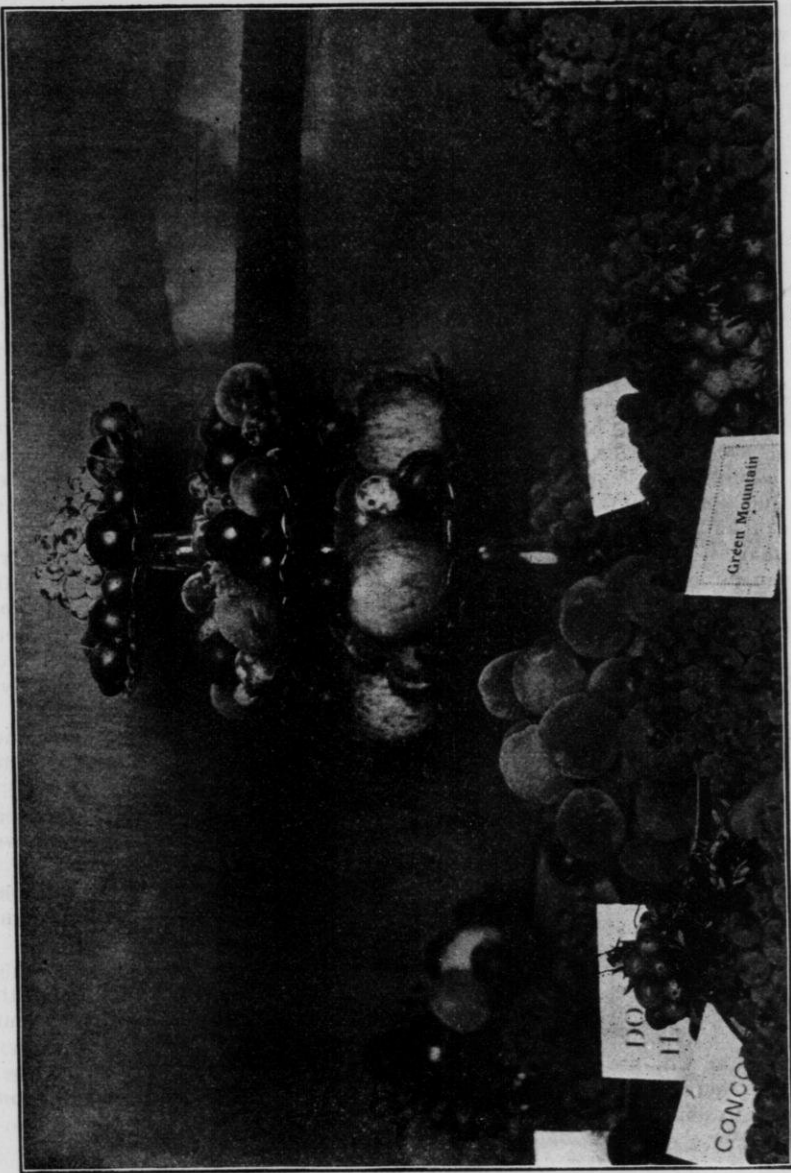


Exhibit of Department of Horticulture, University of Wisconsin,
at Wisconsin State Fair, 1908.

bush form to the canes, which prevents them from being blown about by the wind and makes them more easily handled when burying them for winter protection.

After first heavy frost give winter protection by covering with earth. Remove the dirt in the spring as soon as growth starts; level off the ground and continue cultivating as year previous. As soon as cane is through fruiting, cut out cane and destroy by burning to prevent any disease from spreading to the new cane.

Cost of Plants.

For a quarter of an acre four rods wide and ten rods long, the plants should not cost over fifteen dollars, and possibly can be bought for less. The question should not be whether you can afford to plant and care for this quarter of an acre, but whether you can afford not to plant and care for it. The question of a profit on this fruit garden should be eliminated. It is not a profit in money to be derived, but the satisfaction of having a big, heaping dish of large, juicy berries three times a day fresh from your own garden, and a supply for winter use.

DISCUSSION.

A Member—Do you recommend the farmer to plant a quarter of an acre to small fruit?

Mr. Herbst—Yes, I do.

The Member—What will he do with it?

Mr. Herbst—Eat it. Most any family could easily consume the amount of fruit that will grow upon a quarter of an acre.

Mr. Matteson—I notice in your list

of black raspberries you made no mention of the Older. Don't you consider that a good variety?

Mr. Herbst—There are other varieties besides those I mentioned that are good varieties. I selected these varieties because they have done well with us. You can add the Older if you like.

Mr. Matteson—Have you had experience with the Kansas?

Mr. Herbst—It is not a very good flavored berry with us and inclined to be a little soft.

A Member—Do you recommend the Snyder berry? Don't you consider it hardy?

Mr. Herbst—Yes, it is too hard, you cannot put it down without breaking it. The Eldorado is a much better berry than the Snyder, will last longer.

A Member—Is the cane as hardy?

Mr. Herbst—We find it so. Of course we give winter protection. While some say that winter protection is not necessary, I believe if protection is given the cane will give much better results.

A Member—You spoke of pinching off the terminal bud. You don't do that regularly, do you?

Mr. Herbst—We have not practiced that on the red raspberry. We have on the other cane berries.

A Member—Do you cover the whole plant, or just the tips in bending them over?

Mr. Herbst—We cover the whole cane. The proper way to do that with less damage by breakage is to put that cane down after a good, heavy frost, before you get the cane too ripe. Put it down a little green, it will bend a good deal easier.

ORCHARDS.

D. E. Bingham, Sturgeon Bay, Wis.



Mr. Bingham.

Can orchards be made profitable in Wisconsin? This question has been asked repeatedly and has been answered by a few in a practical way. There is but one answer to this question and that is merely, yes. Orchards can be made profitable to their owners in many localities in Wisconsin just to the extent of intellectual energy put forth in the care of the orchard. Has any line of farming been a success that has not had thought and energy applied to it? Still how many plant the apple tree and there ceases all care and thought of the orchard, still expecting results far superior to other lines of farming, and if there are no favorable results, the cry is, Orchards do not pay in Wisconsin.

Let us consider for a few minutes the condition on the average farm orchard or fruit farm. Sod, close planting, no pruning, no cultivation, no spraying. What do they get? Small apples, scabby apples, wormy apples and no apples. What does such fruit bring on the market? Nothing, or practically nothing, and what does it cost to produce apples under those conditions? Just as much as it does to produce good fruit per bushel, and often times more than it does to produce good fruit.

What makes crops grow? We say plant food, which is in the soil in soluble form, taken up by the feeding roots of the plants. What conditions are most favorable for these results? We say through culture by some means, either by a good system of mulch or cultivation which produces the conditions we want, plenty of plant food and in the right form.

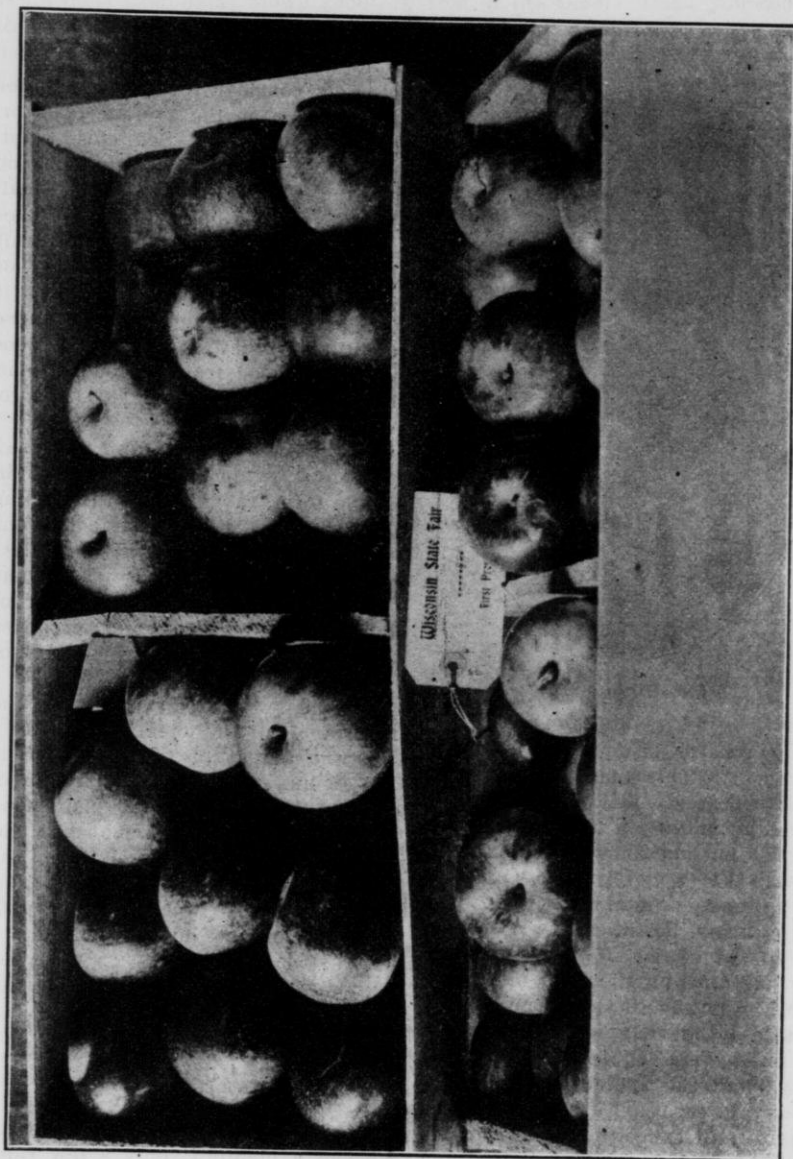
How many orchardists consider the importance of sufficient space for a tree, the extent of the root system, the amount of plant food required, aeration of the soil that plant food may be available, sufficient sunlight in the tree and on the land among the trees, the importance of good foliage, and many other things necessary to make the orchard do its best?

It is true, Wisconsin has many localities where the growing of apples would not be a success, but they can be grown profitably over a large part of the state.

Varieties.

There is no set list of varieties for Wisconsin planters; only a few rules to observe—hardiness, productiveness, and time of maturing of the fruit.

Wisconsin is not so favorably locat-

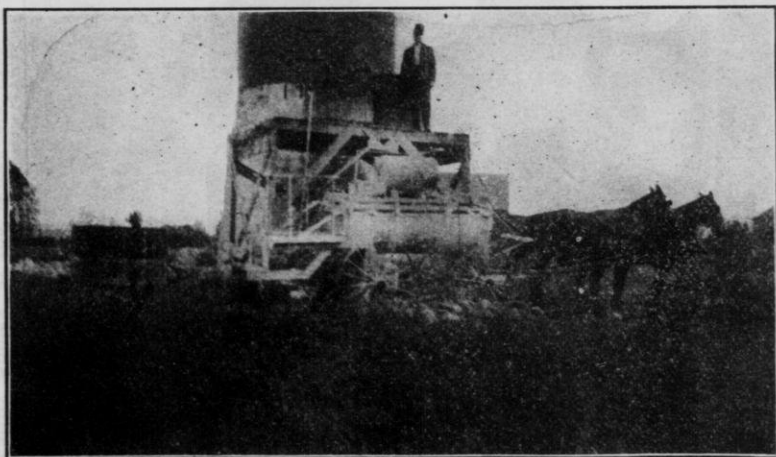


First Prize McMahan Apples at Wisconsin State Fair, 1908.

ed for the production of the late winter varieties as for those that fully mature in our short season.

Such varieties as Wealthy, McMaham, Newell, Snow, McIntosh Red, Northwestern Greening, Duchess, Dudley's and Windsor, etc., will reach a state of maturity equal to apples grown in other states and can be produced at a profit.

and before growth starts and prune the trees, keeping them free from bad forks, dead limbs and thinning out sufficient to allow free circulation of air and plenty of sunlight in the tree. Each variety needs a little different treatment. Some need more pruning and some less than others in order to keep them in condition to hold up a good load of fruit.



Large water tank with arrangement for filling spraying tank.

Distance.

Generally speaking, thirty feet is the proper distance for planting the apple. This gives ample room to farm the land among the trees for the first ten years and gives the trees just the very best conditions, and at the end of ten years the orchard will be paying sufficiently to enable us to abandon the general farm crops, still having room to get among the trees with convenience in keeping up the cultivation.

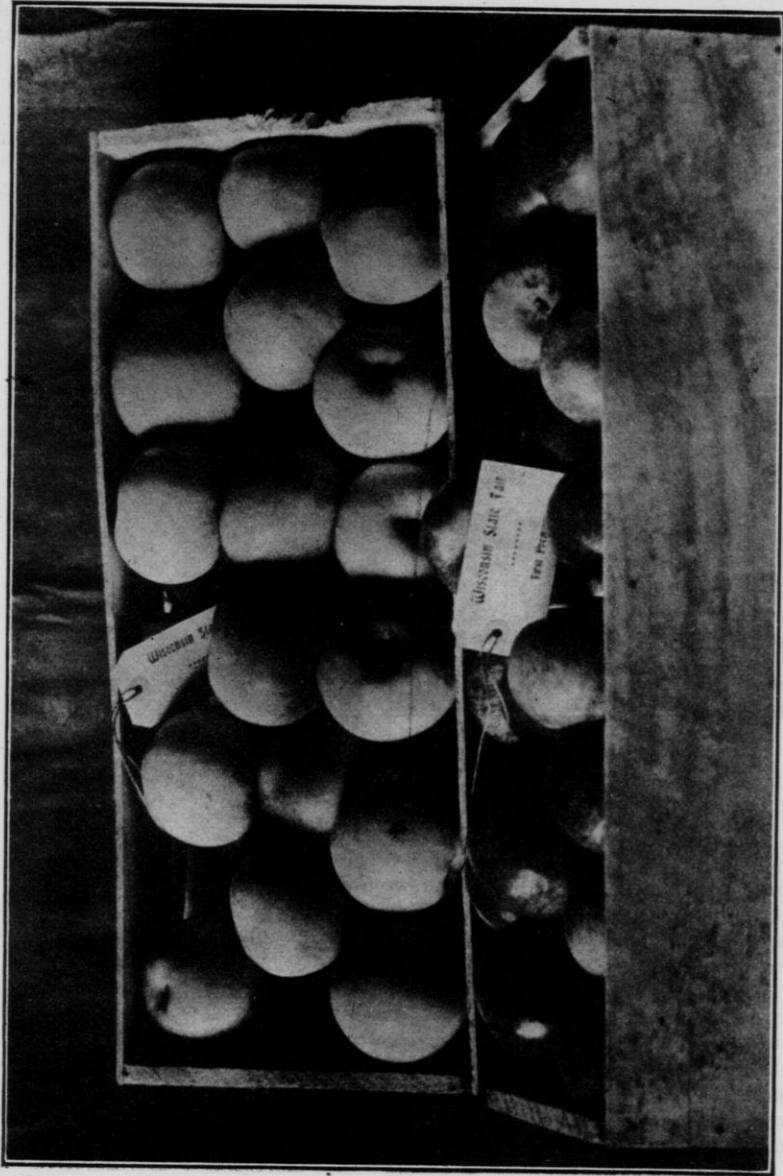
Pruning.

One should go over the orchard every spring, after cold weather is over

Spraying.

You may set it down as a fundamental principle of tree fruit culture that a good, strong, healthy foliage is the one all essential requisite to secure a good crop of fruit.

And after furnishing your trees with proper plant food, suitable conditions by cultivation and aeration to enable them to appropriate this food, the next thing to insure this strong foliage is spraying to protect it against the ravages of fungi and insect pests. It is not enough to start your tree out in the spring with a healthy crop of leaves, thinking that is guarantee of fruit the following season. You must



First Prize Exhibit of Wealthy Apples, at the Wisconsin State Fair, 1908.

protect and defend it, for if by any means the foliage is injured before its function is performed, that is, the maturing of the season's growth, its fruit spurs and fruit buds, the only natural, possible outcome is a poor fruit crop in quantity as well as quality.

Before applying the spray, it is necessary to know something about the insects and fungi we wish to combat. The Bordeaux mixture will not protect our trees against the ravages of the insects and an application of poison on the foliage will not keep the foliage free from the spores of the fungus, but by a combination of the two, we are able to keep our trees through the entire season with healthy foliage.

Time of applying the spray is of utmost importance. An apple once affected with the Scab fungus cannot be made perfect, likewise no amount of spraying can make a wormy apple perfect. We must be ahead of the fungus diseases and insects, protecting our trees as often as we deem necessary.

Thoroughness.

The results secured by the use of the spray depend very largely upon the thoroughness of the work in applying it.

Making the Bordeaux.

After fifteen years' experience, we find the best results with the Bordeaux can only be secured by first carefully making the mixture.

We dissolve four pounds vitriol for each fifty gallons of spray wanted; six pounds of lime for each fifty gallons of spray. When these are dissolved, we dilute to twenty-five gallons each, then pour these two mixtures together and add the poison.

This gives a very fine Bordeaux and will stay in suspension much longer than if the different mixtures were

put together in a concentrated form and then diluted.

The amount of poison to use depends very largely upon what kind of poison. Paris Green, eight ounces would be sufficient for fifty gallons. This settles very quickly and needs almost constant agitation. Arsenate of Lead is the most satisfactory form of poison to use on account of its great adhesive qualities. It stays in suspension a much longer time. This is used six pounds to one hundred gallons of the Bordeaux.

After a thorough knowledge of all the essential features of fruit culture, much depends upon the judgment of the man behind the tree.

DISCUSSION.

Mr. Goodrich—What is the best location for an orchard, in a valley or on a hill?

Mr. Bingham—Of course we want to get on as high ground as possible for two reasons; I want to get a good air drainage and good under drainage. The hills of Richland county are especially adapted to the growing of the apple; also the other counties in the southern part of the state. I would like a level location for the orchard.

Mr. Goodrich—A southern or northern slope?

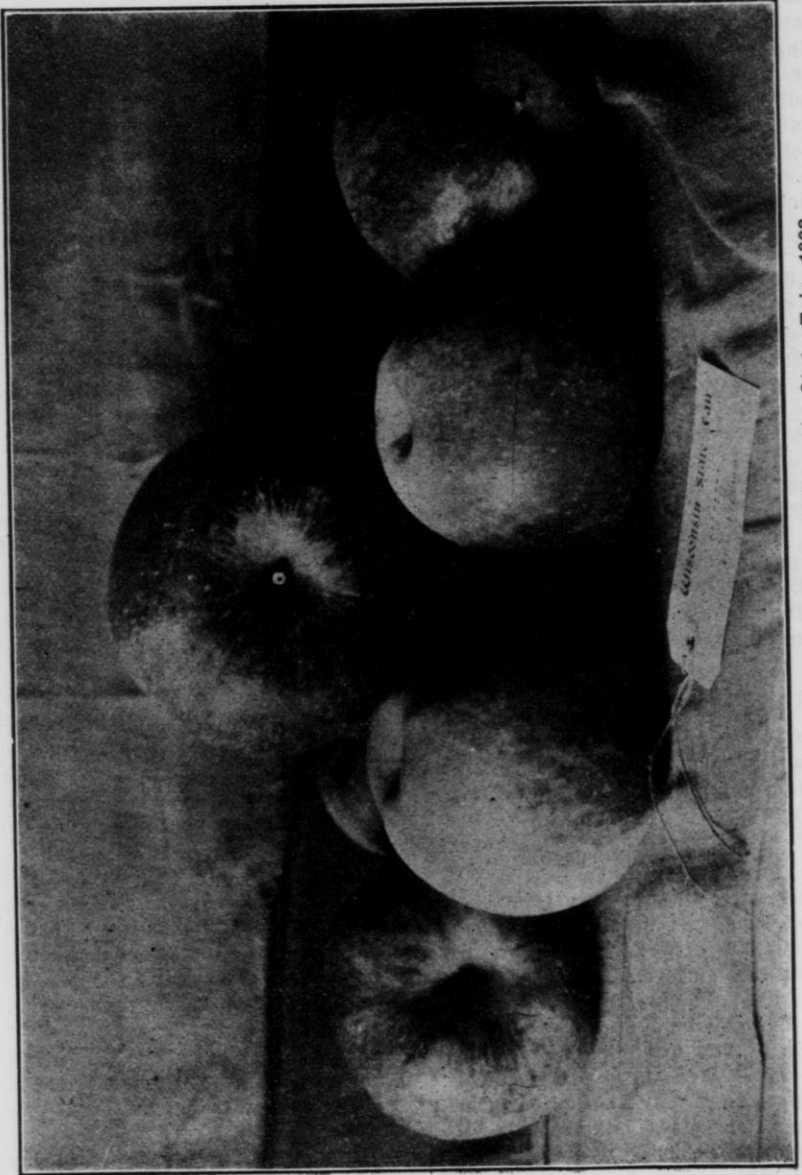
Mr. Bingham—I wouldn't think there was much difference, unless the slope was quite abrupt. I would prefer an eastern or southeastern rather than a northern or western slope.

A Member—How many times would you spray?

Mr. Bingham—For the last seven years we have sprayed four times, but I think it would be better if we sprayed five.

A Member—Do you use Bordeaux mixture each time?

Mr. Bingham—Yes, every time, not beginning until the leaves have start-



First Premium Wolf River Apples, at Wisconsin State Fair, 1908.

ed enough so we use it for the first spraying.

A Member—Is not spraying prohibited when they are in blossom, by law?

Mr. Bingham—I do not think it is here.

The Member—I do not think it is in Wisconsin, but in most of the states it is.

Mr. Bingham—I don't see any advantage of spraying while the trees are in bloom. We can just as well wait until the petals have fallen and get better results, for the pollenization is finished. We always spray once before blooming, in fact, before the blossoms begin to show much color.

A Member—Wouldn't it be rather risky to spray while the blossoms were in full bloom, on account of injuring the bloom?

Mr. Bingham—I think it would.

A Member—How deep do you cultivate your orchard?

Mr. Bingham—We use a spring-tooth harrow for cultivation. We generally cultivate about three or four inches deep.

A Member—How often do you cultivate?

Mr. Bingham—We keep thorough cultivation up till about the first of July.

A Member—How close would you cultivate to the tree?

Mr. Bingham—Right close to the tree, we have no sod around the tree.

A Member—What do you do after cultivation?

Mr. Bingham—We allow it to grow up with a second growth of weeds, or else we sow in some cover crop, like oats or peas.

A Member—How do you get rid of those crops the next spring?

Mr. Bingham—We use a disk getting them in first. If we sow peas or oats, they are killed by the frost and we cultivate them right in, putting the

soil in good condition. We do this work around the trees until they are twelve years old.

A Member—Don't some people practice spraying when they are in bloom?

Mr. Bingham—I don't know of anybody that does.

Mr. Scribner—To what extent have you practiced this spraying system?

Mr. Bingham—I have now about seventy acres that we are handling every year, cherries, plums, and apples.

A Member—How do you protect in winter against rabbits?

Mr. Bingham—We do not have any trouble from rabbits. We always mound our trees to protect them from mice.

A Member—How deep do you plant your young trees?

Mr. Bingham—We plant an apple tree a little deeper than it would be in the nursery.

A Member—Did you ever bank up a tree and make it live after it was gnawed by mice?

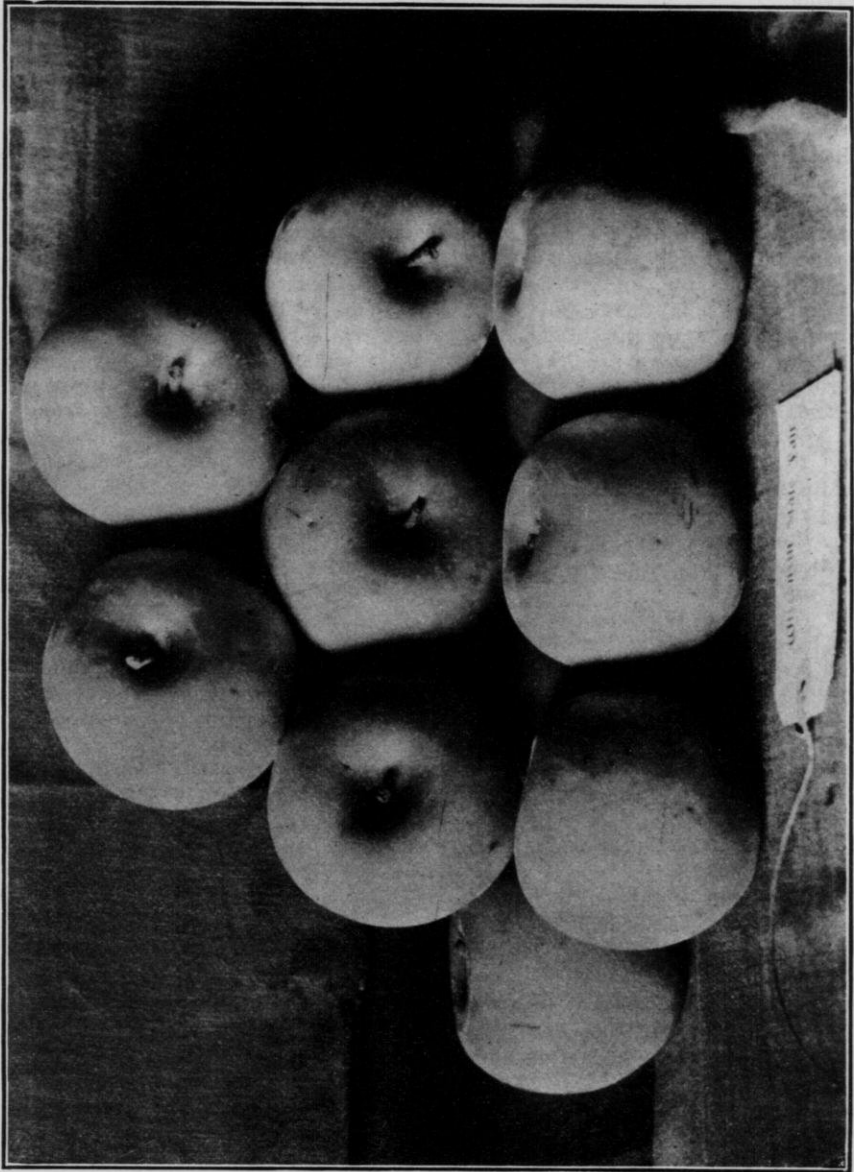
Mr. Bingham—No, I do not think banking would save it if the bark was entirely off; something else would have to be done to it.

A Member—You said Wisconsin was not so well adapted to winter apples.

Mr. Bingham—That depends on what winter apples they are growing. There are some late winter varieties, such as the Ben Davis, that the season is not long enough for. We had better grow varieties that reach a state of maturity, so we can get more money for them and get better returns, get a larger crop and grow them cheaper.

A Member—What winter varieties would you advise a person to raise?

Mr. Bingham—The Northwestern Greening is a good winter variety that matures here. Newell's Winter is another that matures, the Snow and the McIntosh, Dudley's Winter, perhaps a



First Premium Northwestern Greenings at Wisconsin State Fair, 1908.

little later than the Wealthy. Those will mature in our short season.

Mr. Matteson—What is the cause of the Northwestern Greening becoming brown on the inside?

Mr. Bingham—I think that is the nature of the beast.

Mr. Matteson—You have just recommended them.

Mr. Bingham—They will sell. They are like the Ben Davis, they aren't a very good quality, but we grow what we can get the most bushels of and get a good price for them.

A Member—Isn't the Northwestern Greening considered a good apple?

Mr. Bingham—There is some trouble about the coloring up of the Northwestern Greening in the center in different seasons.

A Member—The McIntosh is considered a winter apple?

Mr. Bingham—Just as much so as the Snow.

A Member—If you came into possession of an orchard that was entirely grassed over, what would you do with it?

Mr. Bingham—I would plow it up shallow first and then keep up a system of cultivation.

The Member—How do you like the Wealthy apple?

Mr. Bingham—It is a good money maker.

The Member—And a good eater. I always have thought that when a man got filled up on Wealthy apples he ought to get fat, but I think my friend Scribner must have lived on Baldwins.

A Member—Won't the Snow keep much longer than most people think, under proper conditions?

Mr. Bingham—Yes, I have always contended the Snow ought to be classed as a winter apple, but it is thrown out of many of the exhibits on account of not being a winter apple; still we find many times that it keeps better than the Northwestern Greening, under the same conditions.

A Member—We have Snows at the present time that are fully in as good condition as the Northwestern Greenings.

Mr. Bingham—I think that apples can be kept if the cellar is fairly damp, not too dry, and kept about thirty-two.

A Member—The Snows I have reference to have not been in a cellar this winter, they have been in a back room.

Mr. Aderhold—What is the best treatment if you want to keep apples a long time?

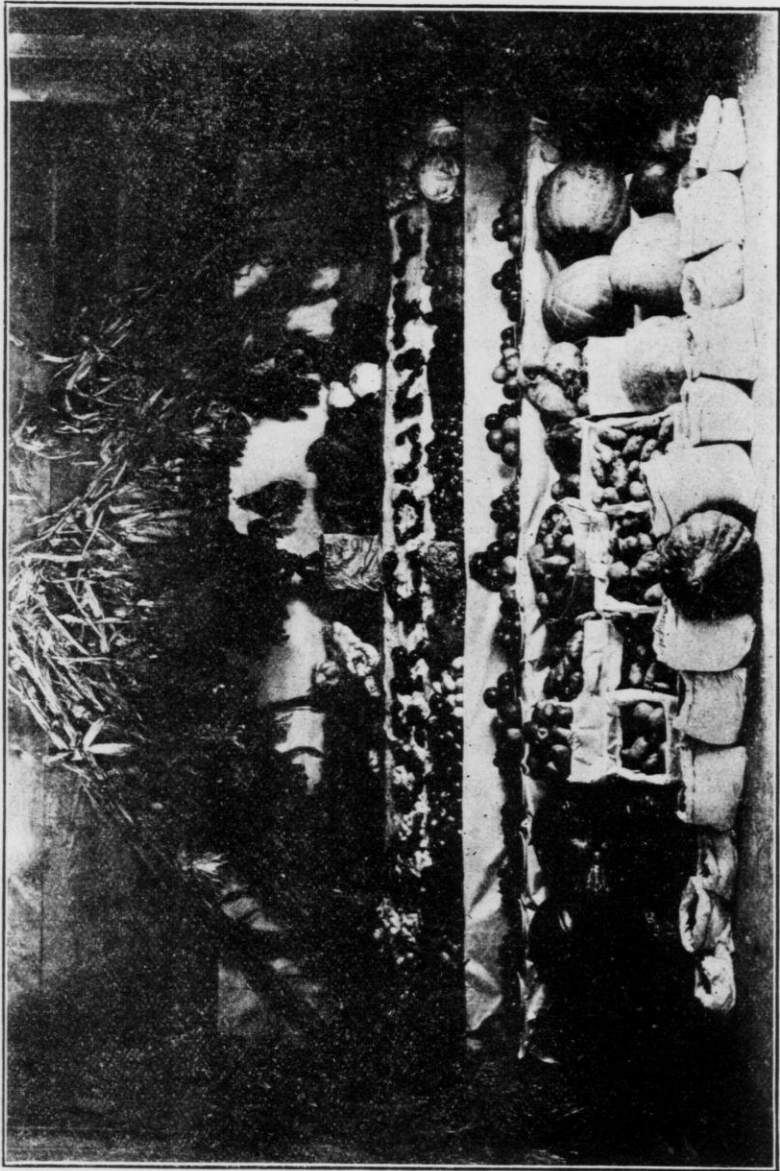
Mr. Bingham—I would keep them practically air tight, that is, so they would not wilt, and keep the cellar cool.

Mr. Aderhold—Have you ever packed them in sand?

Mr. Bingham—I have packed some varieties in damp sand; such varieties as Golden Russett keep very nicely. Mr. Hatch has buried them in the open ground right out of doors and taken them out as he wished.

Mr. Aderhold—Couldn't that be done keeping them in a cellar?

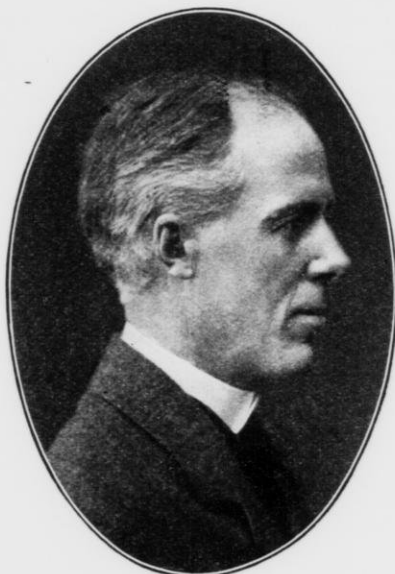
Mr. Bingham—Yes, with a damp cellar.



First Prize Exhibit of Fruit and Potatoes at Northern Wisconsin State Fair,
Chippewa Falls, 1908.

ALFALFA.

Joseph E. Wing, Mechanicsburg, Ohio.



Mr. Wing.

Before I begin talking about alfalfa, I want to say a little bit about fresh air.

When I was a boy I was threatened with consumption; in fact, they told me I had it, and I went west and lived four years, slept out of doors most of the time and got over it; I never have had any trouble with my lungs since; I haven't even had a cold in so long I have forgotten when. When I built our new home I only put in one extravagance, only one luxury,—yes, two of them. First, I put in three open fireplaces built on the King system, with big chimneys and Jackson grates, and then we put on a big double porch where we sleep up above in the summer time and in the winter time, too, a good many nights; when it gets

very stormy sometimes we move in for two or three weeks. In the last two years we have slept in the house not quite a month, my two little boys and myself. One of my boys early developed a tendency to weak lungs and bad throat, had to be taken out of school a great deal, but since he has slept out of doors his sore throat is all gone, and I want to say, the whole expense of that upper porch has been paid ever and over again in doctor's bills that I didn't have to pay, and I believe that boy's life has been saved.

I tell you when I get away from home and the nights come, I feel as if I want to get home and perch on my porch. I do not know of any greater luxury than that of sleeping out of doors, winter and summer, and I never knew any one to take cold from having fresh air.

Alfalfa.

Seven or eight years ago, perhaps ten or twelve, I came out here to this state of yours and talked to some of you about alfalfa, and tried to get you interested in growing it in Wisconsin. I am glad to see that you have had some success with it, there has been a great deal of it grown and some of the most enthusiastic alfalfa advocates in America live in Wisconsin now.

I have grown older since then and I do not know any more than I did then, indeed I don't know that I know as much now as I knew when I was here before, because then I was so sure of some things that I am not sure about now. I am not going to make any speech to you at all today; I am just going to tell you a few little stories, some few things I have seen.

When I came home from the old western ranch to Ohio in 1889, I had been gone from the Ohio farm a few years; I had lived in rather a rich western country, and I entertained some rather large ideas, so that when I came back to Ohio I looked at it with new eyes. It was as though I had seen it for the first time, and yet I had many old memories connected with it. It impressed me that the Ohio country was poorer than I had ever seen it to be before, that the hay stacks were smaller and not so many of them, and a good many barns had their doors hanging by one hinge, and the paint was scaling off and the fences were falling down, and the farmers were talking hard times, and the fields were poorer, and there was good reason for that, because for eighty years they were being steadily robbed while we were raising timothy hay and corn and feeding it out, and we Ohio folks had very little manure to put back on the land, and we didn't know very much about clover and alfalfa. We had been doing the best we knew how, but our country was getting poorer and poorer every year, so it was easy enough to look forward to the time when nobody could well live in such a land. It filled me with sorrow to think of it. I said, "All these fields that I loved so much; they are slipping away from us; they are getting poorer and poorer, and if we don't make some money it is going to be pretty hard to keep things going." I know some countries where the land is very poor and I know that the people are a poor kind too, they are not only poor people, but they are poor farmers, their children grow up in ignorance, and it filled me with dismay to think of those things coming to Ohio.

That very year there came to our town a Farmers' Institute, the first one I ever attended. T. B. Terry came

there, and I well remember how I sat at his feet and listened to every word he said. I didn't know much about farming as it ought to be known, and Terry stood there and talked, for instance, about clovers. He said, "Friends, clovers make land rich." I listened to that hard, and then he drew a picture of a manure shed on a piece of cloth and he told us how manure sheds save manure and help make the land rich, too. I believed every word he said. I am pretty good to believe, sometimes I think I am too quick, but I believed Terry. My wife was with me, a girl that came from out of a town, and married me to come out onto my farm, that unprofitable farm; she married a very poor man who borrowed money to buy his wedding clothes, because I didn't bring anything back from the west but hopes. She sat and listened to Terry, and she said, "Joe, that clover is the thing, let's sow some." I said, "We will." And I hitched up the old sleigh and my wife drove—

Mr. Martin—What were you doing while she drove?

Mr. Wing—I was sowing clover seed while she drove. Now, you know it is a long time for newly married people to be separated from breakfast till dinner time and from dinner to supper, so it was all right for her to help me sow clover seed. She wouldn't do it now, she was younger then, and so was I.

Well, the clover seed grew, some of them, and some didn't. But we had got it into our heads that by means of clover and by means of manure that old farm might be built up and some day might be rich. The question was, Could we do it? We determined we would do it. I tackled that old farm of ours when it was poor. Father had been a good farmer, but he had taken it when it was worn out and he struggled with it a good many years and

he was old. Sometimes I felt as if I wanted to get away altogether, that the task was too discouraging for me, but he said to me, "My boy, I am old; you are young. Won't you be the man now? You used to help me, you were a good boy. Won't you be the man now and let me be the boy and let me help you?" "Yes, I will do that." Well, I had to, didn't I? Well, then

remarks that rather hurt my feelings; he asked why I left the yard or the shed, but I didn't care, I couldn't afford to haul small loads. I used to stand on that wagon, I had big Percheron horses that walked along pretty lively, and hauled that manure, and I was thinking all this time, "Under my feet I have got something that will make one spot of land as good as any



Scene from the front gate of Willis O. Wing's home.

I went out and I tackled that old farm, and I tell you it was poor. But spring came and I began to turn over in my head some way to build it up. I knew manure was a good thing, but we didn't have much and we wasted a good deal of what we had. The farm was poor, but up in town there was lots of manure.

I built a big wagon box about seven feet wide, and I used to go to town and haul that manure home. Some man would send me word that I could have a lot of it for two bits a load, and I would go and get it all at one load. Sometimes that man made

in Iowa or Illinois," and all the way home I was hurrying along to get it onto the land. Way back in my mind during all this time something was working. Up in the rich country beyond us there were large farms and rich farmers who had been able to send their boys and girls to college. My father had always been a poor man. They had nice girls over there that wore good clothes and knew how to wear them, and they liked me when I had my good clothes on, but sometimes I used to meet them when I was standing on that load of manure, and I remember one day when I came

along almost to the farm, standing on that load of manure, one of these girls came along with her black hair, bright eyes and rosy cheeks, and I said to myself, "Here comes Mary, now I know Mary and I will turn out and give her a good chance to go by, and as soon as she comes near me, I will take off my hat and give her my sweetest bow and smile." So I got all

read good books and I never have had. You have even traveled in Europe and I never have. Is it possible you are still so ignorant you don't know the great value and virtue, yes, and the beauty, too, that can come from a load of manure? Are you still so ignorant that you don't know that with this load of manure I can drive through that old rail fence into that old, worn



Mowing Alfalfa on Woodland Farm.

ready, and she came within a few rods of me and then something happened that I didn't understand in the least—she never saw me at all. She drove right by, and at first I couldn't believe it. I was thunderstruck, and then I was indignant; I was angry, and probably I turned red all over my face and down under my collar. Then I looked back and of course she had gone, but I began to talk to her, and I said things to her, the kind of things people can always say when it is too late. I said, "Young woman, you have been to college, and I never had a chance at that. You have had time to

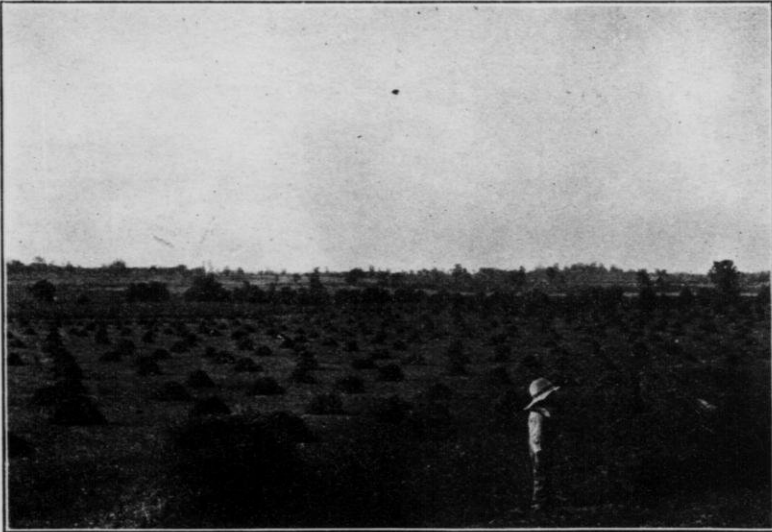
out field, where nothing will grow now except weeds, and I can make grow beautiful clover and alfalfa and corn, and some day I will make that field to sprout and grow a home for another girl, not you?" And do you know, friends, that it all came true?

I tell you, faith is a mighty good thing; you cannot farm without it. I had faith in that field, and today it grows better corn and better clover and alfalfa than I had ever dreamed of, and the girl I married after a while was sweeter as a wife than she ever had been as a girl, and the home that grew was better than I ever dreamed.

By the way, Mary married a politician, and she lives in a rented house.

Well, we started after a while growing alfalfa on Woodland Farm; we learned how to grow it, and we didn't have an easy time learning either. The first bit we sowed was only one-third of an acre, but that happened to be rich clay soil with lime in it, and it thrrove, but the next field we

happy. We kept tile draining and putting on more manure and expanding our alfalfa fields. We bought sheep and fed them, not expecting to make a profit; but just determined to get manure to put on that farm to grow alfalfa. I was a fool, wasn't I? A man devoting his life and brain power to growing alfalfa, I might have been out preaching to many people,



Alfalfa on Woodland Farm, owned by J. E. Wing & Bros. Seed Co.

sowed was too poor and too wet and we learned from those two experiences what we needed, we had to have more manure and put it on the right kind of tiled soil. I had lived in the west where we had grown it and I was determined I would grow it, so we kept experimenting and manuring and tiling, year after year, and so we learned to grow it, but I won't tell you all about it now.

I am going to tell you another story and let you go. We learned after a while to make alfalfa grow on Woodland Farm, and when I had forty acres of it I was mighty proud and

only I didn't know anybody that needed preaching any more than I did myself. Anyway I was determined that alfalfa should grow on that farm. Well, I got that forty acres, and finally we got up to a hundred, and we plowed up sixty this fall that we expect to sow to alfalfa.

So alfalfa grew at last on Woodland Farm, and it brought a degree of prosperity with it. It has not made us very much money; I do not believe there is much money in farming or keeping dairy cows, or anything else, unless it is mercantile or manufacturing business, but still it made us a

good living and the farm is worth much more than it was before. But here is what it has done in our country—it has made a great change in our country.

This farm when I took hold of it in 1889 had upon it working my poor, old father and a lame negro, who got twelve dollars a month, and that was

the three hundred and twenty-acre farm keeps my two brothers and myself and all these other people. When I see their little boys walking to school dressed as well as one of my boys is, I think to myself, "Here, boys, you don't know it, but your little pockets are full of alfalfa hay." We think we have made a demonstra-



Woodland Farm. Husking Wing's improved White Cap.

all the help there was. I turned the negro off when I took hold of it, I couldn't afford to keep him.

On that farm now there are four married men working and my brother. I don't count myself any more. There are single men working on it at times. We give them good wages, we pay a dollar and a quarter a day all through the year. They are working in the alfalfa in the summer time, and in the winter time they are feeding hay to the sheep; in the spring time they are hauling out manure and putting it on the land. We only grow two things, corn and alfalfa, and we haven't made very much money, yet

tion in this way that alfalfa will grow in America and in the eastern part of America.

I will tell you something else it has done. I have fields of corn where, before we grew alfalfa, forty bushels was the maximum crop. Now, growing corn on the alfalfa sod, we have been able to get sixty, seventy-five, eighty, eighty-five, ninety—this is not an auction—one hundred—well, never one hundred on a large field, though we did get it on a small field, and we are going to have a hundred on the whole farm if I live long enough. Last year we grew more than one hundred and fifty bushels to the acre on

two acres, and that was alfalfa sod on a creek bottom, with good seed and good cultivation, tile drained, one hundred and fifty bushels of shelled corn, and that is what alfalfa has done in Ohio.

After a while we got our farm organized, my brother carrying on the work as well as I would, and probably a little better,—and I got an oppor-

see how they did it, so I went to the old world to study fertility of soils there, and I want to tell you about one farm I saw in France.

