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Wisconsin Farmers' Institutes

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WISCONSIN

FARMERS' INSTITUTES,

1887.

Bulletin No. 1.

EDITED BY

W. H. MORRISON, Superintendent.



MADISON, WISCONSIN;
DEMOCRAT PRINTING COMPANY, STATE PRINTERS.
1887.

WIS. FREE LIBRARY COMMISSION
LEGISLATIVE REFERENCE DEPT.

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HON. H. D. HITT,	-	-	-	-	OAKFIELD.
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W. H. MORRISON, Superintendent.

Office:— No. 11, Capitol,

MADISON, WIS.

LETTERS OF TRANSMITTAL.

MADISON, WIS., October 13, 1887.

HON. HIRAM SMITH,

Chairman Farm Committee, Board of Regents:

Enclosed please find the first report of Agricultural Institutes. The act providing for said Institutes makes no provision for an annual report, but the urgent request from all parts of the state for a record of the better and more intelligent methods of farming, as presented and discussed at the Institutes, has called forth this bulletin. The spirit of inquiry awakened in all branches of agriculture throughout the state, as indicated by the eager crowds who attend the fifty-four institutes, will lead to popular intelligence, improved ways and methods, and increased prosperity.

Yours very truly,

W. H. MORRISON,

Superintendent.

SHEBOYGAN FALLS, WIS., October 20, 1887.

HON. GEO. H. PAUL,

President Board of Regents, State University:

I have the honor and the pleasure to herewith transmit to you the first "garnered fruits" of the Wisconsin Agricultural Institutes, for preservation in imperishable form, in the archives of the state, and to be scattered broadcast and free in the homes of the farmers of Wisconsin. Although, as stated by Sup't Morrison, the act providing for these institutes makes no provision for an annual report, nor for the preservation and perpetuation of their products, still it was a considerate thought of the superintendent, and one

that will attest his great interest in his work, to undertake the labor of arranging and publishing those papers and discussions that have thrilled the thousands who have listened to them in such a manner that still other thousands may catch the inspiration, and that inspiration may grow into impressions and results, until the farmers of Wisconsin shall have no need to say to their fellow farmers: Know ye how to rear improved stock, to plant ensilage corn, to build silos, to use the best methods for the development of the farm, and the improvement and elevation of the home-life of the farmer, as it is, the highest privilege of life, the chief school of virtue, the fountain head of individual and national strength and prosperity.

I commend to you these gathered leaves, and these living thoughts, hoping and believing, that in due time there will come from this spring-time sowing a full, and a golden harvest.

Respectfully submitted,

HIRAM SMITH,

Chairman, Farm Committee.

PREFACE.

To the Farmers of Wisconsin:—The phenomenal growth of public opinion, endorsing the new School of Agriculture in our state, known as the Farmers' Institute, is somewhat of a surprise, and an enigma, to the educators of the state, and to those outside who know of its strength.

What the Institute has already grown to, can in no way be so plainly shown, and its methods, aims and teachings clearly exemplified, as by the published record of a *single* institute typical of all. We desire to let the Green Bay meeting, as the closing one of the series of fifty-four, for 1886-7, speak for itself, by giving a full stenographic report of the addresses, papers, questions and discussions.

Not the Work of a Day.

But it must be remembered that the spirit and ability of the representative farmers of the state, who have in these pages given their views, and related their experiences, were not developed in a day, but were the result of forces that had been working for years in the field of the intelligent dairyman and stock grower. For if we look for the primary school, in which these men were largely educated, who were best prepared to execute the purposes of the state when its law-making power passed the original bill, authorizing the Agricultural Institutes as presented by Hon. C. E. Estabrook, and gave that purpose character and efficient help, we shall find it in the State Agricultural Society, State Dairymen's Association and State Horticultural Society, fostered by the state, and largely assisted and developed by the Agricultural press.

Agricultural Conventions.

If we look farther for the initial germs of the Farmers' Institute, we shall find them in the Winter Conventions of the State Society, so ably worked and developed by Secretaries Field and Bryant, and continued by Secretaries Babbitt and Newton, and also their annual reports, which gave somewhat in detail, accounts of the work of the Farm Committee of the Board of Regents, that persuaded the full Board to set apart a few dollars to pay the actual expenses only of travel for some of the said committee and such professors as could be spared from the university, assisted in part by local talent, also by some of the members of the State Dairymen's and Horticultural Societies, and who were invited because they were known to be well qualified to impart the practical information that would advance the interests of the farmers of the state. With such a force, what we well might call the incipient meetings of the Farmers' Institute, were held at several points in the state, prior to their more formal establishment.

Pioneer Workers.

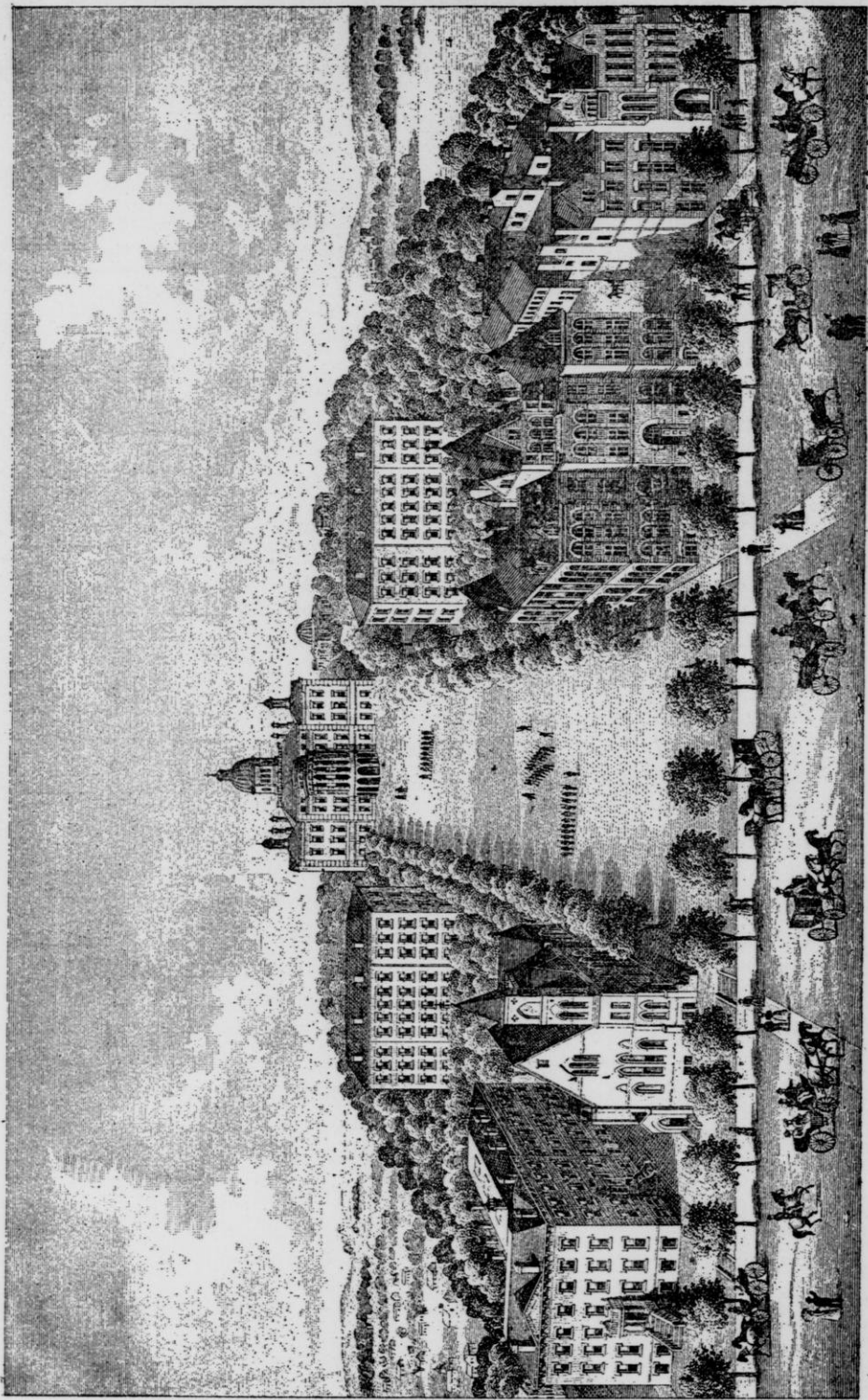
Hon. Hiram Smith, Prof. W. W. Daniels, J. M. Smith, Prof. Geo. E. Morrow, Stephen Faville and Prof. W. A. Henry, were the prominent members of this initial corps of workers to whom the farmers of the state are greatly indebted. It was the hearing of some of these elemental teachings, and witnessing the eagerness with which farmers listened to the discussion of the means by which they could benefit themselves and elevate their vocation, that gave Chas. E. Estabrook, of Manitowoc, a conception of the good that might be accomplished by making such instruction more universal; and with the quick insight of the practical law maker, his institute bill was formulated in his mind as a measure for which Wisconsin farmers were ready and which would materially aid the agricultural development of the state.

The remainder is history, so well known to the people of our noble state, and to many in other states who are ambitious to secure the same good, that a repetition is unnecessary.

A Winter's Work — The Round Up.

The contents of the following pages are presented as an epitome of the developments that have been wrought in two short years by the work, and as a specimen of the kind of information that has been, and will be still more widely diffused among the farmers of Wisconsin. It is true in one sense, that the closing meeting at Green Bay, called together a larger aggregation of the soul and brain, that has given the Institutes character and dignity, and held them longer in session than can be expected to occur in the regular meetings to come. But if the farmer cannot expect as much at each point in future Institutes, they may be sure of part and that of the same character, only it will be improved by later experience and intensified in interest, because the people are better prepared to appreciate the still better lesson that study and experience of the most successful of our own state, and the strong men we may select from other states will be able to impart. With thanks to all who have assisted in this forward movement to hasten the better day for the farmer, we cordially invite your hearty co-operation in your respective Institutes the coming winter.

W. H. MORRISON,
Superintendent.



ETCHED BY MARIA RICHARDS MIT

STATE UNIVERSITY, MADISON.

THE UNIVERSITY OF WISCONSIN.