It belonged to a man by the name of Delacour, who had a farm near Paris. The Minister of Agriculture told me to go to see Delacour and asked him to receive me, and Delacour with that charming French courtesy



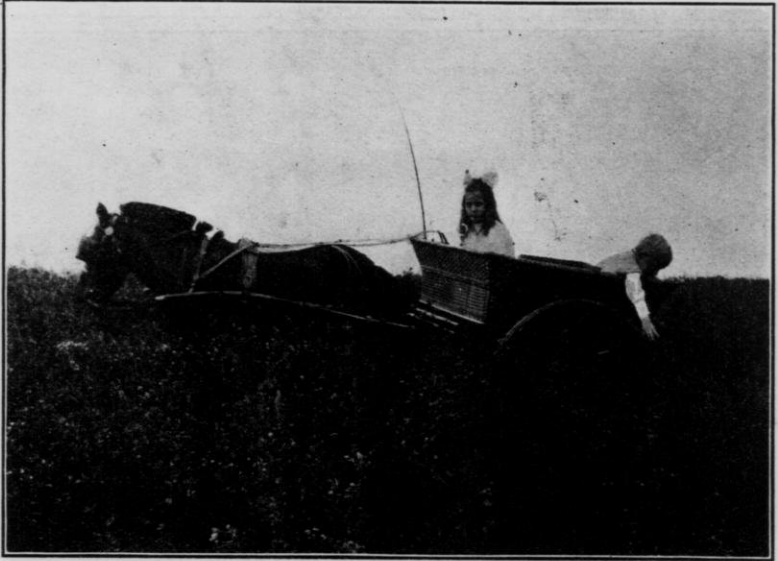
Woodland Farm. The Home of J. E. Wing, Mechanicsburg, Ohio.

tunity at last to go away to the old world. I wanted to go over there very much, because I had studied so much on the problem of soil fertility—you cannot talk alfalfa without talking soil fertility, but I had been thinking on the subject so long I felt I must go to the old world where men have been farming for hundreds of years, because they must have solved some of these things that we were trying to solve. We haven't been here seventy-five years, some of us, and some of the lands have not been cleared more than fifty, so I wanted to go over there to

came to my hotel in Paris to find me. He was rather an elegant looking Frenchman with a long frock coat and a tall black hat and a very charming smile and a nice bow. He didn't know a word of English and I didn't know any French, which made it a little embarrassing at first, but you can do a lot in the sign language. He led me to the train, bought a ticket and put me on the train, and we went out to the farm, talking all the way. We looked out the window every minute, and if there was something we thought looked pretty good, a fine field of clo-

ver for instance, we would smile and wave our hands at it, and then pretty soon we would see something we didn't like at all, and we would shrug our shoulders, and so we conversed very pleasantly, until we got out to Delacour's farm, about forty miles out in the country. At the station a very elegant carriage met us with a beau-

with the oxen's backs and so thick you could have thrown your cap out and it would hardly fall to the ground, and underneath the grain there was green clover springing up. Then we came to where eight men were mowing down a wonderful growth of grass and clover. Women came up behind these mowers and raked the grass up



In the Alfalfa Meadows. Scene on Woodland Farm, owned by J. E. Wing & Bros. Seed Co., Mechanicsburg, Ohio.

tiful span of coach horses; we got in the carriage and rolled out over a beautiful road until we came to Delacour's place. I should judge his farm had two thousand acres and we rolled along through beautifully kept fields.

The first field we reached was a field of wheat, wonderful wheat. It was just ripe and they were cutting it with an American self-binder drawn by three yolk of great French oxen. One man walked along and drove the oxen and another man was on the seat to manipulate the levers. I never saw wheat any better than that, just level

and tied the bunches together, like a corn shock. As soon as I got an interpreter, I asked why he didn't use American mowers as well as American binders. "Ah," he said, "we must give work for the poor men, and we find it just as cheap to have them cut it by hand." He only paid them about thirty cents a day.

After that we came to the beet field, where men were hoeing sugar beets. Those men were little men from Belgium, and as soon as you saw them you could see they were working by

the job, not by the day. But my, how the beets did grow.

After the beet field came the corn field, the only one I had seen in France, and the corn looked well, growing vigorously, although they told me it would not get ripe, but would be used to feed the cows green.

Then after the corn field we came to the village and we wound around between the little stone houses, and these little stone houses I learned were the dwellings of the laborers who lived on that ranch. Each one owned his dwelling, although they did not own the land.

Then after we had gone through the streets of the little village, we came to a great archway, and driving through that we presently came into the middle of the great castle, and there we were in a court maybe eight or ten times as big as this room. On one side were great stone stables where they kept sheep, over on this side they kept cows, all dual purpose cows, making milk for the Paris market, and all fat and sleek. They were all getting green clover with the blossoms on it. I went into the sheep sheds and there were two thousand perfect sheep and they were all getting green clover with blossoms on it. Then at the other end were the great horse sheds, but at this farther end opposite the archway was the residence of the old man Delacour himself, closing in the court, and I never had been in a residence so elegant in my life. The great stone steps led up into it, and when you got into the house, that was simply magnificent with pictures and books, everything a rich man could need. There I was presented to the little boy of the house, the heir to this great farm, the only child. I noticed one curious thing, if you strike a poor country you find large families, and if it is a rich country there you will find small families, and I don't understand it.

But I must tell you one thing about this magnificent home, all the windows of this house looked out into this courtyard, not one looked in the other direction, and as he looked into that courtyard, what did old man Delacour see? He saw those two thousand sheep when they went out into the fields under the care of the wise shepherd and his dog; he saw cows, about two hundred of them come out every day and go out to graze and then come back again at night; he saw those great Percheron stallions coming in with enormous loads, and one more thing he saw, and that was a pile of manure, the biggest I had ever seen and I have seen pretty big piles in Nebraska, a pile as big as this room and as high as your head and higher, covered all over every day with fresh straw, so it didn't smell, and I don't know why, when I looked at that pile of manure and wondered about it, I saw Monsieur Delacour smiling, and he turned to the lady who was interpreting for me and said something, and laughed, and she said, "Ah, Mr. Wing, you have observed the pile of manure?" "Yes, I was looking at it." "Ah, Mr. Wing, M. Delacour wants me to say to you that that pile of manure is one of the things he prizes most. See how large it is." "Yes, it is big, all right." "Ah, M. Delacour asked me to tell you this. That pile of manure is the thing that covers all these fields with beauty and bloom; that pile of manure is what feeds all these cows and sheep in these castle walls; that pile of manure is the thing that feeds all these people that live about here. We prize it, we love to see it grow, we cover it with straw, and as soon as the wheat shocks are gone off the fields, then the men will come with their carts and spread it over the land. That is the thing that covers all our land with beauty."

I stayed there a little while longer.

I went over the fields and I noticed the richness of the clover and all the other beautiful growing things, and I said to myself, "Joe Wing, in Ohio you have been discouraged about that land, you thought it was getting worn out. Why, the farms have not been plowed there for eighty years yet, and you are talking about land getting old, worn out, while here are fields that have been running a hundred years; these really are old fields—yes, indeed, these fields have been running five hundred years, they are getting old." Then I thought again, "Why, it's a thousand years ago and these fields were old fields then, and yet they are more fertile than anything you have ever seen in America. Joe Wing, go home and try to do some good farming on your own farm."

This old Frenchman, M. Delacour, told me two-thirds of his land is in clover of one kind and another and all that he grows, all these clovers, are fed to the animals on the farm and the manure prized and put back, as I tell you.

How to Grow Alfalfa.

Now, how to grow alfalfa? I can tell you all that in five minutes—it is as easy as it is to keep a sweetheart or a wife in love with you, and depends on the same principle exactly—that is, do the little things, just the little things, and the right things in the right time and the right way. You do not need to fall off the court house, or do any ridiculous thing to keep your wife in love with you; it is the easiest thing in the world to make a good woman think you are a good man.

Now, what is necessary to make alfalfa grow? First, that that land shall be dry. Don't ask me if you can sow it in a swampy piece of ground, you can't do it. We have laid sixteen or eighteen or twenty miles of tile draining to make our farm dry enough and

we have only got three hundred and twenty acres. The land must be dry.

Next, it must be sweet. Some lands are born sour. Now, how do you sweeten it if it is sour? Lime, lime.

Between here and Milwaukee, all through this country, it is naturally an alfalfa country all the way, because we can tell it from these limestone pebbles mixed with the soil. Alfalfa revels in limestone soil, so do a lot of other things; limestone makes strong girls and boys. There is no use sowing alfalfa in land that is sour.

Then the land must be rich. Now, I can hear some one say, "I thought you said alfalfa was a soil enricher." And it is, the greatest soil enricher in the world, but you know sometimes you have got to feed the hired man before you send him out to work. A rich soil is easily built up, a poor soil is pretty slow. Alfalfa likes stable manure, and the more you put on the more the alfalfa grows and the bigger the grain crop will be afterwards.

The only defect in this country, it seems to me, would be that in the spring before the snow would go out and the land be dried out, the alfalfa might be killed.

How did we get our limestone? The very same glaciers that brought your limestone pebbles brought the same kind of pebbles to us. I can show you white limestone on our own farm just like you have.

Now, it isn't very safe for me to tell you how to sow alfalfa, but I will tell you how we are going to sow it on our own farm. This week we will plow that land and plow it an inch or two deeper than ever before. We will work that land down until we have a good seed bed, and that means just what it says. Then about the middle of April, with us, we will sow fifteen or twenty pounds of alfalfa seed and about a bushel to the acre of beardless spring barley.

I have told this thing so many times that it seems like a chestnut, but it is the only thing I know. Beardless spring barley is the best nurse crop with alfalfa and with us a nurse crop is almost absolutely necessary to hold down the foxtail grass and the weeds. We sow always some commercial fertilizer with it. What kind? Oh, something full of phosphorus. I would rather have bone than anything else. What for? Why, phosphorus stimulates a quick growth and gets it ahead of the grasses and the weeds.

Now, what is the rest of it? The rest is when that barley comes into head we cut it for hay generally, and that is the whole story, except to keep animals off of it the first year, and maybe the second year, too.

No, that isn't all of it either. I have got to tell you one thing more; there is one very little thing that sometimes causes a great deal of loss.

Alfalfa must be cut at the right time, or else you lose it. When is the right time? We don't pay any attention to the bloom at all, the time to cut alfalfa is when the little buds or shoots appear right down near the ground, ready to make another growth. Go down on your knees and look at it before you get ready to cut it. It don't hurt a farmer to go down on his knees for alfalfa. If those little shoots have not appeared, don't cut it. The first year, if you cut the alfalfa before the little buds appear, some of it you will destroy, and always if you cut before the shoots come you will weaken it. As soon as they have come and start to make a second growth, then cut it.

DISCUSSION.

A Member—What variety do you use?

Mr. Wing—There is only one variety of any practical use and that is the common western alfalfa.

A Member—How much phosphoric acid?

Mr. Wing—We apply two hundred and fifty pounds to the acre and when I can afford it I will put on four hundred pounds, sixteen per cent goods.

Mr. Goodrich—You told what would happen if you cut your alfalfa too soon. Suppose you wait until those buds get up to six or seven inches high, that will destroy the second crop, won't it?

Mr. Wing—Yes; as soon as the buds appear, it wants to be cut promptly, on top of the buds, of course.

Mr. Roberts—Is there any danger of the roots of alfalfa penetrating tiles?

Mr. Wing—Yes, they do penetrate tiles and stop them up if there is a running spring of water in that tile all summer; if not, there is no danger.

Mr. Goodrich—What about inoculation?

Mr. Wing—If you put on lots of stable manure, you will have inoculation enough anyway. If you can get some soil from another man's field, it is all the better, or some sweet clover soil.

A Member—How many years can you grow alfalfa before you plow it up?

Mr. Wing—On clay soil, it will be in strong vigor for eight or ten years, on black soil not so long, it is better to plow it up every four years.

A Member—How would it do to sow with oats in the spring?

Mr. Wing—Sow three pecks of oats to the acre and cut as soon as that comes in bloom, but don't let it ripen. If you sow in the fall with rye you will lose it all, at least we did. You have better winters than we do, because with us it is freezing and thawing so often.

A Member—I can't do anything with that beardless barley you spoke of, it lodges so.

Mr. Wing—It doesn't lodge with us.

If any nurse crop lodges, you will have to cut it off for hay immediately.

Mr. Convey—Two years ago it was recommended to some of the Wisconsin farmers to sow alfalfa in the clover seed to help inoculate the land for alfalfa. What do you think of that?

Mr. Wing—I am glad Mr. Convey spoke of that. In the sixty acres we are going to put in this year which has never had alfalfa on before, in order to get it ready for alfalfa, we

sowed about ten per cent of alfalfa seed in the last crop with the clover, and so it is there now thoroughly inoculated. In that way you can get an idea what that part of the farm will grow. The alfalfa seed should be sown a little deeper than the red clover, it is well to mix it always with red clover, but never sow red clover when it is alfalfa mainly that you want.

Adjourned to 7:30 P. M.

EVENING SESSION.

The Convention met at 7:30 P. M. Supt. McKerrow in the chair.

Supt. McKerrow—Ladies and Gentlemen, we are very highly honored to-night by having with us the Chief Executive of our state, a man who does things. I asked him some time ago to attend this meeting and deliver

an address. He simply said, "I will try to be there, but I will not promise you an address." He is to favor us to-night with a few remarks, and I now take great pleasure in introducing to you Gov. J. O. Davidson.

ADDRESS.

Gov. J. O. Davidson, Madison, Wis.

We are assembled here at the closing session of the institution whose importance to the agricultural development of this state cannot be overestimated. The Farmers' Institute is an epoch in the growth of scientific farming. It marks the emblem of a broad, liberal policy of the state seeking to bring to this greatest and wealthiest of occupations the benefits which labor and experiment afford. Your presence here bespeaks an appreciation of this policy and an approval of these efforts working for progress and profit.

Richland county has reason to re-

gard this gathering with unconcealed satisfaction. This was one of the first counties to turn its attention to the development of the dairy interests, and here it early reached the foundation of success which has caused Wisconsin to become one of the richest dairy states of the Union. So rich were the yields from its fertile valleys and hillsides that this district was early referred to as the "Herkeimer" county of Wisconsin, in honor of that greatest of all dairy regions. Therefore, it is very fitting and a compliment well deserved that the final session of this Institute should be held

among a people whose labor has so largely influenced the growth of this splendid work.

The Farmers' Institute is distinctly a Wisconsin product. It satisfies a pressing need in the scheme of educational development which this state has adopted,—a policy so wide in its scope and so wise in its provisions that it has become a leader among the states and a model for other commonwealths. These Institutes bring to the doors of the people the results of investigations by scientists and the teachings of scholars. They are traveling institutions of learning, free to those who seek their teachings and maintained by the bounty of the people.

It is a great pleasure to be with you at this splendid Institute gathering. It is an opportunity I would like to utilize to call your attention to the many acts of our state, showing its appreciation of this industry, the splendid policies of improvement to which it stands committed and some of the magnificent results already attained. Wisconsin's generosity to agriculture has attracted the attention of the entire country.

The Dairy and Food Commission.

The Wisconsin Dairy and Food Commissioner and his assistants are performing a service for all the people of this state which is impossible of computation. Through the constant and vigilant supervision by this state department, there has been developed an industry whose annual revenue approximates sixty million dollars. In volume of annual revenue from this source alone, Wisconsin is exceeded only by the Empire State. In the quality of her commercial dairy products she is excelled by no state in the Union. In this great and profitable achievement the State Dairy and Food Commission has been very potent.

Nature has given us all the elements necessary to promote this industry,—rich soil, abundant rainfall and sunshine and a thrifty people. But unguided and unprotected by the arm of the state, human greed would soon deprive honest toil of these gifts. Without this department the prosperity of Wisconsin as a dairy state would be abused, and indifference and dishonesty would destroy the wealth which we are now reaping. In all the great markets at home and abroad, it is generally recognized that the dairy products of Wisconsin are unsurpassed, being free from adulteration and of excellent quality,—a condition which means high commercial value. We can all remember a time when our products were not held in so high regard, but now under the very strict inspection of the Dairy and Food Department, its rules regarding cleanliness of materials and workmanship, and above all, its vigilant enforcement of the law, Wisconsin is now securing the benefits to which its people are rightfully entitled.

There is no problem of greater vital interest to every family of this state than the proper protection of our food supply. Great as has been our progress in recent years and rich as has been the opportunity for all, it is yet a lamentable fact that many of the discoveries of science have been applied to defraud, and this in a manner which has jeopardized the health and even the lives of the people. The commonest articles of food; those regarded impossible of adulteration, have been found to be so poisoned by chemicals as to subject the maker to serious criminal liability. The medical profession has never been confronted with so many diseases and such serious complications as during these years of criminal adulteration of the food supply. Thousands of people today are suffering from ailments

which are directly traceable to this cause. The financial loss due to this form of deception is enormous. A spurious article, produced at a greatly reduced cost, is offered to the public which, ignorant of the deception, or unable to obtain the genuine food, purchases a commodity different from that which it seeks. The production and sale of adulterated food is double deception; it robs the legitimate producer of his market and cheats the purchaser by substitution. A law which seeks to prevent this fraud, which punishes the manufacturer or producer of foods which are undermining the health of the people, which places the stamp of honesty where it belongs, and creates an efficient department of inspection and enforcement, is a safeguard for public health, and a credit to the people who enacted it.

There are those who decry the expense of maintaining this work; there are those who advocate a less active policy on the part of the state, but upon examination it will often be found that these complaints originate with persons whose business will not stand the light of public investigation. Instead of limiting the activity and powers of this department in its work of progress and protection, it is my belief that it should be strengthened, and its powers so increased, that the fines imposed upon the offenders and the costs of litigation will make food adulteration a very unprofitable profession.

The College of Agriculture.

Along another line, and a matter of greatest pride to us, Wisconsin occupies the position of the pioneer. The great agricultural college which is maintained as a part of the State University is without a superior in the whole country. Its facilities for intelligent work have been provided by

a generous people and responsive legislature, and offers inducements unsurpassed. Here was established the first dairy school in America. In it young men are trained to become skillful cheese and butter makers. The short course of two winters of fourteen weeks each, had this year nearly four hundred students, the increase for the last term being greater than for the last six years combined. The long course has one hundred and eighty students, which, with recent changes in the work, will be greatly increased. The farmers' course beginning in 1903 with one hundred and seventy-five students, last year had six hundred and this year seven hundred. Co operative work is undertaken in connection with County agricultural schools, where the extension work of the agricultural college is carried to from five hundred to six hundred persons at every such institution.

The criticism is frequently heard that the great institutions of learning are maintained for the privileged few; that the work is exceedingly technical and beyond the grasp of the average man. Such criticism invariably reveals a person who is not conversant with the conditions prevailing at our State University. While I would deem it a pleasure to defend every department of that great institution, we are interested here primarily in the agricultural college, whose work is so closely affiliated with the daily work and thought of all the people that it has made it invaluable, and has repaid in the savings, made possible in one year by the application of the discoveries, many times the total cost of its maintenance.

No more profitable task has been undertaken by the College of Agriculture than the dissemination of pure bred seed grains. Through years of experiment and observation, the success of this work has already reached

such proportions that the Oderbrucker barley yields from five to ten bushels per acre over the ordinary standard varieties. Three varieties of corn have been improved and perfected with reference to the conditions prevailing in the interior of the state and the northern and lake shore counties. The yield of this corn is from twenty to thirty bushels per acre more than the ordinary varieties. In 1906 Wisconsin raised twenty million bushels more corn on the same acreage of land than was produced in 1900. While in attendance upon your County Fair last fall I was gratified to notice the rivalry between nearly fifty young men who were in competition on one of these varieties of corn for a University prize.

A few years ago the loss on the oat crop of this state, due to the ravages of oat smut, was fully twenty per cent, amounting to between four and five million dollars. The energetic campaign carried on to introduce the formaline treatment has reduced this loss until it is not more than three or four per cent. A similar work is now in progress to prevent the loss due to barley smut.

Of equal importance is the battle which the State is waging with bovine tuberculosis. Wisconsin is a rich dairy and stock raising state, and it is of the utmost importance that the health of the cattle be above suspicion. The damage of this disease is one of the greatest scourges which threaten this industry, and its insidious nature, making it impossible of detection by ordinary physical means until so far advanced that great loss is certain makes it imperative that every possible means be resorted to in order to destroy it. The agricultural college and the state veterinary department have, for a number of years, been conducting a campaign of education among the farmers, urging the neces-

sity of using the tuberculin test upon their herds. By lectures and demonstrations, the characteristics and dangers of this disease have been so explained that there is now so thorough a realization of its dangers and so hearty a co-operation on the part of the stock owners of the state, that assurances are being offered that in a few more years science will have become a master of the situation. Because of this vigorous policy, Wisconsin is recognized as a safe state in which to purchase breeding animals.

These are but a few of the fields in which the State University has rendered valuable service. In nursery inspection, weed control, soil drainage and tobacco culture its efforts have been no less effective. Wisconsin's entire higher educational system is animated by the desire to render service and to give to the people results of practical value.

It can be asserted with every confidence that there is not another State University in the country which is doing so much for the promotion of the welfare of the people and especially those following agriculture for a livelihood, as the University of Wisconsin. Leading students of education and public men of this country have characterized this institution as the "Utilitarian" University, because of the fact that its work is so directly of utility to all the people.

With this educational organization serving the people and the eager desire on the part of the farmers for education and its application to their daily work, agriculture faces a new era. Formerly the long hours of painful toil left no time for thought and study. The lack of ready communication with cities, no telephone, infrequent mail service, and very bad roads, made communication most difficult. Crops which represented heavy investment in money and labor were

frequently destroyed in a short time by insects and other pests. There is no occasion for wonder that the intelligent and ambitious youth of the younger generation should seek to rise above the rut of ancient custom and resolve to enter other occupations. His desires and hopes, cramped by the unchanging methods and practices of years ago, reached out and sought the more alluring possibilities of city life.

Agriculture today is a life of opportunity. The farmer has been brought into close relationship with the city and its valuable markets. A rural mail service reaches him daily; the telephone serves for communication with his friends; the daily papers are received almost as early as in the cities. Frequent train service and the growth of the interurban system has made the farmer a suburban resident. His land is too valuable for superficial cultivation. He must supply that product which is best suited to his soil and which commands the best prices at his market. He needs practical education for he has become a member of a rapidly moving and a strongly specialized people. To farm successfully today one must have a mind trained by proper schooling, a mind possessing the faculty of concentration, of analysis, and of decision for action when the opportunity presents itself. Combine the trained mind with the inexhaustible possibilities of the soil and agriculture becomes an occupation robbed of its drudgery, certain of profitable return and a labor of enthusiasm.

This educational training the state provides. Every facility is furnished to awaken and stimulate this thought. The agricultural college at Madison, with its many branches and activities, is a place of inspiration to those who attend it. From this source emanates the most advanced scientific thought.

Its instructors and experts are devoting their lives to the practical application of scientific principles to agriculture in its daily operations. Their discoveries and enthusiasm are responsible for the tremendous development which we now behold. The hundreds of young and old men attending the state school, the thousands of persons attending the Farmers' Institutes, show the response of the public. The profession of agriculture is being raised to the position which it should properly occupy. We see a thirst for scientific and thoroughly practical knowledge. We meet with a studious reasoning and inquisitive mind, striving to grasp the peculiar workings of the laws of nature. Ideals as lofty and inspiring as in any profession have been raised for the young men and women of the farms. Those possessing the faculty for study, and ambitious and aggressive nature, are being carried along with the enthusiasm and momentum of this utilitarian education. All the money which the University and its departments have cost, all the taxes which have been raised for this work, are but a bagatelle in comparison with the magnificent results which are noticeable on every hand. Critics refer to this expense unmindful of its accomplishment. The value of education cannot be expressed in dollars and cents. When the public mind shall have become so lacking in judgment as to discountenance this work, then the public purse shall have been so reduced that there is no revenue for education, then indeed will ignorance and poverty have come to their own. The sentiment of the people today gives no indication of such a wish. We have not yet lost the power to distinguish between waste and investment. We are a practical people; we believe in practical education, and I hope we will continue to believe

in all practical things. Wisconsin is indeed a utilitarian state.

Music by the Training School Quartette.

Supt. McKerrow—The people of Wisconsin are proud of a great many things that we have within the limits of our state. We are proud to say that we have the greatest dairy cows in the world in Wisconsin; we are proud to say that we have a man in the Executive office who has come up from the ranks of the people; we are proud when we point to our representative in the United States Senate; we are proud of a thousand things in Wisconsin, and yet we are not egotis-

tical enough to think that we have all the good things here.

Why are we proud of so many things? Because we have reached out beyond the borders of Wisconsin and brought in the best to be found, to add to our herds and our flocks and our people and our thought and our brain.

In this Institute work we reached out to far away Colorado; over the line into Canada; down in the state of politicians and presidents, and tonight we are to listen to one from the Hoosier State, and it gives me pleasure now to introduce to you a farm woman from Indiana, Mrs. Virginia C. Meredith.

STANDARDS OF LIVING AND THE USE OF MONEY.

Mrs. Virginia C. Meredith, Cambridge City, Indiana.



Mrs. Meredith.

Who makes our standards of living? Are there any standards? Can any one tell us the very best use of a five hundred-dollar income, of a five thousand-dollar income? And what is the relation between the character of the home and the use of money?

Prof. Mason in his fascinating book, "Woman's Share in Primitive Culture," says that the division of labor was made when fire was discovered, the woman stayed at home to tend the fire, and so have come to pass our beautiful traditions of hearth and home. Men have gone afield to hunt, to fish, and bring back to the home the results of their labor—the home has become more and more exalted, until now what men earn upon any given day is spent that day upon the maintenance of the homes of the nation. It is but a small per cent of daily earnings that goes over to the credit of "savings"—to the creation of "capital." The home is the most ex-

pensive institution in existence. Men earn money, women spend it, that is, women use it. Which is the more important, which the more difficult undertaking—to earn a dollar or to use it wisely?

Men have been helped in every possible way to earn the dollar, helped by invention, by co-operation, by tech-

in New York, she had six hundred dollars, we came west and I bought a farm," and of course they lived happily ever after!

Money, broadly speaking, is spent in four generic lines, for existence, comfort, culture and philanthropy. Under the head of existence we may class expenditure for food and shelter, and ev-



Some Shorthorn Cattle bred by Mrs. Meredith.

nical schools, but what agency other than dearly bought experience helps the woman to use the dollar wisely? And yet is it not true that the way money is spent in the home largely determines the destiny of the family? Is it not true that the woman's taste, and ambition, her knowledge and ignorance, largely determine for what money is spent? One treads upon delicate ground when one discusses the family income.

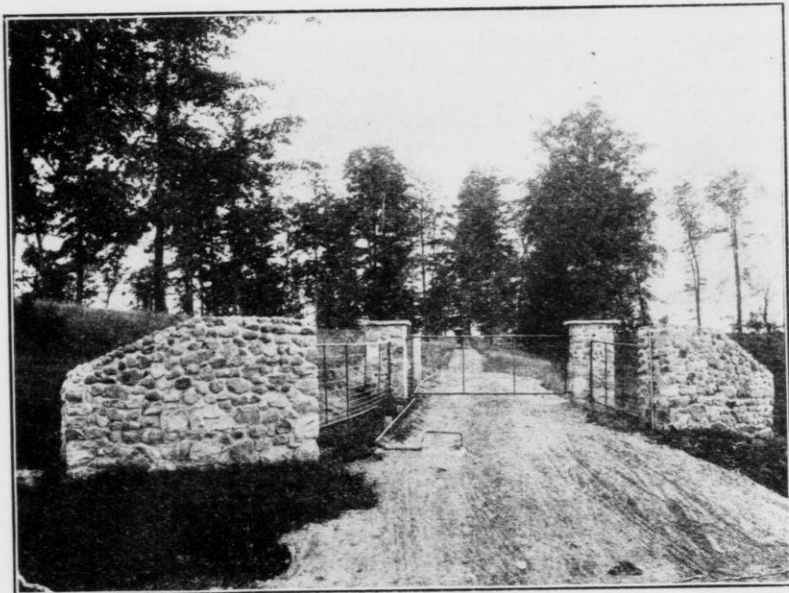
I recall a worthy pioneer farmer who said (the point of this story is in the pronouns), "I married my wife

everything related thereto—not only the food but the fuel and utensils for its preparation—not only the house but its furnishings, as well as clothing. Under comfort we may class those expenditures that make for the more generous living that gives strength and security and which provides for the proverbial "rainy day." Under the head of culture we include the expenditures for education, travel, hospitality, books, and whatever ministers to a better intellectual life. Thus far expenditures have been for ourselves, but there comes a higher plane

of thought and action, we do something for somebody else—that is philanthropy, and so we spend money for churches, hospitals, libraries and social uplift.

There are two types of home familiar to all of us. In one children are being reared with right ideals, they are in school regularly, they are well-be-

haps in neither case does the woman actually handle the family income, but undoubtedly her knowledge or ignorance determines the character of the family expenditure, and this in turn determines the family destiny. The woman determines the standard of living for the family. I have already said that the home is the most ex-



Stone Anchor Walls and Gate Posts. Norborough Farm, Home of Mrs. Meredith.

haved, respectful, industrious, interested in the things that are worth while, and so we say of them that they are sure to succeed, adding in explanation, "their mother is such a capable woman." Of the other type we observe that there seems to be no system in the home life, the children do aimless, foolish things, money is spent for cheap amusements, tawdry clothing and showy furniture, so we predict failure, and very likely sum up the situation by saying, "the mother is such a silly, trifling person." Per-

pensive institution in existence, and we agree, do we not, in believing that the home is the great factor in determining the destiny of the individual. In this connection may I present to you four propositions that seem to me to be important and worthy of consideration.

First, my definition of home; home is a place and an opportunity for the right development of the physical and spiritual natures. The great expense of maintaining the home is justified only because it protects and perfects

child life. The cheap way to live would be in great companies of a hundred or a thousand, but that kind of living does not protect and perfect the child.

Second. Housekeeping and home-making together constitute a business, or profession, more difficult and more important than any other known to modern times. Should there be one who does not agree to this proposition I ask him to name the business that is more important, the business that is more difficult.

Third. The organization of a home is primarily and perpetually a personal enterprise. Syndicates do not organize homes.

Fourth. The one who undertakes this difficult and important business, the one who organizes a home, deserves and ought to have adequate preparation.

It has been said that we have two kinds of Economics—Masculine Economics and Feminine Economics. Masculine Economics uses men for the purpose of creating wealth—that is, uses great numbers of men in manufacture, mining, etc., for the purpose of making money. Feminine Economics uses money for the purpose of making men, that is, organizes the home, buys books, travel, education, all those things that make the training and the thought in the home of such a character that later, in active life, it becomes a decision for the uplift of the race. Ought not the woman destined to become a home-maker to have adequate preparation for her business? Does knowledge modify the cost of living? One may buy a quart of milk for eight cents, or one may buy a quart of oysters for forty cents—there is as much nutriment in the milk as in the oysters—for what has the thirty two cents difference in price been used? Milk is not a suitable food for men, it is too easily and

quickly digested, milk is "food for babes." What shall the choice be? And can any part of this thirty-two cents be saved for culture or used in philanthropy?

The power of choice is the most precious privilege in life—precious because it involves the possibility of making a mistake. Would that we had right knowledge to guide us in choosing what to buy—not only of foods, but of amusement and recreations.

A few years ago Parliament appointed a Commission to consider the commercial interests of Great Britain. It had been found that the markets of the world were returning a lessening profit, apparently because the British working man was not so efficient as the working man of other countries—the lack of efficiency was partly physical and partly moral. At one of the meetings Lord Alverstone, the Lord Chief Justice of England, made this declaration: "Second to drink, and second only to drink, as a cause of crime, is the difficulty of finding healthy recreation and innocent amusement for the young." Was ever there a more significant utterance! The commercial supremacy of a nation dependent upon the moral health, while that in turn was strongly influenced by the recreations and amusements of the young! What are homes for if not to secure the moral and physical health of the young, and how are we learning wisdom about healthful recreation and innocent amusement? What punishment, think you, is reserved for those who have made it difficult to provide innocent amusement for the young, those who have by perversion and prejudice narrowed the list of recreations for young people? Nothing is so easy and so universal as to be mistaken. who has an all-embracing knowledge that renders him infallible in pro-

nouncing on amusements? Our standards change; we know that godly people once burned witches—to be sure all the witches were women and all the judges men; we know that truly righteous people at one time believed it sinful to have a fire in the church. We know that the most enlightened men at one time believed slavery to be right! There is no subject upon which we shall sooner disagree than that of permissible amusements for young people. For myself, I am inclined to believe that it would be difficult to find any amusement which could not safely be permitted in the home of a sensible woman—there it would be so regulated that harm could not result. "The sources of all good are in play," says Miss Ravenhill, "it is the highest point of human development in the child stage."

The use of money incident to hospitality, and especially the hospitality which includes the friends of our children, is dedicated to a noble use. Young people have but slim resources within themselves, they crave the company of other young people. This wholly right craving ought to be gratified along safe lines. This social life is a training that may become invaluable, for it is true, is it not, that when we wish to improve schools, politics, the town, roads, anything, we have to persuade others to help and we can do this successfully only when we can approach others with some degree of ease and confidence. Many a shy girl and awkward boy will under the sunshine of neighborly social life develop strong traits of leadership and conversational power which may prove splendidly forceful.

Money is not a sordid subject. It is worth while to think of the glorious potentiality of the dollar when used to meet "the august appeals of life." The dollar is beautiful when its right use leads on to a fair destiny.

How shall we learn to use it aright? What have we a right to use money for? I wonder if we have a right to buy the adjoining eighty acres when we have not a furnace and a bathroom in our farm house? I wonder if we have a right to buy stock in the town when our farm stock is of the scrub sort?

Learning to use money is like learning to read, or learning to plow, or learning to play on the piano, we must do it for ourselves, good advice seems not to fit the case. We should encourage our daughters to attend those schools which maintain a course in Home Economics, and we should persuade our school authorities to recognize the necessity of having a course of study which will give women an adequate training for home administration. By taking thought we may be able to see that the value of the dollar the man earns is determined by the intelligence of the woman who uses it. By taking thought we may come to see the propriety of permitting children to have some money for their own use. By taking thought we may construct a plan for the right distribution of the family income in the lines of existence, comfort, culture and philanthropy. By taking thought we may be able to force subordinate things into subordinate places.

On the Peristyle at the Columbian Exposition there was this inscription: "To the brave women who amid strange dangers and with heavy toil made homes and reared families." Was not that a noble tribute to our pioneer mothers! Homes are always made with heavy toil and never were the dangers as strange as they which now menace the home. Home Economics is not wholly a woman's subject, it deserves the intelligent sympathy of men. Home-making is an art, a science and a philosophy." May

we each have a worthy share in making its standard high and noble!

Vocal Duet, L. E. Scott and F. H. Scribner.

Supt. McKerrow—You see a Farmers' Institute can produce most anything.

I said that we had many things and many people in Wisconsin of which we are proud. The time tonight is too limited to name all of these

things and all of these people.

In recent years in this state many new names have come to the front in official life, because new movements have been on, and it is only within a few years that the people of Wisconsin have become acquainted with the name of James A. Frear, of Hudson, who is now Secretary of State, and whom it gives me great pleasure to introduce to this audience.

ADDRESS.

Hon. James A. Frear, Madison, Wis.

According to the census reports, two hundred and seventy thousand farmers or agriculturists live in Wisconsin. With their families, those dependent upon agricultural pursuits compose over one-half of our population.

Until the organization of Farm Institutes twenty odd years ago, all the information, all the agricultural education afforded the farmer and the farmer's wife, was that learned from hard personal experience. The State of Wisconsin now appropriates twenty thousand dollars annually for the support of these Farm Institutes, and for every dollar thus spent the state receives back benefits a hundred fold.

A large percentage of attendance at Farm Institutes is composed of residents of the village or city where the Institute is held. Possibly from fifteen to twenty thousand different persons who live on farms were privileged to attend an Institute meeting last year. This speaks volumes for the good work that is being done in the state, but what of the remaining quarter of a million who are denied Institute privileges, or, better stated, who deny themselves its opportunities? What are you going to do for

the man who has no time for new fangled notions, or for the woman whose life is given over to a patient drudgery? The law provides truancy officers and compulsory education for children, but you cannot reach the unconcerned farmer by any such means. You must take Mahomet to the mountain if the mountain refuses to move; you must organize Institutes at the town hall or country school-house, providing an entertainment for those who know no social life and gradually enlarging the field of labor until your larger Institutes will be filled to overflowing by those thirsting for knowledge.

Wisconsin possesses the finest agricultural college in the world, the appropriations for its support and growth exceeding a quarter of a million dollars last year. The state also contributed \$82,595.00 to local agricultural fairs last year, or forty per cent of their premiums. It paid thirty thousand dollars for slaughtered, diseased animals; about eighty thousand dollars towards the State Fair, and over thirty-seven thousand dollars towards the support of the Dairy and Food Commission. Over three hundred thousand circulars and bulletins



Mr. Frear.

were printed, mailed and circulated throughout the state last year. This was apart from sixty thousand copies of the three hundred and twenty-page report of the Institute proceedings also distributed.

Over a half million dollars in appropriations is annually being made for agricultural purposes. Without doubt, this is ten times the amount contributed by the state when your first agricultural Institute was held in my home town a score of years ago. With the appropriations made for general farming purposes and for the poultry, tobacco, cranberry, butter and cheese interests, it is probable the receipts from agricultural products have doubled many times over and brought dollars in return for penny investments.

Of this return, the greater share goes directly into the farmer's pocket, but the increase in taxable property thereby accruing to the different municipalities has made the direct appropriations as profitable to the state at large as monies contributed for other educational purposes, and proper education is always a good investment for the state.

A speaker recently estimated losses to the dairy business in Wisconsin of millions of dollars through a failure to secure the highest possible results as determined by experiments. On the other hand, the profits from dairying and stock raising in general have been enhanced millions of dollars through practical education. The ability to grow two ears of corn where one formerly existed, to raise fruit and live stock under the most approved methods, is of incalculable value to the individual farmer and to the state.

We have progressed from the dummy engine that first ran from Baltimore to Washington until the great one hundred ton monster with a thousand times increased capacity has be-

come a type of modern progress. So too, we have discarded the crooked stick of the Oriental for improved plows propelled by moving engines. The old stone churn has given away to the creamery, while carefully selected, well housed live stock, better feed and better seed bring increased returns to the farmer.

I do not intend to speak of farming excepting to discuss its relation to the state. It is the one occupation overshadowing all others in importance. More people are engaged in agriculture than in any other one business and the world is directly affected by the prosperity or reverses of those who till the soil. The state has recognized this fact by its direct appropriations, just as it has established schools of mining and engineering and free employment agencies to reach other needs. Whatever develops or benefits the farmer as a citizen, gives added strength to the state.

No longer is the term "farmer" or "farmer boy" applied as a term of reproach or unsophistication. The farmer's advantages have placed him in a position of independence far surpassing that of the man in city life. At the first Farmers' Institute held in this state, I remember Hod Taylor said, "A farmer is just as good a citizen as any other citizen, when he is a good citizen." Today he could say, "The farmer is a more intelligent, independent citizen than ever before." He knows no allegiance to any trades organization nor employers' league; his only allegiance is to the state and his only duty to himself and family. He has an active interest in state affairs, for whatever benefits the state benefits him. For this reason, he has an interest in legislation that benefits the general public, and I desire to speak briefly of some new laws which have a special interest to him.

Railway Legislation.

The abolishment of the railway free pass destroyed a weapon used by special interests to secure special legislative favors for themselves, favors which operated to the injury of the state at large, because they were privileges granted at the expense of other rights. It was the first step toward securing needed legislation and Wisconsin was the pioneer state to abolish the free pass.

The Primary Election Law.

The passage of a primary election law gave to every citizen a direct voice in naming candidates for office, as well as rewarding faithful servants, or punishing faithless officials. Contrary to predictions made before its passage, the anti-pass law is observed to the letter by the railways and by individuals. It adds to the revenue of the roads and to the independence of the citizen. Also contrary to predictions, the direct primary is more effective and popular than its most ardent supporters predicted. Where less than ten per cent of our people participated in nominations a decade ago, over ninety per cent of the vote at the general election two years ago was cast by the dominant party at the first primaries held two months before, and over thirty per cent of the minority party vote was cast at the same primary.

This means a return to popular government through the ballot, a ballot that is all-important to the agricultural interests that hold the balance of power:

Tax and Railway Commission Legislation.

The Tax Commission legislation enacted five years ago resulted in a more equitable adjustment between the property of the railways and the

property of individual citizens, adding over six hundred thousand dollars to the annual state income received from the railways and relieving agricultural interests proportionately.

The Railway Commission law passed in 1905 resulted in a governing body vastly superior to railway presidents living in Chicago or New York. Under reduced tariffs already declared by this commission, an estimated saving in freight rates last year occurred of nearly two million dollars, the largest share of which was retained by farmers and other producers of the state.

Under a two-cent passenger rate passed in 1907, thirty-three per cent has been saved to the average citizen who travels upon the railway and this result has been legally attained through increased travel and added revenues gained by railways from the reduction.

More right than money considerations, is the declaration of the principle that the state has an absolute right to control public service corporations, subject only to their right to reasonable earnings on actual values.

The anti-lobby law has removed the special agents who formerly hung like a cloud of ill-omened birds around the legislature. Members are now left to their own judgments, aided by committee hearings or other open arguments.

Other Remedial Legislation.

The law prohibiting political contributions from corporations and other practical legislation intended to secure a free expression of public opinion have also been placed upon the statute books, all of which indicates an improved atmosphere surrounding state legislation that must result in better laws for the protection of the general public.

The public utility law and the new insurance laws passed in 1907, were

rendered possible by reason of these new conditions. In like manner, the binding twine factory law was made possible through the removal of lobbyists, who in past years stifled bills in committees or secured their defeat by methods peculiarly their own.

The Binding Twine Factory.

At the last session one hundred and twenty-five thousand dollars was appropriated for a binding twine factory at the State's prison. An additional amount of working capital will be needed when the plant is put in operation. Such an industry will be of great benefit to the state, aside from the direct saving afforded the farmer.

During the biennial period of 1905 and 1906 the Minnesota prison twine factory manufactured 24,500,000 pounds of binding twine, all sold within the state and not sufficient in amount to supply the needs of Minnesota farmers.

Comparing the state selling price with that charged by the binding twine trust, the Minnesota reports estimate a saving to the farmers of the state on this twine, of \$74,973.45. A sufficient profit was charged by the state on its twine to reach the surprising sum of \$409,452.87, or a total profit over trust prices of \$1,144,426.

While the convicts were maintained at a loss of \$53.90 per capita ten years before, in 1906 the ledger showed a profit of \$279.88, or \$333.00 gain to the state over the figures of a decade ago for each of the six hundred and fifty convicts.

In a personal letter just received from Warden Wolfer of Minnesota, he says the profits direct to the state from the twine for 1907 is one hundred and sixty thousand dollars, and for 1908 will be approximately one hundred and twenty-five thousand dollars. This is irrespective of profits realized by the farmer, and he signifi-

cantly adds, "There is no doubt that the State plant has had a tendency to reduce (trust) prices to farmers as well as to such dealers as are allowed to handle it."

From this statement it appears that a binding twine factory economically administered, has resulted in an annual saving reaching in some years a half million dollars to the state, a sum larger than the annual appropriations made in this state for all agricultural purposes; from which it appears state legislation may have an important relation to the producers of the state and its importance can be appreciated from this single illustration of advantages possessed today by Minnesota over Wisconsin in its binding twine supply.

The income from the Wisconsin State prison for 1907 was \$76,497. The cost of maintenance was \$114,065, leaving a deficit of \$37,568, or an average deficit per capita for each of the six hundred and thirty convicts of \$59.63. Compared with the profit of \$279.00 per capita in Minnesota, this is an important item of expense. Plans for the new factory are being submitted and work will be advanced as fast as possible.

Proposed Beneficial Legislation.

Further new laws have been proposed and will suggest themselves that should operate for the mutual interests of the farmers and the state at large.

One of the greatest problems to the farmer is the question of competent help. An equally important question to the city is the care of the unemployed. Why not enlarge your free employment agencies, as personally suggested to me by Labor Commissioner Beck, so that you can have a bureau wherein the farmer can be placed in direct communication with the man needing employment? The bureau

could be maintained at a nominal expense and give valuable returns to both parties in interest.

Insurance.

I note I was expected to briefly speak to you on the subject of insurance. If opportunity offered, I would be glad to say something upon the subject of the state furnishing life insurance protection to its citizens at a nominal cost, but I will only refer briefly to one phase of the insurance laws passed by the last legislature.

Just as you pass laws regulating public service corporations or other artificial monopolies, laws governing the manufacture of poisonous food stuffs, laws punishing dishonest men or dishonest acts, or laws to reach incompetent or polite swindlers, so the state legislature passed laws at its last session to protect policy holders, as well as widows and orphans, from practices that were unjust and objectionable.

To hold out allurements of a profitable investment when the charge for investment is several times a reasonable amount, is securing money under false pretenses and as culpable in character as any other fraud. The large majority of insurance companies do business in a conservative way and can profitably continue business in Wisconsin, if they so desire, but other companies that charge excessive amounts for expenses, imposing upon the credulity of uninformed people, under new laws are now obliged to remain outside of the state.

From the Insurance Commissioner's last report, it appears that one company that wrote \$673,196.00 new business in 1906 in Wisconsin, used \$1,036,394.00 for carrying its total net insurance for that year. The actual expenses for carrying on the business that same year was \$1,312,469.56. In other words, the expense for the year

was twenty-five per cent greater than the net insurance.

For every dollar of net insurance carried in 1906, approximately one dollar and twenty-five cents was paid by this company for expenses. For every nine dollars collected to protect widows and orphans of Wisconsin policy-holders, five dollars was paid to agents or for other expenses, and four dollars set aside for insurance. And yet all the leading companies that have withdrawn from the state objected to laws reaching such impositions and refused to submit to any limitation of expenses.

Under the new laws, only twenty-five per cent of the gross premiums based on a twenty payment life policy, can be used for expenses. This law will prevent many companies from doing business under past extravagant methods, will give a stimulus to legitimate life insurance and can only be objectionable to those that refuse to accept reasonable restraint. Other important laws were passed for the protection of policy-holders and these laws, unless shown to be incorrect in principle, should not be repealed.

Over five hundred thousand life insurance policies are carried in the fraternal or old line companies by policy-holders of Wisconsin, for a total amount of over five hundred million dollars.

The importance of giving adequate life insurance protection to these people and to thousands of prospective policy-holders, cannot therefore be underestimated. Insurance withdrawals cannot injure the policy holders within the state, although it is to be regretted that several conservative companies have seen fit to carry out their threats made to the legislature. Insurance will be written in Wisconsin by other companies and any needed amendments required to make present laws just and effective will unques-

tionably be passed when the necessity for doing so is shown.

Insurance laws are for the protection of the farmer just as much as for the merchant or other business man. They were passed by a legislature that had no object to serve other than reasonable protection for Wisconsin policy holders.

These, in brief, are laws which represent new, progressive thought in Wisconsin; laws that in some form will eventually become the subject of National legislative enactment. The benefit to the individual and to the state through their passage has a further important result.

The Financial Status of the State.

Under present State laws, all the expenses of administration are paid without imposition of direct taxes against the individual citizen. All the charitable and penal institutions, costing annually nearly a million dollars, all the expenses of state departments, all special legislative appropriations, reaching hundreds of thousands of dollars, in fact, every state expense not educational in character, is paid from general state receipts.

We are building the finest capitol in the west, annually constructing new normal schools, and other public buildings, yet all this enormous expense is paid for from railway, insur-

ance and other taxes, licenses and fees, without any tax levy.

The only state taxes collected have been those for educational purposes and the greater portion of this is afterward redistributed throughout the state.

This fortunate condition in the financial management of state affairs is made possible by legislation and economical administration; it has been achieved by a progressive public sentiment.

If you would further improve conditions, see to it that those who compose the great agricultural interests of the state do not grow forgetful of public duties. He is the best citizen who does not neglect public affairs, who protects his neighbors' rights, and who is ever ready to perform his civic duties without urging.

The pursuit of agriculture makes independent, self-reliant men, so too, free, independent thought serves to make a stronger, better citizenship.

Supt. McKerrow—This has been a wonderfully good repast that we have enjoyed to-night, but the best cooks keep the best course for the last, and we have done that on this program, so will now listen, as our dessert, to a reading by Miss Keys.

Reading, "The Circus in Boyville," Miss Keys.

Adjourned till Thursday, March 19, 1908, at 9 A. M.

THIRD DAY.

The Convention met at 9 o'clock Thursday morning, March 19, 1908. Mr. F. H. Schribner in the chair. Prayer, Rev. McHale.

CLEAN COWS.

L. E. Scott, Stanley, Wis.

Out of the four hundred and forty-six exhibits of butter and cheese at the Wisconsin State Fair of 1907, four hundred and eleven scored above ninety; three hundred and sixty above ninety-two, while one hundred and eighty-two ranked from ninety-four to ninety-eight for butter and 99.25 for cheese. The scoring was thorough and close and the dairymen of our state, both farmer and manufacturer, should be congratulated upon this splendid showing, but there is still room for improvement. Those scores that fell below the average must be brought up to a higher place in the scale of excellence, until that expression, "Unclean flavor," shall be eliminated from the judge's vocabulary.

Improvement Must Come from the Farm.

Factorymen may not know it all, and may not always do as well as they know, but I believe we must look to the farm for the greater share of this improvement.

The farmer cares for the cow and has the first handling of her product and upon him rests a responsibility that he cannot transfer to another. Clean cows mean cleaner milk, and cleaner milk and cream and a better care of these products until they reach the factory, would mean an increase in value and quality of our butter and cheese that I would hardly dare to estimate.

The ideal place for the cow is the pasture, and many a herd has been photographed and painted in all their beauty, comfort and cleanliness upon a sunny slope, carpeted with luxuriant blue grass and white clover, and then driven up through a narrow lane, up to their middle in mire and mud. Then they are made to wade through something worse than mud to get into the stable door. Then they are milked and we are told that the milk has a "fishy" flavor, but if the flavor really comes from fish, it must be from dead ones, for certainly live fish could not exist under such conditions.

After milking, the gate to the lane is closed, so the cows will be handy in the morning, and they are turned out into a small yard, muddy, poached, and with no spot to camp for the night without lying in their own filth.

These conditions are not found upon every farm, but they are altogether too common. Lanes should be made wider, ravines should be bridged if flat and wet, a few hours with a road grader will throw up a pike which, when grassed over, will furnish a dry path for all time. Barns and yards should be constructed upon the driest land available and yards or corrals should be much larger than we usually find them. One hundred square rods is by no means too large for the cow yard upon the average sized farm.

In addition to this, a night pasture near the buildings is certainly very desirable.

The Use of Cement.

I am in favor of cement floors, if you will put plank on top of them where the animal stands and lies, but in the production of clean goods, I regard the good condition of lanes and yards of even more importance.

Nothing can be better than cement for walks, gutters and mangers, but it is too cold a proposition for the animal to lie upon. Being a conductor of heat, there is a constant conduction from the animal's body to the colder earth below.

I once took two basins of water at a temperature of ninety-eight degrees F. and covered top and sides with four thicknesses of cloth to prevent radiation except from the bottom. I put a dairy thermometer in each, placed one upon a plank in a stable and put the other by the side of it upon cement. In fifteen minutes there was a difference of six degrees and in an hour and a quarter the one on the cement was thirteen degrees colder than the one on the plank.

The cow lies upon plank and soon warms it to the temperature of her body, when it will remain so as long as she covers it. I know you will say cover the cement with straw. That will do if you can put enough under the cow and keep it under her, but even with a liberal supply, it is apt to become thin in places and just as liable to be right under her udder as anywhere.

An eastern authority says, "The trouble with cement is that it is damp and if you put down tarred paper before laying the floor, it will prevent the dampness from coming up through." The trouble with cement is that it is as cold as the winter earth below it and no amount of tarred paper below will make it any warmer.

Cement is clean and rat proof. Cover the platform with plank and you have an ideal condition.

A Good Cow Stall.

The fastening for a cow is certainly an important factor in keeping her comfortable, healthy and clean, and many devices have been invented. The swinging stanchion is one step in the process of evolution in advance of the rigid stanchion, but a good cow stall is just as much superior to the swinging stanchion as the swinging stanchion is ahead of the rigid stanchion.

There is no such thing as a perfect cow stall, but the one I am about to present to you, in my judgment, comes the nearest to perfection to any of which I have any knowledge.

The Wisconsin cow is, or should be, in the stable upon an average of twenty-two hours out of the twenty-four for six months of the year. She must then have freedom and comfort and to give her this and at the same time prevent her befouling herself, is indeed a problem. The cows in one of the cleanest and most comfortable herds I have seen this winter were tied loosely around the neck in stalls four feet wide, but the herdsman gave them much care and attention. In other hands, that same herd in those same stalls would have been filthy. What we want is a stall that will keep cows clean with no more attention than the average farmer has time to give them.

Beginning at the wall, I would have a walk four feet wide, sloping one and one-half inches toward the gutter, which should not be less than twenty inches wide and two or three inches lower than the walk. The platform should be six inches higher than the bottom of the gutter of cement and eight feet long to the feed alley. This, covered with two inch plank, would make the gutter eight inches deep from the top of the platform. Two by fours eight feet long are laid three feet, two inches from center to center, and plank four feet long are laid

between them, which forms the platform.

The manger, two feet, six inches by two feet, ten inches, is fitted in between the two by fours and is adjusted to the length of the cow by slipping forward or backward. When properly adjusted, the space between the platform and manger is filled with a plank two feet ten inches long, of the required width.

The manger is made of boards on bottom, sides and back, with plank on front twelve inches wide, which will bring the front of the manger ten inches above the platform. The back of the manger and sides should be about two feet, six inches high. By nailing strips inside, the bottom may be rounded out nicely with concrete one to five, finishing smoothly with a rich cement mortar one to two.

To make a neat job, and that the feed alley may be more easily cleaned, it should be boarded up about three feet on the side and a sloping shelf should cover the uneven spaces between it and the mangers. That no feed fall between the mangers, the spaces may be covered with a six inch board, screwed or nailed to the edges after they are adjusted.

In the front corners of the manger and forming a part of it, are two two by fours four and one-half feet high, inclining slightly toward the cow. Between these, and over the neck of the cow, is a round, smooth stick or gas pipe (I would prefer the wood) screwed in flanges which may be fastened to the two by fours. This should be adjusted at the top of the cow's neck and as it comes just in front of the withers, it prevents her from stepping ahead into the manger. This is preferable to the slatted head pieces in common use.

The stall proper is simply three eight-inch boards four feet long, nailed together in form of gate three feet

high, next the manger, and sloping back in the rear. This is hung sixteen inches above the platform, making it four feet, four inches high at the cow's shoulder. This is hung to a one and one-half inch gas pipe, or round wooden pole (a peeled sapling will answer) by bending round it a couple of pieces of flat iron and bolting to top and bottom of stall. If pole extends from floor to ceiling, this makes a very substantial hanger. If the pole inclines backward toward the gutter at the top and the top of stall shortened to correspond, the stall will be self-centering.

The cows are fastened by chains in the rear, with hook on the right side, and just slack enough to admit of a little flexibility, making it much easier for cows to get up and down.

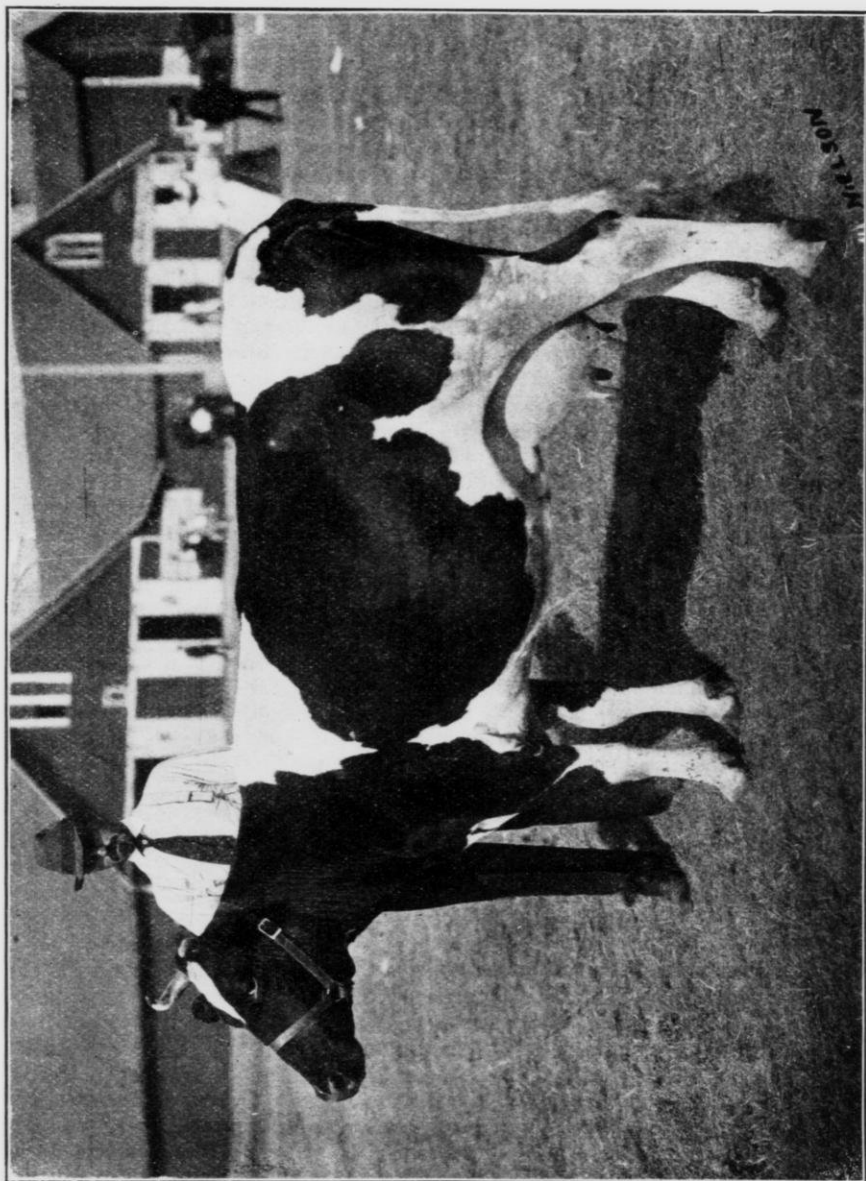
With a windlass over head running the entire length, a section of a dozen or more may be raised up out of the way in letting out the cows and lowered when they take their places. In case of low ceiling, the windlass may be boxed in the hay loft above, with ropes running through the floor from each stall, and turned with a crank from below. Or the stalls may be used without this extra machinery if one does not feel like installing it.

Mangers may be made continuous and solid without the adjustable feature, by making the platform narrower at one end and by putting the heifers and short cows at the narrow end, but when I put a heifer into a stall, I like that to be her home as long as she is in the stable. To do this, it is better to have the mangers adjustable.

The dimensions I have given are for medium sized cows and should be varied to suit the breed.

Stalls raised sixteen inches from platform and flexible as these are, may be placed as closely as stanchions.

If a heifer is put in between two



First Prize and Champion Holstein Cow, at Wisconsin State Fair, 1908.

larger cows, the chain behind her may be shortened and the stall be made narrower thereby. A cheap clevis with which to fasten the chain to the rear of the stall is a one and three-fourths harness dee. A hame staple riveted to the edge of the top board of the stall, makes a convenient loop to snap the rope into if the stall is to be raised.

In case a milking machine is used, one stall may be raised at a time, independent of the others. The stall I am using is different from this in some respects, but is similar in the essential features and in ten years' use I have never had a cow injured, and a stiff brush hung by a hook in a screw-eye in the edge of the stool and used at milking time to brush off the under parts of the cow and her udder is about all that is necessary to keep the cow clean, although we do occasionally curry the flanks and sides of our cows, and for this purpose there is nothing better than a sharp steel curry comb.

DISCUSSION.

A Member—Is there any danger of the cattle raising this gate arrangement?

Mr. Scott—Oh, no, they never raise it, and it would drop right back into place if they did.

A Member—How high would your basement need to be so you would not be obliged to carry the windlass to the upper room?

Mr. Scott—I think eight feet will answer, but that windlass can be made very cheaply and that can be boxed in, a small, long box just above the floor, with a large wheel with the rope attached running down to the crank below, and a whole section can be raised in that way. A one and one-half or two-inch gas pipe with split pulley makes a very neat windlass for raising the stalls.

Chairman Scribner—Will not this cement flick off if the cow puts her foot in there?

Mr. Scott—I think not; it never has with us. You see that concrete is made solid clear to the bottom of the manger.

A Member—It lengthens the manger somewhat for a short cow, doesn't it?

Mr. Scott—You can shove this manger ahead, making the platform sixteen inches longer. Of course you would shove it back for short cows. It brings the manger and the feed in the manger just as close to the cow in either case.

A Member—Aren't those mangers very heavy?

Mr. Scott—Yes, they are very heavy, but you can adjust them with a crowbar. Of course you only have to adjust them once a year, or as a new cow comes in.

A Member—What is the object of having that board in front of the manger?

Mr. Scott—It makes a much neater feed alley and more easily cleaned than where mangers are zig-zag as other adjustable mangers are.

A Member—What is the cost of that manger?

Mr. Scott—I cannot tell you. We do our work ourselves and we do not count the cost.

Prof. Carlyle—Don't you find that space between the manger and the front board fills up with feed?

Mr. Scott—No, sir.

Chairman Scribner—Ours does. We find it very convenient to be able to leave this manger up and clean up under it.

Mr. Scott—It is impossible for feed to get under this manger, and if construction is reasonably close, but little if any back of it. The boards on side of feed alley may be hinged and the dust and cobwebs, which are

bound to collect, swept out occasionally.

A Member—Do you use this manger for water also?

Mr. Scott—No, sir. You could use this for water by having a basin between the mangers.

A Member—Is this a patented device?

Mr. Scott—No, sir.

A Member—Do you leave your cows loose in that stable?

Mr. Scott—Yes, they are not tied at all. It is virtually a box stall. It is sufficiently narrow not to allow them to turn around and yet to give them all possible comfort. This plank is only ten inches above the platform and a cow will lie down and rest her head over the manger or frequently she turns it to her side, lying very comfortably, and the beauty of it is the cow will be kept clean. There is plenty of room to get in there to milk; simply unhook this chain and you have just as much room as if you had stanchions and you haven't a cow behind you.

A Member—There isn't much chance for kicking.

Mr. Scott—No, there is no chance for getting kicked in the rear. I would rather be kicked twice in front than once in the rear.

A Member—Could that cow back out while you were milking her?

Mr. Scott—Yes, but she seldom does. Never unless she has sore teats, or something like that. In breaking in a heifer, we generally put a little feed in the manger and we have no difficulty at all.

Mr. Imrie—Couldn't you have a short chain with three or four links and hook the chain as you went in?

Mr. Scott—You could have, but I never have found it necessary.

Mr. Martin—What would be the cost of that at the present price of lumber?

Mr. Scott—I cannot tell you. Of

course conditions vary; if you do your own work on it it wouldn't be expensive.

Chairman Scribner—It costs something to make any kind of a stanchion, and it only costs a little bit more to make something that is adjustable, which is necessary in order to keep cows clean.

Mr. Goodrich—This adjustable feature is of a great deal of importance, but I do not want to say anything about this stall, because I am the manufacturer of a patented cow stall which has the adjustable feature, and a good many other features, and I do despise this advertising one's business in a Farmers' Institute.

Mr. Wylie—What do you get up for then?

Mr. Goodrich—That is the reason why I have sat here all this while and let the Chairman look at me, and wink at me, and make faces at me.

Chairman Scribner—He is pretty long headed, I tell you; he knows how to get results in a roundabout way, you see.

Mr. Aderhold—His way of keeping cows clean is a very important one, and one thing has not been touched upon yet, and that is that it is unlawful to sell milk that is drawn from an unhealthy cow; it is unlawful to manufacture that milk into any article of food for sale, and the penalty for the violation of that law is a fine of twenty-five to one hundred dollars for each offense, and if milk is sold from filthy cows, every sale or delivery constitutes a separate offense.

Supt. McKerrow—Now, gentlemen, you see it will be cheaper to build this sanitary stall, or even to buy Goodrich's patented stall, than to run against the Dairy and Food Commission and be fined.

Mr. Martin—I would like to correct Mr. McKerrow on that. The Dairy and Food Commission is lame, the

law is lame, they do not inspect stables. They need more inspection than simply to inspect milk after it goes out of the stable. This is a thing that our Dairy and Food Commission are handicapped in; they ought to have the power to inspect the barns.

Supt. McKerrow—They haven't got around to that yet, but they will be there in a few weeks.

Mr. Carswell—That is work the Dairy and Food Commission is doing. They are now inspecting city barns and making an effort to inspect all barns of producers who furnish milk to cities. There are two hundred and

seventy thousand farmers in this state and it is a pretty big job for any Dairy and Food Commission to undertake to visit all those farmers, but they are attempting to visit all the farmers that are delivering milk in cities, and I wish to say right here that in our inspectors' work we have found out that where they have these stalls the cows are much cleaner, in a far better condition, than where they are keeping them in the old-fashioned, stiff stanchions, or if not doing that, tied with chains, keeping them in loose stalls.

THE CITY MILK SUPPLY.

E. L. Aderhold, Neenah, Wis.

The trend of the times is to regulate traffic in food products with reference to purity and wholesomeness. Many foods are used only after being cooked, whereas milk is used largely uncooked and it forms an important part in the daily diet of infants. Impurities, aside from being offensive in foods, may create poison in milk, and as infants and young children cannot stand such poison in their systems, it appears as though the necessity of purity in our city milk supply needs no argument.

An Eastern authority says: "The Lord's will be done," has been piously repeated over a deceased infant in scores of bereaved households when the draining of a stagnant pool, the removal of filth about the dairy, or the application of a low temperature to milk would have allowed the child to grow to maturity."

Dr. Whalen, ex-Health Commissioner of the City of Chicago, in a circular of information on the city milk supply of said city, says: "Every one knows

how milk looks and how it tastes and that it comes from cows or other domesticated animals, and yet very few really know what milk is or how it is made by animals or how dangerous it can be when it gets dirty.

"In spite of the value of milk as an article of diet, many persons on account of their knowledge of the careless way that most milk is produced use as little of it as possible.

"Milk differs from most foods in that its quality cannot be judged by its appearance. The detection of adulteration and contamination is quite impossible in the kitchen. Milk containing bacteria dangerous from their number and variety does not differ in appearance from the pure article."

During the past two years I have spent considerable time inspecting city milks and the dairies supplying the same, and among the rather common criticism I have had to report with reference to stable conditions are: Dark, foul smelling stables; rotten, saturated plank floors; floors that leak

and hide a mass of filth underneath; and filthy cows.

With reference to milk dealers' premises: Musty floors; musty odor; room swarming with flies; employees or operator making a practice of spitting tobacco juice on floors; cigar stubs lying around and premises untidy generally. I have also found premises into which sewer gas came through defective drains.

In those cities where there has been little or no inspection, one can find unclean cans on fully sixty per cent of the milk wagons, due in part to carelessness in washing, but often to the use of unsuitable cans. I found strainers that did not strain; cooling tanks that were foul, etc. I have seen milk sold in bottles that had blotches of milk solids fastened on the glass. I have seen milk cans from which milk was being sold that were so filthy that when they were emptied and covered for a few minutes they would stink. I have seen churns and other utensils in milk dealers' premises from which one could scrape off putrid stuff by the ounce.

I have seen milk venders feed their cows on moldy or rotten feeds. I found one vender whose cows were obliged to drink leechings from a filthy barn yard; another vender used horse manure from a livery barn exclusively as bedding for his cows. I have seen milk venders collect unclean bottles from some customers, refill them with milk on the delivery wagon and deliver the said bottles of milk to other customers. I know one farmer who offered a can full of cream and maggots to a milk dealer and he made a great "holler" because the dealer refused to accept it. I know of epidemics of typhoid and scarlet fever that were caused by the distribution of milk from farms where those diseases were prevalent.

In a Wisconsin city, two months ago,

within two hours after their milk man had left the usual supply of milk and cream at their house, the husband wife and two children were under the care of a physician. It was a clear case of ptomaine poisoning caused by the milk or cream.

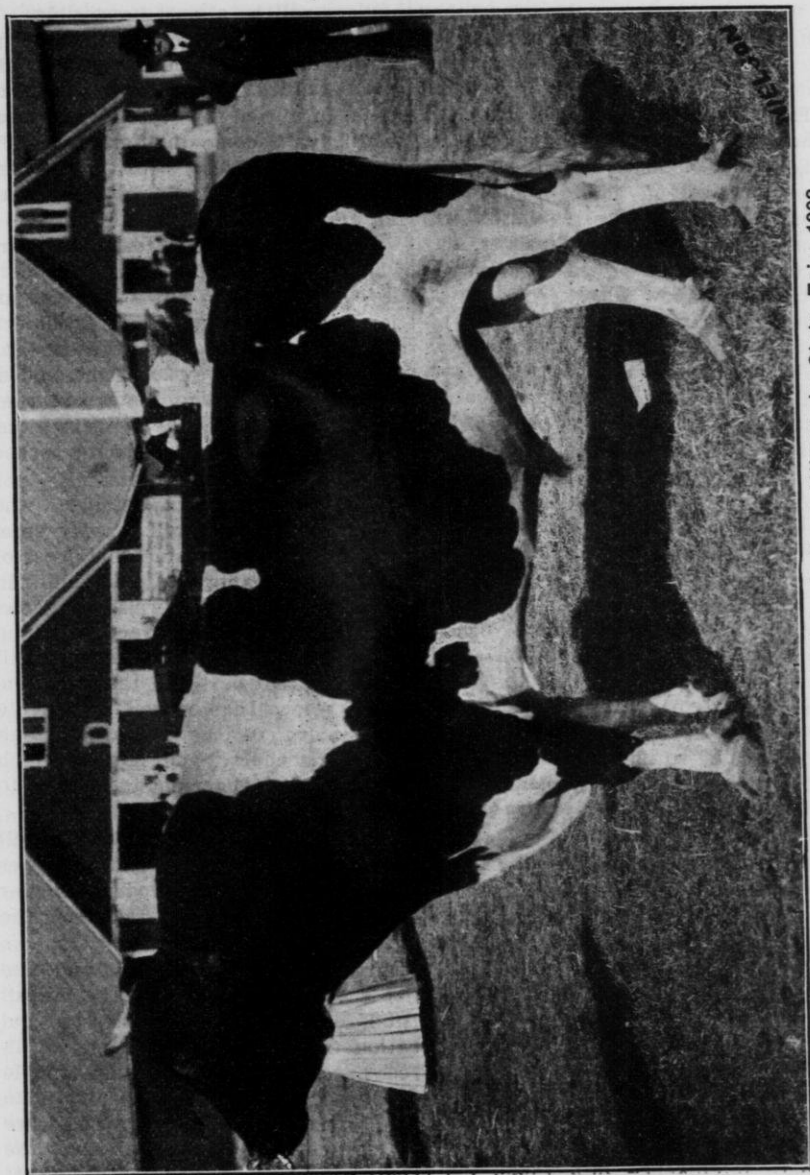
A month ago thirty-six tuberculous cows were found on two farms that were supplying milk to the City of Oshkosh. The tuberculous cows that supply milk to most of our cities have not yet been weeded out.

In order to cover up the effects of carelessness, many of our biggest dealers resort to pasteurization, using all milks that will "stand up" through said process. That raises the question as to whether the bacteria shall be consumed alive or dead, and whether the human stomach shall constitute an aquarium or a cemetery. I inquired of one dealer what he meant by "stand up." He answered: "Any milk that is not too sour, no matter if it is dirty."

Quoting again from Dr. Whalen. "When milk is once spoiled, it can by no known process be made good milk. Pasteurization is merely a method for its preservation and its necessity proves a contamination which might have been avoided. Pasteurization is not an ideal method of dealing with the present day milk and is resorted to as a necessary evil, and nothing more.

"The ideal pure milk supply would be to have milk uncooked, free from disease germs and dirt, and undrugged with chemical preservatives. These conditions involve clean, healthy cows, grass fed in summer and properly fed in winter; sanitary buildings; clean milking; prompt and thorough cooling and distribution in sealed bottles or cans."

We have state laws which forbid the abuses above mentioned, but the force of inspectors is too small to properly



First Prize and Champion Holstein Bull, at Wisconsin State Fair, 1908.

cover the ground, aside from their other duties, and if they could cover it they could not secure safe protection to the consumers without assistance from the municipality.

The public may assume that if a penalty is provided for the sale of milk which ought not to be sold and inspectors are on hand to prosecute offenders, that proper regulation will result. Such conclusion, however, may be erroneous and I will cite several instances to show why.

One vender whose utensils were repeatedly found to be unclean, was finally prosecuted, after which, on several inspections, blotches of putrid matter were found on the inside of his cans, yet he persistently declared the cans were properly washed and were clean.

Another vender after the third warning was prosecuted. Two weeks later liberal patches of a putrid coating were found in his cans. This man washed the cans personally, yet he was ignorant of their condition, until we called his attention thereto.

In these cases enforcement of the law brought no regulation.

Milk can be so impure as to be dangerous to use, yet no evidence may be obtainable that would justify prosecution.

The untidy person may make some changes merely with a view of escaping prosecution, which simply means that he will be as dirty as he dares be, therefore, in my opinion, his milk would not be safe to use as a food product.

In the production and vending of pure milk, intelligence and tidiness are a necessity. Some people do not possess these requisites. We cannot legislate intelligence into them, neither can the inspector scare ignorance out of them, and so long as such people have a hand in supplying cities

with milk, adequate protection to consumers will be almost impossible.

It must not be supposed that the ignorant furnish all the low grade milk used in cities. Far from it. Some of it is furnished by intelligent men, who have become indifferent or perhaps even reckless, because the consuming public is indifferent and does not appreciate cleanliness in milk.

As a matter of fact, some producers who deliver milk direct to consumers have attempted to put a superior article on the market. This entailed a slight increase in expenditure and, as a compensation, they asked the modest advance of one cent per quart over the ruling (usually the lowest) price, and in nearly all cases were turned down by the consumers.

I have interviewed retailers who were buying their milk supply from farmers, and have found that most of these were buying and using milk in their business which was unsatisfactory, but they cannot get anything better for the price the market will allow them to pay, and the situation, in this respect, has become more acute on account of the prevailing high prices for cheese and butter, which furnishes an inducement to farmers to sell their milk at factories.

Dr. Whalen says: "The public will not pay a fraction of a cent more per quart for that milk produced under sanitary conditions than that from the foulest surroundings.

"If the public is indifferent and cannot be educated, what will be the attitude of the producer toward an education from which he can see no direct benefit, but only increased trouble and expense? Can we expect him to employ extra help in order to secure perfect cleanliness; to improve the ventilation and drainage of his barn; to remove the manure daily to a place apart from the barn; to sterilize the pails; to use ice for rapid cooling;

and to take other precautions merely to send a clean milk to the market for which neither the middleman nor the consumer will pay a cent more per can than his slovenly neighbor receives?

"The question can be simplified by the elimination of the public, which does not care and must be saved in spite of itself. We therefore have to deal with the producer beyond the city and the retailer or vender within. Licensing of dealers has done much good.

"Revoking licenses on the ground of unsanitary conditions is a wholesome practice which educates by example."

Here we have the key to the situation. Here is where the municipality should take a hand by licensing every person who sells milk within its borders. The license fee should be very small, or may, perhaps, be omitted, but a penalty should be provided for selling without such license.

People will differ as to the regulations a city should prescribe. My opinion is that the ordinance should require of cows, stables, milk premises, utensils and dairy products, all that our state dairy laws require; also that stables be whitewashed at stated intervals; that cows be kept clean; that cows be tuberculin tested; that milk utensils be sterilized daily; that milk shall be promptly cooled when drawn from the cows, and shall not be delivered to city dealers nor offered for sale within the city above a given temperature (fifty or fifty-five degrees). The ordinance should also cover such cases where milk producers or dealers are blameable for the spread of contagious diseases through the milk supply. People selling milk from but one, or several cows, should be governed by the city regulations in all respects, excepting, perhaps, that of milk temperature.

All producers and dealers should be supplied with copies of the state laws and of the city ordinance bearing on this question and should be given a reasonable length of time to prepare for a compliance with said regulations.

After the ordinance is in effect, an offender should be given notice as to the nature of his shortcomings, and if he offends after a second notice his license should be promptly revoked.

The producer outside the city can be controlled through the dealer within, in this way: If the producer's stable, cows or milk fall short of the requirements, the retailer is forbidden to use his milk under pain of having his license revoked.

The local commissioner of health should have charge of the enforcement of the ordinance and much depends on his fidelity to this trust. He may make inspections in person, or he may be given the services, as he needs them, of a man who is competent. The inspector should be young enough to have good eye-sight.

The City of Marinette has used some method of control and its milk supply is far superior, in point of purity, to the average.

The enforcement of these measures at Marinette involved no hardships or undue expenditures to milk producers, the necessary improvements consisting only of such things which every cow owner should have and would be benefited by, whether his milk goes to the city or elsewhere, and, incidentally, it furnished the conscientious producer the protection he deserved against competition from his slovenly, reckless neighbor. However, I deem it but fair to state that by comparing the present cost of milk production with the retail price, and by considering the high value of milk for cheese and butter purposes, we need not expect material improvement in the purity of our city milk supply without

some advance in price, which the public should cheerfully pay, because clean milk will be inexpensive food at that.

What the public ought to know:

That milk is not clean milk unless some pains have been taken to prevent it from getting dirty.

That dirty milk may be the direct cause of disease and death.

That there is a direct relation between the cleanliness of the cow and the cleanliness of the milk.

That there is a direct relation between the odor of the stable and the purity of the milk.

That disease germs multiply rapidly in milk, and that infected milk may spread contagious diseases.

That milk once impure, cannot be made pure.

That pasteurization tends to preserve rather than purify milk.

That in practically all dairy sections, tuberculosis exists in some herds.

That this disease may be transmitted from the cow to the human being.

That a milk producer, from the standpoint of economy, cannot afford to keep tuberculous cattle.

That a milk producer should be prepared to furnish his customers with proof that his herd is free from this disease.

That some milk cans, from their style of construction, are almost impossible to clean, therefore unfit to use.

That some people are so untidy, or ignorant, that they ought not to be permitted to produce or handle milk intended for direct consumption.

That in the absence of properly enforced measures, there will be more or less milk marketed that is a menace to health.

That prosecution is expensive, uncertain of desired results and if relied upon entirely, is bound to fail

in securing sufficient protection to the public.

That furnishing the public with milk which is clean, uncontaminated and properly cooled, involves no hardships on the producer or the dealer.

That those who furnish such milk should by a system of licensing be protected from competition by dirty or reckless people.

That dirty milk is dear at any price.

That clean milk, even at an advanced price, will be inexpensive in comparison with other foods.

That the dairyman who has a sanitary barn, properly ventilated and free from objectionable odors, and who keeps his cows clean, is a public benefactor and deserves ten times the appreciation accorded him by the consumer.

DISCUSSION.

Supt. McKerrow—Do you know of any city that has adopted the license system?

Mr. Aderhold—Yes, Milwaukee has, and they revoke a license on the third offense. If offenders have been notified twice and are found violating the law after that, their license is revoked, and they hold the same club over the producer that sells milk or cream to the city. If he is notified twice that there is anything wrong with his product, the third time he is prevented from shipping milk or cream, or any dairy product, into the city.

Mayor Keys—I am sorry I couldn't hear part of this paper, but it touches on something that we have in contemplation in this city at the present time. Could you furnish me with a copy of that ordinance?

Mr. Aderhold—I do not think I could do that, but I have here something which gives nearly the same language. Milwaukee has a good ordinance, but they also prosecute under the state dairy laws.

Mayor Keys—I understand those ordinances are enforced by the Health Commissioners. I understood Waukesha has such an ordinance.

Mr. Aderhold—I think Waukesha has. I have been told that White-water passed one recently, and that it was a good one.

Mayor Keys—We contemplate passing an ordinance requiring all cows to be tested whose milk is sold in the city.

Mr. Kirkpatrick—What effect will milk from tuberculous cows have on cheese?

Mr. Aderhold—Well, I would not be so much afraid of it in cheese and butter. Cheese, especially, is not consumed fresh, but in the cities the milks that are sold are used by infants and children, and I think it is possible to convey the disease in that way.

Dr. Porter—Which is better for a bottle-fed baby, the milk of one cow or the milk of a dozen cows?

Mr. Aderhold—it would depend a good deal on what the milk of the one cow was. It might hit the baby just right. I am not prepared to discuss that, however.

Chairman Scribner—We would like to have the doctor answer his own question.

Dr. Porter—Isn't it true that the milk of a dozen cows is apt to be more uniform in fat content?

Mr. Aderhold—Yes, that is true.

Dr. Porter—Now, which is the better for the bottle-fed infant, pasteurized milk or clean milk kept cold until the time it is used?

Mr. Aderhold—My impression is that clean, pure milk, properly cooled, is better.

Chairman Scribner—Every time we pasteurize or heat milk, we hurt its digestibility.

Mr. Scott—I understand that there are many here interested in this subject of milk for city consumption, but

this Bulletin goes into the hands of a great many dealers throughout the state. I was engaged in the business of producing milk for city consumption for five years, and I furnished milk that was good enough for Aderhold, and the way we accomplished it was, in the first place, to keep our cows in a cleanly condition. They were kept in stalls similar to the one I have described and carefully brushed, the utensils were carefully cleaned and sterilized. We delivered our milk in bottles just as soon as possible after this milk was drawn from the cows. It was put into the bottles and then the bottles plunged at once into ice water, thoroughly chilling the milk. Under these conditions it was impossible for bacteria to enter. When we first commenced to operate we left the bottles unsealed over night, putting a cheese cloth over them to keep out any dust or fly specks, and to allow what have been termed animal heat and odors to escape, but upon experiment we found it to be necessary to seal them, and for some years we followed that practice of putting in the pulp caps at once and depending on the cooling entirely. The upshot of the whole thing is simply to keep the cows clean, to keep your utensils clean, and to milk in a cleanly manner, and then to thoroughly cool as quickly as possible after the milk is drawn from the cow.

Prof. Carlyle—The matter of milk supply and tuberculosis is a very important one, but recent investigations, have they not, Mr. Aderhold, indicate that tuberculosis may be transmitted just as readily through cheese and butter as through milk?

Mr. Aderhold—The way I understand it, the germ dies within a few days in butter.

Prof. Carlyle—After ninety days they have been able to give guinea

pigs tuberculosis through butter that was ninety days old.

Supt. McKerrow—That will be a proper subject for this afternoon, when we shall have a discussion on tuberculosis by our bacteriologist.

A Member—Doesn't milk sour quicker to put it in the bottles while it is warm than it will if you cool it down first?

Mr. Aderhold—It is a question how clean the bottles are and how quickly the milk is cooled; that is all.

Mr. Goodrich—I think that question can be answered just by a plain "No."

Prof. Carlyle—I notice Mr. Aderhold didn't say anything about ventilation. Don't you find a great deal of variation in that matter?

Mr. Aderhold—Yes, I do.

Dr. Porter—I believe it is understood now by physicians that manure is quite a frequent cause of conveying diseases; the bacilli that are in manure which fall into the milk are a very common cause of disease.

Mr. Aderhold—That is undoubtedly true, and that brings up again the question of inspecting dairies. Quite a number of farmers have been stopped from selling milk this winter because their cows were filthy, and they had to keep their milk off the market until they had the cows cleaned up, and if any of you could have seen the condition of those cows before and after that cleaning up, I know you would all agree that a little inspection is a mighty good thing.

Prof. Carlyle—Are your inspectors paying attention to the physical condition of the cows outside of cleanliness and tuberculosis?

Mr. Aderhold—Yes; our law forbids the sale of milk from diseased cows, and if we have reason to suppose that disease is present, it is our duty to look after that.

Prof. Carlyle—Only from diseased cows, not weak, emaciated cows, you

don't pay attention to them?

Chairman Scribner—That is a symptom of disease sometimes.

Mr. Aderhold—If they are really weakened from starvation, or something of that kind, I would consider that a diseased animal.

A Member—Mr. Scott, do you think an aerator a good thing?

Mr. Scott—No, except as it assists in cooling the milk. The question is merely that of a quick and thorough cooling. If aeration will assist in that cooling, then possibly it is a good thing, but if the milk can be quickly cooled without aerating, I would greatly prefer that. I know they say that if milk is aerated in a pure atmosphere it is benefited, but Dr. Babcock tried an experiment some years ago; he had milk a little off flavor, and to expose that milk as much as possible to the action of the atmosphere, hung a clean sheet in a clean room and spread that milk upon the sheet, and when it was passed around to over one hundred students, they couldn't tell which had been treated in that way and which had not, showing that the off flavor had not been eradicated. Now, what do we do by aeration? We introduce bacteria, don't we? No woman, if she wanted a can of fruit to keep, would unseal it and turn it from one can to another. She would keep it sealed after it is once sterilized. No man would go into a silo and stir up the silage. Now, milk, when it comes from the udder of the cow is perfectly sterile, and we want to keep it so; we should rather keep it from the atmosphere than to expose it. Thoroughly cool it and you will accomplish just what you want.

Prof. Carlyle—While I heartily agree with Mr. Scott with regard to milk which is furnished from the cow fed on good feed and on good water and all that, will he not admit that in some

barns where there are very strong odors, for instance, like a barn I visited recently where they have very sour ensilage, will it not help that milk to pass it over a cooler in a good outdoor atmosphere, away from

the barn, when the barn is strongly saturated?

Mr. Scott—That experiment of Dr. Babcock's did not eradicate the odor. It was the odor he was trying to eradicate, and he failed.

DAIRY COWS.

Mrs. Adda F. Howie, Elm Grove, Wis.

Those who are desirous of placing Wisconsin foremost in the Union have estimated the dairy interests at fifty-seven millions of dollars; fifty-five millions is the sum named by more cautious manipulators of figures, while more conservative authorities set the amount at fifty millions, including the value of the live stock. We also have been credited with taking first rank for production among the many notable states, but if one will give close attention to statistics, it will be promptly discerned that we are neck to neck in a race with New York for supremacy, for while one state has produced a larger quantity of cheese, the other stands foremost in the production of butter, and while disinterested authorities bicker as to rating and amount, we, practical dairymen, should not pat ourselves on the back and rest content with the laurels already won.

This is an age of rapid progression and in no calling during the past decade has there been made greater strides towards a steady and sure improvement than in every phase of dairy farming, from the introduction of pure bred cattle on humble farms, to the skillful manufacture of the scientifically produced product, so, if we would keep to the front, the sooner we get right down to business principles in our efforts to still further improve the dairy condition of our state, the better it will be for all concerned.

For, really, it does not matter whether our dairy interests at the present time amount to fifty millions or twice that sum, we all know that if this matter was to be given a little more conscientious thought and effort, the value could easily be increased to almost double the credited amount. But one of the greatest drawbacks to more certain progress is that too many dairymen are perfectly satisfied with the records already made and will puff up in a vainglorious conceit when they tell you that Wisconsin stands at the head; that our state is renowned for having produced some of the highest dairy records that have ever been made, and while we gladly admit the truth of this statement, we would urge every dairyman to put forth his best efforts in an earnest endeavor to raise the standing of the various herds.

Some Famous Wisconsin Cows.

It is a happy cause for congratulation that Wisconsin has produced some notable individuals, yet cows of this quality are like great men and women, rare indeed, and it is well to give them prominence as examples.

Some years ago, when the World's Fair was held in Chicago, a little fawn colored cow, with big, lustrous eyes, modestly took her place in the great international contest among all dairy breeds. Throughout the long, hot summer she toiled faithfully and patiently

from day to day, from month to month, until she had put her very life into the pail, when she startled the dairy world with her marvelous record. It was not only a story of wondrous pounds and ounces, but in immortalizing herself she had brought honor to the Jersey breed, renown to her country and state and fame to her proud owner, for the name of "Brown Bessie" is loved and revered far beyond the boundaries of her native land.

A few years later another World's Exposition invited competitors from every section of the globe and again a little Wisconsin cow of the same breed unhesitatingly took her place in the mighty struggle for dairy honors. At the end of this historic conflict Loretta D. stood the champion cow of the world.

The extraordinary achievements of these animals caused a great awakening in dairy circles throughout the country, and was a fruitful incentive for numerous advocates of other breeds to try the virtue of scientific care and feeding under more favorable conditions than those possible to employ while making public tests. The results were most encouraging and a Marathon county cow, belonging to the late Mr. Rietbrock's herd, set a new standard for production by making one thousand pounds of butter in a year, then the Guernsey cow, Yeksa Sunbeam, was the idol of the hour.

Still other dairymen, jealous for the reputation of the breed they cherished, girded on their armour of skill and patience and only a few months ago a Wisconsin Holstein, Colantha 4th's Johanna, astonished the world with her marvelous yield of more than 1,164 pounds of butter in one year.

Some More Good Cows.