Alert-minded as are the people of Wisconsin, and proud of their educational system, they yet do not seem to have quite kept up with the growth of their university. The exhibit of the mechanical department at the Milwaukee Exposition proves to be a source of surprise to the thousands who visit it. The majority are found to have been quite unaware that practical instruction in mechanics, the actual handling of planes, lathes and forges — is given in the state university. The report of the Agricultural Experiment Station will cause in many quarters equal surprise that work of so high grade and of such extreme practical value is being done [in our own institution. We have so long been accustomed to regard the average university as merely a classical college with a wrong name — and, like most things wrongly named, poor of its kind — that we have been slow to realize that a real university was developing in our own midst, an institution in which, if not everything — at least a wide range of subjects is taught, and that not only in the lines of literature, science and philosophy, but also in the professions and the practical arts. Many of our citizens — though among the most intelligent — are not aware that our university offers *ten distinct courses of study*, and that, in addition, special students are allowed to take almost any study found in the various courses, for which they are properly fitted, and, moreover, that students in the regular courses are allowed a large amount of choice in the latter part of their courses — so that really the number of different courses open to students is very large.

THE FOUR CULTURE COURSES.

There is the standard ANCIENT CLASSICAL COURSE that has demonstrated its merits through the experience of the ages and which has so many warm friends and stalwart advocates — a course in which Greek, Latin and Mathematics form the chief agents of culture.

There is the MODERN CLASSICAL COURSE, in which German, French and other modern languages are substituted for Greek, and thereby the gates opened to the vast intellectual treasures stored in the continental languages of Europe, and the means of intercourse with great peoples afforded.

There is the ENGLISH COURSE, a comparatively new one, in which, while foreign and ancient languages are offered, the chief emphasis is laid upon our own tongue, the richness and disciplinary power of which is often overlooked in our admiration of other great languages. In all these courses Mathematics holds a high place and considerable attention is given to the various Physical Sciences. Through the elective studies offered this may be largely increased.

Then there is the GENERAL SCIENCE COURSE in which the leading place is taken by Chemistry, Natural Philosophy, Physiology, Biology, Zoology, Botany, Astronomy, Mineralogy, Geology and kindred sciences, the value of which needs no advocacy in these days of extraordinary utilization of science. With these are also offered more extended courses in higher Mathematics and the modern languages, especially German and French.

All the foregoing are general culture courses intended to give a broad and liberal education, but differing somewhat in their chief tendencies. All afford a wide range of study, rich in knowledge and discipline. Besides these four general college courses there are

SIX PROFESSIONAL COURSES.

THE AGRICULTURAL COURSES. For some years past the university has offered an extended course in agricultural science, embracing also, long courses in the closely related sciences. If the opportunities thus afforded had been embraced and industriously followed up, it would have proved a bonanza to a score or more of talented young farmers' sons. There is just now, probably, a greater demand for thoroughly educated talent in agricultural science than in any other branch of learning. The rapid development of agricultural experiment stations throughout the country creates an exceptional call for ability and skill in that line, and if a few dozen Wisconsin boys who had the native talent, and who says there are not scores of such, had embraced the opportunity, they might now be putting shekels in their pockets and doing the world good and their state honor, at the same time. This course is still offered, with increased, and constantly increasing, facilities. How long shall it remain neglected?

To meet an entirely different educational need, the university offers a SHORT COURSE IN AGRICULTURE, designed to give, in the briefest time and at the smallest expense, the most available agricultural information. A special statement respecting the course may be found elsewhere in this bulletin.

But the university is not content to simply rehearse old agricultural doctrines. Its chief effort is to develop new agricultural science, and to disseminate it. This it endeavors to do in the most direct and practical way, first, by careful experiments and exact analyses to determine the precise truth, and, secondly, by conveying this directly to the farmers by publications and by Farmers' Institutes, so that the FARMERS THEMSELVES are coming into direct relationship to the university. It might be too much to say that they are becoming non-resident students of the university, but it may at least be said that they receive information and instruction directly from it. The work of the Experiment Station is best shown by its fruits, and most who read this will doubtless also read its reports and know for themselves. The facilities of the station are being improved and rendered more effective each year. As to the work of the Farmers' Institutes this bulletin is a witness.

THE LAW COURSE. The location of the Law Department gives it exceptional advantages. Provided with rooms in the capitol, it is right in the midst of courts, legislative halls and executive offices, right among law-makers, lawyers and judges.

Besides its own library, the state law library (20,000 vols.), and the great historical library (116,000 vols.) are immediately at hand. Under these conditions the Law Department has had a rapid growth and is attaining a wide reputation.

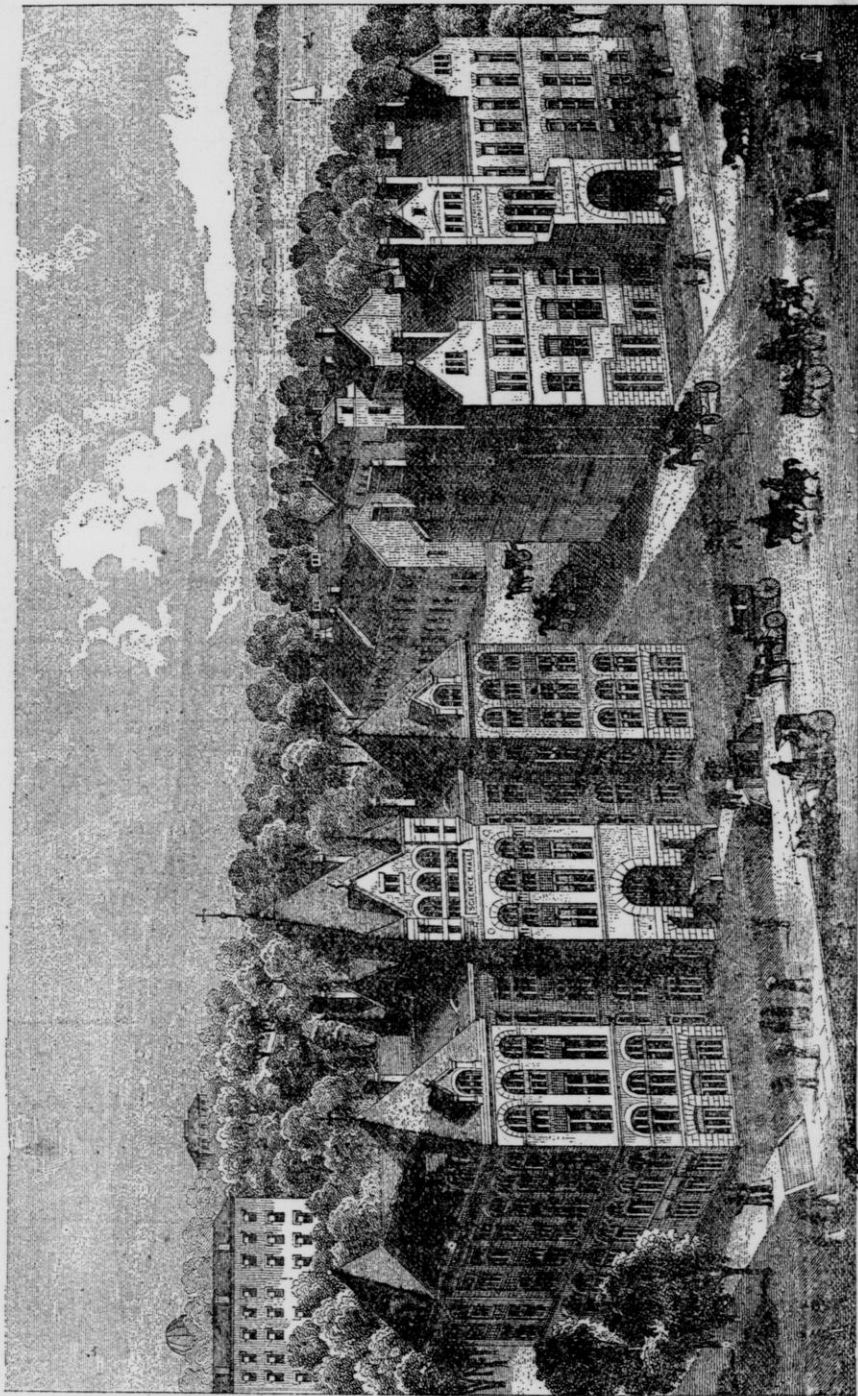
THE CIVIL ENGINEERING COURSE. A full four years' course, embracing practical field-work is offered and shorter special courses are permitted. The facilities are excellent and are continually being improved.

THE MECHANICAL ENGINEERING COURSE. The university endeavors to meet the growing demand for mechanical knowledge and skill of the higher order, both theoretical and practical, by furnishing a full four years' course in mechanical science, embracing extended courses in drawing, shop practice and practical testing. It has been found difficult to enlarge the facilities for shop practice fast enough to meet the demand for this popular element of modern education coming from students in all the courses.

THE MINING ENGINEERING AND METALLURGY COURSE. A four years' course is offered in mining engineering, metallurgy and assaying. This course has suffered for want of facilities since the burning of the old Science Hall, but the new buildings more than compensate for this and a growth in this department commensurate with the recent development of mining interests is anticipated.

THE PHARMACY COURSE. An excellent course in Pharmacy, embracing practical laboratory work, is presented and is well patronized.

All courses of the university are open to ladies on precisely the same conditions as gentlemen. The corps of instructors numbers fifty. About 600 students will be in attendance during the year.



NEW SCIENCE HALL, CHEMICAL LABORATORY AND MACHINE SHOP, STATE UNIVERSITY, MADISON.

Attention, Young Farmers

The Short Course in Agriculture,

—AT THE—

UNIVERSITY OF WISCONSIN

The University of Wisconsin has provided a special course in Agriculture, to accommodate those young men who desire to gain a better knowledge of the science and principles that lie at the foundation of successful agriculture, but who can give only a limited time to such studies. For the accommodation of such students the term opens January 4th, 1888, lasting twelve weeks. The course embraces the following:

Sixty lectures and recitations on practical and theoretical agriculture, by Prof. W. A. Henry.

Sixty lectures on elementary and agricultural chemistry, by a professor of agricultural chemistry, who will be appointed in Dr. Armsby's place.