These are some of the most notable cows of Wisconsin, but while we are speaking of phenomenal merit, let us

be just to every land and breed, for in Scotland, County Ayr, at Fairfield Mains, may be found a royally bred Ayrshire named Lilly. Her owner speaks softly and she comes at his call and stands in a dignified attitude by his side. Anyone who is in the slightest degree acquainted with dairy conformation will cheerfully proclaim an admiration for this magnificent specimen, but when the question of yield comes up for discussion, the shrewd Scotchman will smile complacently and say, "O, we dinna force Lilly for the last drop o' milk, we ship her stock to Denmark, Sweden, Australia and America. Yes," and he lays his hand caressingly on her sharp withers, "she's a grand, good beast."

Now, when I single out these cows that represent the different breeds, you will note that no one breed possesses all the good cows, and I quite as positively assure you that all the poor cows are not of the same kind. There are good and poor in every race of cattle, and, while it must be a source of gratification to own a cow that will yield an abnormal quantity, the average farmer will find a greater satisfaction in the long run by keeping an entire herd of excellent, reliable dairy workers, which can be readily selected from any breed that may appeal to the fancy of the owner. However, the only accurate method of knowing to a certainty the ability of each cow and in order to cull the herd in an intelligent manner, is a systematic use of the scales and Babcock test, and while we already have a number of herds in Wisconsin where cows are producing on an average of from four to five hundred pounds of butter per year, there is no good reason why every county in this grand dairy state may not lay claim to many quite as valuable herds, and with a careful study of animal husbandry and up-to-date dairy methods as an aid to practical experience, the modern road

to dairy success is made a path of pleasure and a walk of ease.

DISCUSSION.

A Member—How is it some cows leak their milk?

Mrs. Howie—Possibly the glands of the udder have become weakened and through some defect in the teat there will be a leakage occasionally.

Chairman Scribner—If the milk is not there, how can it leak?

Mrs. Howie—We will assume that the milk is there. In walking she may move her legs in such a way as to break the tiny milk cells in a full udder, or some little jar would act on them if they were weak; sometimes the action in walking will squeeze a full udder and let the milk down.

A Member—Can a cow hold up her milk, and if so, what is the cause?

Mrs. Howie—There are so many causes it is hardly worth while trying to explain it. You can frighten a cow, or abuse her, so she may become nervous and restless, and that would be one cause. The cow is as sensitive a creature as a human. You can tell if a person likes you, or if he does not. I can feel it just as I feel a draft of air. I don't see it, but I feel it, and it is just so with the cow. Some people and some cows are not quite so sensitive as others, but a good many cows, especially these cows that are highly bred, the ones that will do you the best work under favorable conditions, are most sensitive, and anything that will tend to frighten or annoy or disturb them will affect the flow of milk.

Chairman Scribner—You said you wanted your cows to eat a good deal of roughage.

Mrs. Howie—Yes, I do.

Chairman Scribner—Do you mean carrying them off with the milking stool?

Mrs. Howie—My cows don't get that

kind of roughage. I offer something more scientific.

Mr. Convey—How many times a day are the cows milked on your place?

Mrs. Howie—In developing our heifers, we always milk three times a day. Why? Because we know we have selected the ancestors of that heifer with a view of her giving a large flow of milk; we know that we have petted her and brushed her and encouraged her to give a large flow of milk; we know we have fed her for that purpose, and consequently, when the little heifer freshens we know that little udder may not be able to contain that milk. She may be secreting milk so fast as to unpleasantly distend the udder, so we milk her three times a day. In Scotland the dairy maids will tell you that the more you milk the more you may. Some of you may think it a strange thing for a woman to get up here and tell you about dairy cattle—you ought to go across the water. Whom do you find in the barns helping tend those cattle? Some sweet faced, low voiced woman, and that is why they have made such a success of dairying. We have been glad to send for and bring over their cattle to this country, but if we can only understand the best methods of handling them, we will soon have cattle that will compare with any in the world. My first lesson was from a Scotch dairy maid, my first understanding of the cow and all I know of cows. Yes, I used to look through the fence and see a cow, and I thought a womanly woman should never go in a cow barn; we might wash milk pans and make butter and that was the end of our obligation. Then this woman came and I had a little talk with her. In her sweet Scotch accent she told me they had better cattle in the old country, and I said to myself, "Why does she tell me that, what have we done here that we haven't as good cattle as they

have," and I asked her, "Why haven't we as good cattle as you have?" and the answer was, "Because we love our cattle." And then a great light came to me, for you all know that when you begin to love a thing, you begin to study it, and when you begin to study it you want to know more and more, and when you have studied about a lifetime and have added ninety years to that you don't know as much about it then as you wish you did and must keep on studying.

Mr. Elliott—Do you sing to your cows when you are milking them?

Mrs. Howie—Yes, I do, and I let the boys practice their soft speeches on the cows in just the same way they are going to say nice things to their best girls.

Mr. Elliott—I don't think that is a safe doctrine. I was imbued with the idea that a cow ought to give more milk when she is sung to, and I tried it and she went dry.

Supt. McKerrow—He probably sang a Scotch song to her.

Mrs. Howie—Well, the Scotch songs I have heard wouldn't dry up a dairy cow at all. Many people will say they don't like you to talk in the barn while they are milking; they don't want their milkers to talk. Why, if they talk nicely and smoothly, that doesn't affect the cows, although it may disturb the milkers, for instance if one boy asks another fellow, "Did you go home with that red-headed girl last night?" "No, I didn't." Very likely the other fellow will stop to laugh, and there you will have an uneven milking.

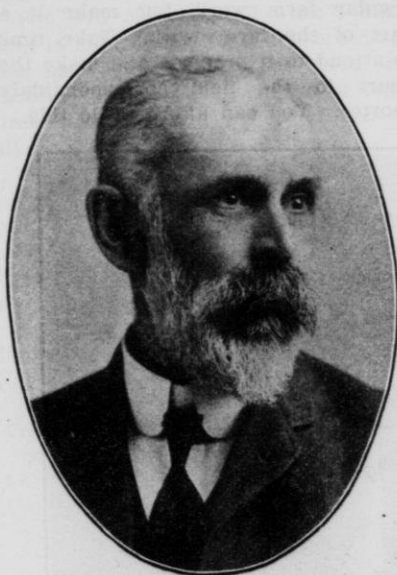
Mr. Martin—I just want to confirm a few things that Mrs. Howie has told us. I am very glad to hear her speak

of the things she has seen on the other side. Not only the cow, Mrs. Howie, did you see, but you saw mothers who had borne from one to ten and twelve children, with ruddy faces, such as our girls ought to have in this country. I have asked them how many children they had, and I couldn't believe it when they told me, and they would bring them in, proud to show that they are mothers. We have breeders who have spent a long time studying this particular question, how do we arrive at the best profit, but I wish we could get our wives and mothers to tell us many things in motherhood. We love our families, we love our wives and without we do have that inborn love for our animals, and work with them and live with them, we never will become successful breeders, and that is why we haven't the breeders in America that they have in those older countries. For generation after generation, families have lived upon the same farms, breeding and developing the same kind of animals, and I will be glad to see the day when our mothers and wives will get up and tell us, go a little further into these matters, and we will listen to them and learn why these things develop; it is what we want to know.

Mrs. Howie—If I could only get the women of America to take a little deeper interest in the young growing things on the farm, they would soon begin to love the farm, because there are so many things to appeal to the womanly nature. Why, you can love an animal, and you know that when it shows its affection for you, it is real, it is honest, and honest love is the most valuable thing in the world.

HERD IMPROVEMENT.

H. D. Griswold, West Salem, Wis.



Mr. Griswold.

Forty years ago in old Connecticut I used the sickle and the scythe and threshed grain with the flail. Now you smile at those things, and yet your cows are no better than those of that time. In all other farm lines there have been improvements, but cows in the large majority of herds are no improvement. There are herds where improved methods have been adopted and the result is wonderful; almost beyond conception. If we had a factory where machines could be turned out that we could feed hay and grain into and would turn them into milk and fertilizers for the farm and you could buy a machine that would use thirty dollars worth of feed and give you back twenty dollars, would you take it? If you could get one that took thirty dollars worth and gave

back thirty, would you take it? If you could get one that would take thirty dollars and give back fifty dollars, then you would begin to be interested, and if he had one that would take forty dollars worth and give back seventy-five dollars, you would begin to ask prices; and if he showed one that for forty dollars of feed would give you one hundred dollars, you would say, that is the one I want. The manufacturer spends years of study and thought and lots of money in perfecting his machine, but the farmer pays no attention to the perfecting of his dairy machine. Now, you farmers are the producers of the dairy cows. You can have the good machines or the poor ones. Which shall it be? Are you willing to take the time to study and produce the good cows? The process is simple, the returns large. If you could buy the machine, you would buy the best. When you buy any other machine, you buy the best, even if the price is higher. Get all the information you can and then with that use good, practical sense in applying it to your conditions.

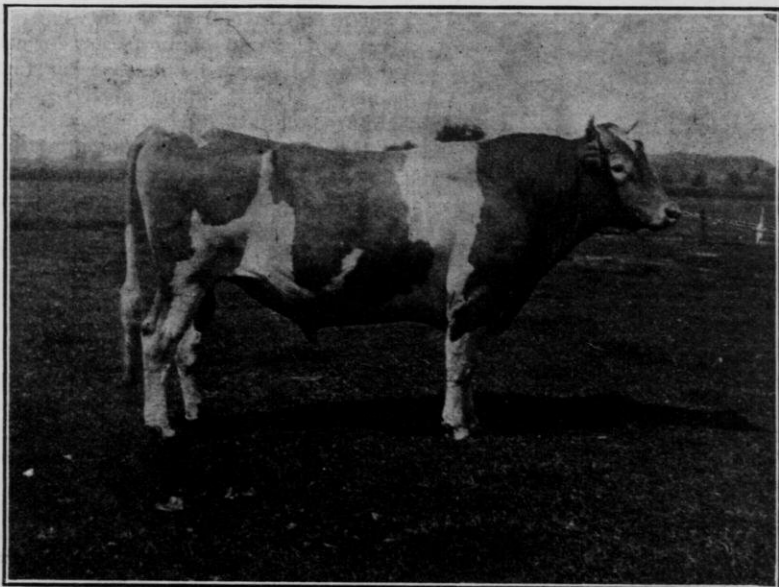
The Average Dairy Herd.

Let us take the average dairy herd as we find it in the State of Wisconsin. We find a mixed lot, no particular breeding, no particular care, no definite purpose. Here is a cow that shows Jersey blood, that has the dairy type and would be a No. 1 cow under favorable conditions. Here is one that shows the Shorthorn, large in bone and a fair looking cow; here is one heavy in the fore quarters and light in the hind quarters—steer built, no capacity, unprofitable and worthless. So we go through the herd.

How to Improve the Herd.

What shall we do? Let us get at it in a business way. Weigh and test the milk of each cow and remove those that do not pay a margin of profit. Study the breeds and decide on the line of breeding that best suits your fancy and your conditions. Then

stir your pride, and the boys are interested as they never could be in the old stock, and right here let me say, do not add the dairy work to the regular farm work, but make it a part of the farm work. Take time to attend to it properly and make the hours in the field correspondingly shorter. You can afford to do this.



Endymion, No. 8916 A. G. C. C. First Prize, Champion and Grand Champion Bull, 2nd National Dairy Show, 1907. At head of herd of H. D. Griswold for the last four years.

pick out a full blood sire that is large and strong, well developed, that has the dairy type and an ancestry behind him of cows that have done good work. Don't be afraid to put money in a good sire. The best investment I have ever made was the money invested in a full blood dairy sire.

Bring up the heifers carefully, with the end always in view of making them the best possible producers of dairy products. You begin to get some animals that suit your fancy and

Your heifers so developed ought to make one pound of butter fat per day while fresh, or three hundred pounds the first year and more as they get older. We have our good years and our bad years; years when things go smooth and years when things trouble us in the dairy business, as in all others, but in following the business for seventeen years, we have made a comparatively steady gain in dairy products and in cash receipts. They have furnished our living and the comforts

of home; have educated the children in school and college. The study of developing the farm animals has become a pleasure to us all.

You will observe that what I have said is not advocating fancy breeding, but just bringing up your herd by careful selection and the use of pure bred sires, which is in the reach of all.

Why should not the farmer keep account of his business as well as others; test the milk; test the cream, and, so far as possible, do his own business, produce a nice, clean business, and get the best price?

I do not want to burden you with figures, but will give a few as an outline of our work.

Averages for 1907.

Average receipts for cream per cow in 1907	\$120.00
Average value of calf at birth	15.00
Average value of skim milk per cow	12.00
<hr/>	
Total receipts per cow.....	\$147.00
Average cost of feed per cow..	44.00
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Average net profit per cow..\$103.00
Average number of cows twenty-one, which includes three two-year olds.

DISCUSSION.

A Member—What breed have you?

Mr. Griswold—Guernsey.

The Member—How many acres of land have you?

Mr. Griswold—I have sixty acres of land; that is all I have, but last summer I rented a small pasture, ten acres.

A Member—Do you raise your own grain?

Mr. Griswold—I have to buy some grain, but I raise all the coarse feed. I have two silos and the two together hold about two hundred tons.

Mr. Convey—About what percent-

age of your cows do you find culls; is the percentage decreasing or increasing, and to what per cent?

Mr. Griswold—We have been keeping full blood sires in one straight line for twenty years, and we have practically no cows at this time but what are good paying cows; I do not know that we have had any for the last five years that would not make three hundred pounds of butter a year.

Mr. Goodrich—Haven't you had to reject some heifers after you had tested them for a year or two years?

Mr. Griswold—We reject them, because we all the time keep the best, but we have practically no heifers now (unless there is something wrong) but what will make three hundred pounds of butter a year.

Mr. Convey—The reason I ask you that question is that people who start to engage in this line of improvement are very apt to expect that all of their cows, even from the common ancestry, all of the products will be something very desirable, and they will generally find that is not the case. Unless you follow a system that few people take up, that is, in introducing fresh blood, you will only breed about the equal of that animal as far as the individuality of the animal is concerned.

Mr. Griswold—We had to reject part of the heifers when we first commenced, but you will understand that every animal in the herd is a picked animal for production, and after breeding this number of years, we rarely rarely get one that is not a paying animal.

A Member—At what age do the heifers come in?

Mr. Griswold—At two years old.

A Member—What ensilage do you allow for each cow on pasture?

Mr. Griswold—We have our own pasture, about twelve or thirteen acres, and we rented a small pasture



Elizabeth, one-half Guernsey. In eleven years has given 103,065 lbs. milk; 5,363 lbs. butter. Owned and bred by H. D. Griswold, West Salem, Wis.

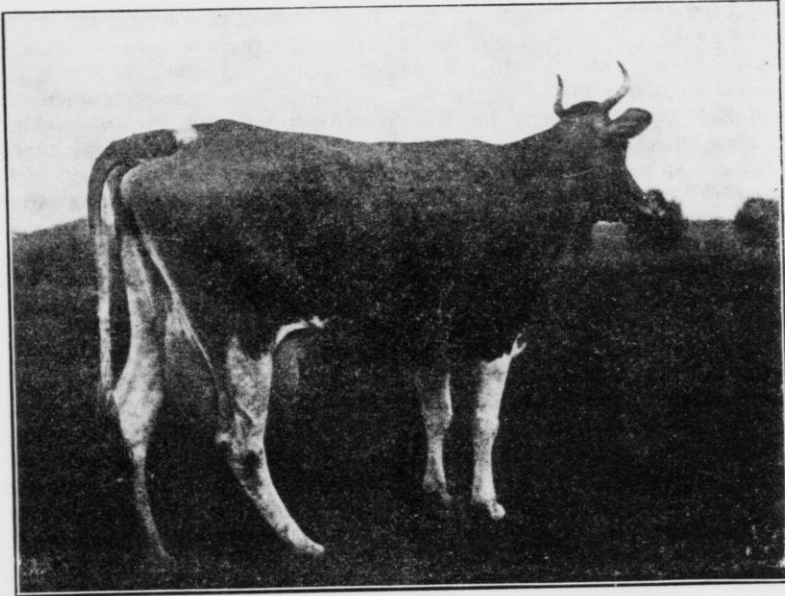
of ten acres, and then with that we feed ensilage all summer, in fact, we feed ensilage all the year around.

A Member—Do you feed grain also?

Mr. Griswold—No, sir, not in the summer; we feed other grains in the winter; we try to make a balanced ration with this ensilage, clover hay and corn fodder.

Mr. Griswold—Part of it goes to the creamery and part of it is sold to the City of La Crosse, and the latter brings me about three cents per pound for butter fat above the average at the creamery.

Supt. McKerrow—You say you have two silos. Do you consider silos a necessity on a farm?



Pet, seven-eighths Guernsey. In eleven months has given 10,523 lbs. of milk; 560 lbs. butter. Owned and bred by H. D. Griswold, West Salem, Wis.

A Member—Do you do winter or summer dairying?

Mr. Griswold—About two-thirds of our cows come in in the spring and about one-third in the fall. Those that come in in the fall, we try to have come in rather late in the fall, about the last of October or the first of November.

Mr. Imrie—I notice Mr. Griswold has a large money yield from each cow. Do you have a special trade for your cream?

Mr. Griswold—Before I had the silos, I had eighteen cows, and I got from those cows about eleven hundred dollars for my cream. After I had the silos and I graded up to twenty-four cows, I got twenty-two hundred dollars for my cream; doubled my income.

Chairman Scribner—That speaks one for the silo, or more than one I guess, and now we are going to make our Scotchman work a little. He will tell us what he thinks about homes.

HOMES.

Andrew Elliott, Galt, Ontario.

The question, What line of work will I follow during my toiling years, is one that insistently presents itself to the mind of the boy; no thoughtful young boy will be content to drift along, wasting the springtime of life, without giving careful thought as to what the harvest of life will be. In the selection of his life work, he will ask himself such questions as this: For what line of work am I, from education and temperament, best adapted? What line of work will afford the greatest possibility of laying aside something for old age, and also give the largest possibility of mental development and happiness; a development that will give breadth of mind, depth of thought, and bring me closer to Nature and Nature's God?

One boy will say, I am going to be something better than a farmer, and the old farm is again asked to educate and send forth another boy. It will take ten years of his life and from twenty-five thousand dollars up, to fit him to take his place among the ranks of the genteel, educated toilers, and when he is so fitted he has to go out and sell his labor in an over-crowded market, for, I submit, in America genteel labor has been overdone, we have been training our sons to be directors of labor, heads of departments, foremen in shops, office engineers, instead of to take their places at the desk, the bench, or on the footboard, with the result that men working in our quarries, on the streets, as carpenters, masons, or plumbers, are getting more money for their labor than are our teachers, preachers or book-keepers. It is difficult for labor of this kind to obtain a foot-hold on the ladder that leads to

success, the remuneration is inadequate and advancement is slow. Only in two ways can this advancement be attained—by the slow process of waiting for the death or dropping out of those above, or by stepping over the heads of others not as well qualified as we are, and when by slow degrees the coveted position is obtained, is the remuneration such as will enable the recipient thereof to lay past anything for a rainy day? Doubtful.

Recently, in conversation with a gentleman who is manager of a large manufacturing establishment, he made the following statement. As a boy I began to work in this factory and was rather well advanced in years before I thought it prudent to marry, since which time I have been in receipt of a fairly good salary. I have a good, careful wife, we have to live in a certain strata of society, clothe and educate our children, and, except keeping up a moderate life insurance, I have been able to save little. But, he continued, that is not the worst of it; I realize that the day is not far distant when I will be retired from the position I now occupy; there are young men in the office who have had a better training than I had, they are aggressive and ambitious, and when the time comes that I am superseded, God knows what I will find to do, there is little room in the rush of business for the man whose powers of life are beginning to wane.

And is not this correct? Let two men apply for a position, the one a young man, fresh from a business training, with all the push and confidence of youth, the other a man of fifty or fifty-five years, with a wealth of experience behind him that the

young man does not possess, but his shoulders are bowed and his eyes are growing dim, he is not so sure of himself, and the young man will get the position every time. There is no sentiment in business; the man past the meridian of life who has to depend for a living on others to hire him, will have a hard old age to put in; whereas the man who has a bit of land he can call his own has a sure source of revenue to support him during his declining years.

But, a young man will say, I do not want an education (popularly so called) and he elects to learn a trade. During the past forty years the manner of conducting business has entirely changed; small establishments have been crushed out by large concentrations of capital. The time was when a large part of what was used was made in the villages; the blacksmith and the carriage maker not only shod our horses and repaired our vehicles, but they made the horse shoes and wagons from the raw material; the small foundries made our farming implements; the wool was taken from the sheep and made into cloth in the local woolen factory, the tailor made it into clothing for the families. Then there was every possibility of a young man, after his trade was learned, becoming the owner and manager of his own factory. Now all that is changed; even trades are no longer learned; the apprentice is seldom to be seen; the utmost that the best mechanic can expect is to become foreman in the shop, or superintendent of the factory,—still an employee. The man is becoming more and more a part of the great manufacturing machine, one man controlling and directing the labor and the life of thousands. In manufactories men become specialists. A young man is placed at a bench and given a certain thing to do. By practice he

becomes expert at that one thing, and at it he continues day after day, year after year.

Some time ago in visiting a modest manufacturing establishment, in conversation with an artisan, I asked how long he had been working there. He replied, "Eighteen years." "At this bench?" I asked. "Yes, six feet of this bench is mine." "How long do you intend to remain here?" "Just as long as I can hold my job." Here we have the pity of it all, individuality and ambition crushed out, the daily return to the same old bench, the same dreary return of daily scenes and daily toil, to be turned adrift when no longer able to render the daily darg of labor, and seldom is it that the pay for services is sufficiently liberal to enable the recipient to provide anything for the future.

This question of the possibility of the worker outside the farm obtaining a competence was recently figured out and the following somewhat alarming conclusions arrived at, the data being taken from Dun and Bradstreet. Of one hundred people starting in business in all lines, ninety-five fail and drop out and only one in the hundred achieves what may be called success; one in one thousand earns more than a living wage; one in twenty thousand is independent when he breaks down or retires; one in twenty-five thousand achieves a position of importance and responsibility; one in fifty thousand becomes a member of the firm. How does this compare with the possibilities of success on the farm?

In recent years we often hear the question asked: Can the young man with nothing but his educated intelligence and the labor of his hands have a reasonable possibility of getting a farm of his own? I believe the possibilities in that line are as good as they ever were. True, it requires more means to make a start now than

heretofore. I have had men in their youth work for me for twelve dollars per month, who now, little past middle life, own their own farms and are comparatively wealthy, every cent of what they have the result of their hard labor. Let the young man of today save his money and by the time he is twenty-six or twenty-eight years of age he will have enough to buy a farm, make a payment thereon and start for himself, and with such a start, a good helpmeet and the blessing of God on his endeavors, before he is fifty years of age he will have a home of his own that will be a sure support for him during his declining years, and that in the meantime will have given him an ideal home for wife and family.

We often hear it said that work on the farm is drudgery. What a misconception; what a wonderful work is that of the farmer; how immensely above all other lines of life's work. In conjunction with the Almighty, he is a creator.

The artist can take a square of canvas and paints and produce a picture that will sell for a thousand guineas. That is Genius. Rockefeller can take a bit of paper, put some figures on it, sign his name to it and it is worth a thousand dollars. That is Capital. The United States can take a piece of paper, stamp it with the warrant of the nation and it passes current as one hundred dollars. That is Money. An artisan can take a pound of steel worth a few cents, convert it into screws or watch springs, and it is worth one thousand dollars. That is

Skill. A workman can, in a few hours, unload a car of coal, for which he secures two dollars. That is Labor. But the farmer—he can take of the light and of the darkness, of the cold and of the heat, of the sunshine and of the shadow, of the drouth and of the rain, combine them with the soil under his feet and produce food for a thousand men. This, this is Creation.

How close we who are on the soil live to the dispenser of all good; dependent upon the All-wise we are for all, yet how confidently we go about our farming operations. We are again approaching the time when the resurrection from the death of winter is approaching. For months the searing winds of winter have blown over the fields, leaving a pathway of apparent death in its wake; all winter long the trees have been tossing their naked arms toward heaven, as if in mute appeal against the pitiless tempest, and the uninitiated is tempted to exclaim, Can these live again? Wait. The omnipotent command goes forth, calling the dead to life; day by day we see the bud swell, the leaf unfold, and the blossom open its petals to the kiss of the sunshine; again the fields are clothed in a mantle of living green, and in due time again comes the harvest time with its benison of food to the eater and seed to the sower.

Again we ask, Is there any occupation that gives the same amount of pleasure and uplift during the toiling years, or a greater possibility of gaining a competence for old age as does the farm?

THE AMERICAN CARRIAGE HORSE.

Dean W. L. Carlyle, Ft. Collins, Colorado.

The subject on which I have been asked to speak this morning is one which I think interests most Americans. I have yet to find anybody who has had much experience in rural life, or even in city life, in this country who does not admire and love a good horse. There are a great many that

descript, the most heterogenous of any class in the world.

I have only to point out to you the types we had on the streets yesterday, ranging all the way from the light draft horse down to a six hundred and fifty-pound pony. They are the most mixed in their breeding of all

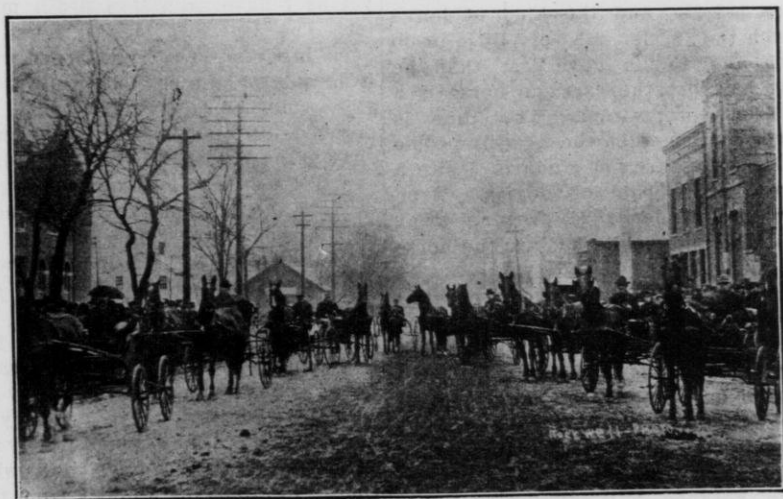


Exhibit of driving horses at the Round-up Farmers' Institute at Richland Center, Wis., 1908.

do not love Mrs. Howie's cow, for the reason that they have not become well acquainted with her, but nearly everyone likes a horse. Indeed, there is something wrong with the normal man if he does not like a horse, the most faithful servant that mankind has ever had.

In speaking to you this morning on "The American Carriage Horse," as he is today, I am speaking about a class of horses that in the past has been the most mixed up, the most non-

the stock that we have in this country, or any other country.

The demand for good carriage horses never was so great as it is today, and the prices paid for good carriage horses never were greater than they are today. The large dealers in New York, Chicago, Philadelphia, Boston, and other large cities of the country have experts out all over this middle west and out into the far west, scouring the country to find good carriage horses and they will all tell you

that really good ones are not to be found.

We have in this country today something over one hundred and ten thousand registered American trotters. This demand, however, is not for the speed horse; the automobile is going to take the place of that type of horse very largely and it is taking the place of it today. The automobile can go faster and stay with it longer than the trotting horse can.

Our trotting horse is developing into a racing machine, a gambling sport very largely, and the kind of horse which the farmer has very little to do with and should have less than he now has, but the carriage horse is a different proposition. The time is never coming when the wealthy people of the cities are not going to desire a nice driving pair of horses. Even now the tendency is growing away from the automobile back to the horse again.

Human nature is a very peculiar commodity; we do not like to have exactly the same kind of a thing that our neighbor has. Your wife won't go and buy exactly the same kind of a hat that Mrs. Smith has; she won't have it; the milliners have to get a different style of hat for every lady in town, because they will not have the same kind of a hat or a dress that any other lady has. That is one of the principal reasons why the automobile is not going to be entirely satisfactory to the wealthy people of the cities. Mrs. Jones, who comes from one of the most aristocratic families of good, long pedigree, buys an automobile for seven thousand dollars, and Mrs. Smith—Smith made his money in packing hogs—will buy one exactly like it, and when they go down the street, whizzing by, the people cannot tell which is Mrs. Jones and which is Mrs. Smith, and consequently Mrs. Jones will not have that kind of an

outfit; she has to have something possessing distinct individuality to distinguish her from Mrs. Smith. That is one of the reasons why we are going to have a demand for high class horses for some time to come.

The American Trotter.

In the types we have had to breed from, we have not had a great deal of encouragement. The most common type is the American trotter; we have more of them than anything else, and yet as I have said, they are a mixed lot. The American trotting horse has been bred for speed and speed only; it doesn't make a particle of difference what color he is, how big he is, how crooked his hind legs are, how many spavins he has, or anything else, if he can trot a mile in two minutes or pace in 1:58, he is going to be the horse that is used for breeding purposes.

That has been the principle always and we have made a wonderful success in breeding speed horses, but when you take horses bred in that way and go back four or five generations, you will find in the thirty-five animals constituting the ancestry in the five generations, about thirty-five different types of horses, and when you go to producing animals from that horse, you are just as likely to get one type as another out of these thirty-five, and we must have uniform types in ancestry for uniform reproduction in the offspring.

The Foreign Coach Horse.

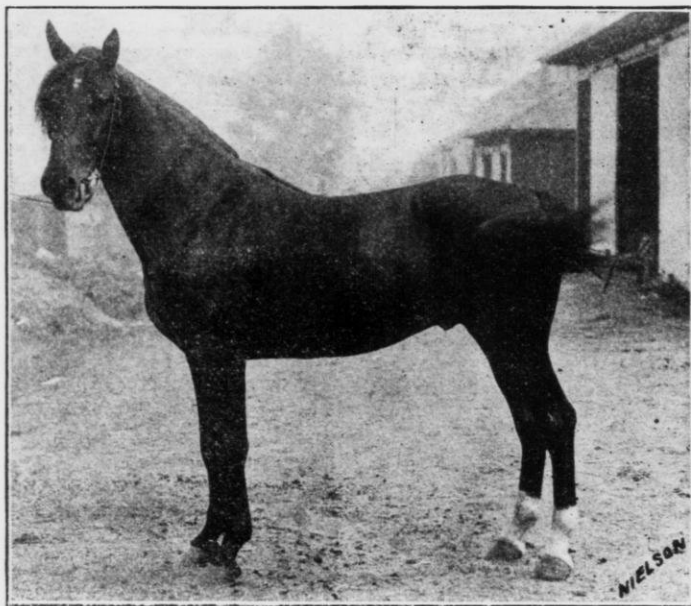
Now, leaving the trotting horse, we have the foreign coach horse, of which the importers introduce into this country and sell to our people something over a million dollars' worth annually; we have the German coach horse, including the Oldenburg, the French coach horse, and the English hackney. I spent several months on the other

side studying these three different types of horses, finding out if I could what their qualities were that would adapt them to our conditions and demands in this country.

I found that the German coach horse, as he is called in this country, is not recognized as a carriage horse in his native country; he is a farm

in Oldenberg horses that I saw in that country was driving on the road a pair of American trotters, and I found the same thing in Scotland; a breeder there was using an American trotter as his carriage horse.

The German coach horse is altogether too coarse for the American, he is too big; he has not the fineness



First Prize Roadster Stallion, Wisconsin State Fair, 1908.

horse. They use oxen for their heavy work entirely and they use these horses for their light farm work.

I saw in the village of Leer, North Germany, two hundred and seventy-eight German stallions that had been brought in from the plows to be sold to Americans and to the German government, and every one of them had collar marks, though they were but four years old. They do not drive them very much, they don't have very much driving to do, the largest dealer

of quality, he has not the style and, above all, he has not the action that we want. That is the criticism we have to make on the German coach horse as he comes to this country today. He is a strongly bred horse, and he will produce his kind with great regularity. They are bred for that in their native country, but as a carriage horse, do not pin your faith to a German coach horse, because any man who does so will make a failure of it, at least they always have in the

past. You do not find one good carriage horse out of five hundred in our best shows, or on our city streets, of German coach breeding.

The French coach horse is developed by the French people, not for coach purposes, nor is he known as a coach horse in France; he is a cavalry horse. The French government spends about three and a half million dollars annually in developing and encouraging their horse breeding interests, through races, through shows and through large breeding establishments which they keep in various parts of the country. They do this for the development and maintenance of their military department and not for the development of horses for coach purposes. Many of them are used for carriages, but that is not the first idea they have in view. The French coach horse has gradually developed a great deal of style, a good deal of finish, but lacks greatly in action, which we desire very much in this country.

The French coach horse breed as we find it today, is one of the foreign breeds which is most popular and most largely introduced into this country for breeding purposes, but it is the most mixed in breed of any, except our American trotter. The French government last year brought twenty-seven English Hackney stallions from England, they brought eight Arabian stallions from Arabia and Barbary, and they brought four American-bred trotters from this country, and I think fifteen Thoroughbreds from England. Those are the breeds from which the French coach horse is built, and he is known in that country as a "demi-sang", demi-sang Norfolk or Hackney, demi-sang Arab, demi-sang Anglaise or Thoroughbred, or demi-sang trotter, meaning half blood American trotter. Any one of these crosses can be bought in France, brought

over here and registered as pure bred French coach horses, and it is being done. Take any pedigree you wish of these French coachers and look them up and you will find that is the way they are bred. This system is followed to produce horses for cavalry or utility purposes, and not as a breeding proposition. They keep that one thing of utility for cavalry service in view all the time. I asked a gentleman, the master breeder of a breeding establishment over there, why they used Arabian blood, and he said, "We constantly, in this country, have to get more quality. Anywhere in the rich, grass growing country that we have, we will never be able to keep sufficient quality in our cavalry horses without constantly introducing Arabian and Thoroughbred blood." That would be the criticism of every horse I saw on the street yesterday except one or two, they lacked awfully in quality.

You are producing draft horses in this country, but it will be hard for you to produce the highest class of carriage horses unless you keep up the quality, just as the Frenchman does by introducing "warm" blood all the time.

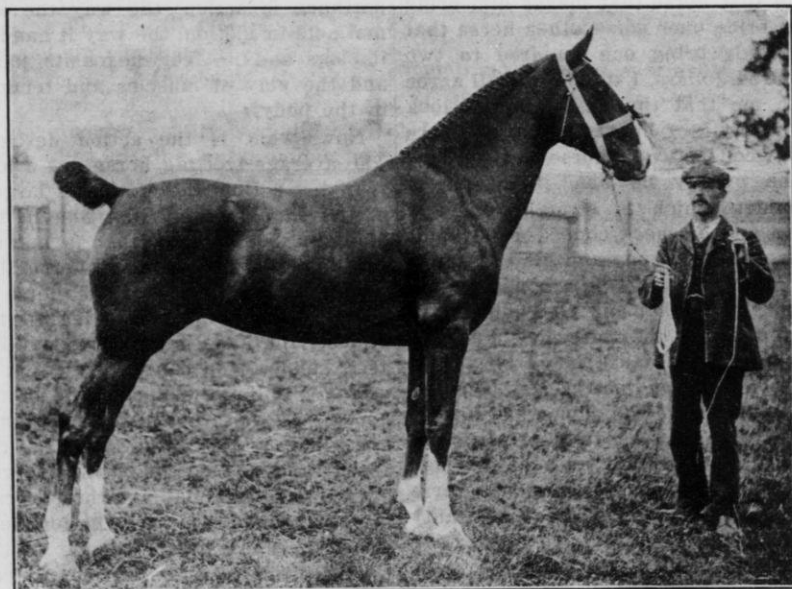
I do not need to say much about the French coach horse, as, with that ancestry back of him, he will never reproduce his kind with any degree of uniformity. We get some magnificent animals in French coach horse breeding, but where do you find any of them that will reproduce themselves when bred upon our native mares in this country? That is their great weakness. They have such a mixed ancestry back of them that they will not reproduce their kind.

The best class of horses which we import from foreign countries to build up an American type to suit the demands of our people is the English hackney. That horse comes nearer to

being the ideal type for Americans than any other, on account of his style, on account of his finish, and particularly on account of his superb action and nerve force.

One of the greatest objections to the hackney is the difficulty in getting them. There are a very small number of them, even in their own coun-

American people are a quick-actioned people, they have more spirit, they have more vim, and they have more energy than any other race of people in the world. They go faster and they want their horses to go faster. They must have speed in the animals they are going to drive, and the hackney horse will not suit them in that re-



First Prize Hackney Mare at the Royal Show, England, 1906.

try. The price of good ones is enormously high; you cannot get a first-class hackney in England for less than eight thousand dollars, and I saw ten thousand paid. I helped Mr. Fred Pabst of your state try to buy some good ones over there and I know something of the prices which they demand before they let their horses go out of that country.

The hackney horse has one objection for our American people that is not found with him in his native home. He has not speed enough. The

spect. The hackney horse picks his feet up very high, but he does not cover much ground; he goes along in a beautiful manner and he is usually a beautiful looking fellow, but he has not enough speed, nor has he endurance as a rule. But the great objection is that we cannot get enough of them to supply the demand.

Market Demands for the American Carriage Horse.

Now, I am down to the point where I want to say a few words and make

a few suggestions on what the qualities are that the market demands in a carriage horse in this country. If you will study the horses that wealthy people are paying one thousand dollars, two thousand, up to seven thousand, or even ten thousand dollars each for geldings and mares for driving in their carriages, study a number of them and try to analyze what there is in that horse that makes him bring that price over some other horse that will only bring one hundred to two hundred dollars, I think you will agree with me that the first thing to look for is style or beauty. I do not care how good action a horse has, or how much quality he has, if he has a shoulder which is straight up and down and his neck comes out straight in front of his body and his tail hangs straight down, his hip bones prominent, his ribs flat and no symmetry of conformation, they are not going to buy him. He must be a beautiful horse to look at, just as Mrs. Howie's cows must have the element of beauty or else she cannot love them. It is not for utility alone that we keep carriage horses or Jersey cows, and the horse is much more loved for his beauty than the cow, so that we must have style first of all.

Now, what contributes to style in a horse. It is the way he carries his head and tail more than anything else, the two ends of him. You get a horse with his shoulders thrown well back over his ribs and his neck rising out of the top of his shoulders, and you have the first element of style and the most important point contributing beauty to that horse.

A horse with his head set on top of his shoulders must have a long and curved or arched neck, or he would be looking up at the sky all the time. With that kind of shoulders also you will usually find a long, straight croup and the tail will rise from the croup

and come out with a graceful sweep; it cannot hang down straight, just as his neck must be arched in order to have him look straight ahead. Those are two fundamental elements, although of course there are other things that add to his beauty, and one is a full, well rounded body and well muscled quarters.

The next thing that is of most importance is action, the way the animal acts in motion, the way it handles its legs and its feet, flexes its joints and the play of muscles and tendons in the body.

Now, what is the action desired? The average trotting horse has a low, swinging action, the motion is largely in the shoulders in front and in the hip joint behind, and that is not desirable action in a carriage horse. Desirable action in a carriage horse is where every joint is moving to the utmost; the knee is pulled up as high as it can be, you can hardly get it in extreme, and the same is true of the hocks. There is not desired the long, swinging stride to be found in the speed horse, but the hock is well drawn up to the body and the feet carried well forward toward the fore legs before they are again brought to the ground. The body is carried perfectly level and steady and the motion is practically all in his legs. When you stand behind a horse with the true carriage action, his hind legs follow the front ones directly in a line and each leg is carried forward in a straight line. When you view him from the side, he should have what is known as balanced action, the hind legs and the fore legs being carried in unison.

A horse with a long back and slack loins is usually very poorly balanced in his action, his hind legs seem to be going one gait and his front ones another. They should be carried for-

ward in unison and the body propelled forward steadily and smoothly.

Now as to the next important point. I am not sure which of these two, action or quality, is the most important, but the third point we will consider is quality.

What is quality in live stock? Nearly every man has his own idea of what it is, but if you analyze quality, I think you will agree with me that it is the fineness of fiber which goes to make up the tissues of the body, the character of the body cells which unite together to form the fibers. If you have coarse quality, you will have coarse fibre making up the muscles, the tendons, the bones and the skin of the animal. Get an animal on the other hand of fine quality, and you have one with fine tissues, fine bones, fine fibres, making up that animal. The outward indication of fine quality may be determined in the lack of coarse connective tissue covering the bone, the muscles and the tendons underneath the skin. The skin on a horse possessed of quality will be soft and thin. The hair will be fine and silky, the tendons of the legs will be clearly defined and hard, the bones of the legs and head will be smooth to the touch and no coarse, loose tissue between the skin and the bones.

Then we must have a horse of good color. Nobody wants a black horse for a carriage horse. You say, a good horse is never a bad color. A black horse will never look as well as a horse of some other color, for the reason that the harness will never show off on a black animal, and the users of carriage horses want a nice looking outfit. Black horses are always put down below what their market value otherwise would be. Dark chestnuts are probably the most popular color; bays and browns are also popular colors. Grays are popular with the more sporty class, and

usually some white is desirable. I know some people object to too much white about the legs and face of a horse, but if you go into the large cities, you will find the best looking horses have white ankles or a star or snip in the face; not too much white, but a solid bay, a brown or chestnut horse, in motion does not attract you as one with some white points.

So much for our type of horse.

Something About Government Breeding Operations in Colorado.

Now I want to tell you something about how we are trying to develop them under government supervision. That work was started four years ago this winter in Colorado in an endeavor to establish from the American trotter a type and eventually a breed that would in a measure supply the demand for this class of horse. The reason we selected the trotter in preference to others was that we found more of them in the best shows than all the other breeds together, but they were usually so mixed in type that we only found one suitable for our purpose out of several hundred.

The idea was that the American people will not spend time enough to develop a breed; at least that has been our experience in the past. They prefer to import something ready-made, even though not as good as it should be.

There was an enormous demand for good carriage horses and a very limited supply, so we went to Congress, asking them to make an appropriation to start this work of building up American types, not only of horses, but of other classes of live stock. We have imported hundreds of thousands of dollars worth of stock of various kinds and we must keep on importing so long as we follow the ideals of the English, French and Germans and try

to develop their ideals of live stock under our widely different environment.

What we want is to develop a type that is adapted to our environment and suitable for our purposes, and we are never going to succeed in maintaining the type unless we do; we will have to submit to the thought that the Frenchman and the Englishman knows more about breeding live stock than we do, and we know they do not. That the work of breeding and developing live stock has been fostered by their governments is the reason that they now excel us, and we are simply following their ideals under our conditions.

We have selected the American trotting horse as the foundation stock upon which to build up this American carriage horse. Size has not been one of the primary considerations that has entered into this. The horse weighing nine hundred pounds will bring just as big a price for certain purposes as one weighing twelve hundred or thirteen hundred pounds; it depends altogether on the use he is going to be put to and the kind of carriage and harness that he is expected to be driven in. A small gig horse weighing nine hundred pounds to be driven in a road gig will bring as much money as a big horse to be driven in a brougham, or as a wheeler in a coach four, so that size is not important. But we must have these three other essential characteristics that have been mentioned, and we have found those quite largely developed in certain families of the trotters.

The government and the State of Colorado co-operate, each putting up one-half of the expense, and we are picking up these horses wherever we can find them with a good ancestry, possessed of good colors, and we are

getting as many of them as possible together and attempting to fix the type, and eventually a breed, and we are doing it along somewhat the same lines that the French government has adopted, with the exception that we are using but one breed as foundation stock. We will probably distribute our young breeding stallions in various parts of the country where suitable foundation stock of brood mares are available to build up this type and add to the numbers we now have and thus enlarge the scope of the work. Our complete work is not very fully developed; we have only had two crops of colts so far, but they are promising better than we anticipated from the stock we had to begin with a few years ago. We were limited to four hundred dollars apiece in purchasing our brood mares. Some day we will be able to pay more. The embargo is already lifted, and we are going to buy some of the best we can find this spring.

The young colts are coming on wonderfully well. I think one of the reasons why a much larger percentage of standard bred trotters are not good carriage horses may be found in the fact that ninety-five per cent at least of the breeders of trotters that I have visited follow the practice of starving their colts during the first and second winters of their lives, and you can never produce good horses if the foals do not get their growth in early life. You must keep the colt growing from the time he is foaled until he is three years of age. Any kind of a common bred horse will have a good deal of beauty if he is properly handled; he will have the fullness of form, the plumpness of body which is desired, and which is one of the essential things in breeding a good carriage horse.

Adjourned to 1:30 P. M.

AFTERNOON SESSION.

The Convention met at 1:30 in the afternoon of March 19. Mr. L. E. Scott in the chair.

Song, Miss Marjorie Mitchell.

CO-OPERATIVE DAIRY TESTS.

F. H. Scribner, Rosendale, Wis.

To secure a good, even grade of wheat or other grain for seed, a fanning mill is used, with a good screen to take out the small and shrunken kernels, and in some instances it pays well to hand-pick a small amount, as it increases not only the quantity but the quality as well, and while many farmers are so very careful along these lines, they are very negligent about screening out some of the unprofitable cows of the herd.