Twenty-four lectures on elementary botany, and 108 hours' laboratory practice in botany on the common plants of the farm, including grasses, by Prof. C. R. Barnes.

Twenty-four lectures on the anatomy of our domestic animals, and the treatment of their common diseases, by Dr. V. T. Atkinson, State Veterinarian.

No expense has been spared to make this a practical, popular course.

The latest purchase is the famous AUZOUX life-size model of a horse, which can be dissected, and shows 3,000 separate muscles, nerves, blood vessels, bones, etc. This model alone cost the University nearly \$1,000.

The expenses for the 12 weeks of the course need not exceed \$65, for incidental fees, books, board, room, and washing.

Why lose such a grand chance to learn a thousand facts of interest and profit to any one who follows farming?

This course opens January 4th, 1888, and lasts 12 weeks.

No examinations will be required, but applicants must be not less than 16 years of age and have a common school education.

For further particulars address

PROF. W. A. HENRY, Madison, Wis.

UNIVERSITY OF WISCONSIN.

Department of Agriculture--Farmers' Institutes.

SUPERINTENDENT'S OFFICE,
MADISON, WIS., October 1, 1887. }

To the Farmers of Wisconsin:

The following are the appointments for Farmers' Institutes for the coming winter, with speakers, subjects, dates, etc. The attention of Local Committees is especially called to the Suggestions on the last page of this circular.

HON. HIRAM SMITH,
HON. H. D. HITT,
HON. C. H. WILLIAMS, } Farm Committee
Board of Regents.

PLACES.	COUNTIES.	DATES.	PLACES.	COUNTIES.	DATES.
1—Hudson	St. Croix.....	Nov. 1-2	43—Fennimore	Grant.....	" 10-11
2—Augusta	Eau Claire.....	" 1-2	44—Lancaster	Grant.....	" 12-13
3—Ellsworth	Pierce.....	" 3-4	45—Dodgeville	Iowa.....	" 12-13
4—Bloomer	Chippewa.....	" 3-4	46—Mineral Point.....	Iowa.....	" 17-18
5—Osceola Mills.....	Poik.....	" 4-5	47—Shullsburg.....	La Fayette..	" 17-18
6—River Falls.....	Pierce.....	" 8-9	48—Darlington.....	La Fayette..	" 19-20
7—Chippewa Falls.....	Chippewa.....	" 8-9	49—Monroe.....	Green.....	" 19-20
8—New Richmond.....	St. Croix.....	" 10-11	50—Green Bay.....	Brown.....	" 24-25
9—Menomone.....	Dunn.....	" 10-11	51—New Holstein.....	Calumet.....	" 24-25
10—Hammond.....	St. Croix.....	" 11-12	52—Chilton.....	Calumet.....	" 26-27
11—Mondovi.....	Buffalo.....	" 15-16	53—Plymouth.....	Sheboygan...	" 26-27
12—Eau Claire.....	Eau Claire.....	" 15-16	54—Port Washing-		
13—Whitehall.....	Trempealeau	" 17-18	ton.....	Ozaukee.....	Jan 31—Feb 1
14—Durand.....	Pepin.....	" 17-18	55—Manitowoc.....	Manitowoc...	" 31 " 1
15—Poynette.....	Columbia.....	" 21-22	56—Waupaca.....	Waupaca.....	Feb. 7-8
16—Waterloo.....	Jefferson.....	" 21-22	57—Hortonville.....	Outagamie...	" 9-10
17—Medford.....	Taylor.....	" 29-30	58—Sheboygan Falls	Sheboygan...	" 14 15
18—Stevens Point.....	Portage.....	" 29-30	59—Cedarburg.....	Ozaukee.....	" 14-15
19—Weyauwega.....	Waupaca.....	Dec. 1-2	60—Rosendale.....	Fond du Lac	" 16-17
20—Plainfield.....	Waushara.....	" 1-2	61—Kenosha.....	Kenosha.....	" 16-17
21—Westfield.....	Marquette.....	" 1-2	62—Clinton Junction	Rock.....	" 21-22
22—Black River Falls	Jackson.....	" 6-7	63—Burlington.....	Racine.....	" 21-22
23—Galesville.....	Trempealeau	" 6-7	64—Union Grove.....	Racine.....	" 23-24
24—Tomah.....	Monroe.....	" 8-9	65—Mukwonago.....	Waukesha...	" 23-24
25—West Salem.....	La Crosse.....	" 8-9	66—Oregon.....	Dane.....	" 23-29
26—Sparta.....	Monroe.....	" 13-14	67—Beloit.....	Rock.....	" 28-29
27—Hillsborough.....	Vernon.....	" 13-14	68—Evansville.....	Rock.....	March 1-2
28—Viroqua.....	Vernon.....	" 15-16	69—Delevan.....	Walworth.....	" 1-2
29—Elroy.....	Juneau.....	" 15-16	70—Whitewater.....	Walworth.....	" 6-7
30—Mt. Sterling.....	Crawford.....	" 20-21	71—Waukesha.....	Waukesha...	" 6-7
31—Prairie du Sac.....	Sauk.....	" 20 21	72—Palmyra.....	Jefferson.....	" 8-9
32—Richland Center	Richland.....	" 22-23	73—West Bend.....	Washington..	" 8-9
33—Mazo Manie.....	Dane.....	" 22-23	74—Oconomowoc.....	Waukesha...	" 13-14
34—Reedsburg.....	Sauk.....	" 27-28	75—Cambria.....	Columbia.....	" 13-14
35—Lodi.....	Columbia.....	" 27-28	76—Ft. Atkinson...	Jefferson.....	" 15-16
36—Baraboo.....	Sauk.....	" 29-30	77—Watertown.....	Jefferson.....	" 15-16
37—Edgerton.....	Rock.....	" 29-30	78—Fond du Lac.....	Fond du Lac	" 20-21
38—Montello.....	Marquette...	Jan. 3-4	79—Waupun.....	Fond du Lac	" 20-21
39—New Lisbon.....	Juneau.....	" 3-4	80—Berlin.....	Green Lake...	" 22-23
40—Portage.....	Columbia.....	" 5-6	81—Hartford.....	Washington..	" 22-23
41—Beaver Dam.....	Dodge.....	" 5-6	82—Madison.....	Dane.....	" 27-28-29
42—Platteville.....	Grant.....	" 10-11			

TRANSACTIONS,

WITH

ACCOMPANYING PAPERS AND DISCUSSIONS

OF THE SAMPLE

FARMERS' INSTITUTE,

Held at Green Bay March 28, 29, and 30, 1887.

In the absence of Superintendent Morrison, J. M. Smith was called to the chair. Hon. L. B. Sale gave the following

ADDRESS OF WELCOME.

Mr. President, Ladies and Gentlemen — I remember a year ago at the time the institute was held here, of speaking to one of my farmer friends and asking him if he was going to attend the institute, and he said, "No." I asked him why, and he said he did not care to hear lawyers talk or preachers pray about farming. If it were a fact that these institutes were to be conducted by lawyers and preachers I should not blame that good farmer man for standing back a little upon his own knowledge of the art and science of agriculture.

A few years ago as a member of the Board of Regents of our State University, I had the privilege of assisting to establish a few farmers' meetings to be held by the state for the spread of knowledge among the farming community, upon the subject of agriculture and kindred pursuits. From the small beginning that was then inaugurated has since developed in rapid succession, the Agricultural Institutes, which we are now having throughout the State, under the

direction of the Board of Regents of the University, and under laws enacted two years ago this winter and re-enacted by the present legislature, with an increased appropriation to defray the expenses of the Institute. The wisdom of this movement has been fully justified by the results which have been attained; by the great success which has attended these Institutes, and by the large number of wide-awake practical farmers who attend them; by the increased interests in dairying, in stock raising, in the improvement of stock, in feeding stock, in the tilling of the soil in the best methods, of improving the soil, and the crops. These meetings have fortunately been conducted, by men not only of broad intelligence, but men of long experience in the subjects which they discuss, and what they say to you is confined not alone to theory, but they have confirmed their theories by practical demonstrations. Of the large number of these meetings which have been held during the present winter, I am told that the attendance has everywhere been large and in some places it has been so large that many were turned away for want of room. Thousands upon thousands of the farmers of this State have availed themselves of the opportunities afforded by these meetings. See what a mighty educational force is here being exercised, and with the added appropriation which our legislature has now provided, the number of these Institutes and their advantages will be greatly increased.

All honor is due to the distinguished gentlemen who are conducting these meetings. The work they are doing is entitled to the greatest praise on the part of the farming community. Their mission as educators entitles them to the respect and hearty co-operation of every good citizen of this state.

Expressing the hope that this meeting may be a profitable and successful one, this, the last meeting of this series of the year, as I understand it, in behalf of the good people of the city of Green Bay, I bid you all a hearty welcome to our city.

RESPONSE.

BY MR. STEPHEN FAVILLE.

Mr. Chairman, Ladies and Gentlemen — I said years ago when any man voluntarily joins any organization, he was in duty bound to obey orders. Therefore, although I know I cannot respond to this address of welcome as Brother Adams would have done, I see nothing to do but to obey orders. I want to thank you very heartily and cordially for your welcome here, and we know it is tendered in the right spirit, for a good many of us have been here before.

It may not be amiss for me to say just a few words in regard to this institute work. I have attended at least half of the whole number of institutes that have been held this winter, and it has been a surprise to me to see the numbers that would come out and the interest manifested, and we have been greatly cheered by the numbers of those who have stated that they have felt very much benefited, that there had been some words dropped, perhaps by their neighbor, just as likely as anybody, something that had stimulated them to better farming.

The Gospel of Hard Work.

We do not come to you to-day with any new agricultural gospel at all. It is the same old gospel of hard work. If I remember rightly it was decreed in a very early day of man's history that man should eat bread by the sweat of his face. Now that decree has not been reversed, it is not likely to be. I have lived long enough to learn that there is no good thing to be gotten without somebody sweats over it; some of us have got so we let some other fellow do the sweating, but just the same somebody has got to sweat. Now, we do not feel that the farmers of this country do not

work enough, indeed, I believe they work a little too much, what we wish is to induce a little more thought, and as a consequence a little less sweat, and in the end a little more money. To illustrate, we hope by the papers and discussions that shall be had at this institute, that the farmers who have dairies will go home and strive to be a little better dairymen, keep their cows in better shape, feed more judiciously, make a little better butter, and get a little more money out of it, and so in other branches. If you are raising corn the effort will be to raise better corn and take better care of it. So in the making of beef and so on through.