The final test of a beef steer is the block; he has to be killed to know actually what percentage of dressed meat his carcass contains. An expert buyer can estimate very closely along these lines, but who can estimate by the looks of a dairy cow what she can produce in a year, and yet that is what hundreds, yes, thousands of so-called dairymen are doing; they are guessing at it, or, what is even worse than that, are giving very little thought to the matter at all.

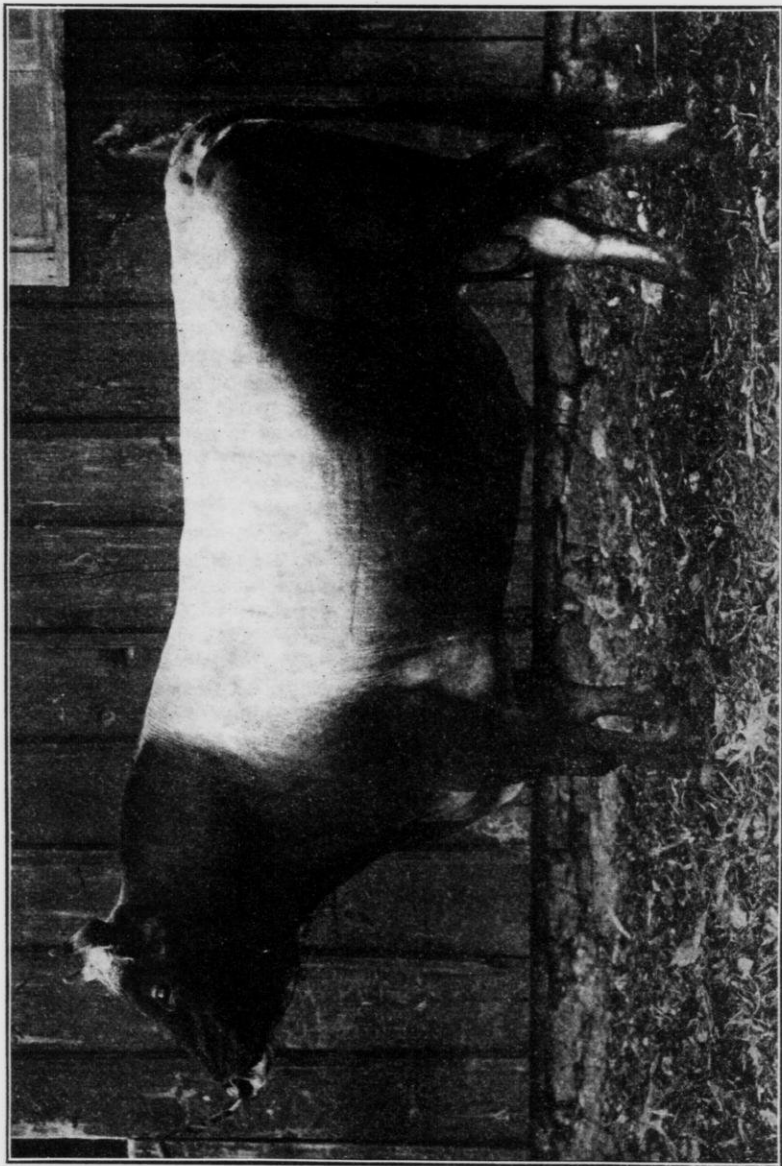
The Babcock test and milk sheet were splendid inventions, and yet so many do not take advantage of their use. It seems strange to me that dairymen have to be compelled by law to be good to themselves. Our laws read that every person shall keep his cows in a healthful and cleanly condition, the stables shall be well lighted and ventilated. These rules should have been sacred and vital to every dairyman without the compulsion of

law, realizing that not only the health of our animals was at stake, but the health of the dear ones in our families, and the health of those who use the product from our cows.

There is no law in force compelling us to test our cows to know how much butter fat they are making in a year, but I imagine that before long a law will be passed to the effect that no person shall have any moral or legal right to keep cows in such a way that no profit is derived from them, as it is not only the dairyman that is affected by it, but his family must suffer as well for his negligence. It costs something to live now-a-days, and costs something to get ready to live; the boys and girls are seriously handicapped now unless they have at least a good, practical education. This is where the moral right comes in.

Some of the Advantages of the Co-operative Test.

That people ought to test their cows is evident on all hands; not only from the reports from factories, but individuals themselves, reporting the small amount received from their cows, which in many cases barely covers the cost of keep, labor and other expenses. That there is a great difference in cows I think none will dispute, and if the returns from the whole herd scarcely cover the cost of keep, there certainly must be some



Jersey Bull, owned by F. H. Scribner & Son, Rosendale, Wis. There is nothing that aids the breeder of dairy cattle so much as testing. Records of the dams of this sire have been kept for at least eight generations.

way below, and if these were weeded out, far better results would be obtained.

It is hard work to imagine a man so indifferent to his own interests that he would not put up a milk sheet in his stable and own and operate a Babcock test for the encouragement of this work, and it is for the benefit of those who will not, or who do not care to take the trouble that co-operative test associations are being formed.

Co-operation along this line is a splendid thing, and while there are many that trust you and would as soon take your test as any, yet there is always a suspicion of doubt on the part of some and especially those with whom you are not personally acquainted, and if you can co-operate with your cattle club, or some test association, or your creamery man, it makes it more valuable, for the Bible says, "That in the mouth of two or three witnesses every word may be established."

And I think the publishing of these tests has its benefits as well, as it may be an incentive to better work all around; the man will be a better feeder and will study up the kinds of feed that are best adapted for milk production, to be more liberal in his feeding, and to have more regularity about his feeding; the water will be seen to more carefully to see that they have a sufficient quantity, and that in the winter it is of the right temperature. He will also plan for some supplementary feeds for summer use when the pastures are getting to be brown and dry, either by putting up a silo large enough to have some left over for summer use, or by growing some green crops for soiling purposes.

Every one has some pride, or at least ought to have, and I think the publishing of these tests would have a good effect. If a man was a good

feeder and had some good cows, he would be proud to show his records; on the other hand, if he was a poor feeder with inferior cows it would have a tendency to make him ashamed of himself to be so far behind his neighbors that he would probably either improve his methods and herds or go out of the business.

Hopeful Agencies in Testing.

The different cattle club associations are now offering to pay one-half the expense of testing the pure bred cows, providing the cow gives the required amount of butter fat stipulated, which amount varies somewhat with each breed association and also with the age of the animal. The cow that produces the required amount is said to qualify for the advanced registry, or Registry of Merit, as the case may be. This work is usually done through the co-operation of the different experiment stations and is a very reliable and economical way of doing. This is a test for pure bred cows only; so far as I know, there is no advanced registry for the common or grade cows, and I think it would be a wise move, either for the Wisconsin Dairyman's Association or the Experiment Station, to start an advanced registry of this kind, regardless of what breed, the reports to be printed at the end of each year.

The Wisconsin Dairyman's Association spent a lot of money the last year sending out men to organize Test Associations throughout the state. They would go to a community, make a house to house canvass and try to get the farmer to agree to weigh the milk from each individual cow every milking and to furnish an accurate sample from each cow once a month, either to the local buttermaker, or a man sent for this special work, and in compensation the farmer agrees to pay fifty cents or one dollar, as the case may

be, per cow per year for this testing, providing enough cows can be secured in the locality to make it pay. This has been a great educator, as the farmer would not only find out which his boarders were, but the tester would visit the different farms frequently and give advice, not only in regard to improvement in condition of stables, light, ventilation and kind of stall for keeping cows clean, but of the feed and care of the animals.

I have also known it to have a direct benefit on the creamery men, as they were usually anxious to have their test compare with the test association work, and I believed the farmer realized enough in this way to more than pay for the work of the whole year.

There never will be an over-production of good cows. Wisconsin is being looked to to produce and furnish high grade cows and high prices will be the rule for a long time to come. What makes a cow valuable is not only her being a high grade cow of some of the leading dairy strains, but her ability to perform at the pail, and if this is substantiated by some test association, it makes her all the more valuable.

DISCUSSION.

Mr. Stiles—How often do they test these cows?

Mr. Scribner—Once a month. I think that is sufficient for finding out approximately what they can do.

Mr. Goodrich—How many milkings do they take the samples from?

Mr. Scribner—It is better to take at least four. If we take a sample from one milking, the milk is liable to be up or down in fat. We know the milk varies very much with different cows at different times, so it is better to take at least four milkings, then take a sample out of the four milkings and call that the test for the month. In

that way you will get very nearly an average sample of the milk.

A Member—Why does milk vary?

Mr. Scribner—Conundrum. I do not know.

Supt. McKerrow—Does anybody else know?

Mr. Scribner—I haven't found him yet.

Mr. Goodrich—Why is one man bigger than another?

Mr. Stiles—Does the milk as a rule vary a great deal from milking to milking?

Mr. Scribner—Not as a rule.

Chairman Scott—State some causes why milk varies.

Mr. Scribner—When Scott pounds the cow over the back with the milking stool, she doesn't give it down.

Chairman Scott—How is it when Scribner lies abed Sunday morning?

Mr. Scribner—He doesn't do it; he gets up when the alarm clock strikes.

Mr. Goodrich—I understood Mr. Scribner to say that it did not vary very much from one milking to another as a rule. Have you seen the Creamery Patron's Handbook where there is a test and a big variation all the way through; in several instances one cow's milk varying three per cent between one milking and another?

Mr. Scribner—Yes, but as a rule they do not vary much. I have been testing cows all my life, and I find, as a rule, they do not vary very much. Of course there are exceptions. Anything unusual around the barn always upsets them. We want everything to run along smoothly, and if we observe that rule, we will very seldom have large variations in the tests. Of course there are things that happen that will upset the cows that we cannot help.

Chairman Scott—We often hear the expression, "She is only a heifer." Is it a fact that the heifer tests lower than the mature cow?

Mr. Scribner—No, as a rule, this percentage of fat is fixed for her when she is born, and we cannot change it very much; it doesn't change very much from the time she is first in milk until she gets through.

A Member—What is the expense of getting a man into a community every month for a test?

Mr. Scribner—It ought not to cost to exceed fifty cents per cow per year, and in many cases is being done for twenty-five cents per cow.

Mr. Goodrich—It is usually fifty cents, and I have known farmers, when they are asked to have their cows tested, ask, "How much will you pay me to do it?"

A Member—Why does morning's milk test higher than evening's?

Mr. Scribner—It usually does not, if the time is the same. We ought to divide the time as near alike as possible. If we milk at five o'clock in the morning, we ought to milk at five o'clock at night. Usually the shortest period will test the most.

A Member—What is the variation of test from good feed to poor feed?

Mr. Scribner—The poorer the feed, the better the test, as a rule, that is, the poorer the feed, the less milk you will get and the test will run up a little. The better you feed, you will get a larger flow of milk, consequently a less percentage of fat.

Supt. McKerrow—Will that percentage vary very much?

Mr. Scribner—Yes, a good deal.

Chairman Scott—Will it vary in proportion to the difference to the amount of milk?

Mr. Scribner—No.

A Member—Can you feed richness into milk?

Mr. Scribner—No, sir.

A Member—How many cows do you need to start a test association?

Mr. Scribner—There ought to be at least two hundred or more.

Mr. Griswold—With us, we probably have fifteen or twenty herds in our association.

Mr. Scribner—Somewhere about two hundred cows?

Mr. Griswold—Yes, and with us, the man that runs the creamery does that testing for fifty cents a cow. We can usually get a local man to do that, and that is for the whole year. He comes each month for fifty cents a cow for the whole year.

Mr. Goodrich—As I understand it, a test is of but little value unless you take it for a whole year. You have got to feed the cow for the whole year, and take for the pay what she produces in the year.

Mr. Scribner—Yes, very many cows will give a large flow of milk for a little while, but that is not a profitable cow. It is the cow that can give a good, reasonable amount of milk all through the year that is the profitable cow every time.

Chairman Scott—Is the test of very much value unless weighing is done?

Mr. Scribner—Certainly not. The man agrees to weigh the milk every morning and takes out samples about once a month.

Chairman Scott—Then the true criterion is the number of pounds produced in the year?

Mr. Scribner—Yes, the amount of milk is of just as much importance as the test.

A Member—In order to take that test, how would you take the sample of milk?

Mr. Scribner—Milk your cow thoroughly and pour the milk into an empty pail. Pour it back again three or four times and then take out your sample; take out the same amount from each milking and put it into a bottle or jar by itself.

A Member—Should you have some preservative in this jar?

Mr. Scribner—If it is winter time,

no; if it is summer time, yes. If it will keep sweet without the preservative do not use it.

A Member—What scales do you use?

Mr. Scribner—We have milk scales now that everybody can get very cheaply. I think you can get them for about two dollars and a quarter; they are very economical scales. You want a scale that weighs in tenths rather than ounces, as the bottles are divided into tenths and it simplifies the work.

A Member—Does it hurt the test if the milk freezes?

Mr. Scribner—Only that you cannot get as perfect a sample. It will test all right if you can get a perfect sample, but it is pretty hard to get a perfect sample after the milk has been frozen, or if it has stood. There is no time when so perfect a sample can be secured as when first drawn from the cow.

A Member—And the more water you put in it, the quicker it will freeze.

Mr. Scribner—That is right.

ANOTHER YEAR WITH THE MILKING MACHINE.

E. Nordman, Polar, Wis.

We have now operated a milking machine for more than one year and I am glad to report that it has been a profitable investment for us. I shall not, however, presume to advise others with respect to the matter. In this paper I shall confine myself to my own experience and to deductions that have been drawn from this experience. I hope in this manner to be able to present a few facts which will help other farmers who are troubled with the milking problem to decide for themselves as to whether the milking machine will help them out or not.

By way of showing how we are situated, I will say we milk from twenty-six to thirty cows; we have usually from twenty to thirty head of young stock on hand, and we winter one hundred ewes each year. Excepting what work is done by myself, all the labor on the farm has to be hired. I may add that because of its expert nature, satisfactory farm help has been high-priced and hard to get. We, therefore, substitute labor-saving machinery for this help wherever possible,

and the milking machine is a means to this end.

The milking machine has been a good thing for us for the following reasons: first, because it makes it possible for us to keep cows at all. It must be remembered that our farm is surrounded by lumber camps and saw mills, where high wages are paid. I find no difficulty in meeting the competition as to wages, however. Where the trouble comes in is that in our northern country the workmen are all lumber jacks. Now a lumber jack would lose his social standing at once if he were to engage in so menial an occupation as pulling teats, consequently, money cannot hire him to do this work. Operating a milking machine, however, is a job he can take without loss of dignity and so he will hire out to milk cows mechanically when he would not do it by hand.

Second, because it saves the expense of one hired man the year around. We are milking nearly all of our cows this winter and the manure from all the stock, except the sheep, is hauled

out fresh every day and spread on the fields, yet one man and a school boy, who helps with the chores mornings and evenings, do all the chores. I think you will agree with me that without the milking machine this man would ask for more help.

Third, because the cows like the milking machine better than they do hired help, on the average. The milking machine does its work quietly, and never yells at the cows or uses a club or a milk stool on them. In fact, there is no occasion for rough treatment, as a cow rarely ever raises a foot when she is being milked mechanically, even though her teats are chapped or sore from some other cause. We all know it is different when she is milked by hand.

Fourth, it makes it practical to get through our work, chores and all, at six o'clock every evening the year around, except a few days in haying and harvesting. While this can also be done on farms where there are no milking machines, still they are a valuable aid in bringing about this desirable result.

I can say our cows have been milked as well since we have had the machine as they ever were before.

Of course the milking machine is not automatic and needs to be handled with judgment. On our farm, the machine has been operated by two men at different times, and, so far as I can see, any man who possesses good dairy sense ought to be able to run a milking machine. Just as each cow needs to be fed and treated according to her individuality to get the best results, so the milking machine must be manipulated to suit the individual cow. Some cows' udders will have to be manipulated a great deal, especially after they freshen, while others will need to be handled scarcely at all. We have found our heifers that were never milked by hand are the easiest

to break in with the machine and always ready to give down their milk. The older the cow, the more likely she is to be obstinate and require extra attention from the operator.

As to the time required for milking by the mechanical process, I will say a man can milk about three times as fast this way as by hand. On our farm, one man with an assistant milks twenty-six cows in less than one hour and at the same time runs the milk through the separator and feeds the skim milk. Besides this, he feeds the cows their grain rations as they are being milked. This hour includes the time it takes to get the machine ready and to wash it and put it away after milking.

While we have not kept a milk record since using the machine as we did formerly, still we know from general results that its use has not affected the yield. There is no difference in our creamery returns of last winter as compared with the winter before that can be attributed to the use of the machine.

I must say here we have never thought the machine injured the udders of the cows, or that it affected their health in any way.

We found that our tread power, standing out in the cold, could not be relied upon to furnish steady motion when the separator and milking machine were both operated at the same time, so we have had to buy a small gasoline engine. The engine and the milking machine must both be kept and operated in a temperature that is always above freezing, to keep them in perfect working order.

It costs us about fifteen dollars per year for parts of the machine that have to be replaced occasionally and for repairs. This, aside from what it costs for gasoline, is the total expense of maintaining the machine.

Let me say in conclusion that we

never expected the machine to work automatically and have considered it simply as a means to aid us in solving this vexed milking problem, and we have not been disappointed in this. We try to remember that to get good results from the use of the machine we must exercise judgment, pay strict attention to details, and handle it precisely as the manufacturers direct in their instructions furnished to purchasers. Anything short of this spells failure.

DISCUSSION.

Mr. Goodrich—How many machines have you?

Mr. Nordman—We have three machines that milk six cows at a time.

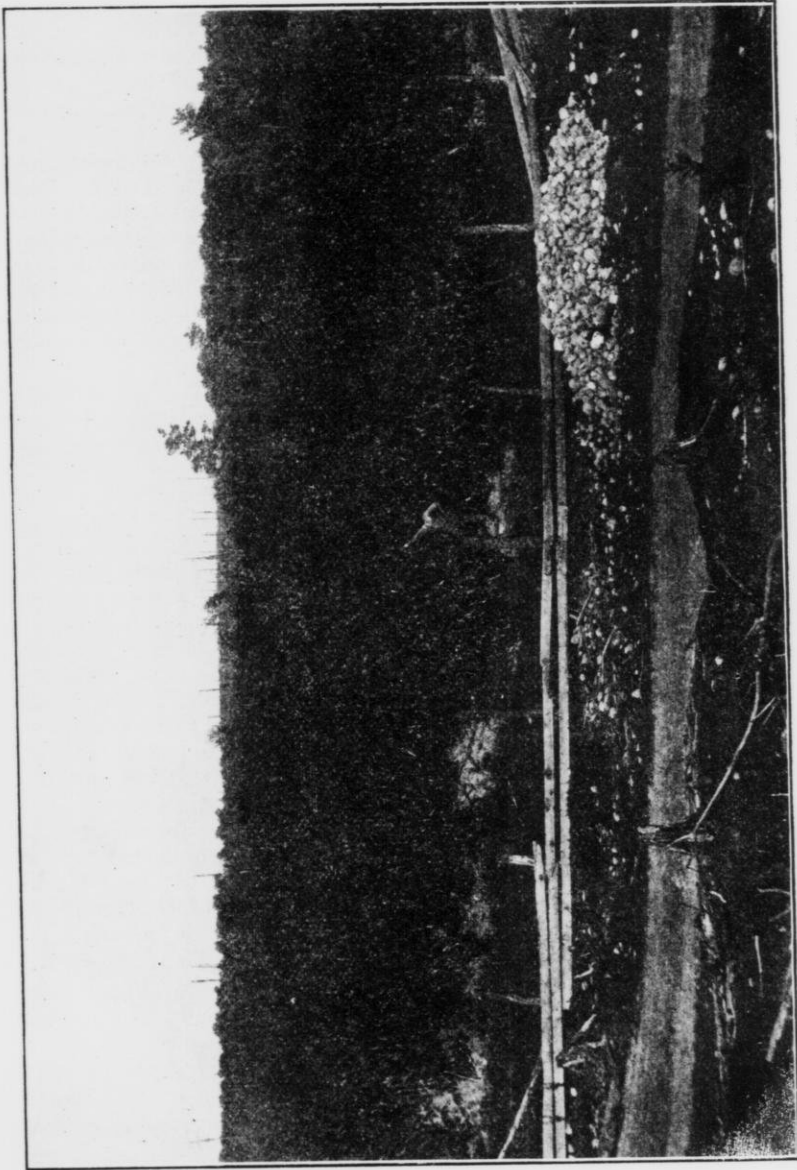
Mr. Goodrich—Can one man handle those three machines?

Mr. Nordman—Yes; it keeps him good and busy however. He has got to be a good man.

Mr. Goodrich—I am exceedingly glad to hear this good report from Mr. Nordman. This question of getting the cow's milk has been a very serious question for a great many years and has handicapped a great many men, and I have done what little I could to investigate this subject. Over sixty years ago two miles from Fort Atkinson there was a milking machine invented. The inventor thought it was a success, but the cow thought it was not, and it was not; the cow was right, as she generally is. Since there have been a good many such machines invented. There was the Thistle machine, invented in Scotland; that was praised highly and it was supposed it was going to do all the milking in the country where there were large herds, but it proved a failure. Then there was the DeLaval Lactator, and that was a grand machine, but it has gone into oblivion. Then there was the Waterloo machine, and that has gone with the rest.

Now, this is the Lawrence Kennedy machine. Last summer I learned there were men with large farms that were using that machine.

I have some friends that are looking to me to find out about milking machines, because they have large farms, where they are feeding five or six hundred steers, and they have a lot of cows, but they cannot get them milked. I should not have stayed here today if it had not been for this subject coming up. I want to find out what I can. Last summer I visited a farm where the man has eight hundred acres; he had four hundred steers, but he knew that the cow would pay a good deal more for feed than the steer, so he built great, big, long barns to accommodate all the cows. Another man got twenty-five cows last summer and he has three milking machines. He is adding to the number of his cows gradually. I talked with the man and he said he thought the machine would be a good thing when he got cows enough. He said, "If I didn't have any more cows, I wouldn't care about it, but when I get cows enough it will be a good thing." I asked him how long it took to milk his twenty-five cows, and he said a man can do it in forty minutes. Well, that is doing pretty well. But, you know you cannot always rely on just what men tell you, even about their own business, although I believe you can rely on Mr. Nordman. Now, this man I was talking about said it took one man forty minutes to milk twenty-five cows. I waited till milking time and when they got all ready to milk, I took out my watch, and I watched them closely. There were really two men attending the machine. I saw that one was really the expert and the other was a learner, so I do not suppose he really helped very much, but I saw them fumbling around getting those cups put on, and I guess it is quite a little



Field of Flint Corn that always ripens on farm of E. Nordman, Polar, Langlade Co., Wis.
Yields from 10 to 12 tons of matured silage per acre.

trick to do it. Anyway it took them just one hour; he had only exaggerated twenty minutes, which isn't so very bad. I timed the milking of each cow. They milked on some of them fifteen minutes and after they had taken the machine off, I examined the cows, and I noticed one cow that I thought the thing was sucking her, and sucking and sucking on three teats, and it wasn't getting any milk. I was afraid that wasn't good for the cow, but maybe it was, and after they had taken it off, I found that from one-quarter of that udder I could milk quite a little milk after she had been milked fifteen minutes. I found out so much about the machine. Now, I am going back there if I live, within two or three months, because I want to see what progress he has made, for I suppose he has sixty to a hundred cows now, and I want to investigate still farther, and I do hope that the machine will be a success, because I tell you when it is a success cows won't grow fast enough in this country for the market.

A Member—Can you shut off the machine so it will only milk one teat at a time?

Mr. Nordman—No, you can't. There are those that you can, but not our kind. I do not know anything about any machine except the Burrell Lawrence Kennedy machines.

A Member—Is the milk cleaner than if drawn by hand?

Mr. Nordman—Yes, ordinarily it is.

Mr. Goodrich—If you wanted to get the individual record of your cows it wouldn't be practical?

Mr. Nordman—Not with the machines we have. It takes machines with partitions in them for that, so each cow's milk can be kept by itself.

Chairman Scott—I do not like to contradict Mr. Nordman, but I happened to be visiting on a farm one day

when they were milking by machine and also by hand, and one of the students came down to analyze the milk, and he gave the results of his analyses, also of samples that had been previously taken, and he found that there were about twice as many bacteria in the milk milked by the machine as from the samples milked by hand, showing that while the machine may be more cleanly than ordinary milking, that milk can be milked by hand just as cleanly as from the machine.

A Member—Wasn't that because the machine had not been properly washed?

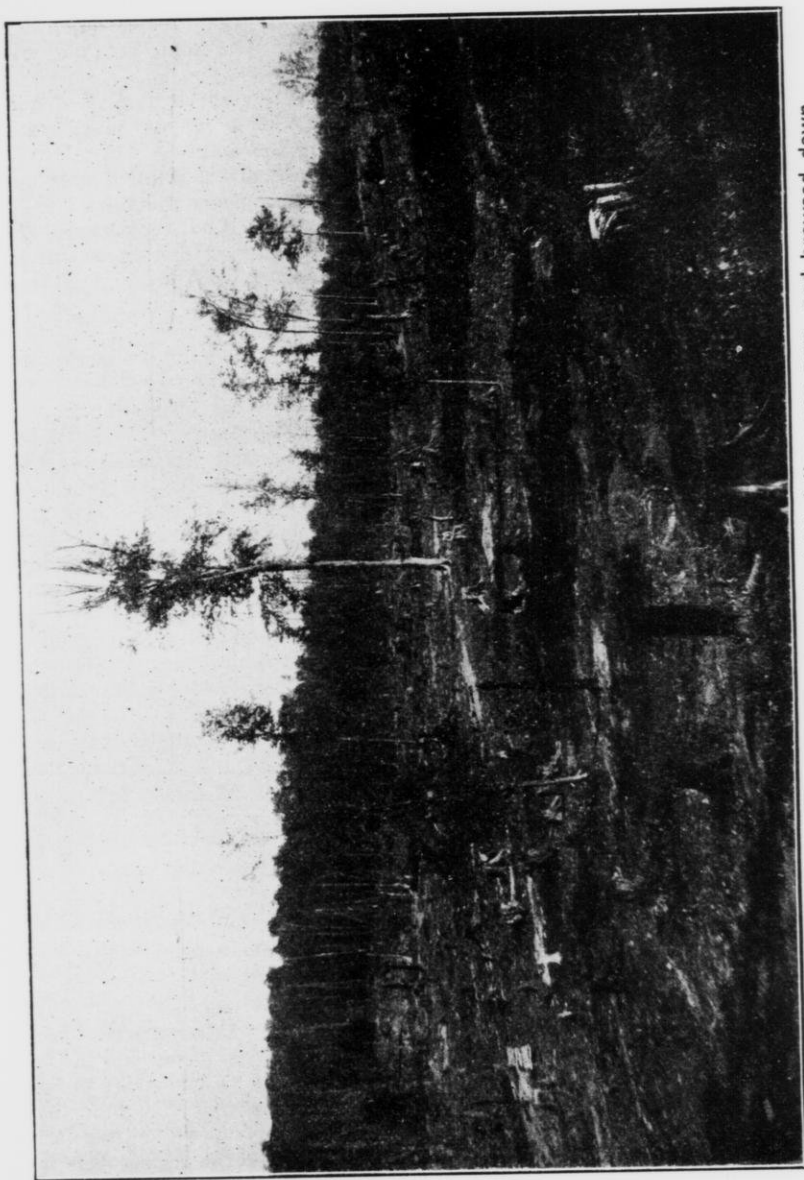
Chairman Scott—Oh, it was washed by the University people; both kinds of milking were done in the same stable.

Mr. Aderhold—Mr. H. B. Gurler, of DeKalb, Ill., who was at that time producing certified milk for the city of Chicago, retailing it at twelve cents a quart, was taking the greatest possible precaution to have that milk as clean as it could be well produced, and when he got the milking machine, after he had used it for several months, he got a bacteriologist out there to see which milk was the cleaner, and he told me that the milk from the machine had only one-third of the germ content that the hand-milked milk had, and that was mighty clean milk that he was producing. He had used the machine several months.

Mr. Nordman—I do not see that there is any opportunity for dirt to get into the milk, providing the machine has been properly cleaned and taken care of.

Mr. Aderhold—It is impossible to get milk as free from dirt by hand milking as by machine milking, and if what Mr. Scott says was the case, they didn't have their machinery clean.

Chairman Scott—In that machine milked milk there was only about five



An old slashing logged up, at cost of about eight dollars per acre, and browsed down with sheep the last three years, will be narrowed with spring tooth and seeded to clover and timothy next spring.

thousand bacteria to the cubic centimetre.

A Member—Will this machine draw all the milk?

Mr. Nordman—It won't milk all of the old cows clean. There are some of the older ones that are very obstinate about giving down their milk, but the younger cow usually take to the machine very kindly, and they give down their milk without any trouble.

Mr. Goodrich—The old cows haven't fallen in love with the machine yet; those that have been milked by hand for a number of years.

Supt. McKerrow—Then it is largely a matter of education; education of your cow, education of your hired man, of the dairyman, and everybody concerned. Somebody stated here that the result of using the machine would be that our cows would finally become very high-priced, because of the demand for them as a result of the increase of the dairy business. I think nobody needs to be afraid of that. The machines will simply assist a few people to milk their cows when they haven't any milkers within their own family, or when it is inconvenient for them to get them. I do not expect that any man with a family on his farm that he is bringing up will make the milking machine profitable, be-

cause he can do the milking right in his own family, and he doesn't need a machine. It was because of necessity that Mr. Nordman got the machine.

A Member—Is there danger of getting bloody milk if you leave your machine on too long?

Chairman Scott—I think that is not true with the modern machine.

Mr. Nordman—You know there are all kinds of milking machines still in existence, and it won't do to take what I say as an indication of what all the machines on the market will do. For instance, up in St. Croix county there was a man who manufactured a milking machine of his own and he was using it, and I can assure you that I wouldn't want such a machine as he had on my place.

Mr. Scribner—You place the machine between two cows and milk them both at the same time?

Mr. Nordman—Yes, that is the way we do.

A Member—Isn't it a fact that if the cow is not milked dry that the milk that is left in the udder is the richest milk?

Mr. Nordman—Yes, that is true, and that is one reason why we go after that milk by hand if the machine does not take it all.

BREEDING DRAFT HORSES.

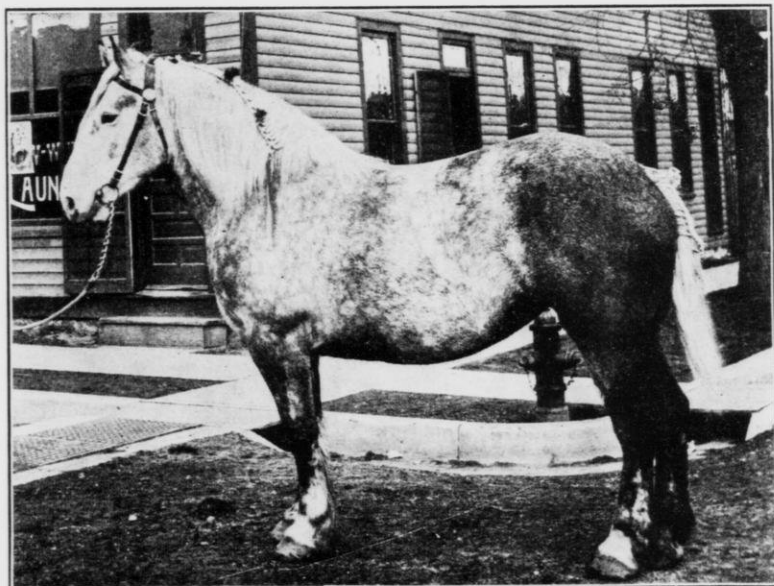
Dean W. L. Carlyle, Ft. Collins, Colo.

I want to say to you in the beginning of this little talk that I was wonderfully surprised this afternoon in noting the quality of the horses I found here in the exhibition on the streets of your city. I made a statement down there which one or two persons called in question and I want to repeat it here, so it will get into the records and be down in black and white; and

I want to stand back of it. I have attended every International Live Stock Show that has been held in Chicago, and I have judged draft horses there every year that the show has been held. Last year we had the largest class of Percheron horses and the best class that ever was shown, in that show, at least, that was the universal expression of opinion there.

I want to state to you that there were seven pure bred Percheron mares out here on the street that were superior, taking the entire seven, to any seven in that show. I want to say further than that, that one of the mares that took fourth prize in that show, I was instrumental in having bought for a man in Colorado and pay-

here. You have the hills, you have the grasses, you have the soil, the limestone and the water, and all you require now is men, and you are evidently getting those here, to produce just as good, and I believe better Percheron horses for the American people than the Percheron district in France. The Richland County Percheron



Percheron exhibited at Round-up Institute at Richland Center, owned by Richland County Horse Breeders' Association.

ing one thousand dollars for her, and we got her cheap at that.

You people should know something about the quality of the stuff you have in this valley, and I am mighty glad to say that I have been traveling in nearly every state in the Union since I left Wisconsin, and I have studied horses and horse-breeding conditions everywhere, and I have not seen any place in America that is more nearly like the Nogent valley in France—the heart of the Percheron horse breeding district—than you have right

Horse Breeders' Association that has been organized here is something that is very commendable. The founding of such an organization to develop one breed and type of horse for an entire district is an enterprise which stock men in this country are not paying enough attention to. A man is apt to say, "I will not breed Percherons because my neighbor, Smith, is breeding them; I am going to breed shires or Clydesdales." This sentiment is all wrong.

Mrs. Howie will tell you that in

Europe all the stock of a certain class in each district is of one breed and type, because they have found it pays better. They study their conditions and adapt the stock to those conditions and then all unite and success is sure.

You have selected in this valley in Richland county a breed of horses that without question are best adapted to your conditions; those conditions are as nearly as possible like the native conditions under which those horses have been produced.

The stallion which I considered the best of those shown on your street here was home bred, and better still, bred here in Richland county.

My subject, however, is "The Draft Horse" and not the draft horse of Richland county.

The Draft Horse.

Breeders are doing a great deal for the improvement of draft horses in this country and making success of breeding many of those horses. That is very clearly illustrated in the sensation that our American bred six-horse team of draft horses made this year in their foreign trip. The Armour six-horse team were the sensation everywhere they were exhibited. Never was there shown in Europe such a six-horse team as were shown in this American bred team in the old country this past season. They created such a sensation that they had to have a body guard of policemen practically all the time they were on exhibition. King Edward, of England, had them shown twice before him by special request in order to see and study them thoroughly.

The trouble is we are not producing an average grade of draft horses nearly as good as we should, and we have some marked defects, and I want, first of all, to speak on the defects which we find in the average good draft

horses in the United States, the defects which the market finds and the defects which the users in the city streets find.

Weak Points in Our Draft Horses.

I think the weakest point in our draft horses today is defective fore feet. As nearly as I can estimate from investigations made in the second-hand sale stables in Chicago, where fully eighty per cent of the draft horses that are used upon that city's streets are thrown aside, at least seventy-five per cent of the draft horses are rendered useless after a few years service because of lameness, the seat of which is in the fore feet.

You go onto the market in Chicago with a bunch of good draft horses for sale, the first part of the horse the buyer looks at is the fore feet, and if they are not sound and right, the price is immediately cut down.

The fore feet are the most important part of the horse from the user's standpoint in the United States today, and very little attention is paid to that point as a rule.

The second weakest point is in the hock joint and about twelve per cent of the draft horses in our large cities are discarded because of weak, defective and unsound hock joints. These two, the fore feet and the hock joints, are points which we should consider carefully.

Now, what are the weaknesses in the feet? We are using in this country more Percherons than we are of all other draft breeds together; they are the breed that seems to be the best suited to our American people, and the Percheron horse's fore feet is perhaps his weakest point. Many of them are too small; not small perhaps at the surface of the ground, but small where the hoof and the hair join at the hoof-head or coronet. This

is the particular part of your Percheron horse's foot which you should examine carefully in looking for weakness in a breeding horse. Get a good large hoof-head, with plenty of depth and width in hoof at the heel, then see that the pastern or ankle blends nicely into the hoof. The ankle from the fetlock joint down to the foot in the Percheron is frequently very short and very straight, and if long, sets

to the sole. Of course, we do not want them too deep.

Get a horse with a hoof that is dense, that is, closeness of the fibres altogether. You do not want a hoof in which the fibres are not laid closely together, giving you a smooth, hard, bone-like horn. A hoof that is not smooth on its surface, dense and close fibered, will not hold the shoe and will wear off very quickly if not shod.



Exhibit of Percherons at Round-up Institute at Richland Center, owned by Richland County Horse Breeders' Association.

too far back. Pasterns should have an angle of about forty-five degrees, but should be clean and smooth and show lots of quality of fibre and give a full, nice, round blending of the bone and sinew into the hoof.

Now, then, the foot itself. Get a foot that is wide in the heel and deep from coronet to ground surface.

One or two of these horses that I saw on the street lack a little in the depth of the hoof. Ordinarily on limestone soils, we do not have that trouble, but some of these mares lack a little in depth from the hair down

When you look at the bottom of the foot, get one that is concave, hollowed up in the center and with a good, large, full, well-developed frog. The frog is one of the most important parts of the horse's foot, the cushion which is placed there by Nature to break the concussion as the horse puts his foot to the ground. Very frequently, as our horses are shod in this country, the weight comes all outside on the rim of the foot, which is not intended to bear all the weight, but we have so shod the horse in many instances that the frog is all drawn

up and shriveled, and the sole is flattened out. See to it that there is a good concave sole and that the bars, those parts of the foot that run in from the corner of the hoof just at the heel, are particularly strong and well-developed, and then do not allow the blacksmith to cut away all the bars and frog, simply because it is easy to cut, when he should be cutting down the outside wall of the foot and bringing it level with the sole and frog.

Now, I want to say a word about the three stallions which we had out here in the street.

Richland County Draft Horses.

There was of course, a good deal of difference of opinion when there were a couple of hundred of us all judging together and I did not agree with most of you, and most of you did not agree with me, and that makes a judge happy, you know.

I think we nearly all agreed on the first prize horse, a horse with wonderful quality, and that is a very important point in a draft horse. We have been giving altogether too much credit to size in our draft horse breeding stock, and not enough attention to quality. Do not think I want you to believe that we do not want large draft horses, because we do. Horse flesh is worth about twenty-five dollars a hundred pounds, when you add it to a horse weighing over seventeen hundred pounds. A horse weighing seventeen hundred pounds is worth say two hundred and fifty dollars, if he weighs eighteen hundred, the same quality of horse will bring about two hundred and seventy-five dollars; if he weighs nineteen hundred, he will bring about three hundred dollars on an average. But size, at the expense of quality, is one of the greatest mistakes we are making in breeding draft horses.

The reason many of you selected the largest black horse out there for second place, and many of you for first place, was because he was the biggest horse, and though he had a fair amount of quality, he had many quite prominent defects.

The weakest point in a horse should be a pretty good indication of the value of that horse, just as the weakest link in a chain is a test of the strength of the chain. I am going to use this black horse as a sample to criticize, because he had some of the defects which we notice in nearly all Percheron horses.

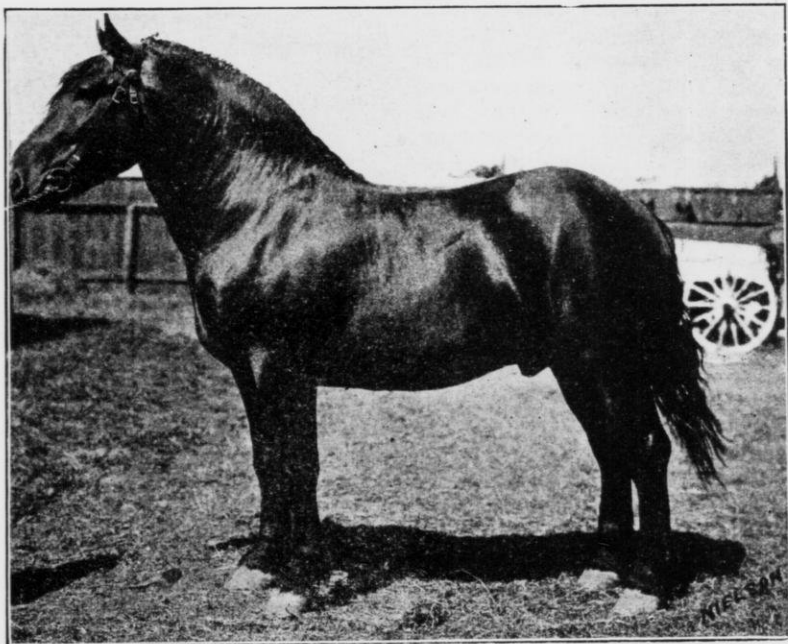
He did not have good fore feet. His feet were not straight; they tipped over and turned inwards. He also had prominences on each side of his hoof heads, just above the heels behind, which would very easily develop into sidebones. He had short pasterns, short from the ankle joint to the hoof. Above his ankle, just below his knee, he had what is known as splints, and quite large ones. It is a common expression to say that we want a flat bone in the leg. That is a misnomer. All cannon bones are round when you dissect them, but they appear to be a flat bone when the tendon is almost as large as the bone, the tendon standing back at the back side of the bone, if large and well-developed, gives the leg a flat look, and that is the kind of a leg we want, because the strength lies in the tendons quite as much as in the bone.

This horse had large, round legs and not the best of bone, and the tendons were very small back of the bone, especially just below the knee.

Then when you examined the hock of that horse, there was a round, smooth, puffed appearance, indicating a coarse quality of tissue surrounding the bones, which we know on the occasion of severe strain would give way and develop into puffs and

bogs and other defects which would interfere very seriously with the value of the horse for heavy work, and those kind of hocks are not desired, though they are found upon many Percheron horses in this country. I would advise you, if you wish to study the difference, to compare the conformation of the hocks of the big black horse with

with plenty of quality and style, but the reason you could not put him first in that class was lack of size and weight. Of course, he had a bad splint on his front leg below the knee, but that is not a very serious fault with a draft horse. I remember an old Scotchman telling me not very long ago that he always liked to see a



Prize Winning Percheron at Wisconsin State Fair, 1908, owned by W. L. Houser, Mondovi, Wis.

the hocks of the horse placed first, and you will notice a wonderful difference in the quality, in the shape, contour and bony prominences projecting from the hocks of the first prize horse which you will not see on the other.

The gray horse, which was placed second, some of you wanted in the first place. He was a horse with more quality than either of the others perhaps; he had good feet and as clean bone and legs as you could wish for,

splint on a horse, because, he said, "If it is not there, you are always worrying for fear it is going to come, and if it is there it is not going to do any harm anyway, and you are relieved from worrying." There is a good deal of truth in that remark. A splint does not amount to much, except to indicate to some extent the character of bone.

A point in the large black horse which evidently many of you did not

notice was a flat instead of well-rounded ribs or barrel and a narrow back. We keep a draft horse for the power which he will put into the collar for the load which he is moving; that is the purpose of them, and we should never lose sight of it.

The power which a horse puts into the collar is transmitted largely from his hind feet up through his hocks, thighs and quarters, along the muscles of his back to the collar. The front legs, when a horse is drawing his heaviest load, are sometimes almost lifted off the ground altogether; there is very little power transmitted into the load through the front legs; those are largely for carrying the weight of the body. So that, first the tendons of the leg and then the muscles of the thighs and those of the stifles and quarters and along the back give you an indication of the power that may be transmitted to the collar, and those are the parts that should be well developed. The black horse was narrow in the back and was very light in his muscular development and would not have the power, other things being equal, that the gray horse would have. I would consider the gray horse, or a horse like him well broken, would draw almost as large a load as the black one; I would be disappointed if a pair of horses like the small gray one would not draw a bigger load than a pair like the black one, for the reason that they would have more nerve force, more strength in their hocks and better developed muscles at those points where the greatest strain is applied. The black horse is a better horse than the average, but he was weak when compared with the other horse. These weaknesses are only comparative weaknesses. I am simply using this black horse as an example in lieu of a worse one, that is all.

Weight One of the Most Important Considerations.

Now, then, I told you before that weight was one of the most important considerations in selling a horse for a good price on the market, and a good price is what we should be breeding horses for.

The weight or size of a horse is very largely determined before he is two years and a half old. One of the greatest mistakes the breeders of draft horses are making in this country when compared with the breeders of France, England and Scotland is in the fact that they do not feed and develop the young colt well enough. The first two years of his life is the time a colt's growth is made and when it is made the cheapest and the only time when you can really make growth. Later on you can put on fat, but you develop the bone and the tendons and the muscle fibres in the early stages of the colt's life. We have some trotting bred horses in these carriage horse classes at home that are heavier than their dams and they are not yet two years old, and it is simply because they never had a day of stagnation in their growth since they were foaled. We keep them gaining in weight every day.