Low Prices and Close Competition.

We have fallen upon times that are trying every branch of business in the country, but every branch of manufacturing, trade, commerce, and agriculture, all these have fallen upon times that are trying us severely. The price of every thing is low, we have got accustomed to expensive living, and one of two things is certain, we must learn to make a little more money or learn to spend less. We are not satisfied to come down to living as we did twenty or thirty years ago, and so we must learn to earn a little more money and these institutes are run upon that idea.

For instance, in the matter of making butter as most of us are feeding our winter dairy cows, we are feeding a ration that costs from seventeen to twenty cents a day to get our cows up to a point where they will make a pound of butter that will sell for twenty-five cents, on which you see there is a very small margin of profit. But suppose we can devise means whereby we can feed for seven to eight cents, and get just as much milk and butter, you see we have got a nice profit left. There will be gentlemen here that will tell you exactly how to do that very thing, and that is only one thing that they will tell you out of many. Some of these gentlemen have made a success of beef raising, some others in wool, and they will tell you how they

have done it and draw from you questions and discussions and I expect to learn from somebody in this audience several things I did not know when I came here.

This is your meeting, and to the extent that you enter right into the discussions, ask questions and call out the knowledge of the speakers and your neighbors, just to that extent you will be benefited. I might sit here an hour and listen to some of these gentlemen talk, and they fail to say just exactly the thing that I want to know about, or that that man over there wants to know about, but a single question may be answered in a minute and give us just the information we want.

I thank you again for this welcome and for the large attendance at this first meeting, and I sincerely hope that the attendance and interest will increase in this meeting as we progress.

CLOVER AS A FERTILIZER.

By T. B. TERRY, HUDSON, OHIO.

It is a well-known fact, to farmers who raise clover, on soils where it grows well, that their land will bring a larger crop of wheat after clover, even if the hay is all removed and no manure returned, than it would before the clover was sown. Now here was fertility got from some source. Whence was it? Directly from the plowing under of the clover roots or sod. But where did the clover roots get it? And why could not the wheat have got it just as well? According to our best present knowledge, to put it in simple terms, clover is able to get more nitrogen from the soil than the wheat could. Then when we plow under the clover sod it decays and furnishes food for the wheat.

The clover is a sort of scavenger or coarse feeder as compared with the wheat. Again the roots of clover run down some feet and have the power of pumping up fertility to the surface where more shallow feeding crops can get hold of it. The clover root is much the largest at the surface or for the first six or eight inches, hence most of the material that it has taken to grow the entire root is left where the root decays in the surface soil.

Whether clover owes *all* its value as a fertilizer to its ability to act as a scavenger and to its power to go down and bring up from the subsoil fertilizing elements that have leached downwards is a much discussed but not entirely settled question. Scientists disagree somewhat on this point. However, the bulk of testimony at present is that it does not get much of any nitrogen from the air. Dr. Lawes says, however, that it is likely to be a subject of inquiry for a long time before the final solution of the problem will be arrived at.

He also says if it should be ultimately proved that the nitrogen of the atmosphere played any important part in furnishing the nitrogen taken up by the plant, it is more probable that the nitrogen enters into combination with some ingredient of the soil, then that it is directly assimilated by the plant itself. This was written by Dr. Lawes in the *Country Gentleman* for March 17th, and shows that our highest scientific authority stands on the fence ready to jump down on the winning side. In other words, he is not sure that clover does not get its nitrogen from the air.

Clover Tops.

I have spoken only of the roots of clover as a fertilizer. The tops are equally valuable. Probably there would not be much difference in the dry weight between the roots on an acre and the hay. The roots are only valuable to plow under for a fertilizer. But as the tops make choice hay it will usually be wiser to use them for this purpose, or to feed them off in the field with cattle or hogs. The manure, if

carefully saved, may contain about eighty per cent. of the fertility that was in the hay. Under some circumstances it may be wiser to plow under tops as well as roots to furnish fertility for other crops. This will depend on relative prices of different crops, also on distance from the barn to which hay must be drawn and manure returned. Each farmer must figure this out for himself. Clover is sown with your grain this year; next year it brings a big crop, and in the fall it will have arrived at its maximum as regards root growth. Either then or the next spring it should be plowed under for the most valuable results, and some other crop put on to make use of the fertility stored up in its roots. The heavy growth and hence shading of the ground by the clover, undoubtedly helps to make the land more fertile afterwards. Those who have tried pasturing clover and mowing it side by side tell me the mowed land is decidedly the most mellow and productive the following season. This may be owing to the shade from the mowed crop or because the land is not packed by the tramping of pastured stock. Secretary Bonham has found by trial that the root growth is far greater where the field is not pastured at all. I know of parties who have kept their land up in productiveness for twenty years or more by raising clover once in three or four years and simply plowing under the roots, all the hay and grain crops being removed, but I would not advise any such treatment.

Feed out the hay and save all the manure carefully, and feed purchased wheat bran and oil meal with the straw and fodder as far as you are able to. If you have good land you may depend on clover mainly as a fertilizer for a time to get you out of debt or to build you some new buildings; but do not depend on it too much until we know the nitrogen does come from the air. I speak strongly in favor of clover because it helped me out of a tight place. I bought a run down farm, and do not see how I could have done the half that I have without its aid.

The Best Clover for Hay

For hay, the medium clover is best. For plowing under as a fertilizer, the mammoth is considered better. We hear of clover sick lands. Yes. You will hear of more than you will *find*. Where you will find one acre that is clover sick, I will find you 1,000 sick for the want of clover. Sow it once in three or four years, in your rotation, and never worry about clover sickness. Land gets sick of wheat or most any crop if raised too continuously.

Did I own a farm in Wisconsin that had been rather run down from improper management, my first step towards better things would be to sow clover seed if it would grow, and there are few soils where it will not.

I have heard those who plow under clover for a fertilizer, saving none of it for hay, argue [something like this: The use of that land for a year, that is, the interest on the value of it, is \$5. One dollar more will pay for clover seed and sowing. This is \$6 an acre. Plow the clover under when full grown and it will grow a big crop of corn and wheat, I cannot fertilize in any other way as cheaply.

On some farms, perhaps not. If one had a good silo I think he could so reduce the cost of securing the clover for feed, that it would nearly always pay better than to plow it directly under. In conclusion, I can not better express the matter than in the words of friend Faville, who was asked at an institute last winter the essentials for renovating a worn out farm. He said there were three: The first was clover, the second, *clover*; the third, CLOVER.

CLOVER.

BY D. G. CHEEVER, CLINTON.

Examined from any stand point, we shall find clover one of the most interesting and profitable plants in our farm economy.

As an article of forage, when cut at the proper time, suitably cured and well stored, it has perhaps no superiors and few equals, furnishing a perfect animal food. But valuable as it is in this particular, its greatest value is as a fertilizer used in the proper rotation of crops.

A Good System of Rotation.

One of the best systems of rotation is clover, corn and wheat. Turn under the clover sod in the fall, thoroughly pulverize the soil in the spring and plant to corn; the following spring sow to wheat, and again seed to clover, using land plaster if the soil is sandy or clayey. On the black vegetable mould of our rich western prairies, the plaster will be less certain in results. With this system of rotation fields have produced from thirty to forty-five bushels of wheat per acre, and one hundred bushels of ears of corn on an average for thirty in succession.

The chief reason why wheat is the best grain to rotate with corn and clover is that there is a great similarity between the composition of the ashes of wheat and clover.

The growing of clover is equal to deep plowing, because its long roots penetrate deeply in search of food for the stems and leaves, which if plowed into the land undergo decomposition and leave near the surface elements taken from the subsoil. Its leaves take carbonic acid largely from the atmosphere and the plowing in of this crop augments the

carbon of the soil very materially, which changes its color and gives it greater capacity to absorb solar heat and to retain manures and ammonia whether resulting from their decomposition or absorbed from the atmosphere.

The following analysis made by Dr. Salisbury shows the inorganic or ash elements in one hundred parts of clover ashes and compares it with ashes of wheat and oat straw; the similarity of the clover and wheat is marked, while that of the oat straw is quite dissimilar in amounts.

Constituents.	Clover.	Wheat straw.	Oat straw.
Phosphoric acid	8.80	3.07	1.54
Sulphuric acid	5.98	5.82	6.46
Lime	37.09	6.70	3.15
Magnesia	4.45	3.82	1.09
Potash	26.70	13.44	3.15
Soda	7.07	0.16	
Silica	4.85	65.38	76.16
Chlorine		1.09	0.73

Clover as a Green Manure.

In discussing the merits of clover, as a green manure, we should never lose sight of the fact, that when practicable its value is greatly enhanced by feeding to thrifty stock and carefully saving both solid and liquid droppings, and as quickly as possible return them to the soil from whence taken.

Careful investigation has demonstrated that the roots of the clover plant equal in weight the stalks and leaves, so that a crop of green clover plowed under weighing ten tons furnishes in fact twenty tons for manural purposes, which, it is calculated is fully equal to five cords of good barnyard manure to the acre. In view of these facts and much more that could be said did time permit, it is not surprising that clover is becoming more and more popular as a farm product year by year, as its merits are better known.

Experiments with Clover.

Prof. I. P. Roberts, of Cornell University, N. Y., at one of our farm institutes this winter gave the following experimental work: A field that had been liberally manured, and had been under the plow and cropped for six successive years, was seeded to wheat in the fall of 1882. Two quarts per acre of timothy seed were put in. In March, 1883, six quarts of clover seed per acre were sowed on the wheat. In 1883, when the wheat was cut, the seeding appeared to be about seven-eighths clover and one-eighth timothy. The yield of hay in 1884, was estimated to be between two and three tons per acre. An abundance of moisture being present, the second growth started quickly and grew luxuriantly. Wishing to sow this field to wheat in the fall, and having plenty of hay the question arose whether it was best to cut the second growth for hay and purchase fertilizers or plow it under. In order to throw some light upon this question, the clover from an area of sixteen square feet of average growth was cut and dried, and the roots of the same area was dug, washed and dried. The tops contained when analyzed, 11.41 per cent., and the roots 9.85 per cent. of water. Taking the yield of sixteen square feet as the unit for computation, it was found that there was a yield per acre of air-dried hay, containing moisture as above of 3.295 pounds; of air-dried roots, containing moisture as above stated, 4.893 pounds. The analysis showed that the roots had not been entirely cleansed of the sand, although every effort was made to do so.

Analysis of the tops taken from the second growth, August, 1884, gave the following results:

Nitrogen.....	2.31 per cent.
Potash.....	2.74 per cent.
Phosphoric acid.....	53 per cent.

Results given in pounds per acre.

Nitrogen 76.11 lbs. at 15 cents.....	\$11.41
Potash 90.28 lbs. 4 cents.....	3.61
Phosphoric acid 17.46 lbs. at 6 cents.....	1.0

Total

Roots.

Nitrogen	2.24	per cent.
Potash567	per cent.
Phosphoric acid44	per cent.

Results given in pounds per acre.

Nitrogen 109.6 lbs. at 15 cents	\$16.44
Potash 27.74 lbs. at 4 cents	1.10
Phosphoric acid 21.52 lbs. at 6 cents	1.29
Total	<u>\$18.83</u>
Value of tops	\$16.06
Total value	<u><u>\$34.89</u></u>

The Question Naturally Arises if Clover

plowed under furnished such a large amount of plant food for the succeeding crop, why husband so carefully farm manures. Here we have in one year a large crop of hay, and in the second growth of tops and the roots, plant food equal to ten tons of well preserved manure or three-fourths of a ton of high grade ammoniated superphosphate.

Some careful investigations conducted during the past season, demonstrated the manurial value of clover. The samples in this case were taken from clover two years from seeding, very late in October. The soil was a moderately fertile clay loam. Some timothy was mixed with this clover, all was very tall and rank and the clover quite brown and gray. The area cut and dried was 25 square feet.

Weight of air-dried tops per acre	5.417 lbs.
Weight of air dried roots per acre	2.068 lbs.

The tops were found to contain in analysis:

Nitrogen	91.5	pounds.
Phosphoric acid ..	40.35	pounds.
Potash	78	pounds.

The roots contained per acre:

Nitrogen	47.36	pounds.
Phosphoric acid	27	pounds.
Potash	31.96	pounds.

The value of nitrogen, etc., in the roots and tops of an acre computed at the same prices as above would be \$30.10.

Experiments with New Seeding.

As to the quantity and value of clover, are interesting as showing the vast amount of roots that grow in the soil in a limited period of time. The soil from which the roots were taken was a sandy loam. The ground was used for growing oats in 1885. In the fall it was plowed and treated to eight or ten loads of manure per acre on the surface, and sowed to winter wheat, September 15th. Two quarts of timothy seed per acre was sowed on the land about ten days afterwards. In March, 1886, about five quarts of medium clover seed per acre was sowed upon the wheat. A heavy crop of wheat was harvested. The roots of the clover were dug in the wheat stubble November 16, 1886. From the time of sowing the clover seed to the time of digging the roots was eight months. Sixteen square feet of surface was dug over and the roots washed and preserved. The tops of the clover having been cut as close as possible with a sickle before the roots were dug; one-tenth of the roots were found to be timothy. They were thoroughly washed and dried in a hot room for about two weeks when a determination showed that they contained 6.86 per cent. of water. Using the unit of 16 square feet—the area dug for computation, it was found that an acre contained 1.991 pounds of air-dried roots, containing 6.86 per cent. of water. Computed at the average amount of water found in air-dried hay 14 per cent., the amount per acre would be 2.156 pounds. Estimating the composition the same as that found in the former experiment it would show that the value of these young clover roots in the wheat stubble was \$8.00 per acre. That is to say, the plant food they contained could not have been purchased on the market in the form of fertilizers for less money.

RECUPERATIVE AGRICULTURE.

BY PROF. I. P. ROBERTS, CORNELL UNIVERSITY, N. Y.

How to restore a sufficient portion of the original fertility of impoverished fields so that their occupancy and culture may be fairly remunerative while improving them, is a problem that requires careful consideration. Through ignorance, carelessness and greed, many once fairly fertile acres have been so far impoverished as to preclude profitable cultivation now or hereafter, if the same systems that robbed them are persisted in.

It is not my purpose at the present time to speak of lands which, under any management, would prove unprofitable if kept under tillage, but of those which in time can be so far improved as to make their cultivation profitable. Neither is it my purpose to give details, instructive of improving the land, except so far as may be necessary to explain and emphasize certain principles, as environments always control, to a large extent, the means used to accomplish our ends.

Improve Poor Lands.

A large amount of our cultivated land—I believe fully one-half—if not producing, under present management, over ten bushels of wheat, or its equivalent in other products per acre, and over an eighth, to put it mildly, is not producing over half that much. You may not agree with my estimates, but must admit that the income from thousands upon tens of thousands of acres is so small that it is insufficient to give even European starvation wages to the farmer. If land will not give fair wages and a profit under tillage, then it should be permanently seeded to grass and clover. Why spend the equivalent of a dollar for the pleasure of receiv-

ing in return ninety-five cents. A field well set in grass will improve rapidly in fertility if all the manure that the animals produce that consume the grass, and a reasonable amount of bran and other like by-products, be returned to it. Of all domestic animals sheep are best suited to improve poor lands.

There are vast and inexhaustible stores of plant food in and upon the earth, which are either going to waste or inert and valueless to the farmer in their present condition. It is the province of improved agriculture to seize upon crude and cheap material and through the aid of plant and animal transform it into merchantable food and clothing. The phosphoric acid found in the rock and bone for which is paid eight cents per pound will be found in the milk, a thousand pounds of which contain:

Potash	1.5 pounds.
Phosphoric acid	1.7 pounds.
Nitrogen	5.1 pounds

The total cost of the above in the form of fertilizers would be one dollar; in solution in milk they sell readily for from \$10 to \$40. Then why not purchase more liberally of the crude, cheap products; mix them with brain and muscle and sell at these advanced prices. A ton of bran costing \$14, furnishes, in round numbers:

Nitrogen.....	44 pounds.
Potash	28 pounds.
Phosphoric acid	54 pounds.

If fed to sheep not less than 80 per cent. of these valuable constituents would be found in their droppings, as follows:

Nitrogen, 35 pounds at 16 cents.....	\$5 60
Potash, 22 pounds at 4 cents.....	88
Phosphoric acid, 43 pounds at 8 cents	3 44
	<hr/>
	\$9 92

If we take some other products, as cotton seed meal, the showing will be still better.

Husband the Fertility of the Farm.

It is of the land that is slowly and almost imperceptibly decreasing in productive power and fertility, that I would speak. This class embraces a vast area, and upon these lands reside nearly or quite one-half of the farming population. "Speed the plow." No; stop the plow and let him that hath been raising forty acres of wheat write quickly twenty, and he that hath been raising twenty let him write ten. We are in some cases carrying the valued, concentrated fertility of the farm in grain, etc., to the railroad, and offering in a glutted market at cost or so slightly above that the profits will not justify the purchase of cheap, crude plant food to replace that sold. The result is the farmer replows the tired land and once again, against his will, he calls to the land to stand and deliver. If he could only see clearly that forty acres of wheat at twenty bushels per acre means very small profit, but that twenty acres at thirty bushels per acre means profit and fertility both. Will we never learn that 400,000,000 bushels of wheat bring more money than 500,000,000? Will we never learn that when any large number of people in this country are working for lower wages than they should or without a liberal profit, most other workers soon share a like fate? Then husband the fertility of the farm till the world is willing to pay cost and profits for what you have to sell. I know the people cry for cheap food; but if some must suffer, then I would quite as soon the suffering should fall on those who squander a large per cent. of their earnings in pandering to vices, as to see it fall on the children and hard-worked, frugal wives of the western farmer.

What to Do with the Surplus Land.

What will be done with this surplus land? "Why, let it go to grass." Why longer fight your best friend? Why not make peace with your friend while you can honorably and profitably? Lay down the implements of warfare; climb on

the fence and see the grass grow and the clover perspire with the labor of pumping the nitrogen from the subsoil to the surface. Sign an everlasting peace that your children's children may inherit this land. Corn may be king, but grass sits on the throne and fertility is the power behind the thrown. Man cannot live by grass alone, so we must plow; plow, as the world will pay for it; but as we plow we must plan how we can at least partly supply the place of the plants we are destroying. Our domestic animals supply to some extent the office of conserving fertility. Then a reasonable number of them should be kept, and the manure — *all* of it — should find its way back to the field at the earliest possible moment consistent with crops and season.

This will not be sufficient in most cases to keep the land up to its most profitable condition, and just here commercial fertilizers should come in, not to take the place of farm manures, but to supplement them. If we desire to improve the soil, we would do well to study nature's methods of making soils. We see her clothing the habitable parts of the earth with plants, most of them so diminutive and worthless for cultivation that we hardly notice them, but all are useful as soil builders. Then comes the myriad animal forms to feed upon and convert them quickly into soluble food for other plants for other animals. In modern agriculture the same order should be preserved. Raise the grass to feed the animal to make manure to feed the grass. Somewhere before the circle is completed we take a small fraction of toll from the three elements mentioned, and to replace them we draw from the bountiful stores in the bowels of the earth, from the sea and from the waste places.

Then true agriculture consists in taking from the soil such concentrated products as are suited to minister to our varied wants, replacing them with crude, cheap and waste products so skillfully that no serious diminution shall occur. To do this to the best advantage requires a great amount of skill, training, knowledge and labor, and where either or all of these are notably deficient, the land suffers.

Discussion.

MR. J. M. SMITH — If I understood you correctly, your theory was to raise a crop of clover, mow it once for fodder and then for seed, and after that plow it under either in the fall or in the next spring. Is that correct?