You cannot grow a colt as he should grow on hay alone, nor on grass alone. The best feeds that I know of to produce these draft horses are oats, alfalfa hay if you have it, and carrots. You can put an enormous growth on your colts by feeding them these foods and giving them abundance of exercise. We feed our colts all the hay they wish to eat. When they get a liberal allowance of oats and carrots, they will not eat too much hay. We feed the oats twice a day, morning and evening, and carrots at noon; one and one-half pounds of oats to every one hundred pounds weight in your colt is an excellent rule. If your

colt weighs six hundred pounds, give him nine pounds of oats and nine pounds of carrots as a daily ration, and then you can give him all the good early cut hay of any kind which you can get him to eat and if you take good care of him otherwise, give him shelter and plenty of exercise, he will grow if there is such a thing as growth in him, and you should have that colt weighing when he is two years old between fifteen hundred and sixteen hundred pounds.

We have one at home that weighed 1,725 pounds when he was twenty-two months old, and he was raised in just that way. Youth is the time to get the growth on them.

Breed for quality, selecting for good feet, good hocks, good legs and quality of tissue all over, and then feed for size, and you will usually get it.

Do not breed to some of these great coarse, rough, lumbering, gross draft stallions we have in this country, expecting to produce the horses the market demands, for you won't get them. Select for quality in the foundation stock quality in the tendons, bones and tissues, and do not look for too much size, though size and weight are very important if combined with quality. I would rather have breeding stock weighing 1,650 to 1,800 pounds with quality than 2,200 pounds with coarse bone, poor feet and poor hocks and rough conformation. Breed and feed with these things always in mind and you will not fail to produce here in Wisconsin draft horses that will always command the highest market price and the demand will continue for many years to come.

DISCUSSION.

Mr. Imrie—Would you feed oats to the colt the next summer after the colt was foaled?

Prof. Carlyle—If they do not have

an excellent pasture I would, otherwise I would not. In August a few oats on grass when the flies are bad is the cheapest and best proposition I know of in raising colts.

Supt. McKerrow—I do not want Prof. Carlyle to mislead these people into thinking that the first prize mare here would beat an imported mare, simply because she was raised in Richland county in the State of Wisconsin.

Prof. Carlyle—She would not.

Supt. McKerrow—I have been informed that she was merely an orphan, and was raised by a lady; that is the reason she won the prize, probably.

Prof. Carlyle—I always did think a great deal of the ladies of Wisconsin, and I think a whole lot more of them since Mr. McKerrow told me that.

A Member—Will the feeding of alfalfa hay to a horse have a bad effect upon its eyes, tend to make it blind?

Prof. Carlyle—The feeding of any kind of dusty hay, especially moldy hay to a horse, and when fed from an overhead rack, will predispose a horse to blindness. Alfalfa hay as raised in your rainy climate here is very apt to be moldy and for that reason might be more dangerous than any other kind.

Mr. Martiny—Speaking about the quality of the horse, is it a fact, or isn't it, that when you get beyond a weight of eighteen hundred pounds, say, in a draft horse, every hundred pounds you add you get at an expense of some quality, or, in other words, can you get a larger, heavier horse with as much quality as we have in an eighteen hundred-pound horse?

Prof. Carlyle—No, sir, you can't. I think it is possible to get them, but we haven't been doing it as yet. I have never seen very many horses that weighed very much over eighteen

hundred pounds that did not lack quite seriously in quality.

Mr. Nordman—What do you think about silage as a part ration for horses?

Prof. Carlyle—I haven't had much experience with feeding silage to horses, and I would not, on general principles, like any kind of sour feed for a horse with his small stomach. A sixteen hundred-pound horse's stomach will hold only three gallons of feed at a time, while one of Mrs. Howie's little Jersey cow's stomachs will hold up to thirty-five and forty gallons of food at one time; it will hold a whole barrel full.

A Member—How many of your colts do you stable together?

Prof. Carlyle—The colts we are raising have never been inside a stable and where you have any kind of a reasonable climate I wouldn't put

them in a stable. Give them a good, warm shed, where they are sheltered from the wind, give them plenty to eat and above all, give them exercise. There is not an animal on the farm that requires so much exercise as the growing colt. You might as well pen up your boys and expect to grow healthy men out of them as to confine young colts in a stable.

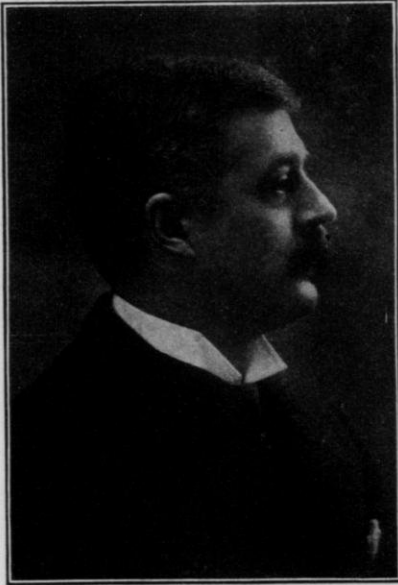
A Member—Do they all eat in the trough together, I mean the colts?

Prof. Carlyle—Yes, sir, though we do not like to have more than six or eight in a lot or paddock together.

At this point in the proceedings, Superintendent McKerrow put up for auction the ear of corn which had taken the highest prize at the Mid-winter Fair, which, after considerable lively bidding, was sold to Mayor Keys for six dollars.

BOVINE TUBERCULOSIS.

Dr. M. P. Ravenel, Bacteriologist, Madison, Wis.



Dr. Ravenel.

Tuberculosis is a disease affecting primarily two classes of animals, men and cattle. As the great Frenchman Villemin, who showed that the disease was contagious, says, "Man and cattle are the two species which keep alive this terrible disease."

The word "tuberculosis" is oftentimes confused with the word "consumption." The word "tuberculosis" comes from the word "tuber," the same word that is applied to root crops, like potatoes. Tubercle simply means a little tuber or nodule; therefore tuberculosis is a disease that is characterized by the formation of these little nodules or tubercles. Consumption always starts as tuberculosis and then a mixed infection takes place, usually by some of the

germs, which causes pus formation. This mixed infection gives us what we call consumption. Every case of consumption is a case of tuberculosis, but a pure case of tuberculosis is not consumption. Tuberculosis may affect joints or bones or any organ in the body, whereas consumption is tuberculosis of the lungs.

In cattle the disease starts with these little nodules, so that the Germans call it *perlsucht*, and we call it grape or pearly disease, but never mind whether it breaks down to form abscesses or not, or simply forms these nodules, it is one and the same disease always.

Now, tuberculosis in cattle is important from two standpoints; first, on account of its being an economical scourge; on what it costs the farmers in the United States, and the world in general, simply from the loss of cattle.

It is important in the second place from the fact that tuberculosis can be transmitted from the cattle to human beings, and because consumption is such a scourge to the people of the United States.

Do you know that in this country of ours four hundred people die every day of every year of consumption, which means one hundred and fifty thousand per year; it means the equivalent of six cities the size of your capitol city of Madison are wiped off the face of the map every single year that goes by.

If we take the actual money loss, based on the expense of the illness, and the value of a man's life, we have something like three hundred million dollars which this disease costs the United States every year. In Wisconsin we have about two thousand, five

hundred people die every year, and that means that there are about twelve thousand cases in the state existing all the time.

Now, some of this is due to cattle. In the State of Wisconsin you have, I

man is the same in kind as in animals; it is always caused by the germ tuberculosis, discovered by Prof. Koch. This germ gains entrance to the body in two different ways,—through the mouth and through the breath. When-



Fig. 1. Tongue and tonsils of pig infected by feeding tubercle bacilli. Infection took place through the tonsils which were badly ulcerated. The intestines were free from tuberculosis. (See Fig. 2.)

believe, about a million and a half of cattle. Tests, as far as they have been made, show that about ten per cent of the cattle in Wisconsin are diseased. In some herds it has run as high as seventy-five per cent.

Tuberculosis a Germ Disease.

Now, the cause of this disease in

ever it gains a lodgement in the body it starts to form these little nodules and in cattle they may grow and grow, until in some animals they weigh as much as sixty pounds. In the human, when they grow to the size of a hazel nut, they usually break down, form an abscess and are expectorated. This goes on in the no-

dules until the lungs are honeycombed, and we have what we call chronic, ulcerative tuberculosis. Now, that broken tissue is gotten rid of by spitting, and in every mouthful of spit that the consumption throws out you

she has coughed up from her lungs, and you will find they are laden with these germs, and this is an important factor in spreading the disease among cattle.

The disease is spread in cattle prin-

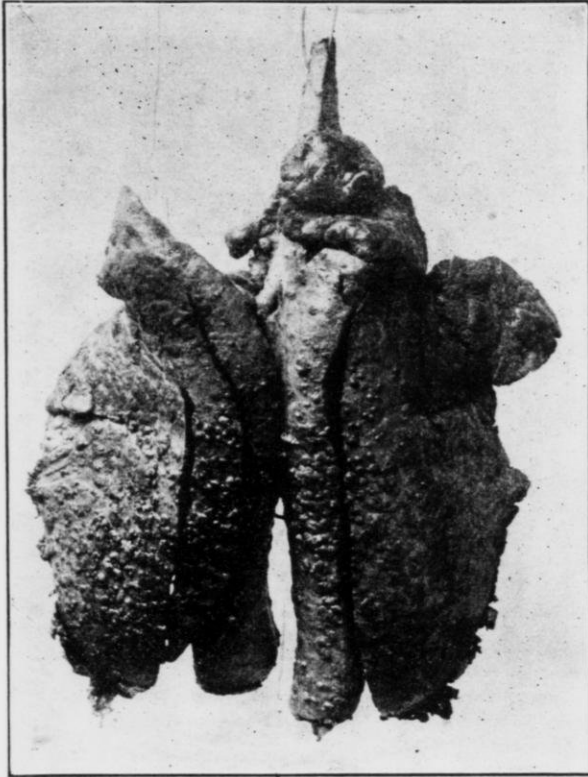
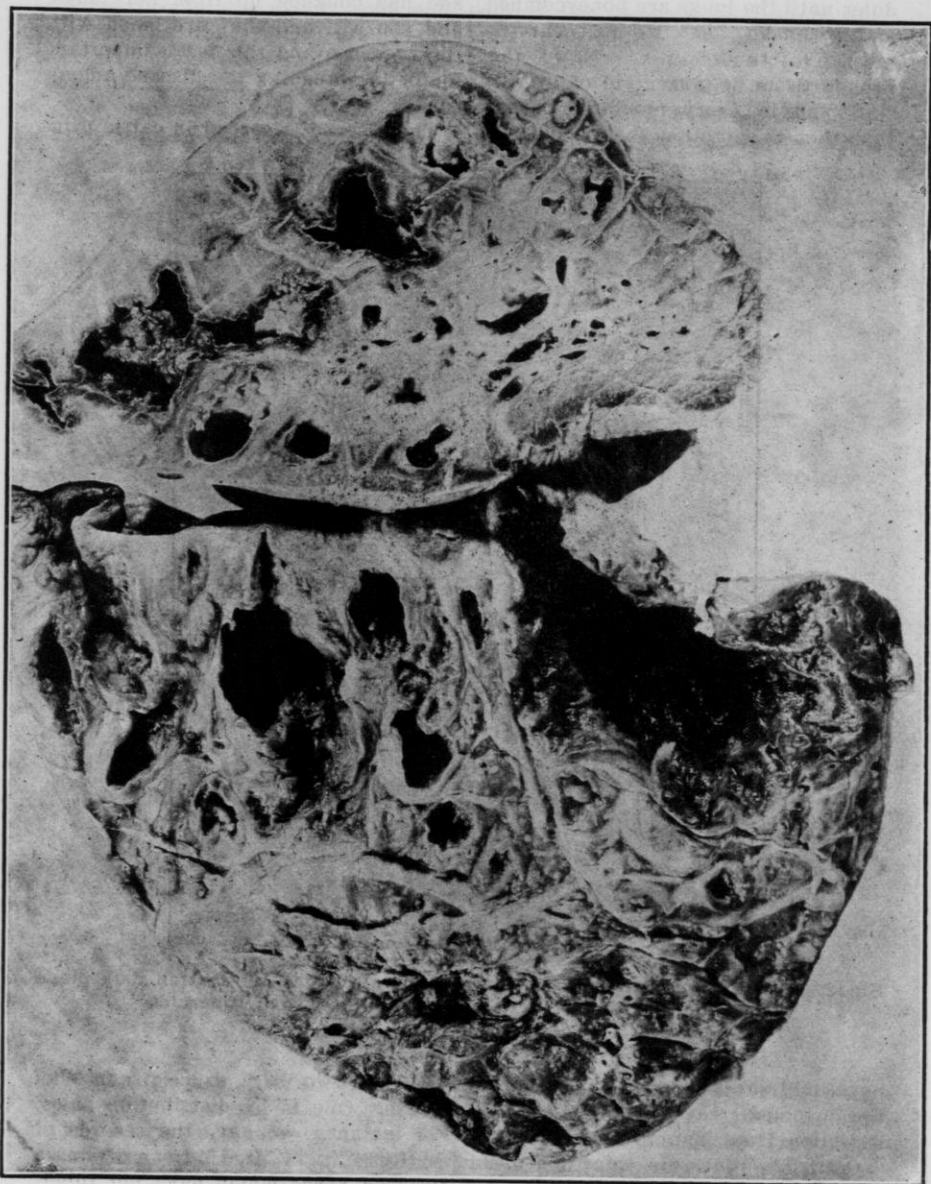


Fig. 2. Lungs of pig infested by feeding tubercle bacilli. Infection took place through the tonsils. The lungs are filled with tubercles throughout. (See Fig. 1.)

have millions of germs, and that is the principal way of spreading consumption from man to man.

Cattle do the same thing, only not to such an extent. If you put a nose bag on a diseased cow, with a piece of wood in the end of it, you will see little particles of spit there that

principally in two ways, especially in Wisconsin. One is by distribution sales. For instance we have the records of Dr. Russell and Mr. Hoffman of single diseased herds which have put tuberculosis into ten or twelve other herds. Say a herd of forty cows is sold, many of which have tuberculosis, and are



Lung of cow showing extensive cavity formation. Infected by feeding.
Intestines free from disease.

distributed around amongst ten different farms. Each farm in this way has the seeds of the disease planted on it and if it is allowed to go on, it will finally affect every single cow on that farm just as sure as the sun shines.

The second way in which tuberculosis is spread in Wisconsin is by means of the creameries. When you take your milk to the creamery and haul back skim milk for feeding your calves and hogs, you do not get exactly the same milk you carried to the creamery. In most of the creameries that skim milk is not sterilized. Your neighbor may have some tuberculosis on his farm and you find you are developing tuberculosis in your calves and hogs, due to the germs from the milk of some other patron of the creamery. This has been proven in many cases to be the source of tuberculosis in healthy herds.

Tuberculosis is spread in another way—through the habit which some animals have of licking each other's noses and mouths, and also to a certain extent by coughing. If a cow goes from its stall into another stall, or if the same trough is used for several different animals, and one has consumption, that one will affect every cow that uses that stall or trough. We have positive proof of this. We have taken scrapings from mangers and found that the corners and crooks were loaded with germs.

Consumption is Not an Hereditary Disease.

Now, a question which every one will ask is this, Is consumption inherited? No, absolutely no; neither in man nor in animal is consumption an inherited disease. It does run in families, but that is only because the diseased parent, be it a cow or a human being, furnishes the seed for the offspring.

If you take the history of orphan

asylums you will find that although the great majority of children who are in these charitable institutions have been made orphans by death from consumption, yet consumption is an exceedingly rare disease amongst these children.

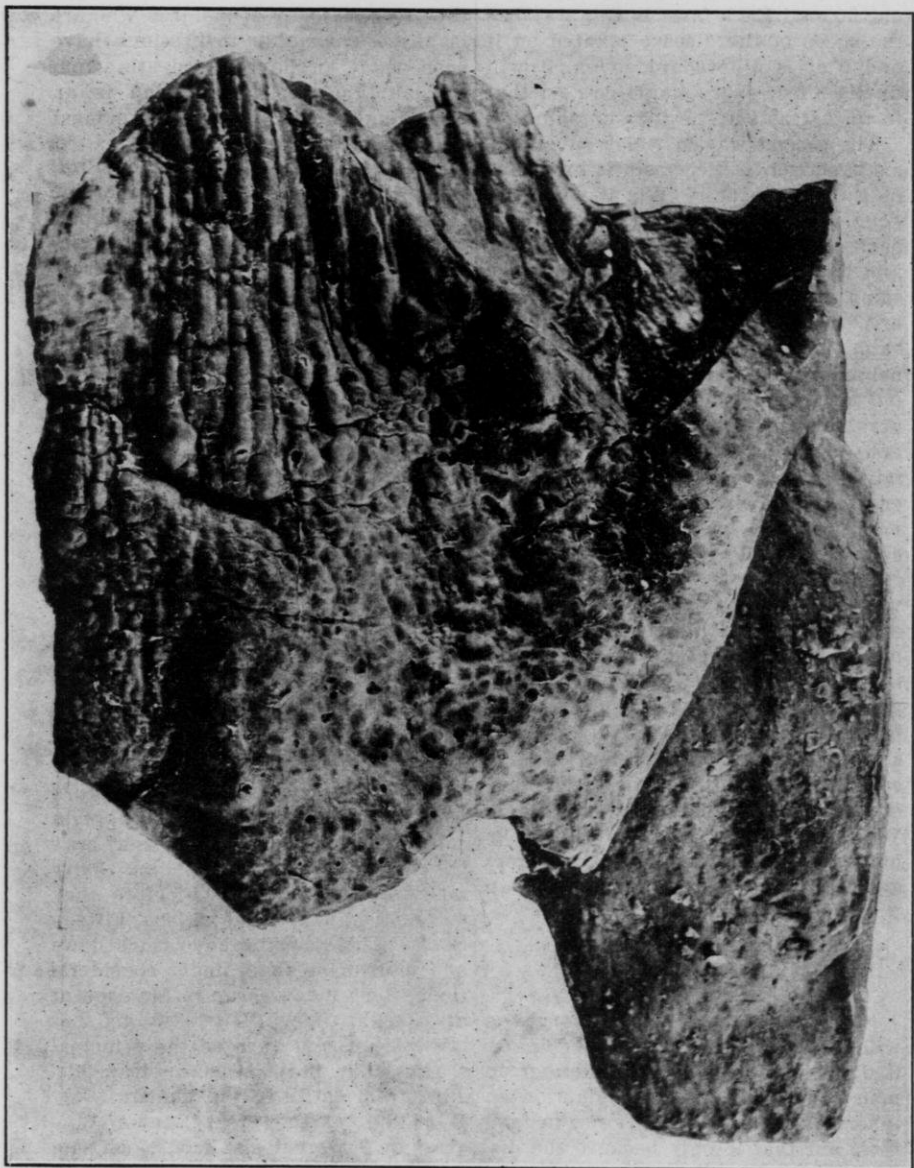
Take the method proposed by Prof. Bang—it has been carried out a few times in this state. If you have tuberculous cattle in your herd, you quarantine those cattle, and raise calves from them according to what is called the Bang system. The sick cows are put on a part of your farm away from the rest of the herd. As soon as the calves are born, separate them from their mothers, feed them on either pasteurized or sterilized milk, or on milk from healthy cows, and you will raise healthy calves every time. The calves won't inherit the disease. Your calves will not have consumption, although born from consumptive mothers.

The Necessity for the Tuberculin Test.

Now, the question of tuberculin testing is going to be brought up later; I simply want to show you some of the points which make this testing necessary.

In a great many cities in the eastern part of our country, and also here in some of the cities of Wisconsin, laws have been passed compelling dairy men to test their herds before they can sell milk in these cities. Fifteen cities of Wisconsin have such laws and more have them under consideration. Such a law is up in Madison at the present time. We tried to get that law passed, and gave as the principal reason that the disease is transmissible from cattle to the human.

In 1901, at the great London Congress on Tuberculosis, Prof. Koch said the disease in man and that in cattle are different, and there was no danger to the human from animals. The English Government appointed a com-



Liver of calf inoculated with tubercle bacillus from child, showing extensive tuberculosis. Child probably infected by drinking tuberculous milk,

mission, and the German Government appointed a commission, both of which worked from three to five years, and I am glad to say that both these commissions reported that the disease was transmissible from cattle to man. This has been done by finding in the tissues of children who died from consumption germs coming from cattle. The German Commission found that ten per cent of the cases they examined had been transmitted from cattle. The English Commission found that about twenty-eight per cent had gotten their disease from cattle.

Therefore, this phase of the law is interesting. Cities all over our country are now demanding that children shall be fed with milk from tested cattle.

But leaving out this phase of the question altogether, bovine tuberculosis is a scourge to the farmer. Some of you may not believe this, because you have never run up against it. In Pennsylvania, where I have been working for twelve years, we ran across some herds where the farmers would not test. In one single case of which I have knowledge, occurring about twenty miles from the city of Philadelphia, we met a farmer of this kind, who insisted upon doing nothing, until his cows got so bad he lost five or six of them inside of a month, after which he had them tested, and cleaned out the diseased ones.

Let me tell you this: Cattle act exactly like human beings to consumption. You will get some cows which will live five or six years in good condition, and in apparently good health, although they have got tuberculosis, and you will get others which will die on your hands within a few months, just exactly as a man having galloping consumption will die in two or three months, while a chronic type will last thirty or forty years. It makes no difference whether your cow

has this rapid kind of the chronic type of tuberculosis, she is bound to infect the rest of your herd.

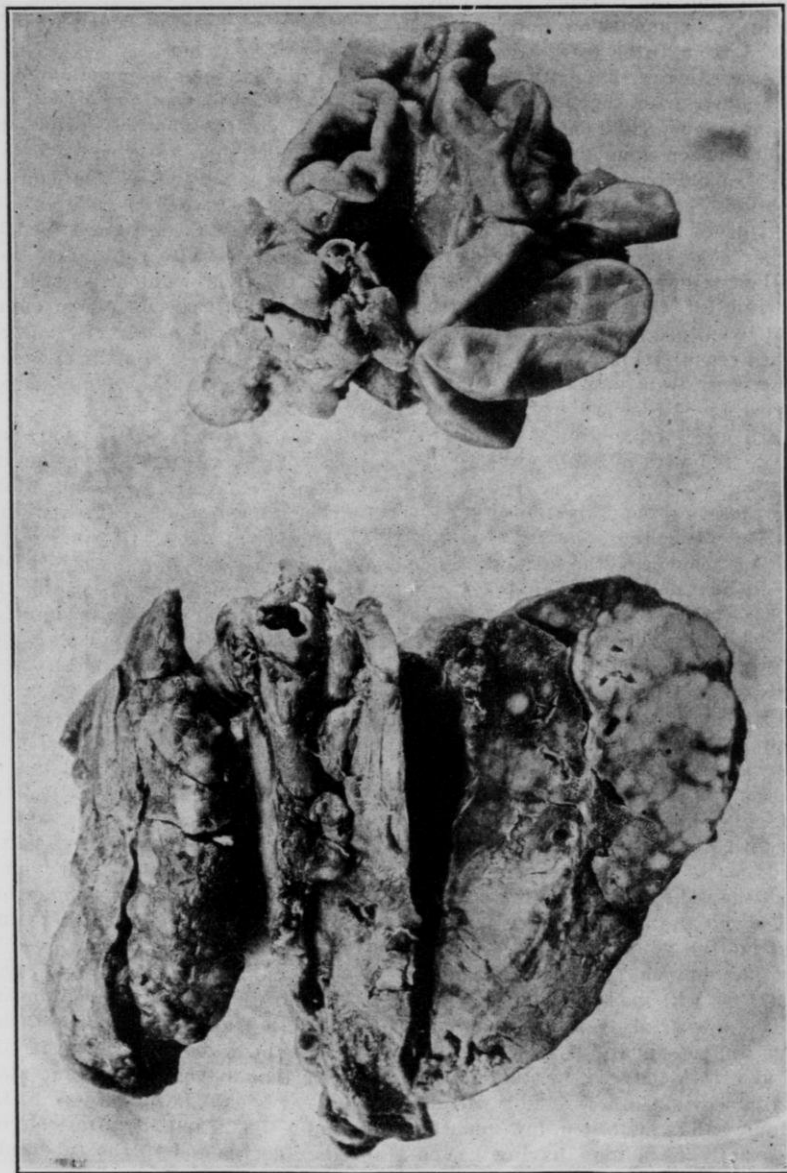
The disease can be communicated from one cow to another; it will pass from one cow to another—even when she is not sick to your eye. Of course the condition of the cow depends on the care you take of her; you can treat her badly, and feed her badly, and she will run down more quickly than one which is well fed and taken good care of. You cannot go by the looks of a cow; if you have got the contagion on your farm, sooner or later every cow on your farm will get the disease.

One other point:—after you have tested your cows and killed the diseased ones, what are you going to do? Are you going to put fresh cattle into your stables at once? If you do, you might as well save yourself the trouble of testing, because this disease is contagious, and your stable is infected. These germs can live five or six weeks at least, and if you put fresh cattle into your barn without taking any precautions, your fresh cattle are surely going to be infected. Therefore, when you clean out your herd, and get rid of your tuberculous cattle, do two things. Disinfect your stable, and be sure that you buy healthy cattle. Don't let your neighbor sell you a sick cow, and don't let some man outside of your state send sick cows into this state.

I hope the next Legislature will pass laws requiring testing, and making tuberculosis a legal reason for refusing cattle. I have bought cows in the State of Pennsylvania. In that state we always bought cows subject to the tuberculin test, and if after buying the cow she reacted to the tuberculin test, the sale was off.

Some Precautionary Measures.

When you clean out your herd, at



Lungs and intestines of monkey infected by feeding. Lungs show far advanced tuberculosis. Intestines free from disease.

the same time clean out your stable. Direct sunlight is the best germ killer we have. Do you know that sunlight will kill every disease germ that we have yet discovered in a few minutes to a few hours, depending on the amount of matter protecting that germ? For instance, what a cow coughs up is phlegm containing the germs. The phlegm covers and protects them, and they are harder to kill on account of this protection. In dark, damp, illy ventilated stables, tubercle bacilli will live five or six weeks; therefore, let me urge that you have your stable well drained, well lighted, and well ventilated, because while we cannot put direct sunlight into every corner of the stable, we can put diffused light in there, and the more light we can get in there, the healthier our cows are going to be, and the healthier our stables are going to be.

Now, in cleaning the stable, I would advise you to get rid of all old wooden troughs. A wooden trough is one of the most dangerous things you can use. You have cracks which it is impossible to clean out thoroughly; therefore the cement trough is very much more healthy. If you have these wooden troughs and cannot afford to get rid of them, scrub them as clean as you can, and then wash them thoroughly with something like lye soap, because strong alkali dissolves the thick material which is in the sputum. After washing, disinfect with a spray pump. There is nothing better to use under ordinary circumstances than milk of lime. This is made from freshly burned, or quick lime. It must be water slacked and not air slacked; it takes about sixty parts of water to one hundred parts of lime to slake it properly, then you mix one part of this lime with four parts of water, the proportion varying a little according to the spray pump you are going to use. It is always better to leave your

stable unoccupied for at least two weeks before you put your fresh cattle in. If you follow these directions, I will guarantee you will never have tuberculosis in your herd. Remember that any disease we have any knowledge of always comes from another source of that disease. There is absolutely no such thing as disease starting by itself. You might just as well expect the most fertile soil in the world to raise a crop of corn without putting any seed there, as to expect the most delicate cow to have tuberculosis without having had any opportunity to get the seed.

Most people will ask, if you do not inherit the disease, don't you inherit a tendency to it, and isn't this about as bad as the other?

As a general rule, if your health is bad, if you are mentally worried, if you lose sleep, if you indulge in too much in the way of alcohol, you are more liable to diseases than is a perfectly robust man, and much the same is true of cattle. You may have the bodies of your cattle or yourself in the best possible condition for the reception, and growth of the germ, yet you will never get the disease unless the germ is put there.

Therefore, the main lesson is to keep yourself as far as you are able in the best possible physical condition, and to keep your cattle in the best possible physical condition. Clean out your herd, then clean out your stables, and put in nothing but clean cattle after that, and I will guarantee that you will never have tuberculosis in your herd.

DISCUSSION.

A Member—Do people transmit the disease to cattle?

Dr. Ravel—They can do so, but it very rarely happens, because the cattle germ is from twenty to thirty times as poisonous as the human germ. It has been done experimental-



Extensive tuberculosis in calf inoculated with tubercle bacillus from child, who was probably infected by tuberculous milk.

ly, and even accidentally, by consumptives tending cattle, but there is not much danger.

A Member—Can the germs be killed in the milk that comes from the factory?

Dr. Ravenel—They can be very easily killed. A temperature of one hundred and forty degrees Fahr. continued for twenty minutes will usually kill them. A temperature of one hundred and sixty degrees Fahr. for twenty minutes will certainly kill them.

A Member—Is it possible for cattle to contract the disease from the manure of infected cattle?

Dr. Ravenel—It is quite possible. Hogs unquestionably contract the disease in this manner, by feeding on the droppings of cows.

Chairman Scribner—The question was asked this morning as to whether it can be transmitted through the medium of butter or cheese to the human.

Dr. Ravenel—There is no question that it can be transmitted through both butter and cheese. If it is cooked enough, the danger is very much lessened, or even entirely done away with. Butter does not furnish a medium in which the germ multiplies or grows; therefore, the danger from butter is comparatively slight. I have never been able to find any known cases of transmission of the disease either through cheese or butter, but the germs have been demonstrated both in cheese and butter, therefore the danger exists theoretically.

A Member—Are sheep and hogs subject to the disease?

Dr. Ravenel—I have never seen a case of tuberculosis in sheep. We can infect them experimentally, but I never have seen a case of tuberculosis in sheep occurring under natural conditions. It is occasionally reported, but it is exceedingly rare. Hogs are the most easily infected animals that

exist. I have seen a large herd of hogs infected by feeding on skim milk from the owner's own cows. They are very liable to the disease.

Chairman Scribner—Is there any way of testing a hog?

Dr. Ravenel—That is a question that has been asked me repeatedly. It is sometimes done. The method is practically the same as for cattle.

Dr. Porter—They are doing it in Washington.

Dr. Ravenel—I presume the value of a hog is hardly considered enough to warrant the expense of testing. It is pretty hard to hold a hog, too.

A Member—Doesn't this tuberculosis start from high breeding and high feeding? I have never seen cut open or examined an animal but what they told me was highly fed, and fed for the purpose of making something out of it.

Dr. Ravenel—I can answer both those questions by a most emphatic no, but must explain it a little. I will go back to what I said about ventilation, and clean stables, and keeping your cattle in good health. If you have a cow which is badly fed, and is bred too close, you will get probably a better soil for your seed, but that is all. Take, for instance, the Channel Islands, where we get Alderney, Jersey and Guernsey cows, some of the finest cattle in the world. There is not one single case of tuberculosis on those islands, and yet in this country Jersey cattle are the ones that are affected perhaps to the greatest extent. As a rule they are highly fed and highly bred, but that doesn't produce the disease—I say this most emphatically. You can have the most delicate strain of cattle possible, yet not have tuberculosis in them. Contagion is the most important and necessary factor. Even the most delicate cattle will never get tuberculosis until

the germ of the disease is furnished for them.

Supt. McKerrow—In curing the human family of this disease, don't you practice high feeding?

Dr. Ravenel—Certainly. The cure for consumption in the human family is high feeding, rest, and fresh air, and the same things are good for cattle.

Dr. Porter—Don't you think that a little good wine or beer every day would ward off the disease in the human system?

Dr. Ravenel—Personally, I think that is a pretty good prescription, but you must be careful that it is "a little."

Mr. Stiles—Is it possible to vaccinate the calves taken from their mothers to prevent them contracting the disease?

Dr. Ravenel—That is a big question. Von Behring in Germany and Pearson and Gilliland in Pennsylvania, have succeeded in demonstrating that you can vaccinate calves so they are not liable to the infection, but the protection does not last long.

Von Behring's vaccine is often dead when you get it, and it has been proved that it must be living to have a warding-off effect. Another danger has been shown by the French:—germs used for vaccine can live in cattle certainly for one year, and

therefore you are running some risk. While in the laboratory we have shown certain things to be possible, we have not yet reached a practical application of our knowledge.

A Member—Do horses have it?

Dr. Ravenel—Very seldom; almost always in horses which have been living in the same stable with tuberculous cattle. I have never seen more than five cases in my life in horses, and those were kept in stables with tuberculous cows.

A Member—If the cattle are very strong and come in contact with these germs, will they take the disease?

Dr. Ravenel—They unquestionably will. They probably will resist it more than weak cattle,—that is, it would take a bigger dose of germs and a longer exposure. Well fed and well housed cattle have more resistance than badly fed cattle. The stronger the cattle, the better, and the greater resistance to tuberculosis, but after all infection is the important matter. Even the strongest cattle will succumb if the germs are virulent and the dose sufficient.

A Member—Do all cows cough that have the disease?

Dr. Ravenel—All cows in some stage of the disease cough, but they may go for a considerable time after having the disease without coughing noticeably.

THE FARMER AND THE TUBERCULIN TEST.

W. A. McKerrow, Pewaukee, Wis.

All over the world scientists, lecturers and demonstrators are carrying on the fight against tuberculosis in the human family, making large and expensive exhibits all over the land showing the danger of this most dreaded disease, educating the peo-

ple and warning them of its spread in many different ways.

In the report of a commission appointed by King Edward and given out by the Surgeon General of Great Britain, the statement is made that by their investigations he is convinced

tuberculosis is transmissible from the bovine to the human family. I was told a short time ago by an eminent scientist that there was nothing that affected the heart of a farmer more than when his purse was drawn upon. I firmly believe if the farmers of our land realized the danger of using products from diseased, tubercular cows, immediate testing would follow, even though the first cost would appear enormous; however, this is not the case. When we stop to figure the economic value of testing at once for tuberculosis, it stands to reason the immediate removal of an infectious disease from our herds is, in most cases, the most economical.

Every good dairy farmer aims to make the most rapid improvement in his herd possible, by the use of the best sires obtainable and by purchasing better cows. Could any one afford to continue this improvement without knowing whether tuberculosis would take them all in time and thus destroy his efforts, when by the use of the tuberculin test he could weed out the disease if there be any and continue the development of a healthy herd, and by testing from time to time know that they are continuing healthy? Why should we wait for a compulsory test when we can readily see the safeguard to health and the economic value of immediate testing?

The time is not far distant when a uniform compulsory test will be established by law in Wisconsin. Our Canadian neighbors have a bill pending before Parliament providing for a compulsory test; the Wisconsin State Dairymen's Association in session last week advised a uniform test for tuberculosis; city councils are providing protection for the people by compelling the application of the tuberculin test, and all milk for the consumption of their citizens must come from non-responding cows.

The diagnosis of tuberculosis is very difficult by means other than the use of the tuberculin test, because the disease is so varied in its attacks on the various organs of the body and in the extent of the development of the disease, it necessarily leads to mistakes when diagnosis is attempted by ordinary means of examination. The tuberculin test, which is marvelously accurate in its indications, has been almost universally adopted for the detection of tuberculosis.

Tuberculin is a serum prepared by sterilizing, filtering and concentrating the liquid in which the tubercular bacillus has been allowed to vegetate. This substance when injected into the tissues of a tubercular animal has the effect of causing a decided rise in temperature while it has no effect on animals free from the disease.

The tuberculin test can be made in the fall or winter months with the greatest accuracy and convenience, when the cattle are in the barn under normal conditions, and no one can do it more safely than the herdsman with whom the cattle are well acquainted. No animal should be tested within a few days of gestation, or one which has a fever in the system from any other cause. Watering the herd should be done immediately after taking the first temperatures; cold water has the tendency to lower the readings.

The instruments required in making the test are, two or more self-registering thermometers, a hypodermic syringe and four spring paper clamps. These may be procured from a local druggist or veterinary supply house, or through our own College of Agriculture at Madison, who supply these instruments only as an accommodation to farmers making the test.

How the Test is Applied.

The tuberculin test is applied by

first taking preliminary temperatures, at intervals of about two hours, a sufficient number of times to establish the normal temperature of the animal under ordinary conditions of life. For the sake of accuracy, at least three of these temperatures should be taken.

The proper dose of tuberculin, which is two c.c. for an animal of one thousand pounds, is injected under the skin just back of the shoulder with the hypodermic syringe. The injection is usually made late in the evening, and the temperature is taken every two hours the following day, beginning early in the morning, about eight to ten hours after the injection is made, and continuing for at least five readings. It is found that the general rise in temperature in tuberculous cows commences about eight hours after the injection of the tuberculin, and reaches its greatest height at from the twelfth to fourteenth hours.

In determining the existence of the disease, we should take into account the tuberculin curve of the chart, which is a gradual rise and fall of temperatures, and no animal should be tested having an average temperature above 103 degrees in the three preliminary readings.

Some doubt the accuracy of the tuberculin test, but from the reports of the highest authorities who have made thousands of tests, and careful post mortem examinations, we find all report a very small per cent of unaffected reactors.

Prof. Bang, of Copenhagen, one of the highest authorities of Europe, says: "Numerous tests in almost every civilized country have demonstrated that in the majority of cases it is an excellent means for diagnosing the existence or non-existence of the disease, but giving no positive information as to the extent to which the disease has progressed."

Practically all the animals which

react are affected with tuberculosis and should be separated from the remainder of the herd. The best authorities, after studying thousands of tests, say that there are few, if any, mistakes made in condemning cattle which show a typical tubercular reaction. This being the case, it should not be necessary to force the test upon cattle owners; they should be anxious to make it for their own protection and that of their families and patrons.

There is no greater danger to the cattle and hog industries of this country at the present time than that of tuberculosis, a disease already widespread and rapidly extending. Without the use of tuberculin, it would be impossible to control the disease and the farmer and stock grower would be at its mercy. With the aid of tuberculin, our herds can all be converted into healthy ones in a few years, and in many cases in a few months.

The Use of Tuberculin in Wisconsin.

Let us say a few words about the use of tuberculin in Wisconsin. Tuberculin is now prepared by the Federal Government and sent to our Experiment Station and Live Stock Sanitary Board for free distribution, provided the regulations and rules sent out by them are followed, namely:

First, the test shall be made within thirty days after the receipt of the tuberculin, the temperature records must be filled out according to directions on blanks furnished with the tuberculin, and sent to either of the departments mentioned above, who will report the results of the test to the owner, and the Department at Washington.

Second, in case any tuberculous animals are found in the herd, the owner agrees to remove them at once from the healthy portion of the herd, so as to prevent further spread of the dis-

ease, and not to sell them to any person for any purpose. Reacting animals must not be disposed of except by the State under the rules of the Live Stock Sanitary Board.

Third, in case any tuberculous animals are found in the herd, the owner agrees to thoroughly disinfect the stables occupied by the herd, with a reliable disinfectant and re-test the balance of the herd in three to six months. The disinfection of the stables must be certified to by the local health officer.

Several thousand cattle are being tested this winter by veterinarians, Short Course students and farmers in Wisconsin, and it is found from test sheets sent to the departments mentioned at Madison that Short Course students and farmers who have given it proper attention are making reliable tests.

It is essential every farmer should know more about this disease and how the test is made, whether he makes it himself or not. It should be a part of his education. As an example of the value of knowing how to make the test, a short time ago two progressive Wisconsin Guernsey breeders went east to Pennsylvania to attend a high-class Guernsey sale. This herd of cattle were furnished with health certificates of a tuberculin test, having been tested by a graduate veterinarian. These two farmers, after the purchase of nine head, thought best to re-apply the test to insure themselves from all danger of trickery. Procuring the tuberculin from the Pennsylvania Department, they went on with the test and found on completion that every cow of the purchase was diseased. If you are employing some one to make the test, know how yourself, and keep an eye on him to see if he does it right.

DISCUSSION.

A Member—How often should the test be repeated?

Mr. McKerrow—It is advisable to make the test at least every year. Some of our farmers make it every two years, but to know that your herd is free from disease it would be advisable to make it at least every year.

A Member—Would you wait a year if you had found some cases reacting on the first test?

Mr. McKerrow—According to the rules and regulations sent out by the Live Stock Sanitary Board, you must re-test the reacting animals in three or four months, six months at the latest, and if you make that re-test at that time, I think that would be sufficient if no further reaction is found.

Mr. Imrie—What is the approximate cost per head for the testing of an ordinary herd?

Mr. McKerrow—That is pretty hard to determine. Our veterinarians make their own fees, but I believe up in the western part of the state, where four or five hundred animals have been tested near West Salem, it has cost the farmers approximately four dollars a herd to test.

Chairman Scribner—Suppose you are making your own test, what is the cost of the experiment?

Mr. McKerrow—The instruments as they are sold from the Experiment Station are four self-registering thermometers, together with hypodermic syringe and four clamps, these things are furnished at about five dollars. The tuberculin is furnished free by the Government to our Experiment Station, or Live Stock Sanitary Board.

Mr. Convey—Isn't it in violation of the law to employ anybody to make the test for pay unless they be a qualified veterinarian?

Mr. McKerrow—I believe that anybody making the test does not need to

diagnose the case; they are simply doing the mechanical work, and I do not believe that it is really necessary to have a graduated veterinarian, yet I understand only graduate veterinarians can collect charges for this work.

Chairman Scott—Isn't it a fact that in many cases, students, graduates of the Short Course, are capable of making these tests?

Mr. McKerrow—I believe the Short Course students are doing most of the testing in the state, especially in the northern part of the state, and you will find in communities through the state the farmers get together and employ some person to do this testing, and if they apply to the Experiment Station Dr. Russell will send out a Short Course student to do the testing in a particular locality.

Chairman Scott—Any careful farmer can read the thermometer and can make the test.

Mr. Goodrich—But a man wants to give a certificate of good health when he sells his cattle that is called a legal guaranty.

Mr. McKerrow—When these test sheets are sent to the Experiment Station, if the test is made by a Short Course student, they then receive a certificate from the Department, don't they?

Supt. McKerrow—No, no. The state will only accept test sheets made by the farmer or student if the sheets are all right when passed on by the State Veterinarian and will accept the cattle only under those conditions. The farmer is losing one-third and the state two-thirds, but if you are selling cattle and want a legal certificate of health, then that has to be made and signed by a qualified veterinarian.

A Member—I would like to know in regard to the legal basis of this subject. I went out and tested some cows during Christmas week, and one

of my enemies came along and wanted to know how many tests I had made, wanted to make me trouble with the veterinary law. I simply diagnosed those cases; I didn't treat any animal. Now, did I violate the law? The law has something to say in regard to the treatment of those cows, but I didn't treat them, gentlemen, I simply diagnosed them, and I have a right to do that. I went to the district attorney of our district, and he said, "You have not violated the law;" he explained the thing, and I thought he talked good sense.

Mr. Goodrich—We all know that among the farmers there are a whole lot of people that do not believe in the test. There are some things that have happened that I think are very unfortunate and ought to be explained. For instance, there was a man that lived near Ft. Atkinson who had a fine herd of cows. He had them tested by the State Veterinarian, and eight of those magnificent, high grade Holstein cows reacted. They were sent into Milwaukee, the owner went with them, and we got back word that they did not show any signs of tuberculosis when they were slaughtered. Now, it ought to be understood that that was under the Government Meat Inspection, and that the animal was not closely examined. You have probably, many of you, heard of that case, the man's name was Hecht, and a good deal has been said about this case. Now, what sort of examination do you think should be made under those circumstances, certainly something more than just a meat inspector's examination, shouldn't there?

Mr. McKerrow—That is all that is required by the Federal Inspectors. In Milwaukee they simply examine and pass those beef carcasses for human consumption. They do not examine the carcasses thoroughly enough to find out whether there are any small

tubercular lesions that are isolated in the carcass.

Supt. McKerrow—It is not a post mortem examination, it is simply a beef examination.

Mr. Goodrich—Yes, but, unfortunately, people do not understand as they should.

Mr. McKerrow—A great many farmers will raise quite a kick when they get the reports back from the Federal Government at Washington, when, as happened, out of a herd of ten cattle which they shipped to Milwaukee, they got a report that three were condemned and seven passed, in other words, that only three of the animals which had reacted to the tuberculin test had the disease so bad in their systems that they were unfit for food. The trouble is not found by the Federal Inspectors in its first stages, because they are not inspecting closely enough to find those small nodules, which may be very small or in isolated places in the body, and not easily seen.

Mr. Martin—In shipping pure bred cattle of any kind, we require a certificate of the tuberculin test. What we would like to know is whether the test made within the year will pass in the other states. The law says it must be certified, registered.

Mr. McKerrow—If you are shipping out to other states, you should have a recent test by a veterinarian.

A Member—If you had a herd of six or eight pure bred cows which reacted, what disposition would you make of them?

Mr. McKerrow—I think I would take the chances on the tuberculin test and dispose of them. Of course, if I had a herd of very valuable animals, I would prefer to keep them in quarantine and get the product from that herd before disposing of them. If I were keeping them four or five months, I would make a re-test of the herd and find out for sure whether

they were tuberculous. I do not think there is any question but what the tuberculin test is a good thing if the test is properly made, and without doubt the disease exists in the responding animal in nearly every case.

Supt. McKerrow—Mr. Goodrich raised the question of part of the herd not showing lesions. There was a case very recently near Whitewater where that condition occurred. There were eleven head, I believe, shipped to Milwaukee and killed, and only three showed lesions so far as the Government Inspectors were concerned, but some of those were so much emaciated that they were condemned and put into the tank. But on inquiry it was found that this test was not made in the proper way, although it was accepted by the State Veterinarian. In the preliminary taking of temperatures, six of those animals showed from 103 to 105 degrees before the injection of the tuberculin. Now, one animal may, from an abnormal cause that we do not understand, show a high temperature of over 103, but when six out of a herd show it, that indicates they are all out of condition. That veterinarian went on and tested the whole herd, and while some of these went higher in the following temperatures, they were condemned, the tuberculin test indicated they had tuberculosis, but the test was not satisfactory, although it was made by a good veterinarian. I guess he didn't happen to have his judgment with him when he made the test, and there will be exceptions of that kind where the tuberculin test does not tell the story, because there is something wrong there to begin with. In this case the high preliminary temperatures said the cattle were not in condition to test at that time.

Mr. Wylie—There is a wrong impression about the work of the Government Inspector. All he is ever af-

ter is to decide whether that subject is fit for food or not. The first thing they do when they go down there, the heads are cut off and they make an examination between the jaws and along the neck. The next thing they examine is the lungs and the liver, the intestines, and if tuberculosis is not found in any of those spots, the animal is passed, unless you go to him and say, "Here, that disease must be there somewhere; I wish you would look a little closer." But he is a hard worked man and if he gets a little time, he may examine the flanks, just before the shoulder in the flesh, and if it has developed very much, you will find it just in those points. But he isn't there to absolutely locate tuberculosis in every case that is put there. He is there to see whether it is fit for food or not. If he does not find it in

the places I have indicated, the animal is passed for food.

Mr. McKerrow—We had a case of that kind in slaughtering our own cattle, where no lesion was found until there was a second special examination made, when a small one was found.

A Member—Can human beings get consumption by eating the flesh of these animals?

Mr. McKerrow—We know when the flesh is thoroughly cooked, it kills the disease germ. In foreign countries, they consume most all of these diseased animals, but the cooking is under the supervision of the Government, and all the meat is thoroughly cooked before it is consumed.

The Member—Is there any cure for it?

Mr. McKerrow—No, I think not, at least none that is practical for the stockman or dairyman to use.

RESOLUTIONS.

The report of the Committee on Resolutions was called for and presented by the chairman, Mr. Nordman, as follows:

Resolved, That we are opposed to all forms of special privilege, whereby any person or combination of persons are given an advantage over their fellows in matters of the production or distribution of wealth.

Resolved, That we favor such a change in our present tariff policy as will enable the farmers of the United States to exchange their surplus products with the people of other nations. To this end we favor maximum and minimum rates and that minimum rates may be granted wherever like concessions can be obtained on our products.

Resolved, That we commend the efforts of our government to control the operation of all forms of business enterprises that tend to become monopolistic in their operations.

Whereas, The widespread use of tuberculin during the last two years under the auspices of the State Live Stock Sanitary Board and the Wisconsin College of Agriculture has revealed the fact that bovine tuberculosis is obtaining a strong foothold in many of our herds in Wisconsin, and

Whereas, The evidence already accumulated points conclusively to the fact that this disease is generally introduced from one herd to another through the purchase of animals affected in unrecognizable stages by physical examination, and

Whereas, In some sections of the state it has been conclusively shown that the infected skim milk of factories has been the means of spreading the disease to young stock and hogs, therefore, be it

Resolved, By those in attendance at the Round-up Institute of the Farmers' Institutes of the State of Wisconsin, that we will use our best endeavors to secure satisfactory legislature from the forthcoming legislature looking (1) to the compulsory pasteurization of skim milk and whey from the factories, and (2) the compulsory testing of all breeding and dairy animals offered for sale, except those for immediate slaughter.

Whereas, The roads of Wisconsin can be greatly improved and such improvement will greatly benefit the people as a whole and the farmers in particular; and

Whereas, We believe it is a just and equitable thing that the state as a whole should help the farmers to pay for these better roads; and

Whereas, Such a plan, whereby the state helps to build country roads, is in successful operation in most of the states of this country and is resulting in a great stimulation of the building of good roads; be it

Resolved, That it is the sentiment of the Closing Farmers' Institute of 1908 that the people of this state, and especially the farmers, should support with their votes the amendment to the State Constitution to make it possible for Wisconsin to use State mon-

ey to assist in building good country roads.

Resolved, That we condemn the advertising of condimental package foods in the agricultural press, as several of the experiment stations have proven that oil meal costing one and one-half cents per pound is of more value than these foods costing ten to fifteen cents per pound, and that of the three hundred and fifty thousand dollars spent annually in Wisconsin for these package foods most of it is wasted, and as the publishers are knowingly printing advertisements that defraud the people,

Resolved, That we demand that this class of advertisement be cut out or we will withdraw our patronage.

Resolved, That we commend the efforts of Postmaster General Meyer in his recommendations for a parcels post.

Resolved, That the law relative to highway taxes be revised so that such taxes be paid in cash.

Resolved, That we appreciate the cordial reception and hospitable entertainment given by the people of Richland Center at this Twenty-second Round-up, and we hereby extend our thanks to the several local committees and to all others whose efforts contributed towards the success of this Institute.

Resolved, That a copy of each resolution relating to legislation be forwarded to the proper legislative body.

On motion, duly seconded, and after some discussion, the report was unanimously adopted.

WOMAN'S DEPARTMENT.

COOKING SCHOOL.

Held at Richland Center in Connection with the Closing Farmers' Institute,
March 17, 18, 19, 1908.

Conducted by Mrs. Helen Armstrong, Chicago, Ill.,

Assisted by Miss Edith L. Clift, Chicago, Ill., Mrs. Virginia C. Meredith,
Cambridge City, Indiana, and Miss Elizabeth Allen,
of Dunn County Training Schools,
Menomonie, Wis.

Stenographic Report by Miss Nellie E. Griffiths, Madison, Wis.

FIRST SESSION.

Tuesday Afternoon, March 17, 1908.

In opening the first session, Mrs. E. G. Ostrander, President of the Home Economics Club of Richland Center, which had charge of the local arrangements, said:

In behalf of the Home Economics Club of our city, I extend a cordial welcome to this Institute and to our city. Your presence here shows a growing interest in a subject so long neglected—Domestic Science. We are all interested in that which produces energy and existence. Food is primitive energy. Formerly we selected food with the view of satisfying appetite only. Domestic Science teaches us to select our food with regard to its building qualities. Important as this subject is, until quite recently there have been no schools where girls could get this learning, and even now, so limited are they that few can avail themselves of them. In Wisconsin women are supposed to have school suffrage. This, however, must not be construed to mean that they

can vote for the County Board, with whom rests the establishment of agricultural schools in which this branch of learning may be taught, therefore it behooves us as mothers to become thoroughly informed in regard to this subject—what Domestic Science is, what it teaches, how it teaches, and whether it is practical, so we may present it to our voters in an intelligent and convincing manner.

Now we know that the subject of establishing such a school is under consideration by our County Board this spring, and we are very glad to have these ladies at this Institute who will give us such information as will enable us to present the matter to our County Board in an intelligent manner.

I take great pleasure in presenting to you Mrs. Armstrong, who has charge of the program for this part of the Farmers' Institute.

Mrs. Armstrong—I feel very grateful to Mrs. Ostrander for putting this

subject in the way she has, not only because it comes very near your own people, but because it saves me from trying to say the same thing. It is interesting to be in a town where there is a club which stands for Domestic Science and where people consider it quite worth their while to study it.

In the work we conduct at the Institutes, as you have already learned, we devote our time to plain, everyday things. I am not going to talk very much about Domestic Science. It seems to me it is far more valuable to have something that is practical to apply and make use of in our own home. It is very entertaining to go to cooking school and see very elaborate dishes prepared from very expensive things, as some of us perhaps have done, but while it may entertain or amuse at the time, it does not give us anything to carry away or make use of afterwards, so I have given you, as you will see by the program, just the simple, everyday things we would use in our own homes. We must have a foundation of plain cooking before we can attempt the more elaborate dishes, and that is what we want to take up first and consider principles more than recipes, which are simply the results of applying principles.

This afternoon we are going to spend our time talking about soups and the cooking of vegetables; we will also prepare a pudding.

I will prepare the potatoes first, because they take the longest time to cook.

Smothered Potatoes, Recipe.

For one quart of sliced or chopped raw potatoes make a pint of sauce with three tablespoons of drippings, four of flour and a pint of milk. Season with salt and pepper and mix thoroughly

with the potato adding a small onion if desired. Place in buttered dish, cover and bake an hour or longer, according to quantity and temperature of oven. Uncover and brown the last twenty minutes.

All measures are level in my recipes.

For this we use raw potatoes and they may be chopped or sliced. Sometimes I put them through the coarsest cutter of the grinder and they can be prepared much more quickly than if cut into pieces. These are cooked with a hot sauce and additional seasonings. I am going to give one variation of the dish and that is the addition of a green pepper that has been cut into rather small pieces. While this is not exactly the season for the green peppers, later when we do have them, we find them very good to use in our vegetable dishes and salads. This may be cut in small pieces and added to the sauce.

In making the sauce, the butter is melted, not enough to brown it at all, but just enough to soften it slightly before the flour is added.

We are going to bake the potatoes this afternoon in an earthenware baking dish and the time for baking varies from an hour and a quarter to an hour and a half, depending on the heat of the oven and the way in which the potatoes are cut, taking longer to cook when cut in large pieces.

In this recipe we have the butter. In my lesson I use butter, but drippings from meat can be used just as well. Fat from bacon which has been fried is very pleasing combined with potatoes, and I do not know any better gravy to serve with baked potatoes than a gravy made from bacon fat, flour and milk. We have the additional flavor of the bacon, but it does not make quite so nice a looking sauce, because it darkens it.

For convenience, the milk for this

sauce has already been heated. It is not necessary to warm the milk, but saves time in putting the sauce together.

Scalloped potatoes may be made by putting the uncooked potatoes into the baking dish, adding milk, butter, flour and the seasonings and baking for an hour and a half or two hours, and that is a good way to cook the raw potatoes, but this way is a little better for two reasons. One is that the flavor of this sauce is different from that I have just given you, because the flour being cooked in the butter gives a different taste, and another advantage is in the length of time for the cooking. We find where we put the potatoes into a warm sauce that they will cook in less time than with the cold milk, and we think the additional time to prepare them is offset by the difference in taste.

In making this sauce, do not let the butter or meat fat brown at all when it is to be used with milk, because that will spoil the appearance. For meat gravies, brown the fat first, but a meat gravy, like sauce for potatoes or chicken, should not be browned at all.

In making this sauce it is more satisfactory to use an enameled utensil than tin, because in using tin the sauce is apt to stick and doesn't cook so evenly, so enameled utensils are always more satisfactory for these mixtures.

Put in just a small part of the milk at once and blend that thoroughly with the fat and flour. It cooks together and is smooth. It is a little better to use a saucepan that has a handle at the side, as the mixture must be stirred rather continuously while it is being cooked.

We use white sauces for so many things that we think it is worth while knowing just what is the best way to make them. It is a little easier to put the milk in the saucepan, heat it,

stir the flour and water to a paste and add to the warm milk, but the result is not the same, because of this difference in taste where the fat is melted and the flour added to that. Another advantage is that the sauce is cooking all the time we are putting it together, so when it is thick and smooth, the flour is cooked, but often in the other way it will not be done, which makes a very unwholesome dish.

We make white sauce for all our creamed vegetables—onions, carrots, cauliflower, turnips and cabbage are all delicious served with this sauce, and then we use it so much for our made dishes. When we have meat, fish or vegetables to be warmed over, there is no way these articles can be reheated so satisfactorily as in a well-made sauce, so we lay a great deal of stress on the making of this sauce.

Salt should not be put into the mixture until the milk is cooked. I sometimes put a slice of onion in the bottom of the dish, or a little onion juice for flavoring may be added, which is a matter of individual taste. The sauce for this is not so thick as we make it for potatoes which are already cooked. With those the starch of the potatoes will not thicken it any more, but in this the starch will make it thicker. The sauce should be about the consistency of cream soup.

I know of no nicer way of warming over potatoes than to chop them, add the sauce and bake them just long enough to brown the top, or even cook them on the top of the stove. They do not taste the same as these, but they are very good. Grated cheese can be added, making one of our choicest potato dishes. Very dry cheese, cheese that will be too dry to use in any other way, can be used in this way. Cook just long enough to heat the mixture through and melt the cheese.

These potatoes are baked in a mod-

erately hot oven. We always prefer an earthenware dish for the baking, it is better than granite, which is very good for cooking on top of the stove, but is not so good for cooking in the oven, as the heat is more evenly distributed; it cooks more evenly than in a thinner material.

When the green peppers are very hot, as they sometimes are, we cut them and soak them first, pour boiling water over them, let them stand a few minutes, turn off the water and use them in salads, or they may be cut into halves, browned lightly and served with steak or chicken. We sometimes stuff the peppers and bake them, using a stuffing of meat, ham, chicken or veal. Peppers sometimes are very hot. A thick skinned pepper is not so hot as a thin one.

If the potatoes are cut very long before they are put into the sauce, they will become hard if left in cold water. It is best never to let them stand very long even after they are peeled, unless old, when they are a little better for standing in cold water after they are prepared, but not for other potatoes.

It is not a good plan ever to have a dish filled too full, as it is apt to run over in the oven. We cover the potatoes over while they are baking, but do not cover them tight, on account of the steam, as it is almost certain to cause the lid to stick to the top of the dish, so you can leave the cover partly off.

I will now get my materials ready for the pudding, as that requires considerable time for cooking.

Steamed Chocolate Pudding.

Recipe.

Beat one egg well with one-half cup of sugar and mix with one cup of milk. Pour this gradually over two cups of flour sifted with three scant teaspoons of baking powder and a lit-

tle salt and add last two squares of Walter Baker's chocolate melted. Place in a buttered mold and steam for an hour and a half. Turn out carefully and serve with creamy sauce.

For this steamed chocolate pudding we have the dry materials sifted together first, the flour, baking powder and a very little salt. The chocolate is to be melted for this; it is not necessary to grate it, the easiest way is to melt it over hot water.

We use three scant teaspoonfuls of baking powder for this quantity of flour, which is always sifted once before measuring and sifted once with the baking powder. We only use one egg, so we use considerable baking powder. The salt is added to this mixture also.

Instead of steaming this pudding this afternoon, I am going to cook it directly in boiling water, using a mold which has been greased, and the lid also, and this is to be put in a deep pail or kettle, boiling water poured around it and boiled for an hour and a quarter.

We sometimes use cocoa in this pudding in place of chocolate, which may be sifted with the flour. Substitute for the chocolate about a half a cup of cocoa, using just a little less flour. We find that many of our simple cakes are just as satisfactory made from cocoa as where chocolate is used. We do not have the same richness we have when the chocolate is used, but it is a very satisfactory substitute for chocolate. The melted chocolate is added to the mixture after it is prepared. The egg is beaten well with half a cup of sugar and mixed with one cup of milk. This is poured gradually over the flour and then the chocolate is added.

I am going to use a melon mold this afternoon with a cover which fits on perfectly tight. This is a very

simple and inexpensive pudding. We use a hot sauce with it.

There is one thing in our cooking that varies more than anything else, and that is the flour. We find that one kind of flour will thicken so much more than another kind that it is impossible to give any recipe that will work equally well with all kinds of flour, so we have to have a variation on that account, sometimes more and sometimes less than the recipe calls for. I think you will find that with the bread flour, that is, what we call Minnesota flour which is largely used for bread, you will have to use a little more milk or a little less flour, as the quantity given makes the batter too thick.

Pour prepared egg and milk over the flour and when it is all beaten to a smooth batter, add the chocolate and stir it very thoroughly, so as to make it very smooth. You see it is a very simple mixture and very easy to make. If you like a flavor of vanilla, a little of that may be put in the pudding itself, but generally we put it in the sauce, either a hard or liquid sauce.

Be sure to have plenty of boiling water ready whenever mixtures are to be steamed, because it is necessary for the cooking to begin at once. Never put mixtures on to steam in cold water. One may be successful in doing it, but it doesn't sound very reasonable. We do not put cakes in the oven and then light the fire, but mixtures that are made with soda and baking powder must begin to cook at once, as they begin to form gas as soon as they are moistened, and if we have to wait until the water or the oven is heated through, it seems certain that we will lose some of the lightness, so we have the water boiling. Have enough water to avoid adding more inside of half an hour. If you have a regular steamer, you can

put on enough water to cook it all, but where you cook it in hot water, you must add more.

We use two of the small squares of chocolate, representing one ounce each. For almost all dishes requiring chocolate, it may be melted instead of grating it, which is not a very pleasant piece of work, to say the least. Stir the chocolate in thoroughly, else it will not be blended thoroughly with the batter. You understand the difference between stirring and beating in making batters. Stirring doesn't give a close, fine texture to batters, a fine grain is produced by vigorous beating. The batter is a little bit thinner than we would have for layer cake.

In steaming a pudding in a mold, allow considerable space for rising. Two-thirds full is about as much as we like to put in a mold. This fills the mold to within about an inch and a half of the top. I have placed the top of a baking powder can in the kettle, so the mold will be raised from the bottom of the kettle. If we put it flat on the bottom, the batter is very apt to stick to the mold. Several thicknesses of paper will answer as well as anything else. We have the water coming up about one-half of the height of the mold.

In the steaming of breads and puddings of various kinds, we always follow the same general directions. There are some changes in using the steamer over this method of cooking directly in the boiling water. For one thing, with the steamer you may have water enough in the kettle or pail to do without adding additional water, but when the dish is cooked directly in the water it is impossible to do that. With a mold of this size, if I had a very large quantity of water it would be apt to displace it. I make no difference in the length of time in cooking brown bread and puddings, whether cooked directly in the water

or over the water. Use a kettle which has a tight-fitting cover. If the cover fits loosely so much steam escapes that the cooking is not done as quickly as it should be. A folded towel can be placed just under the cover to retain the steam. It is very much better to use a covered mold than one which is uncovered. If we do not have a mold that has a tight cover, it is better to place a piece of greased paper over the top. It is likely that the steam which rises from the water will condense against the lid and fall back and make it soggy. A piece of greased paper will answer just as well as a cover, if tied on the top of the can. If you steam brown bread you have noticed that the brown bread which is not covered in steaming is apt to be a little bit soggy when the bread is really cooked through. We have had to put bread in the oven and dry it off, so we think it is better to cover the mold.

We make a good many different kinds of steamed breads and puddings, and we think it a very convenient way of cooking because we do not have to think of the temperature, as in baking, where we have to have the oven just right. Sometimes we see a cake which has a crack down through the crust, which is because the oven is too hot. The heat has been so strong the crust has formed before the rising has been completed, then as the batter continues to swell it does not have any other place to go, so it cooks out through the center. Too slow an oven will cause too coarse a grain and too dry a cake. The baking is more important than the mixing. Many a choice cake has been ruined in the baking. Steaming does away with uncertainty, so far as results are concerned.

I spoke about cake baking because I was asked several questions in regard to it and was told there was

some interest expressed in the matter of cake-making, so I would be very glad to answer any questions in regard to cake baking. I will just speak of the main points in the mixing and baking of cakes.

There are two kinds of cakes, those that are made with shortening, and those made without. All cakes come under these two classes. All cakes containing shortening are put together in the same general way, the butter being first creamed (never melted), the sugar beaten into that, and when yolks of eggs are used they are added at this point. We sometimes beat them singly into the creamed mixture instead of together with an egg beater. Flour is sifted before measuring, then sifted with the baking powder or soda, and flour and milk (or water if more convenient) are added alternately to the first preparation. Stiff egg whites are added last and folded in lightly.

Question—How may we test the heat of the oven?

Mrs. Armstrong—That is one of the most difficult things we have to learn in baking, because I have not seen anything in the way of an oven thermometer that is at once reliable and moderate in price. We have oven indicators which are very satisfactory, though they give relative degrees. We haven't anything that is at once practical and inexpensive in the way of a definite oven thermometer.

Tomato Soup.

Recipe.

Cook one can of tomatoes for twenty minutes with a pint of water, a bay leaf, a bit of mace and parsley, half a dozen cloves and pepper corns, two teaspoons of salt and a small slice of onion. Heat three cups of milk, thicken with two tablespoons of corn starch and allow ten minutes for cooking.

Add one-half teaspoon of soda to the hot tomato, strain through a coarse sieve and add to the thickened milk with three tablespoons of butter just at serving time. Tomato cooked in the same way (or fresh ones in season) may be combined with an equal quantity of beef or other stock and an excellent soup is obtained. Meat for stock should contain some bone well cracked and should be cut into portions and placed in cold water for some time before cooking. Heat gradually and cook very slowly.

Tomatoes require considerable seasoning and we generally use these same seasonings, whether for sauce or soup.

Soup Making.

I want to talk a little while about the making of soups. We are only going to make one kind this afternoon, but I am going to speak about soups in general.

There are three classes of soups, those that are made with any kind of meat, whether thickened or simply as a broth would be. The second is what we call the cream soups, that is, those made from different kinds of vegetables, from one or several combined, cooked and strained and mixed with the heated, thickened milk. Many kinds of vegetables may be used, tomato, corn, carrots, asparagus, celery, etc. Celery is one of the best of our cream soups, tomato and corn also make excellent soups. The third class is what we call the purees, or soups made thick from the pulp of the vegetables from which they are made, such as bean, pea or potato soup. The pulp is pressed through a coarse strainer, which gives a thickness and a consistency to the soup.

All meat soups are made in the same general way, and in cooking meat for soup remember we must have a certain amount of bone in order to get

the best results, and the bone should be thoroughly cracked. We may use meat that is not absolutely fresh for roasting purposes, but the freshest of meat should be used for soup. It will spoil more rapidly in soup-making than any other way. We should have a small amount of fat, and the meat should be firm. The very cheapest cut will give just as well flavored soup as the more expensive cuts. The shin or shank of beef is best for soup-making.

Meat may be wiped or scraped, if there is anything on the outside we want to remove, but do not wash meat before making soup, as we lose a considerable of the juice of the meat. After the meat has been prepared in this way, cut it into small pieces and place in cold water.

This afternoon we are going to make a small amount of stock. The meat has been cut into small pieces, because the more of the surface is exposed to cold water the more of the juice will be thrown out, so we get more juice from one pound cut small than from one pound cut in large pieces. We let the meat stand in cold water before it goes on the fire at all. Let it stand half an hour, or better, one hour. After this meat has stood a reasonable length of time in the cold water, you will notice the water has a decidedly pinkish tinge, which shows the cold water draws the juices from the meat, while hot water makes a brownish mixture, so when we cook meat for the sake of the meat we use boiling water, for a soup, cold water.

Place the kettle over the fire where it will heat through slowly. Remove the first scum, then set the kettle back where it will cook very slowly for several hours, the time depends on the kind of meat to be used; to get the flavor best it will require several hours. The surface water should just bubble slightly, it should not boil hard. Soup does not have as much flavor

where it is allowed to boil furiously as it has when cooked very slowly.

Add seasonings when the meat is thoroughly cooked, also vegetables. The vegetables never should be cooked any longer than is necessary to cook them through. Turnip and carrot are put in just long enough to cook them thoroughly. If the vegetables cook as long as the meat does, the result is a strong, rank taste. Sometimes just a few pieces will give a disagreeable taste to the soup where they cook too long in it.

We use a great variety of vegetables in our soups. Celery roots and leaves will answer just as well as the stalks of the celery. In summer we add fresh vegetables that will give a pleasing flavor.

Soup must cook long enough to give the broth a good flavor and to cook the vegetables through. Various herbs may be added for flavor. A bay leaf, a blade of mace, a bit of parsley, minced onion, or various herbs may be added, making a great variety in our flavors. It is economy to have a variety of seasonings in our pantries, so as to give a variety of tastes to our meat dishes. We can make one kind of meat do double or treble duty by seasoning it differently at different times. Be sure that the kettle for soup-making is closely covered.

After the soup has bubbled until the meat seems to be thoroughly done, we take the kettle off from the fire and if the soup is to be used at once, we usually strain it and take off all the fat that we possibly can remove from the top. Sometimes we add other articles, like macaroni, rice or noodles. Macaroni may be broken into pieces and used to give additional flavor or body. If soup is to be cooked over, we strain it and put it where it will cool as quickly as possible. The more quickly foods are cooled after cooking, the better they are, so we put the

food where a current of air will blow upon it, removing the lid while the food is cooling. If you wish to remove the pieces of seasonings you can put them in a piece of cheese cloth, then they do not need to be strained. We like to use the pulp of the vegetables to give body to the soup, then the seasonings can be put in a cheese cloth and removed.

We are most of us thoroughly familiar with the idea that soup is a very sensible thing for us to use and a desirable addition to the dinner table. Theoretically that is all right, we believe it is a good plan to begin the hearty meal of the day with something light and stimulating, as a meat soup should be. There is not a great amount of nourishment in it, but there is a certain amount of stimulant, and it is good for our digestive apparatus to take a light soup at the beginning of a hearty meal. It sounds all right in the cook-books, but when we have three meals to prepare every day and there are three hundred and sixty-five days in the year, and there is so much to do anyway, we cannot take the time to make soup every day, so while the idea is all right, it does not always work out that way in every day practice. I have found in my experience that soup used for supper or lunch is not only practical, but a very excellent thing to have. A good lunch for school boys and girls is a thick, well-made cream soup, nicely seasoned, served with crisp bread or wafers. Most children like the cream soup better than they do the meat soup and it can be made from a great many different things. One of the easiest is corn soup, because it does not require long cooking, and often for supper in hot weather the soup is a very sensible thing to have. A good soup and a light pudding is ample for a supper or lunch. Cream soup would be used more generally than the meat soups.

These cream soups are easily digested and they contain considerable nourishment, because they are made with milk, and we think a soup made with milk is nourishing. We sometimes make meat soup more like chowder.

Our other class of soups, the purees, are quite hearty, because we have all the pulp of the vegetable served in the soup. Bean soup is improved by adding a ham bone. Parsley is always a suitable seasoning when we have it at hand. These soups should be rather thick. We think potato soup will hold its consistency much better if a little flour is used with it. Perhaps you have found that the potato and milk will separate after it is put on the table. The addition of a little flour will obviate that. Onion is always added.

The cream of vegetable soup which I have given on the recipe slip is a very good one. I think you will find this is a very good combination of vegetables and a very inexpensive soup.

Cream of Vegetables.

Recipe.

Melt four tablespoons of butter in a saucepan and add one-half cup each of cut celery, turnip and carrot, also a tablespoon of minced onion, a bay leaf, blade of mace, bit of parsley, and cook slowly twenty minutes. Then add three tablespoons of corn starch or twice as much flour, and when blended pour over it gradually three pints of hot milk. Add two teaspoons of salt, a little pepper and cook all in a double boiler for twenty minutes. Rub through coarse sieve and add two egg yolks beaten with one-half cup of cream.

We make it differently from the other soups, as we cook the vegetables first in the butter. People are surprised that the vegetables do not become brown cooking in the butter. If

they are kept covered, the steam will keep them from getting brown at all. Cook about twenty minutes and then add the flour to the vegetables and the butter, which is practically the same as making the scalloped potatoes. Then we add to this the hot milk and put it in the double boiler to cook for twenty minutes longer. If you want to serve the vegetables in the soup, as some people like to do, the seasonings can be placed in a piece of cheese cloth. If you want it particularly delicate, after it has been strained add the beaten yolks of two eggs with half a cup of cream. Always dilute egg with milk when you put it in a hot mixture to keep it from curdling. The egg makes the soup creamy and also gives it color. The milk should be scalded before the salt is added.

Question—Does it take the same required time for all vegetables to cook in soup?

Mrs. Armstrong—No, there is considerable difference. For instance, we do not think cauliflower should cook but about half an hour, cabbage three-fourths of an hour, turnip or carrot might take even longer than that. We must vary the time according to the age of the vegetables. Green corn is scraped off the cob, but we cook the cobs first, then put the scraped corn into the same water so as to get the flavor.

Question—Then if you were using vegetables in the soup, you would put in the ones that required the longest cooking first?

Mrs. Armstrong—Yes, that would be best.

We have one rule that we always follow in cooking our vegetables, and that is that all vegetables are put on to cook in boiling water. We do this, first, for flavor; second, because the food value would be less if cooked in cold water, and third, for appear-

ance. In green vegetables the color is very much better when cooked in a small amount of boiling water, both for color and flavor. Cook all other vegetables uncovered. Put them on in boiling water in a large kettle with plenty of water, have the water boiling hard, and leave the kettle uncovered, which throws off little odor.

Question—When your vegetables are done and you have too much water to put in the required seasonings, do you pour the water off, such as turnips or carrots,

Mrs. Armstrong—If we are going to mash them we drain them first. If I am going to have a mashed vegetable, I find it is a little bit better to cook it, drain it, and then put it back on the stove where it will cook dry. There is such a difference in winter vegetables, some are so much drier than others, so it is better to cook them sooner than they are wanted, drain off the water and put them back on the stove to cook dry.

Our creamed vegetables we drain and put into a white sauce. If you have never cooked white turnips that way, try them some time. Cook in boiling salted water, drain thoroughly just as soon as they are done, and put into a thick white sauce, add a little minced parsley if you have it. This is a very inexpensive dish and very easy to prepare. We sometimes combine carrots and potatoes. Cabbage cooked in that fashion and very carefully drained is about as delicate as cauliflower and doesn't have the bitter taste it has where it is cooked a long time. It seems too bad people do not pay any more attention to the cooking of vegetables. The variety of ways in which to cook them and the large variety of vegetables makes it seem as though we might have a variety every day.

Question—Is there an advantage in

the using of soft water in the cooking of vegetables?

Mrs. Armstrong—In hard water they do not cook through as they do in the softer water. Water varies so much it is hard to give any definite rule. We sometimes use soda for softening the water. We find, for instance, in cooking the beans, when we have dried beans, if we cook them in the water without the soda that it takes longer to soften them, and in using the soda it consequently shortens the time for the cooking.

We use salted water for all vegetables that grow above the ground. In cooking potatoes we add salt when they are about half done, and green vegetables are much brighter in color when salted at first.

We have one recipe on the slip that we are not going to use this afternoon, and that is the corn oysters.

Corn Oysters.

Recipe.

To one can of corn add salt, half a cup of flour sifted with a little baking powder, two tablespoons of butter melted, and two well beaten eggs. Fry on a griddle by the spoonful and serve very hot.

We have given you this because it is a very good emergency dish. It is a very good hot dish for short notice for lunch or supper, or even to use for a breakfast dish in place of something more hearty. This recipe will make fifty of the little cakes. We make them about the size and shape of an oyster, but they are not more than half an inch thick when they are fried. They are fried with a very small amount of fat. Sometimes I have to use a little more flour on account of the difference in the corn. There is a difference in canned corn; sometimes it is thin and sometimes quite dry. These are very nice and dainty if fried quickly, so they are

just done and served at once. No fried foods should be allowed to stand after cooking. Use just enough fat to keep them from sticking. I use an aluminum griddle and do not grease it at all, but on an iron spider or cake griddle it will be necessary to use just a small amount of fat.

Tomato as prepared for this soup can be made into a sauce to use with meat dishes, with eggs, fish, meat balls, or croquettes. Half a can of tomatoes will be all that is necessary, combined with flour that has been blended, and serve around or pour over the fish or meat.

The Cook Box.

Long, slow cooking may be accomplished in two different ways. One way is by putting the soup on the fire and keeping it slowly simmering all the while the cooking is being done. Sometimes on a wood stove it cooks too fast and if we push it back it stops. We have another way of doing this which is easier than any we have mentioned, which is by the use of the fireless cooker, or the cook box. The principle is the same, that is, the retaining of the heat which has already been reached, and to do that it is necessary to have the mixture thoroughly heated through first.

I am going to have this soup meat heated now, then have it put in the cook box. We will have the tomato taken off and strained and then I will show you the cook box while that is being done.

As you see, the arrangement which we have here is a very primitive one. It is a heavy, well-made box, about twelve by twelve, with a tight fitting, hinged cover, which is fastened with ordinary window fasteners. The box is lined with asbestos; and the pail, a three quart granite pail, containing the food to be cooked is firmly packed with wool cushions. We can cook

foods that require long, slow cooking in the box, such as dried fruits, soup stock, oatmeal and many of the breakfast foods. We sometimes make baked custard in this box. Slow heat is absolutely necessary always in the cooking of eggs. Slow cooking for a proteid food, like milk or eggs, is much more healthful so far as the digestibility is concerned. We can cook roasts and chops by the quick method, but the tough meats must be cooked by the long, slow process.

Put the soup meat in the box at night, then in the morning take it out and add seasonings, then put it back in the box and leave it again for several hours. Vegetables, cereals and fruits only need to be heated once. We can put meat for stews, etc., on after supper at night, heat them through thoroughly, then put them in the cook box, in the morning take them out, add the seasonings and vegetables, reheat them, then put them back in the box and by noon time they will be ready to serve. Starchy vegetables are not so satisfactory cooked this way as over the fire, because they are apt to become soggy, but some of the other vegetables can be cooked in the box with good results. We do not get any browning or crisping by this method. Baked beans can be cooked in the box, then can be browned in the oven after they are cooked in the box.

Tomorrow afternoon I shall use the meat in the making of the meat turn-over and the stock will be used for the meat turn-over and the soufflé.

Many of these boxes or cookers are made in much more elaborate ways than this. Some of them have two or three compartments with different sized kettles for each. The kettle should fit closely and thoroughly cover the space, so there is no air space in the box at all.

Question—Are things as good when

a small quantity is cooked in a large kettle?

Mrs. Armstrong—I would not put a little bit in a large kettle. Use additional filling and use a smaller kettle, because the air will cool off too quickly.

The article that is to be heated should be heated through. Oatmeal that is put into the box at night when taken out in the morning is usually hot enough to put on the table, or a few moments heating will answer. When we put in soup stock at four o'clock in the afternoon and leave it until ten o'clock the next morning it is warm.

Have the cover fit perfectly tight. There must be no escaping of air if we want to get the best results.

Question—Do you cover the pail with the pail cover?

Mrs. Armstrong—Yes, we have a pail that has a tight cover. If we use two pails, we place one over the other.

Question—Can boiled ham be cooked in that way?

Mrs. Armstrong—Yes, but I would give it two heatings, just as we do the meat. If the ham is very salt, it is good to put it on in cold water. A large piece of meat takes a long time to heat through before putting it in the cook box.

Question—Is it necessary to have the cook box packed with wool?

Mrs. Armstrong—No, other fillings are sometimes used. Sheep wool is used, excelsior has been used, and newspapers torn very fine and packed even in the box are also used as a filler. I know a woman who made a cook box out of an ordinary candy pail. She took newspapers and tore them, just using a single thickness of paper, made wads of them and packed the wads down tight in place until she had the space filled, then placed a pail on top of that and packed around it

with these wads of paper, pounding them down tight each successive layer, then packed it tight to the level of the pail. When the pail was lifted out, the rim was packed firmly. Then a cushion was used for the top. I think the idea of that is better than the one we have. It is more sanitary, because if anything is spilled it is very easy to remove the paper and replace with fresh. It is also less expensive than the wool.

Question—Would not that paper be apt to become damp and moldy?

Mrs. Armstrong—No, there is no reason why it should become damp; there is no steam. Just as soon as the dish is put into the box the steam ceases.

Question—In using these home-made cookers, do the balls of the pail interfere?

Mrs. Armstrong—No, not so small an extension as that?

Just a few words about the soup. For the tomato soup I add the soda to the tomato to prevent the curdling of the milk, and in making cream of tomato soup you may have the tomato ready to strain and heat and you may have the milk hot and thickened, but do not blend at all until just before serving, as it will lose the fine, smooth consistency.

In making the soup, we often find that, while the soup has a very good taste, it is not the color we like to see, so we may get that color by putting sugar into the frying pan and letting it melt and brown and add to that a small amount of boiling water. This can be used for coloring soups or custards or ice cream, or we may use "Kitchen Bouquet," which is a liquid combination of vegetables and sugar cooked to this color and is a seasoning as well as a coloring. I have very often found that the ladies are not familiar with this article, which is so convenient and economical. I always

use it for soup and the meat gravy to give that rich, brown color. Do not use it in sweet dishes, because it is made of vegetables, but we do use it in meat dishes.

Now, about the pudding sauce.

Creamy Sauce.

Recipe.

Cream half a cup of butter and beat into it one cup of sugar and one-quarter of a cup of milk or cream. Heat over hot water and flavor as desired.

We have the butter and sugar creamed and we add to that milk or cream for the liquid sauce. For hard sauce omit the liquid. You may use any flavoring desired. The hard sauce is always best made with pow-

dered sugar and liquid sauce should be made with granulated sugar. The sauce does not need to be cooked, but is set in boiling water until hot and creamy.

Question—How would you prepare the chocolate pudding in the cook box?

Mrs. Armstrong—We could not put this pudding in the cook box. It is only the things that require long, slow cooking that we can use in the cook box.

The sauce was simply left standing in the boiling water until it was in a thickened condition.

In slicing a pudding, always warm the knife first, so it will not make the pudding so heavy in cutting.

SECOND SESSION.

Wednesday Afternoon, March 18, 1908.

In our lesson yesterday afternoon, we spent some time in discussing meats and the preparation of the different kinds of soups. Today I want to talk a little about the cereals and our starchy foods.

I presume there is no line of goods that is more generally represented in our markets today than the cereals, and we divide them into two classes, the cereals that require cooking and those which are already cooked and ready to serve. I think there is a reaction at present in favor of the cereals to be cooked, because there is more nourishment in them than in the foods prepared all ready to serve. To many housewives we find the objection to using them is the long time required in cooking, and right here is where our fireless cooker comes in very well. Last night we left the meat for the soup stock in the

box over night. This morning when the soup was taken out to be heated and the seasonings added to it we put the oatmeal in.

In preparing the oatmeal, or the corn meal, we use the boiling water in the preparation, salt the water before adding the grain to it, and if it is to be cooked in the cooker for a great length of time, we let it boil for about ten minutes first. We realize that these cereals, unless thoroughly cooked, are very unsatisfactory indeed, are very indigestible, and consequently of very little value to us, for it is not what we eat but what we digest that counts, therefore we do not care to tax our digestive apparatus with things that do not digest, but if thoroughly cooked the oatmeal and the corn meal are very valuable to us indeed. They are more desirable in cold than warm weather, because

they are heating foods. In warm weather we would give preference to the wheat cereals. We must realize that the cereals require long cooking; they must either have several hours over the fire, or twice that time in the cook box, where the temperature is very much lower. Whatever is put into the cook box must be heated thoroughly before it goes into the box, because it is impossible for the temperature to be raised any after the article is taken off the fire. If left over night in the cook box, it will be found ready to serve in the morning for breakfast.

While we realize that these foods require very thorough cooking, we find that if a cereal is cooked the day before and reheated for breakfast, it gives very satisfactory results. In cold weather enough can be cooked at one time to last several mornings, and enough only for each meal can be reheated as needed. Cover with cold water when set aside, to prevent a crust from forming.

The cereals that are all ready for use appeal to the housewife because they require so little preparation, and most of us who get our own breakfasts know that five or ten minutes saved is an added inducement. When these prepared cereals are sent out they do not say on the boxes that they require as much time for cooking as they really need. Any package cereals should be cooked at least twice as long as the directions given on the box. If the box says twenty minutes, allow forty minutes, using the boiling water in order to swell the grain in the cooking.

In using the cook box for the meats and soup, we reheat the article, but for the cereals and grains a single heating is all that is necessary and from six to ten hours may be allowed for the cooking of any of these grain foods.

We have so many of these package cereals on the market today that when we want to select some the array is perfectly bewildering, but nine out of ten of these prepared foods, the best thing about them is the cream and sugar we put on them. There is nothing harmful about the cereals, but we very much over-rate their value so far as nourishment is concerned. Quite a complete report on breakfast foods has been sent out by the Canadian Department of Agriculture, and it was perfectly surprising to learn how very little some of them contain of food value. It is ridiculous to claim that these cereals contain more nourishment than the grains themselves contain, and that is what the manufacturers do; they certainly have it written out in a most plausible way.

If we have hearty breakfasts, if we use eggs, and perhaps some starchy foods, such as bread, toast, or muffins for breakfast, or if we have meat for breakfast, as so many people do, then the amount of food value in our cereal need not be very great, but do not think you get a hearty breakfast if you depend upon these prepared breakfast foods, for, as I said before, the best thing about them is the cream and sugar you put on them. For many who lead very quiet lives, who do not get a great deal of exercise in the open air, that sort of a breakfast is very satisfactory indeed, but it is not the kind of thing that the man who is working on the farm is going to find sufficient for his needs for the morning meal, so please bear in mind that the prepared breakfast foods average up very small so far as their food value is concerned, but the other class are very wholesome if we give them thorough cooking.

We use the cooked cereals in other ways besides as a warm cereal for breakfast, and if you have never tried the cold wheat cereals in warm weath-

er, I think you will find them very appetizing for breakfast with fruit. The cooked Cream of Wheat, or Petti-john's Breakfast foods, or some of the other wheat cereals, are all very satisfactory served cold, and when we serve them cold we make the mush differently than if served hot. It takes very little of the grain to form a jelly when the mixture is cold. If made thin and jellied in the cups or molds and allowed to chill thoroughly, then turned out and served either with or without fruits, they are very good. Cracked wheat is particularly good served in this way, but needs long cooking first.

These cereals may be served with sliced bananas, dates, or sometimes with fresh berries, but we would not use the strawberry, we do not think it is a good idea to combine acid fruits and cream, but the bananas, prunes or baked apple combine well with the cereals in serving.

I think most housewives will agree with me that breakfast is about the hardest problem of the day. Lots of people are satisfied with a cereal, eggs, coffee and toast, but others want more of a variety, and it is hard to select the foods that are suitable to the morning meal. Sausages, fried potatoes and buckwheat cakes may suit the hard-working farmer who is in the open air. We do not give that kind of a breakfast to children who are going to school, because it takes too much of the blood to help digest this meal to give the brain active and vigorous work. Have you noticed that after a hearty meal you do not feel like doing mental work? We like to rest awhile, we are far better able to do physical work than work that requires any amount of thought, so we realize that these hearty foods are not the best thing for those who are not doing hard manual labor, and it is hard to choose the breakfast for

those in-doors a great deal of the time, but we feel that the cereals when served with cream are a great help in our diet, and if we have, as I said before, a hearty meal, then prepared cereals may be used to good advantage, but the manufacturers claim so much for them it is amusing to read their descriptions, and we are apt to believe them because it is down in black and white.

Cereals.

Recipe.

Cook rolled oats in boiling salted water for ten minutes, then place in cook box over night. For wheat cereals with dates, prepare the fruit by cutting it into strips, then cover with boiling water for ten minutes, drain well, add to the well cooked cereal and serve with cream.

Always use boiling water in the cooking of cereals. In cooking corn meal, we have the boiling water, salted, and pour the meal gradually into the water. In that way the mush may be kept smooth and is very much better than when it is all put in at once.

People do not realize the importance of corn meal in the diet, nor the good things which may be made from it. There is a vast difference in corn meal, some is so very dry it is impossible to make anything good from it, but it is possible to make many good things from good corn meal. Most people in using corn meal mix the batter too stiff. It thickens more than flour. We always get more satisfaction from corn meal mixtures when we use sour milk and soda, it makes a more tender mixture. We find too that most people use a little corn meal and considerable flour, but it should be just the other way, more corn meal than flour should be used. People in the north put sugar in their corn bread, but the southern people, who

make delicious corn bread, never do. Hot breads are sometimes indigestible, but often that is from slack baking. In baking powder biscuits we often see little biscuits made so there is a crust all around them; they will almost melt in your mouth. There is more in the baking of these mixtures than anything else, so far as digestibility is concerned. Hot breads are called indigestible because there is so much that is soft in the center and we are apt to swallow it without chewing it. Hot bread should be thoroughly masticated. The crust is always the better part in the biscuits. Muffins and all forms of hot breads should be baked so there is a crust all around them; if biscuits or bread are put in a pan close together so there is no chance for a crust to form excepting on the top and bottom, that has much to do with their indigestibility.