MR. TERRY — Well, you can do it any way you please. What I said was, that in the fall after the first year's growth, I would either plough it then or in the next spring in order to get the most benefit from the crop, because then the roots have attained their maximum growth. I don't allow any animal to step on my hay crop that I use that way. I would plough the crop under in the fall in order to get the best results from the clover roots.

MR. SMITH — One of the best farmers I have ever known, used to follow this course with clover. He mowed it as hay once, he then mowed it in the fall for a crop of seed, the following spring he put on plaster; he said he did not dare sow plaster the first year because it would make it so large it would be worthless; but he sowed it with plaster the second year and mowed another very large crop, then in the fall he either ploughed it under or plastered it and then ploughed it under and sowed corn the following spring, and he considered that the best way.

MR. TERRY — I do not believe that will be as good a plan as a rule. I believe that in most cases the second year's clover will not be as large as in the first place. It is very much the same with your strawberries, you know as a rule you get the largest crop the first year, and that has been my experience with clover unless the land is very rich and well underdrained.

MR. BENNETT — Will you please mention the soils upon which you think clover would not grow?

MR. TERRY — I don't know any soils on which clover will not grow at all, but of course there are some soils that will grow clover better than others. Light, sandy soil or loamy soil will grow it better than heavy clay soil, but I don't

know of any clay soil in our vicinity upon which clover will not make a good fair crop, if it is properly tile drained and properly worked.

QUESTION — Do you roll the ground after sowing the clover seed?

MR. TERRY — No; my practice for seventeen years has been to sow the clover seed in the spring as soon as the bulk of the snow had gone off and the surface of the ground had begun to thaw, before it is all thawed out, and then let the freezing and thawing cover it. I have never failed in seventeen years of getting a good stand, and I have seen my neighbors fail year after year where they waited until later. This last season we had it very dry, and I sowed very early and my seed got started so early that it grew very well. The roots got down to the water so it went through the dry weather, while many of my neighbors who waited until the ground got dry and then sowed the seed the roots did not grow deep enough to get a good stand.

MR. FAVILLE — You sow yours with fall grain. We do not here, you know, we sow with spring grain.

MR. TERRY — Yes; I sow in the fall. I am so far away from home here that I would not undertake to advise. Your soil is so much lighter than mine and your climate different. I am asked about dragging seed in on very light sandy soil. I would not want to harrow it so as to bury the clover seed very deeply; an inch perhaps might answer. Where we put the grain in with a drill I would put the clover seed right on top, and the roller, if you roll it, would certainly put it in deep enough. I can not see any objections to rolling on such soil as you mention, however; I would not roll the whole field if you had not been in the habit of doing so; I would roll a strip through and see how it works. I have tried that sometimes on my wheat and potatoes to see how it would work.

MR. FAVILLE — I want to emphasize what Mr. Terry has said about the value of clover as a fertilizer. I do not believe there is a farmer in Wisconsin that can afford to farm

it without raising clover. It is the only way that I know of where a farm of very much size can be kept in its native fertility, and there is not a farmer here but knows the importance of retaining the fertility of his soil. It is his stock in trade, it is his bank account, and you can no more draw upon that bank account without replenishing it, than you can go to your bank here and keep taking money out without putting anything in; you know that very soon you will get to the end of it. You can't cheat Mother Nature. Of course, if we have only a little farm and keep considerable stock, perhaps you can make manure enough to keep up the land, but for a large farm it takes too much. Now, just how clover acts as such a valuable fertilizer I am not able to say. Some say it gets a large part of its growth from the atmosphere, and others think it is in part from its mechanical influence from the roots running down so far into the soil; we all know that the roots running down into the soil has a tendency to loosen up the ground and let the air in. No doubt, also, it furnishes a sort of a mulch for the ground.

You know it is stated as a principle in philosophy that nature abhors a vacuum, and I think it may be said as equally true in agriculture that nature abhors barrenness. You know how soon the earth will go to work and cover up the bare places. If you don't grow something better there the weeds will grow, you have seen it where it has been burned over bare, the fire weed will come up and cover the bare spot, so the ground is shaded and it is kept from the rays of the sun and from the evaporation of ammonia that is always rising from the earth.

I don't know how it all works, but I know what the results are. I know that if we sow clover liberally and often, we can maintain the fertility of our soil. With us we have a three years' rotation of crops. First clover, mowing it just one season, two crops, then turn it over in the fall and plant corn, then oats, and so around again, and in that way our land is growing better. If the land is poor it would be advisable perhaps to plough in one crop, but after you have

got your land up in fertility you can keep it so a great many years. Now, if the land needed it, I would cut but one crop of clover for feed pretty early, and plough in the other. I think that is equal at least to fifteen wagon loads of manure to the acre, that clover with the roots and that once in three years will keep the land up pretty well.

Don't try to farm without clover. You know it is the very best hay you can get. There is a mistaken idea that timothy is the best, and it may be for horses but for a milch cow, for cattle, calves, sheep or anything of that kind, clover is very far ahead of timothy for feed in my judgment, and my judgment is not based upon guess work at all, but upon years and years of experience.

MR. SMITH—Give us your idea of clover as a fertilizer of soil, independent of its feeding value?

ANSWER— I think it is the very cheapest way that we can manure the land, particularly on a large farm a distance from the barn. I don't know of anything that will take its place except it is barnyard manure, and you know that it is very slow work to go over a large farm with manure that is made in the barn.

J. J. W. BILLINGSLEY— One of the most remarkable studies in practical farming is the wonderful recuperative and restorative effects of clover on land. This effect can hardly be exaggerated. It is a mystery to many farmers how a crop grown on a soil can impart to it more than it takes from it. Perhaps it will help them to understand this to remind them that but a small portion of the plant comes from the soil. In a ton of dry clover hay, chemists tell us there are but from 106 to 134 pounds of organic matter (by which they mean that which has come from the soil), and all the remainder is inorganic, or matter that has come from the atmosphere. Another fact which helps explain how green manuring helps the soil is, that in most soils there is enough of plant food to grow hundreds of crops (and often thousands), and much of this is in a condition in which it is not readily available for the plant. One of our best modern

writers on agricultural chemistry says: "So great is the wealth of fertility stored in the soil that if the nitrogen, phosphoric acid and potash contained in the upper twelve inches of a good soil were valued at the prices charged for them in our commercial fertilizers, a farm of 160 acres would be worth about a half million dollars."

This must be constantly borne in mind: The question we are about to solve in cultivating our farms is not, when will the soil become perfectly exhausted, but how can we manage it so as to get profitable crops at the least expense now?

QUESTION — If you were sowing clover on very poor, light sandy soil, would you do anything to help the clover grow, and if so, what?

ANSWER — I would sow at least one hundred pounds of land plaster to the acre; if I could get it pretty handy, and it is cheap, I would put on a hundred and fifty pounds. Rich land would not need that. On our prairie soil, we do not need it, but on any clay land or sandy land one hundred pounds of plaster to the acre will double the crop of clover.

QUESTION — Suppose we have some soils upon which plaster has no effect, as far as we can see, what would you do in such a case?

ANSWER — I would sow a little salt, and I would get a little lime and try it. If you will sow some plaster right at the time you sow the seed after the grain is sown, it will help that clover come up, and it will tide you over quite a severe drought.

QUESTION — I would like to hear the gentleman's plan of saving clover when he cuts it, how he takes care of it before it is put into the barn?

ANSWER — Well, the very best plan is not to cure it at all; to build a silo and put it in as fast as you cut it. If I haven't a silo the next thing is to just about half cure it, not dry it so the blossoms will drop off, and the leaves, but wilt it nicely, and put into a tight barn, the tighter the barn the better, and the more of it you put in together. Then cover it up with some straw or hay. It will heat and cool

and dry itself up and come out very much better than it will in the old way. Put it in quite green, but not wet. I have done this for fifteen years past and have stated it in audiences like this and some man would go home and cut it when the dew was on it and perhaps get rain on it, and he would put it in and it would heat too much and spoil. Clover can carry its own juice and not spoil, but any foreign water — any rain, it cannot carry. You put it in quite green, and it will come out much better than if it is dried before it is put in the barn.

QUESTION — When it is put in green that way, will it come out black and smoky, or sweet and dry?

ANSWER — That will depend entirely upon how wet it is when you put it in. I never had any hurt a bit, but of course I have always watched it to see that it was just about right. It will heat and burn a sort of a reddish brown. I think that the heating is a decided benefit. It will pack in tight and exclude the air from itself, and if it is covered so the air won't get at it from above it won't hurt.

B. S. HOXIE — I will give you L. N. Bonham's, President of the Ohio Board of Agriculture, method of making clover hay: "He selects a bright day and starts the mower as soon as the dew is off. By 11 o'clock he has cut as much as can be hauled in between 1 and 5 o'clock. The clover is then all turned and shaken up loose before he goes to dinner. By 1 o'clock it is dry enough to rake into windrows if the day is an average hay day. No time is lost now in getting it into the mow. The hay is warm and free from external moisture. The warmer it is the less moisture is left on it. By 5 o'clock he has it all in the mow, if possible. If not all in, then he leaves it in the windrow until near noon the next day. After he stops hauling at 5 P. M. the mower is started to cut what he can haul in the next day. The clover cut so late in the day is not wet with dew, and will not wilt enough to be blackened by the dew. It will be ready to shake up and spread out before 10 o'clock the next day, and by 1 o'clock he can begin to haul it into the mow.

"The clover hay thus made goes into the mow bright and with every leaf and head left on it. The secret of the whole business is, it is free from external moisture, while the warmth of the hay when it goes into the mow hastens the approach of the temperature of the mass up to 122 degrees, when the germs which cause increased fermentation are destroyed and the hay keeps bright and sweet, and comes out fragrant clover with all the heads and leaves of good color. His mow is 28 by 28 feet and as tight as good siding and strips painted can make it. There are no windows in the sides to let in air. The clover is put in as compactly as he can get it, to save room and kept level to have the heat uniform. Sometimes he sprinkles a half-gallon of salt to the load when putting into the mow, but this is of doubtful value. To exclude the air from the top of the mow he often covers with straw. But this does not pack closely. He finds it better when hauling in wheat to fill up over the clover with wheat. This excludes air, and packs the clover so that it keeps bright to the very top.

"The old theory that the mow must be open and the clover thrown in loose, and treated to 'plenty of salt,' which may mean much or little, is exploded. Green clover will keep green in the silo if well packed and the air is excluded. Clover hay, put into the mow warm and dry, the day it is cut, will keep brighter and purer and sweeter than if cured longer in the field. The trouble, however, in farmers adopting the method is, they do not attach enough importance to the fact that the conditions named must be followed. It will not do to cut clover in the morning and haul it in after sundown. It will surely mould or come out brown or fire-fanged, simply because dew falls at 5 o'clock. Nor can we cut clover and put it in the mow the same day without favorable conditions of sun and air. In neither case will the hay go in free from external moisture."

QUESTION — What is the value of clover put up in the silo as compared with hay cured in the old fashioned way?

ANSWER — I would rather have one ton put into the silo

green, than to have three tons of dry hay in the manner that they generally dry it, dry it in the sun until the leaves and tops break off. I built my silo large enough to put in ten acres of clover and I was perfectly satisfied from the way that it fed, that we had doubtless the feeding value of that ten acres of clover over the old way of putting it up. We fed it just as we would feed roots, we wouldn't feed it all at once, but we saved it along, and it lasted astonishingly, very much beyond my expectation.

QUESTION — Does the frost hurt clover in the silo?

ANSWER — No, sir; I suppose it would freeze but it didn't freeze at all this last winter. The body of the silo did not go below eighty degrees. Clover don't pay for cutting to put into the silo, and it don't need to be hurt if you will take a little pains to tramp around the edges and the corners as it settles, so as to exclude the air. I should be decidedly in favor of the medium red clover as the best for feeding. I have never tried any alsike. I doubt if it would be as good for putting into a silo. I understand it is more like white clover, but I have been told that alsike is most excellent for hay.

MR. SMITH — I will say for the information of the gentlemen of the audience, that Senator Matt. Anderson, one of the best farmers in this state, is raising alsike entirely and has discarded common clover thinking it makes much better hay. I think he has not tried in the silo.

QUESTION — Would you undertake to make a success of clover, raising on land that was extremely sandy, where there was no subsoil under it, by the help of plaster and salt, etc.

ANSWER — It is the only thing that I know of that will fetch sandy land, excepting of course, lots of manure. I would not give up any land as worthless until I made a trial of it turning in one crop and using plaster.

QUESTION — I live north of here up on the Milwaukee and Northern road, and up in that country there are thousands of acres of sandy land that has got scarcely any timber on

at all, and never had to all appearance. It has a little oak brush and scrubs and some jack pine. There is a light grass that cattle feed on in summer and do pretty well on. I would like to get an idea from some of you experienced men as to whether that soil is good for anything or not?

ANSWER—You can tell by trying it. I don't know. I would not give it up as worthless until I had taken a little piece and tried it. Still of course there is some land up here that is so poor that it is hardly worth the trial. I have seen ordinarily sandy soil brought to by clover, but he is talking about something that is poorer than poor.

QUESTION—I read in the *Milwaukee Sentinel* that Mr. Morrison said that it was his opinion that he could bring the poorest sandy land in this state to a good state of fertility with clover, corn and cows. Up north we can't raise corn, but clover and cows, (providing we could make the clover grow) would be all right.

MR. PEFFER—Some twelve years ago I went through Adams county with a friend of mine, and as we went through we noticed it was just such land as this gentleman has been speaking of, once in a while an oak scrub and once in a while a jack pine and sometimes there were holes in it and looked as though they were canals, and come to find out it was the wind blowing the sand away. This gentleman had a farm there of some ten or twelve hundred acres. He said he was stocking it, and I asked him what he stocked it with in the winter time. He says: "They have got some marsh hay, but in the summer time they run all over, and when there was no grass, they would eat off the scrub oak bushes." Finally I saw some houses standing there empty and I asked about it and this man says: "Those folks have been raising hops, and these lands have been hopped, and the men got starved out and left it and the land has gone back to the county for the taxes." He said: "Anyone making an agreement that they will live on it two years, will get it for nothing and free from taxes, and get title to it in two years." There were some Hanover men in our

section that had lived on sandy land and after I came back I was talking to them, and one of them says: "If I could only get up there and look at that land I think that it is worth looking after." He asked me how far down the holes were where the sand was blown away. I told him about a foot. A little while after I took the man along with me and we looked at the land and the result of it was that his brother-in-law and another man went up there. I always heard they got along very well and five years after I went there and they had cattle and haystacks, and grain stacks and nice fences, and were doing first rate. They told me they went down just about a foot and there was a sort of reddish clay underneath the sand. When they first commenced they had no team and they spaded it up the first year, and while they raised that crop they worked out and earned enough so as to get started with some cattle in the fall. Then the next spring they put two yoke of oxen on the plough, and got the red soil up and after they got that up, there was no trouble, and they have just as good crops there as anywhere. When they first went, they thought clover would never grow there, but it has just been the making of that country, and I believe that the best clover in this state is now out there.

MR. FAVILLE — There is no clover seed in the world so good as that raised on sandy soil.

ANOTHER GENTLEMAN — Ten years ago I hauled plaster on land that was considered too poor to enter, the sand burrs were growing there and it was only a few years before I raised a big crop there.

MR. WOODRUFF — A piece of land was sown with clover and timothy seed two years ago. The clover has now been winter killed, I would like to know if there is any way to get the clover to grow again, without ploughing up the whole field?

MR. FAVILLE — It is very likely if you should sow on clover seed it would catch more or less, and come up among the timothy, the same as if it was sown with wheat, but I

wouldn't advise that, I would break it up. We only mow one season, it kills out pretty often, so we mow twice the first season and then plough it up and plant corn on it.

MR. PEPPER — After mowing timothy I should break it up and re-seed it again, right off, and sow the clover just as you would thrash it with a flail, right with the timothy seed in the fall, that is the best way to catch.

MR. FAVILLE — Mr. Theodore Louis can tell you about handling the kind of land that has been talked of here. He began on very poor land and he has stuck to it, until he can raise corn, one hundred bushels to the acre every time.

QUESTION — How much do you sow on an acre with small grain?

ANSWER — I always sow a little timothy with it, I sow four quarts of clover seed and four quarts of timothy, if the clover does not kill out the first season our first crop is entirely clover, we don't see any timothy at all. That amount will seed an acre well. If I were going to sow it just to fertilize sandy land I would make it about six quarts of clover seed.

QUESTION — Mr. Smith, can you tell me whether there is any difference in the mammoth clover seed and the medium? It is always mixed up, and it bothers us because they do not ripen at the same time.

MR. SMITH — I cannot tell them apart.

The Institute now adjourned until evening.

The evening session convened at 7:30 o'clock, J. M. Smith in the chair.

BEE-KEEPING ON THE FARM.

BY C. A. HATCH, ITHACA, WIS.

If it were a question as to whether the ordinary farmer could not add bee keeping to the many and varied industries of the farm, as a means of profit, I should say no, for with his dairying, grain-raising, sheep-farming, hog-raising, to say nothing of horse and cattle-raising, the average farmer has himself and family so overburdened and overworked that nothing is done properly and promptly, and the addition of bee-keeping would only put another iron in the fire, to contribute to the general conflagration now going on there. But when it becomes a question of furnishing himself and family with a pure, wholesome sweet at small expense—a sweet that will satisfy the natural craving of childhood without injury to health, or spoiling the teeth—then I say yes, positively yes; for, as compared with honey, the commercial sweets of to-day, for healthfulness and purity, have no favorable comparison. But mind, do not delegate all the labor to the women folks unless they have plenty of time and need the out-door exercise, which is not apt to be the case on the farm.

The first thing to look to after you have made up your mind to keep bees is

Pasturage,

for a greater falsehood was never palmed off on a gullable public than that bees “work for nothing and board themselves.” A bee cannot live on pure air, neither will he fatten on spring water nor give increase with no effort.

The only reliable sources from which honey may be obtained are confined in this state to three, viz.: clover, bass-wood or linden and buck wheat, and a man might as well buy

twenty head of cows with no land to pasture or feed them on as to get bees with none of these three sources of honey within range. True, other plants and flowers yield honey, but only in living quantities, not sufficient for surplus. Either clover or basswood alone might be depended on, but to depend on buckwheat alone would be a failure, for it comes so late in the season that bees would have to be fed, to get them strong enough to gather honey in the fall, for several months previous, which would not pay for the quality of honey got from buckwheat.

Pasturage should be within two or three miles at farthest, of the hive, and by the acre, if clover or buckwheat, and by the hundred, if basswood trees are depended on.

How to Get Bees.

1. Whole colonies in frame hives may be bought, which, in the long run, will be the cheapest.
2. Whole colonies, in box hives or gums, may be bought and then transferred to frame hives. This saves some in outlay at first, and gives a chance to get some practical knowledge of bees and their habits while transferring to frame hives.
3. Nucli, or swarms with but few bees, may be had at small cost, in suitable frame hives, and then built up to strong colonies for winter, but would give no surplus the first season.
4. Natural swarms, obtained of some neighboring bee-keeper, the purchaser furnishing the hive. This involves small expense and no work.
5. The purchase of bees by the pound, with an accompanying queen, which can be turned loose on frames of foundation in a suitable frame hive and then treated same as small swarms. None of these plans, except the first two, could be expected to give any surplus or increase the first season. The best time to buy bees, if full colonies are purchased, is in May. If any of the other plans are accepted, June 15th is early enough.

Summer Management.

See that they have at all times plenty of honey for at least two weeks' supply in the hive. In absence of honey a syrup made of best coffee "C" sugar may be given. Keep the hive covered warm, with a piece of old carpet, horse blanket or coffee sack, cut a little larger than the top of the hive, so as to keep in the heat; put a board on this and a roof 2 feet by 2½ feet over the board.

Supers

should be put on as soon as clover blooms; if extracted honey is what you want, a hive an exact duplicate of the one containing the bees, should be set on after removing all the covers. Lift one-half the frames from the lower hive, with their adhering bees, taking only frames full of honey, or sealed brood, and put empty frames, or frames full of comb foundation, in their place, and fill out the top hive in the same way. Just before these hives are full, repeat the operation, and put on a third hive, or as many as the bees will fill, and when the honey season is over, extract the honey from all except the bottom set of frames. Set away your supers for use next year, eat your honey and grow fat. If you think you want some comb honey to please the good wife and show off for "company," put in a few "broad frames" full of sections, and if there is a good honey flow they are sure to be filled.