In using the corn meal we make the muffins, the corn meal soufflé, the plain corn meal mush and corn meal dodgers, a batter that is dropped by the spoonful into the frying pan and browned lightly on both sides, or baked in the oven until they are quite crisp. We make corn meal and rice muffins, the regulation corn bread, and what the people call corn mush.

A very good breakfast dish can be made by using the corn meal with cold meats of any kind. When the corn meal mush is made (it will brown better if made with milk) if we have a cupful or less of cooked meat, that may be chopped and added to the mush just before it is taken from the fire, poured into a baking powder can to let it get cold, then slice it and fry it in the frying pan. It is a good breakfast dish. It is possible to use corn meal in a good many different ways if we experiment with it, realizing always that the batter must be soft when thus used.

Macaroni with Cheese.

Recipe.

Cook one-half package of macaroni uncovered in plenty of boiling salted water until tender; drain well and place in cold water to whiten. Make a white sauce with four tablespoons each of butter and flour and one pint of milk. Season with a teaspoon each mustard and salt, also paprika, and add a cupful of grated cheese. When sauce is thoroughly heated, add the cooked macaroni and the yolk of one egg mixed with a little cream. Cover with cheese, place in baker and brown in a hot oven.

In cooking macaroni have the water boiling to begin with and have plenty of water. Those who have cooked macaroni realize that it is very apt to stick, so we grease the pan lightly at first, then put it on to boil, adding salt to the boiling water.

In preparing macaroni, spaghetti, vermicelli, and these various forms of starchy foods, there are two or three things of importance to remember. First, the macaroni, spaghetti and vermicelli are all the same material. They are made of the best wheat flour and contain considerable nourishment, but very little flavor. Never put macaroni to soak before it is cooked. People are apt to think that macaroni is not clean and needs careful washing, probably arising from the fact that it is prepared in Italy and we think perhaps it is not quite as clean as we like to have it, but nine-tenths of the macaroni is made right here and it is made in the cleanest possible fashion. The paste is prepared entirely by machinery, is forced through tubes by long presses and is spread out on large frames of cheese cloth and these are spread out to dry in a very clean, dry room, there is no handling of the material at all with the hands, except when it comes to be

packed in the boxes, and then it is done with hands quite as clean as we usually have in our own kitchens, so it is not necessary to wash the macaroni before cooking it, or if washed it should be done quickly.

Cook the macaroni uncovered, so it will not boil over. Boil rice in the same way. The time depends somewhat upon the macaroni itself, probably from thirty to forty minutes. After the cooking is done, we drain the macaroni thoroughly and cover it with cold water. It may stand that way ten minutes or ten hours, it does not make any difference. You can cook the macaroni in the morning, then drain it, cover with cold water and let it stand all day, then fix it for supper.

Most of us who are fortunate enough to do our own work realize if we are going to be out very much afternoons that supper usually has to be started right after breakfast, and it is just as easy if, when we know we are going to be out in the afternoon, we start things in the morning, as it is to rush home madly and have supper late, instead of having it half ready before we went out. There are lots of things that can be done by what I call "previous preparation."

We serve macaroni with cream sauce, with grated cheese browned, we put it in a baking dish and brown it, we use a tomato sauce with it, or a brown sauce, sometimes we add chopped meat or tongue, or some highly seasoned meat. These starchy foods are very desirable, but we have to add a flavor to them, because they are practically tasteless unless we do, but very good dishes can be made from them if something is added that has considerable taste.

We cook the macaroni first, then put it into the frying pan with butter and tomato, either the pulp or fresh tomatoes, sliced onion, also green

pepper cut in pieces, and let it simmer, adding water or meat gravy. Let this simmer for about half an hour and thicken slightly; this makes a very good supper or lunch dish.

Corn Meal Souffle.

Recipe.

Cook three-fourths of a cup of corn meal in one pint of hot milk until thickened, add salt and remove; then beat in the yolks of four eggs singly and add last the stiff whites of eggs. Bake in a moderate oven, in earthen dish preferably, until light and nicely browned, and serve at once from the baking dish, either with butter or meat gravy.

For this corn meal souffle I am using the corn meal that comes in packages. It is more expensive, but it is preferable to most meal that is sold in bulk, it is more moist and tender than meal I usually find. Generally speaking, bulk meal is not as satisfactory as the package corn meal. I am using the Quaker corn meal.

We cook three-quarters of a cup of corn meal in one pint of hot milk until it is slightly thickened, then beat in the yolks of four eggs singly, let it stand for a few minutes and then add the whites of the eggs. We do not like to add the whites of the eggs to the hot mixture because they lose their lightness. When the milk and meal are cooked together it should be a very thin mixture. Beat in the yolks of the eggs thoroughly, just as if they were being beaten for cake. Be sure that the mixture has stopped bubbling before the mixture is added to it, or else we will have something we had not figured on, for the egg cooks with so little heat. We usually let it stand about five minutes before putting the whites of the eggs with it; it is not necessary to let it get cold. This dish is usually served with meat that has

a gravy to it. It is good to have it when you have a roast, for the oven will be just about right to cook the soufflé. It is nice with any kind of a roast, as an additional vegetable, served right from the baking dish, or put on a plate and the gravy or butter put over it.

In adding the whites of the eggs to this mixture, they should be cold, a little salt is added to them and they are beaten with a wire whisk instead of a Dover beater. After we have beaten the whites of the eggs until they are stiff and dry, we add them to the soufflé very gradually, so they will retain their lightness. As in Sunshine cake, we do not beat the mixture hard after the stiff whites of the eggs are added to it, so I shall mix it very thoroughly and bake it in this butter bowl about half an hour. Use a moderately hot oven, we do not use a very strong heat for these mixtures. This is a soft, spongy mixture and must be thoroughly baked or it will fall when it is taken from the oven, and it must be served when it is ready or it will settle a little. This is one of the most delicate corn meal dishes. We have several kinds of soufflés, a cheese soufflé, made with a thin sauce, or a tomato soufflé are both very delicate. I am using a perforated spoon, because that keeps the lightness in the mixture better than an ordinary spoon. Do not stir or beat the mixture, just draw the spoon lightly through it. An earthenware dish is better to bake this mixture in than a granite or tin dish. If you have to use skimmed milk, add a spoonful of butter after it is taken from the fire.

I will now make the sauce for the macaroni. I am warming the milk. Perhaps some of you who cook macaroni have found there is a great deal of difference in it. I find there was a misunderstanding here. I mentioned

some brands of goods that I wanted, not because I am advertising those goods at all, but I always feel if I get hold of anything that I know is good it is only right that I should let others know the fact. Red Cross macaroni, also the Marvelli brand, are both good. We will make the same sauce as we did yesterday for the potato, only this is a thicker sauce. For the macaroni we like the cheese, and it is more satisfactory to use cheese that is rather dry. When I have to use very fresh cheese, I find it makes a better crust if I use cracker crumbs or bread crumbs with the cheese, but dry cheese browns very nicely.

Make the sauce with the butter, flour and milk, season with salt and paprika, and only a small amount of salt where cheese is used. If cayenne pepper is used, do not use as much as of the paprika because it is very much stronger. We use paprika with cheese mixtures, chickens or salads, or in almost every place where the ordinary pepper would be used. Melt the butter in a pan, then add the flour to it, and last of all pour in the milk. A quarter of a cupful of butter may be used, or a smaller amount will answer, but of course it does not make the dish quite so rich. Do not let the butter brown at all. Be sure that the flour is sifted before it is used for thickening purposes, in fact, for anything if you want the dish to be smooth.

I find that one of the most satisfactory things for the making of sauce is a wire whisk. Butter and flour may be mixed more readily with it than with a spoon, because it takes the lumps out of the mixture as soon as they form.

Add the seasonings after the milk has been scalded, for the salt sometimes causes milk to curdle. These sauces, if made on a gasoline or oil stove, had better be put over an as-

bestos mat, then they are not so apt to stick to the pan. They must be stirred all the time we are putting them together if we want satisfactory results. There should be just enough of the sauce to moisten every particle of macaroni. If we just add the cold milk and raw flour it would require more cooking, but this is all cooked and needs to be put in the oven only long enough to heat it thoroughly and brown it on the top, or it could be served hot in this way without any baking.

Creamy Rice Pudding.

Recipe.

To one-third of a cup of well washed rice add a scant cup of sugar, a teaspoon of vanilla, a little salt and two quarts of rich milk. Bake for two and one-half hours in a slow oven (one oven burner about half on), stirring mixture three or four times during first hour. Serve very cold.

I want to speak about the preparation of this rice pudding, which, I think, is the easiest and one of the best kinds of rice puddings, and, as it requires a very slow oven, we thought it well to make the pudding this morning.

Wash the rice thoroughly, then let the cold water run through it, add the sugar, flavoring, a little salt and two quarts of rich milk, and bake for two hours and a half in a slow oven, stirring mixture three or four times during the first hour. It seems like a very small amount of rice, but when it cooks long enough and slow enough it is a very nice pudding. It is an old-fashioned pudding, it used to be called "Poor Man's Ice Cream." It should be baked in an earthenware dish instead of a thinner one. A tablespoon of butter added to this gives the brown crust on the top. If the milk is rich, you need not use any butter at all. It is stirred occasionally while it is

cooking, then at the last it is allowed to brown nicely on the top.

We have had the soup meat taken out from the kettle. We are going to use that meat for the turn-over and the gravy will be thickened and will be used to serve around the meat roll and also around the soufflé. It will be thickened and used just as it is from the meat stock.

I am going to cook a little of the Cream of Wheat and serve it with the dates this afternoon. We think the dates are excellent to use with the cereal, or figs may be used, and that is a very good way of using a mild laxative for children. Bananas, dates, raisins, currants, may all be served that way and will be more appetizing than if served otherwise. We use Pettijohn's Breakfast Food in the same way with fruit. Occasionally to serve with meat, Cream of Wheat will take the place of potato, and it is best served with gravy. We use hominy in the same way, as a substitute for potato.

Question—Would you serve fried mush with meat?

Mrs. Armstrong—If the fried mush is served with meat, all it would need in it would be a little bit of butter, more as we use sausage, making it a substitute for meat instead of a substitute for potato. Delicious corn bread can be made with the scraps of fat. Where we have pork fried out and all of the liquid fat is drained from that, there are bits of crisp fat which are stirred into the corn bread, and where that is used no shortening would be used at all.

Question—You spoke about serving fruits with cereals, but all the fruits you spoke of are boughten fruits. Why not use berries in their season?

Mrs. Armstrong—During March, as other winter months, we must depend on these. The berries would be used in season. When we have the fresh

fruits we do not serve them in the mush, but serve them with the mush.

A Lady—We have found that rhubarb sauce well sweetened, or even made as a sort of butter, is very nice.

Mrs. Armstrong—I think that would be very satisfactory, too. Rhubarb is very wholesome, and if scalded before cooking need not be peeled. If rhubarb is cooked in the oven in a baking dish with no water and the sugar added when it is almost done, it will have a better flavor than if cooked on top of the stove.

A Lady—I think that canned raspberries could also be used with the cereals after draining off the juice.

Mrs. Armstrong—Any of the fruits that combine nicely with cereals could be used. We all find that in our own individual families we have to arrange matters in regard to our taste and mode of living. I feel sorry for the woman who is tied to the cook-book. We should have a little inventive ability, finding it possible to substitute one thing for another if we do not happen to have what the cook book calls for.

Question—Do you ever put raisins in your rice pudding?

Mrs. Armstrong—No, I do not in this pudding because it is quite good enough without. Raisins are also apt to cause the milk to curdle.

Meat Turn Over.

Recipe.

Prepare a crust with one pint of flour, one teaspoon salt, three scant teaspoons of baking powder, and three tablespoons of shortening. Moisten with milk until soft enough to handle and roll out about half an inch thick, in oblong shape.

Spread with chopped, cooked meat slightly moistened with stock or soft butter and water and roll up compactly. Brush lightly with milk and bake in a moderately hot oven. Serve with hot brown sauce.

We are going to use this meat for the turn over. For this dish we prepare a crust just the same as for baking powder biscuit. It may be made with milk and shortening, or with cream without any shortening at all, which makes a very delicate crust indeed. About the crust that I am preparing, the flour has been sifted with the baking powder and the salt. We use three level teaspoons of baking powder. If we had used eggs then we would not have used so much baking powder. I have rubbed the butter into the flour with a spoon. We will add milk to make a soft crust and roll it out just as thick as we would roll it for biscuit. Use just as much moisture as the flour will take up without being sticky. Dough of this kind should be handled lightly. Baking powder and soda crusts should never be handled very much, but if worked lightly with an ordinary table knife we can make a more even consistency.

Question—What kind of baking powder do you use?

Mrs. Armstrong—Either the Rumford or the Royal. The Royal and Price's are the same. The Rumford powder is a phosphate powder and a little less expensive than the cream of tartar powders.

This crust should be about half an inch thick, about six inches wide and twelve inches long; we will spread it with the meat and roll it up. A little water and butter may be added to the meat if no gravy is at hand. Almost any kind of meat may be used. Chicken with white sauce, mutton with tomato sauce, etc., may be used. The crust is to be brushed with milk after it is placed in the oven, so it will brown nicely. Baking powder biscuits will always have a better crust if brushed with milk before being baked. Do not make the roll too thick, because it takes too long to bake it through. There should be plenty of gravy to serve with the roll.

THIRD SESSION.

Thursday Afternoon, March 19, 1908.

THE CHILD, A FARM PRODUCT .

Miss Elizabeth Allen, Menomonie, Wis.

It is a great pleasure to me to stand before you, to look into your faces and read there the evidences of a certain discontent, for I take it such is the impelling power that has brought you all together in this Institute. Had you, every one, been satisfied and content with what you are having and doing in your own homes, you would not be here, and I am glad there is such a feeling as a noble discontent, —a feeling that will not let us rest until we are having the best we can have and are doing the best that we can do. If I knew that I could say something really worth your while today, something that would aid you in solving even one of the problems of the home and the family, I would feel that it is good to have come here to you with my message. I consider it, however, more than a pleasure, it is also an honor to stand before you and to be permitted to address you; for this is a great body. I read with much delight President Roosevelt's opening words to the delegates of the International Congress of Mothers, held in Washington, D. C., this month. He said, "This is the one body that I put ahead even of the veterans of the Civil War. When all is said, it is the mother, and the mother only, who is a better citizen even than the soldier who fights for his country. The successful mother, the mother who does her part in rearing and training aright the boys and girls who are to be the men and the women of the next generation, is of greater use to the

community, and occupies, if she only would realize it, a more important position than any successful man."

Had I talked first, I might have given some suggestions of greater or less value along the lines of domestic economy, for I hold it a fundamental truth that a good school teacher must, first of all, be a good housekeeper, beginning with herself, then reaching out to her immediate surroundings and culminating her work in her school room as to cleanliness, orderliness, fitness and beauty, but the rich feast you have been having for three days would leave me but little to say along such lines.

Still, I had an interest, real and personal, in coming to you, an interest in that which is your greatest interest, the boys and girls in your homes. So I have chosen for my topic, "The Child, a Farm Product," the finest, most improvable product of your farm. In them our interests meet at a common point of contact, interests which will not merely lead us into pleasant social relations, but tend, I trust, toward a worthy consideration of some of the necessary questions of Socialism in the home.

Now, you have come from all parts of this splendid state of ours, you have come from your rich farms with their generous fields, their well kept fences, comfortable homes, barns bursting with plenty, well cared for, contented cattle, horses, sheep and poultry, adequate machinery and many modern appliances, and you are here struggling

and striving for best methods and processes of utilizing and improving it all.

It is a great thing that the conditions and progress and prosperity in farm life today are such that the former desire to leave the farm and remove to the city or town as soon as a sufficient competency should be secured has been overcome, and is, indeed, a thing of the past. It is a great thing that it is no longer true that the brightest boys and the most efficient girls want to get away entirely from the farm home.

Some fifteen years ago Octave Thanet, writing of the farmers in the north and south, said, "The farm life is a lonely life, and until we solve the problem of mitigating that loneliness, our people will not turn to the farm save as they are flogged there by necessity." That was undoubtedly true of the Iowa farms of which she wrote at that time, and it is doubtless true of some sections of our country still, but we are to be congratulated that it is no longer true of us in Wisconsin.

The mitigating processes of the rural mail delivery, rural telephone service, traveling libraries, Farmers' Institutes, County Training Schools, County Schools of Agriculture and Domestic Economy, interurban electric service, and organized good roads work, added to the fine progressive spirit of the men and the women on the farms, have caused it now to become rather a question of brains, than of necessity, that determines whether the boy and the girl, the man and the woman, shall choose this occupation of life, and advance it from a mere avocation to a real vocation, and these mitigating processes have made your State of Wisconsin occupy an enviable position in this country and in the individual estimation of other states.

But we are stopped by a greater

proposition than any of those so ably presented in these splendid meetings you have attended these three days past, and it is this: To what end are we doing this? Is it merely to improve our farms, to raise more products, to feed more stock to sell and get more money to buy more land, to raise more products, and so forth, and so forth? Is it not rather that the child in the home, the boy and the girl, is it not for them you strive and toil, is it not for them you study to improve, is it not for them the heavy work is done, the old clothes worn longer than they should be, and the hours of the day counted too few for the great labor? It is that they may have an education, it is that they may study music, mechanics and art, that they may go to the schools provided by State and County, that they may have their chance to reach out to greater, higher, nobler things than you have been able to do.

It is largely to the schools that you are looking for these better things. That is right, for surely the school and the teacher can do many things for the children that you cannot do. At the same time you mothers can, and must, do many things that the teacher never can do. Hence, it is by co-operative effort that the work shall be accomplished.

Dr. G. Stanley Hall, in a recent address, says, "Few who do not live in the work realize how profoundly the educational system of this country is now being revolutionized. Parents are steadily unloading more and more of their duties upon the school, even house-work, darning, patching, sewing, cooking, gardening, bed-making and washing are no longer learned at home, but in school, so that at five or six, if not earlier, parents come to feel that their duties to their children are slight."

That may sound exaggerated, but

how often do we hear it said that today the public school takes care of the intellectual and physical training, the Sunday-school of the moral and spiritual training, so that provision of food, clothing and shelter is all that is left to the home. I believe you will agree with me when I say, Woe to the community where such can be the case, where there is not the warmest and heartiest co-operation between parent and teacher. Jacob Riis says very truly, "I hope to see the day when every teacher will be a natural and cherished guest in the home, cherished even as one of the family, and not until we have come to that will we have struck the real key-note of school reform. When the home and the school stand together, the school will have acquired a backing that will keep it safe and true to its work, and make it the cornerstone of our liberties and the honor guard of the Nation."

So it is concerning youth we have to consider and it is an intricate and delicate study, for no two children are alike. Every boy, or girl, differs as much from every other one in character and temperament as in appearance. Even in the case of twins with the same ancestry, heredity, environment and training, they differ, often, as fundamentally in tastes and talents as children of different families, hence each one becomes an intimate object for study. You know that it is possible to predict the speed a thoroughbred colt will approximate, or to anticipate the quality of an Ayrshire or a Durham, but who is wise and sagacious enough to discover in the nursery the coming statesmen, poets, scholars, scientists and artisans, or even to foretell what qualities of mind, character, or body will be developed? No one can estimate the power of an individual, the "ego" that dwells in each bodily frame, and that asserts, in the course of life, supreme author-

ity. Nor is one cunning enough to determine the extent to which the individual will be influenced by association with his fellows, so complex are the conditions in which one lives. No one knows the force, or the influence, of the elements that nourish the body, the air one breathes, the tones of voice, the religious faith, the conventions of society, the thoughtless joke, the friendly warning, or the helping hand.

This means that until they reach maturity, every boy and girl requires positive guidance, personal and constant, from the home, from the mother, from those elders of the family who have had longer experience in the ways of the world. And it is here that there comes the dividing line between co-operation between school and home, and the responsibility that rests almost absolutely in the home.

It is cruel, and in some cases it may be even counted criminal to allow a child to experiment for himself upon matters pertaining to conduct of life, —to say that "Experience is the best teacher," and that the child must choose his own course. The young are as much entitled to know what older persons have discovered concerning conduct of life, and to receive restraint and warning until their eyes have been opened and their powers of judgment have been developed, as to be taught laws of diet, of climate, and of government.

Every child, boy or girl, is entitled to be trained along the lines of moral, as well as intellectual, well-being; though many a tender mother and loving father have not yet realized this. "Go to school, learn your lessons, mind your teacher, and win a diploma," is not the whole gospel of child training from the home point of view.

In answer to the question, "Why are not our boys and girls better chaper-

oned?" the answer has come, "It is because we must trust them." That is a good point, but while we trust fire and water and other forces, we watch them and keep them in control, and is it not the high function of the home to avert tragedy in the social life of the young by keeping in touch with them, by sympathetic precepts, and by wholesome example?

A second responsibility that I believe rests with the home even more than with the school, is to train the child to put a proper valuation upon himself, to establish his self-reverence, to treat him in such a way as to cultivate his own self-respect and thereby to give him that ease of manner and freedom of self-expression that so many of our young people from the rural districts are lacking in. Do not hesitate to let your boy and your girl know that they are worth while, and that there is a still greater value that they may attain to through study, training and culture, that will place them on equal footing with their fellows and give them a worthy confidence in themselves.

A third point of responsibility is that of the reading the boys and girls of our state are doing. In my many visits to the rural homes of our county, I am often gratified to note the amount of good reading matter provided for the home. Magazines and newspapers, and library books are on the table and are generally read. This is as it should be.

I do not wish to discuss the question of young people reading the daily newspapers, there is too much to be said on both sides of the subject, but I do wish to express a strong protest against the decrease of the reading of the Bible in the home. What does it mean when, in a group of twenty-five of our most intelligent young people from the rural districts, but two could respond to the call for the Twen-

ty-third Psalm? Why is it that allusions to scriptural literature and characters fall to the ground far more often than those to Shakespeare's characters, or those of Mythology? Hercules they know, and Portia, Rosalind, Macbeth, The Vision of Sir Launfall, To a Water Fowl, Evangeline, and Snowbound are familiar friends. Why is this, except that the school in its work in literature is recognizing its responsibility, while the home is not training its young to read the greatest book, from a literary standpoint alone, that the world has ever produced? The school has no operation here, it teaches Literature, and it teaches it well, and I regret to say that the time has not yet come when not only will Bible literature be permitted by law, but will be required to be taught in the public schools throughout the state, not as a matter of Doctrine or Religion, but as a literature.

It is said, and not entirely without justice, that this is an age of vandalism and irreverence, an age of obedient parents. This thought brings us to the consideration of a fourth point of responsibility resting on the home. It is this,—you must teach the boys and the girls in your homes that the first law of life is to obey, and that the greatest master to obey is one's own self. That policy, adhered to firmly and unrelentingly, will do away with irreverence, violations of truth, honor and purity, and establish reverence and respect for those in authority. It is absolutely necessary that these lessons shall be first inculcated in the home, then the children will be noble and high minded, and your schools become what, in your highest ideals, you desire them to be. The home is the dearest, most sacred spot on earth; here is the heart of the child, here he must learn to lay hold of the high things of life, here he must learn to lay hold of the law, here it is

that he must find the highest love and happiness, and the possibility of the fulfillment of every good thing.

Give love and happiness without stint or measure to your children; open up each young life to the sunlight of lofty purpose and broad living; watch each step, each outgoing

and incoming; keep the standard high, the influence strong, the inspiration lofty, through love and sympathy, thus you will strengthen the moral tone of the community, make good men and women, dignify and make the home attractive, and meet the need for educated citizenship.

THE HOUSEKEEPER, HEALTH AND HYGIENE.

Mrs. Virginia C. Meredith, Cambridge City, Indiana.

The housekeeper's duty in relation to health is two-fold, first, to herself, and second to her family. It has been well said that the home is the supreme asset of the nation, and it is beyond doubt that her health is the housekeeper's supreme asset. "Get well, stay well, look well," is an exhortation that the wise will heed.

In sacred history there is given a sketch of one woman, and but one, who is called "great." An analysis of the sketch discloses six great virtues, discernment, decision, hospitality, self-control, contentment and steadfastness, all of which were illustrated in the administration of her home. In the same Bible we have a prophetic vision of the "model" woman, a prophecy not yet fulfilled, despite preachers without understanding. The model woman described in Proverbs will "bring her food from afar" when she understands the balanced ration; she will "work willingly with her hands" when schools of Domestic Science teach her how; she will "gird her loins with strength and strengthen her arms" when she shall have been taught adequately about the body in which her soul dwells, and in that far off time there will be no headaches and no backaches! How to choose a husband worthy to "sit among the elders" she will know when she shall

be trained in social life and social life guided by trained house mothers! "Her children shall rise up and call her blessed," "her husband's heart shall safely trust in her" when schools of Home Economics shall have taught her how to wisely distribute the family income in the generic lines of existence, comfort, culture and philanthropy.

The housekeeper's first duty to herself consists in exalting her business by thinking so well of it that she exultantly gives her best thought to it, gaining knowledge, appropriating best methods, reserving always for herself the quiet hour when poise and peace may do their perfect work in her soul.

Children must be given fine health, right ideals and suitable preparedness if they are to succeed in life. Health is almost wholly dependent upon the house mother, she may create and control conditions of food, clothing, exercise and sleep, which in turn determine health.

Health and hygiene constitute a field so large that it would be unwise to attempt to discuss more than a small section here, perhaps the disposal of waste may be as fruitful a point as we could consider today, and even that subject is too large for us. We shall, therefore, pass by the subject as it is related to food and to cleanli-

ness in general. We would do well, however, to bear in mind that cleanliness is the most costly beauty and on that account deserves great consideration.

I am going to speak particularly of sleep, its relation to health and what the disposal of waste means in that connection. One-third of life is passed in sleep, we do not know at all what sleep is, it has been called "tired Nature's sweet restorer," but certainly physical weariness alone does not demand that such a large part of life should be dedicated to recuperation—the lazy man who never works will sleep as long and as soundly as the plowman. Sleep is not only a physical exercise, but it has some relation to mental health. Should we visit an insane asylum, we would be told that often sleeplessness is one of the first indications of mental alienation, one who does not sleep soon loses mental balance, the mind apparently loses more than the body when sleep is not regular and refreshing. But sleep has more even than physical and mental influences—there is a spiritual quality. When are we most kindly disposed, when strongest to forgive and to forbear, is it not after healthful sleep, is it not in the early morning hours? The pagans have a saying, "The night time of the body is the day time of the soul." It is also said that "In sleep man is captured, not by death but by his better nature."

Whatever sleep may or may not be, we know that it must be vastly important when one-third of life is given up to it. We know, too, that we can control the conditions that make for restful and refreshing sleep. We also know that during this one-third of life we are unconscious and therefore must insure right conditions in advance; moreover when asleep the physical powers are relaxed and consequently

one is more susceptible to bad conditions.

When studying physiology we learned that there are four organs of excretion, the intestines, the kidneys, the lungs and the skin, and that good health is dependent upon each set of organs doing their work promptly. We know that the lungs and skin are involuntary in their action, they go on doing their work day and night—the skin is even more active at night than during the day in disposing of its share of the waste of the body. All food, all drink and all air taken into the body contributes but a small share of itself to the building up or maintenance of the body, the larger part passing off in waste through the four organs named. What can or ought the housekeeper to do to insure that during sleep the lungs and skin shall do their whole duty in keeping the body healthy?

Is it not a serious thought to consider that, so named, "bad air" diseases are the ones which the doctor can do least for, tuberculosis is the greatest illustration, a disease increasingly prevalent and fatal. Other diseases formerly dreaded as scourges have yielded to the physician, we no longer dread small pox and diphtheria. So then it would seem that the housekeeper has the responsibility of preventing disease; she must study hygiene; the doctor has the responsibility of curing disease, he must study medicine, but fortunately the latter studies hygiene too and gives us of his knowledge so that we may prevent what he cannot cure.

One-third of life is passed in sleep, let us then make the bedroom a healthful place, arrange for plenty of fresh air, and strive to find out how much is "a plenty." Provide no hiding place for dust and dirt in the shape of unnecessary draperies, upholstered furniture and carpets. Reserve the bed-

room for sleeping and furnish it accordingly with curtains that may be laundered, rugs that may be taken out for dusting, and a sanitary bed.

If the skin is more active at night than during the day in disposing of waste and if the skin during twenty-four hours throws off from one to two pounds of waste, which is not properly disposed of is as dangerous as that from the kidneys and intestines, then let us be scrupulous in giving attention to the care of the bed. Is it not too true that many who excel as cooks fail utterly in the care of bedrooms? The gospel of two sheets is not a mere refinement, it is a sanitary consideration. Many sheets are about three feet too short, the sheet should completely and amply cover the mattress and as it bears a relation to the lungs, as well as to the skin, it should generously overlap the bed clothing near the chest, some waste is naturally deposited by the breath, and it is essential that the bed clothing should be protected by sheets which can be easily and often laundered.

The housekeeper will be confronted with the necessity of choosing between the woolen blanket and the cotton comfort for warmth. The type of mattress is an important point for knowledge and right decision, but when considerations of cleanliness are seen to be as essential as comfort, the judgment cannot go far wrong.

It would not be wise to condemn the use of the feather bed, but who has time for its proper care; who has strength and money for its cleansing?

Too much cannot be said about the necessity for sunshine and fresh air

in the bedroom. Alas that there should be an untaught mother, who, like the one in Mother's Meeting, related her plan of giving her little daughter a dime a week for making her bed before breakfast! Far better that the bed should lie open all day to the sun and air, and unmade, than to be made up before breakfast.

Because the skin is an organ of excretion, it is proper that no clothing worn during the day should be worn at night and children taught this essential point are well on the way to refreshing sleep. One may smile at the solicitude of the British mother who is always represented as anxious and worried about the airing of her absent son's night shirt, and one may smile at the Britisher who carries his "tub" around the world, but one should reflect upon the health of our English cousin!

The good housekeeper is unfailing in airing the rooms in the morning hours, but would we not do well to air the living room before leaving it for the night? Who has not been stifled by the air in churches and public halls which through years have been closed immediately the audience disperses and thereby the waste from countless lungs has been permanently deposited on walls, floors and cushions!

The queen bee is a queen not because of better lineage, but because of better food and ampler room for development, and the boy may come into his inheritance of good health through our intelligent attention to his bedroom and his preparation for sleep.

HOUSEHOLD CONVENIENCES.

Mrs. Helen Armstrong, Chicago, Ill.

I am going to talk to you about some very practical things that come under the head of "Household Conveni-

ences," and right along the line that Mrs. Meredith gave you, about the care of the housewife, the care of

herself. Did you ever stop to think that the woman who does not take any care of herself may have to be taken care of sometime because she is used up, she is a helpless member of society, simply because she has not taken care of her own health. We see that so much in the home, the over-nice, over-wise, over-careful housewife. We see women so careful of their homes they cannot let the young people come in and have a good time because it musses things up, makes a dirt, and that is too much trouble. They look at things from the wrong standpoint, have wrong standards of values. It is a matter of the point of view after all, we all see things just a little bit differently. But when we think of the extra care, the time, the extra work it may make to give our young people a good time in their homes, it seems such a very unfortunate way of looking at it, and the trouble is we began wrong. Many times in furnishing our home we have things so nice they cannot be used. Some people furnish their homes for their families and some for their neighbors; we have things because other people have them, because we do not care to be different from other people. We buy things because they have them in the shops; we buy hand-painted sofa pillows which look well in the shop windows, and this is where such things belong, if they have a place anywhere. We have things for show and not for comfort, but if a home is not comfortable I would like to know how it can be a home.

If a woman is going to belong to clubs, to have social life, to get out of doors and enjoy something besides her own little home circle, and if she has the work of the home to do, it stands to reason that there must be some change in our methods or we cannot accomplish all this. We see women go to extremes; some spend all

their time going to parties; then there are others who are all the time doing their work, they are not mistresses of their homes, they are slaves to their housework, and largely in many cases simply because they do not see things from the right point of view. We have learned a great deal from our mothers and grandmothers about house-keeping and home-making, but after all if we tried to do things as they did we would be behind the times. A dairyman would not run his farm as his grandfather did years ago, and it is so in our homes.

I go into kitchens, and I am not surprised that women hate housework, because they do it under such conditions. A workman is known by his tools and a housewife is known by her kitchen, by the things she has to work with. I sometimes wonder if it is because we are so economical that we hang onto things just as long as we can make them work. We see all kinds of things in the kitchen that are unsatisfactory and undesirable. It seems to be more so in the kitchen than elsewhere. Just as long as we can make an egg beater work we use it, no matter how hard it works; just as long as we can make a flour sifter work, no matter how hard it turns, we think it is all right because it answers the purpose, or the rolling pin with one handle. Economy does not mean being stingy, it does not mean being close, or going without things. Economy means wise expenditure, having a thing to do with and knowing how to use it intelligently, and when we are truly economical in our kitchens, we have well furnished kitchens, but unfortunately in furnishing the home most people begin with their parlors, then the sitting room, the hall, the dining room, etc., and then if there is anything left they furnish the kitchen with that, the most important room in the house.

I do not want you to think that I mean to have a lot of expensive things, but there is more satisfaction in having utensils that do satisfactory work than having poor ones. I think it pays every time. The amount of expenditure necessary to have a comfortably furnished kitchen is very small when it is compared with the constant annoyances that come with working with inconvenient and unsatisfactory utensils. I thought it would be a good idea to speak of why a few of these things are better than others and bring out a few points that are worthy of emphasis.

We like to use utensils that are easy to care for, because there is a whole lot of work in dish washing. It is curious to see how most people wash dishes. The easiest way is to do all the cooking things first. There is all the difference imaginable between the proper and improper way of washing dishes. After the careless cook has the dinner ready, she puts the pots and pans back on the stove perfectly dry, not thinking if they are filled with water they are so much easier to cleanse. This is the difference between the easy way and the hard way.

I have here on the table some utensils, part of which I brought with me and part of which I got from the store here, which I want to mention. These are not the only ones necessary in the kitchen, but some of the things I thought it was well to put a little emphasis on.

Just a word before I take up that part of it, and that is in regard to the foods as we buy them from our stores. Probably some of you are familiar with the movement that is being made through the country for clean groceries and clean stores. A good many people do not understand the need of the movement, thinking it enough to take proper care of the food after we

get it. A little influence in each place by each woman is going to mean a whole lot in the long run and when we can buy food that is perfectly clean, then it is going to mean a great deal toward healthful conditions, so if you can do anything in this campaign, just give a helping hand. Some of the grocers say the women never complain and if things stand for days exposed to the air they are just as well satisfied as if they are protected. If we insist on these things they will be done. If we are satisfied with a lot of waste and unsanitary conditions, things will be continued as they are now.

When speaking about steaming foods, I found some people thought I meant using a steam cooker, but I meant just an ordinary steamer. It is very good used for warming over foods, not breads, but some cooked foods that we want to keep hot, without the washing of any utensils at all. One of the handiest things in the use of the steamer is that if there is a member of the family late a plate with the various foods can be set in the steamer and the food will not dry as it will in the oven.

Question—Isn't it necessary to cover it with a napkin?

Mrs. Armstrong—Yes, if you have anything that is going to absorb the steam. If a bowl were turned over the plate it would answer.

I have been asked about taking care of the bread after it is taken from the oven. We want air to circulate around the bread before we put it away. I spoke about using a dish drainer. Turn it upside down and that will hold three or four small loaves of bread nicely, and if the bread stands on that it will not get soft on the bottom as it would on a cloth.

I find it is a very handy thing to have the covers of kettles and sauce pans right near the stove and there

never seems to be any handy place for them, but I have used a very simple device, just taking an ordinary toaster, bending the handle back, then taking two pieces of twine and fastening the front part of the handle, forming a rack to hang on the wall near the stove. It is handy to have two of these, one for the covers and one for newspapers, papers save so much labor in the kitchen.

A good sized double boiler is a very convenient thing to have. There are times when we have a quantity of milk or soup or some cereal that we would like to keep warm or cook and a large double boiler is better than a kettle set inside of another. It is not a necessity but a convenience.

A coffee pot that is white inside is very much easier to keep in good condition; one can see at a glance whether it is absolutely clean or not. It is sometimes a question whether it pays to buy a good coffee pot or not; it depends on how it is taken care of. There is nothing that affects the flavor of the coffee more than the pot.

Question—Do you think there is any danger of flavoring the coffee pot if it is washed with soap suds?

Mrs. Armstrong—I do not think it would make any difference with the enameled ware. If there is anything that needs thorough cleansing it is the coffee pot. A percolator is very good, but it is much more expensive.

I spoke about the baking of bread and the advantage in using the single pan always instead of a large pan with two or three loaves baked together and about the crust, which we consider desirable in bread making. These Russian pans last longer than pans made of tin. There is no economy in buying tinware unless it is a good quality. I do not care for tinware for cooking purposes, unless it is for layer cakes. The bread pans of Russia iron last longer and are very much more satisfactory

Question—What does that pan cost?

Mrs. Armstrong—I bought one like that some time ago for fifteen cents. Pans like that never require any greasing at all.

Here is another thing that may interest some of you and that is an aluminum griddle. It requires no greasing and does away with all of the odor from the greasing for cakes. There is nothing breakable about this, like the soap stone. Soda is the main thing to avoid in using the aluminum ware.

These spatulas are a great help and very pliable. We use them to remove muffins and cakes from pans and one will soon pay for itself in the cleaning out of the utensils after mixing is done. You see a spatula scraped around inside of a bowl will take off every particle of batter, there is no waste at all. We use it for various other things, like turning omelets and griddle cakes. They are not expensive; I think a spatula like that costs about twenty-five cents.

We have also a wire brush and a steel pot cleaner. I like the wire brush better, although the other is good for some things. If anything sticks to the kettle, then the rings will scrape more easily, but if sal soda is put into it and cold water and it is allowed to stand for some time, it will loosen it much better. The wire brush does not break off the enamel as the rings will do.

Then we have a brush for cleaning vegetables and things like that. I think, too, it is necessary to have two, so one will not be used for all purposes; have one to use about the sink and one for the cleaning of vegetables. It is much easier to clean potatoes with one of these than to rub them with the hands.

We have two measuring cups. These are marked off in fourths and thirds. Many people measure by their judgment and experience. That may

be all right when the experience comes, but when we get one of the recipes in a cook book giving certain measurements, it is difficult to get exact measures with a tea or coffee cup. With materials at the present prices, we cannot afford to waste them by guessing at it. There is no possibility of a failure when we have the proper directions. When we have materials exactly measured, then put together in a certain way and a certain amount of heat applied, we are sure of certain results. We do not believe there is any luck in cooking.

One of the sink strainers will save a great deal in the care of the sink. I have seen women stand and pare potatoes, drop the parings into the sink and then pick them up again; such a lot of energy wasted. The care of the sink as we have our sink today is perfectly easy if we are careful about our work. "Anybody can clean, but it takes a lady to keep clean." That is, what a difference there is in the way we do our work, some do it without any thought and care, make work for ourselves all the time. A true and homely saying is to "let our heads save our heels." For taking off stains from the sink, kerosene is cheaper than anything else. Ventilation will take the odor away. Scouring powders are fine and if applied to a damp sink will take off all the surplus dirt very easily indeed. At least once a day flush the kitchen sink with sal soda and boiling water. Do not take any chances about having grease clog in the drain pipes. Keep sal soda for the washing of the kitchen utensils, as well as the sink.

I have a wire rack here that I use for roasting meats. Place the meat on the rack instead of putting it in the pan. When the roast stands on the bottom of the baking pan it practically fries in its own fat on the bottom of the pan. The top may be roasted, but the lower part will stew or fry, whether people use water or fat.

This flat pan is handy for use in baking a fish. I had this made for that purpose some time ago. It is a single thickness of Russia iron, turned at the end and with handles on the sides, made just the size of the baking pan. Place the fish on it after greasing, set it in the baking pan and bake the fish. Then when the fish is done, all one wants is to slip a knife under it and slip it from the pan on the serving platter. It is difficult to remove a cooked fish from the pan to a platter ordinarily.

These enameled bowls come in different sizes. Now, if one has to depend upon servants, do not buy bowls like these. If you can take care of things yourself have them. They are easy to clean, are light and a good shape, so far as the mixing is concerned. I would not put them in the hands of a careless maid, because they are apt to be chipped and they are expensive.

I have a potato masher here which I use as a fruit press as well. Put cold mashed potatoes through the press, which makes them light and smooth.

We have a very fine wire sieve when using baking soda. Sometimes there will be lumps in a mixture where soda is used. If it is rubbed through a fine sieve into the flour there will be no lumps in the soda at all.

We like a bean pot for the baking of beans and for the cooking of some of the dried fruits. Try some time making apple sauce in something of this sort, in a heavy covered dish, and see how fine it is. Soak dried fruit over night before cooking; wash it in lukewarm water and put it to soak over night in cold water; then in the morning put it on to cook in the same water it was soaked in, provided it is kept where it is clean. The flavor from long, slow cooking is much better than quick boiling. Sugar should not be added until fruit is tender.

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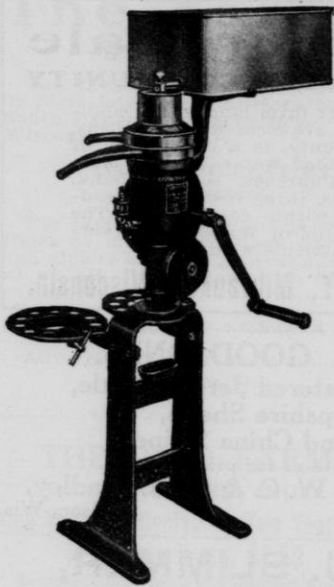
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February 9-19, 1909, will occur the sixth annual course for farmers over twenty-five years of age. This work is designed to give the most useful instruction in the least possible time, at a period when the farmer can be away from home for a short time. This year the special features will be the consideration of the Conservation of the Farm Resources. The problems of fertility, manures, soils, drainage, road improvement and rural sanitation, etc., will be discussed by specialists. Programs and detailed information will be sent on request to Prof. D. H. Otis, Madison, Wis.

For farmers' wives and daughters special lectures and demonstrations in Domestic Science will be given during the first week of the course, February 9-13. For information on this course address Mrs. D. H. Otis, Madison, Wis.

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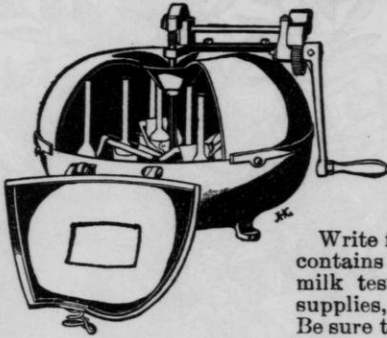
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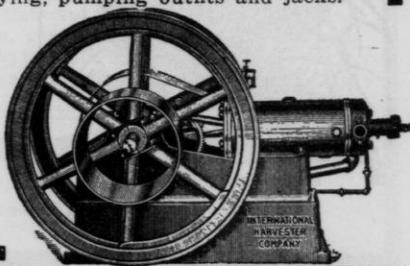
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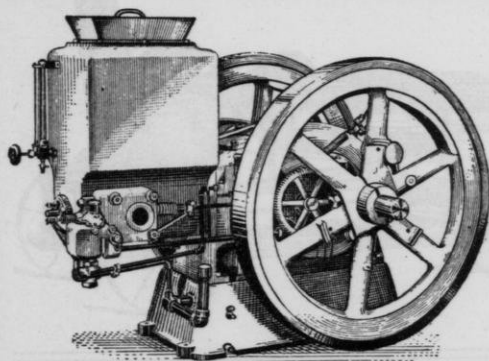
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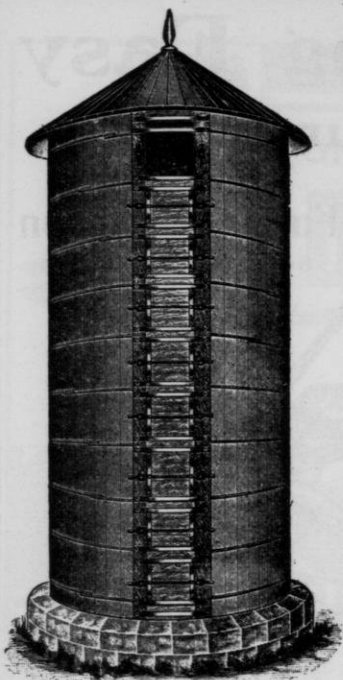
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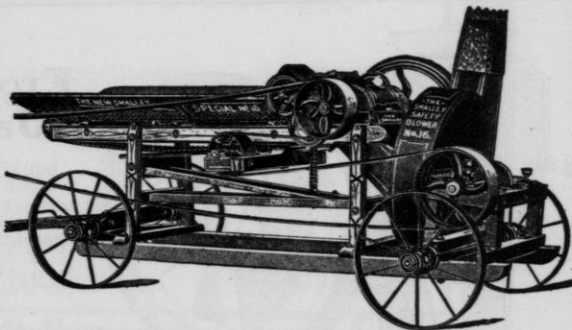
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