Preparing for Winter

is done by examining each colony, to see if it has at least 25 pounds of honey; supply any that are deficient, from frames of honey kept for the purpose while extracting, removing empty frames, if there be any.

To Winter

with the least possible trouble, put them in a cellar where the temperature stands uniformly at about 45°. Set them away from the wall at least 18 inches, and 2 feet above the

floor of the cellar. Remove the board covers and put over the frames a piece of heavy cloth of some kind that will allow a slow passage of steam from the bees, but not too sharp a current; leave the entrance open full width. Disturb them, by light or jarring, as little as possible. The cellar should be perfectly dark.

Set them out on their summer stand when willows and soft maples are in bloom, give them plenty of honey, cover them up warm and let them alone until May.

FASTENING ENDS AND BINDING EDGES.

Bx MRS. R. C. BARLOW, HUDSON.

So long ago that it seems like a shadow, I recall a small girl, ambitious to do whatever she had not judgment to understand, will to execute, or patience to finish. One day she brought to her mother a ruined piece of needle work, doubly ruined, because the beginning had promised it was going to be nice. The material was puckered and stretched and drawn out of shape, ends of threads protruded here and there, and the raveling edges had gnawed great bites into the body of the cloth. With a storm of tears and penitent exclamations, the child declared the whole thing was horrid; nobody could do anything with such wretched stuff, and there was no use in trying any more. I remember, as if it were but yesterday, the questioning look in the mother's face, and the sensible words she spoke: "My unhappy little girl your work is spoiled, only because you neglected to fasten the ends and bind the edges. No good and lasting work ever was done or ever will be done by anybody careless enough to leave loose ends and raw edges. Take care of these two things and half the trouble of life will vanish."

The whimpering child to which this bit of personal advice was given has lived to see its wonderful efficacy and universal applicability verified a thousand times.

Small Crops and Low Prices.

Of late the newspapers have been full of reports, showing a depression in all branches of agriculture. Doleful tales are told of the poor prospects and grievous surroundings of the farmer's life.

The two great causes assigned for this unsatisfactory state of things are small crops and low prices for all farm products. These are facts, and facts must be accepted whether agreeable or not. Not only are prices exceedingly low but are likely to remain so. Nor can the grain crops for years to come be made to average what they formerly did. The agricultural doctors have been called upon to cure these evils. They have prescribed all sorts of fertilizers; they have told the farmers to get thoroughbred stock; to build ample barns; to buy first-class machinery; to plant only the best seed. All excellent remedies in themselves; but like many other doctor's prescriptions, expensive, and when obtained not necessarily successful unless surrounding connections are favorable. Indeed many a poor farmer might as well be told he must make a trip to the moon, as that he must have any of these things before he can hope to better his circumstances.

Other Causes of Failure in Farming.

Then must his affairs drift on year after year from bad to worse? Are there no other causes of trouble? Are there no remedies? Driving through the country the past summer I have thought verily there are many other causes. Too often I saw impoverished fields, dilapidated buildings, tangled shrubbery, weedy gardens, gaping fences, bantam fowls, half starved pigs, raw boned steer-like cows, skinny calves, heavy old horses, weak-kneed colts, rickety wagons;

water-soaked sun-dried machinery around too many farm houses. I saw litter and refuse and rubbish of all kinds. Squalor, neglect and waste in doors and out. In some places there was ignorance, laziness, intemperance, dishonesty and profanity. Think, too, of the children in such homes. How are they growing up?

Evil Influence on the Boys and Girls.

Are not the boys to grow up even more weak, shiftless, vulgar, vicious men than their fathers, a source of anxiety and trouble to whomsoever they are related, worthless to the community and a curse to themselves? And what is to prevent the daughters from developing into frivolous, improvident, helpless women, hasty in temper, coarse in thought, untidy in person, with neither heads nor hearts, nor hands to usefulness and beauty, their very souls barren and unlovely? Seeing these things, feeling that they ought not so to be, believing there was no need they should so continue, like a flash it dawned upon me, that these unfortunate farmers stood in the same condition as the miserable child of long ago, with her frayed out rag of embroidery and equally in need of the same advice.

Begin Now to Straighten Things Out.

I am no Deborah, gifted with prophesy and zeal and eloquence to show the road to ease and wealth, to exceeding ease and increase of flocks and fields, in horses and cattle, in men servants and maid servants, but I can safely say to every disheartened, unsuccessful farmer, you will find an ever-present recourse of hope and cheerfulness in your calling if you will begin at once to bind the raw edges and fasten the loose end on your raveling out farm. Begin with whatever is nearest. If burdocks and thistles are going to seed by the road side cut them down. If harness or wagon is out of repair, fix it. If the gate is off its hinges, hang it. If there is a hole in the granery, stop it up. If there is con-

fusion among your accounts and store bills, straighten them out. Don't sit brooding over small crops and low prices. If you have done your best to help these evils, whining about them will do no good. Give your whole heart and mind and strength to things you can better. This will occupy you, interest you, cheer you, worry and low spirits will be gone. There will be no immediate change in prices, or crops, but you will see things in quite another light; you will wonder how you could have so plagued and tormented yourself.

I can't explain, but I do know that to put things to rights and to feel that *you* have put them to rights, even in the most trivial matters, is the sweet way to bring on good terms with yourself and be at peace with the world. If you believe this, if you don't believe it, try it and see. Whatever you wish, if you bind the edges with thoroughness, good temper, courage, integrity, patience and common sense, if you fasten the loose ends with observation, skill, industry and economy you may set poor crops and low prices, yes, and sumptuous fare, and fate and people, and fine linen and the almighty dollar at defiance.

THE EDUCATION FOR FARMERS' DAUGHTERS.

BY MISS CLAPP, OF NEW RICHMOND.

How to educate our girls to be farmers' wives? is a question which the courtesy of your committee has entrusted to me for a few thoughts this afternoon. It is a good omen, and one which I hail with joy to see upon the programme for a Farmer's Institute topics relating to the best interests of the boys and girls. I would that my thoughts might be

inspired by the spirit of truth, my lips touched with living coals, and my words chosen from Heaven's choicest vocabulary so grand and sacred is the theme.

How to educate our girls to be farmers' wives? Don't educate them at all to be farmers' wives. Some of them will be doctors' wives, some ministers' wives, lawyers' wives, and, alas! some will be old maids. They don't believe it, but the world always has had some unmarried women, and always will; and some of us are vain enough to believe that there is room for a few, and that girls need not be taught to shun them so assiduously as to run their heads into inextricable difficulties. Don't educate the girls for any specific position exclusively, but educate them first to be girls, frank, generous and true; then to be women, intelligent, self-reliant and efficient, and they are ready to take up life's work wherever they may find it.

Labor is Honorable.

The question then is how shall we educate our girls. Teach them first and last and always the nobility of work the disgrace of idleness; that no necessary work cheerfully done is a drudgery. We only make it such when we do it with a drudge's spirit. Mothers, farmers' wives, do not teach your girls that you have all the hardships of life; that you want them to go to school and get an education so they will not be obliged to work as you have done. Schools have been accused of teaching children that the prime object of an education was to save them from drudgery. But it is not the schools, it is parents, actuated by a false affection, who seek to instill the thought that educated people live more easily. Teach them that every position has its lights and shadows. Let your own cheerful and attractive home be an object lesson on the lights of the farmer's life. Education begins much earlier than we are apt to think, and if we allow it to run wild too long it is very likely to get beyond our control. The first necessity for education is in the home, the early home, and if neglected there, can never be

made complete. Shall we say it? that too often more care is given to the rearing of calves and colts than to the boys and girls. Not for want of love and tenderness and proud aspirations for their future welfare, but because we expect the children to grow of themselves and straightway develop into prodigies of smartness without regard to conditions.

Farm Journals and Periodicals.

In these days of progress the farmer has his agricultural journal and his dairy paper to which he gives full faith and credence. He studies the best food and conditions for fattening hogs, and the best fertilizer for his crops. But he don't believe much in the new fangled notions about wholesome food for his children or the most profitable books for them to read. He forgets, he doesn't think, perhaps he doesn't know that the air they breathe, the food they eat, the sounds they hear and the sights they see, all effect their present and future welfare. He is simply oblivious to their natures and needs. He hasn't time to think about them; he has entered upon the business of acquiring property, probably for his children, that he may be able to place them in good circumstances by-and-by, when they ought to be able to place themselves there.

To acquire property it is well when it is sought as a means, not as an end. The first grand, supreme business of the parent, that which all plans should subserve is the education, the bringing up of the child, the proper and well balanced development of this three-fold nature. A business in comparison with which the accumulation of money as an end, sinks into nothingness.

Money and Lands are not All of Life.

But how often is it the case that the whole vigorous, pushing, manly nature of the father is thrown into the one purpose of making and saving money, the energies of the mother all consumed and literally licked up in the attempt to do her part of this great life work.

Both deny themselves every luxury and even necessary comforts (and the children come in for their full share of the denial), with the laudable purpose of saving for their families, perhaps with the very worthy purpose of giving them an education and desirable advantages in the future. All plausible; but meanwhile those little scraggy, knotty natures, are getting pinched, shriveled and twisted beyond all future redemption. Better give them something now. While the bud is opening give it the soil of love and tenderness, the air of freedom and Christian charity, and water with your prayers, your counsels and your companionship. Carefully watch the present growth during the age of helplessness and entire dependence.

The Present is the Golden Opportunity.

Many a woman has received by the last will and testament of her father, money to be squandered by a dissipated husband, money of which she was robbed in her childhood, and which, if it had been judiciously used then in her education and proper training, would have put her beyond present need.

Home Training and Influences.

Nothing can take the place of early home culture. I once heard a lady excuse the ill-manners of her boys by saying that the teachers did not teach manners at all nowadays. A manifest neglect; but did that excuse the mother who had a thousand and one avenues to the child's heart, never open to the teacher? Nay verily.

I am not pleading for extravagance or indulgence, but I am pleading that the home, the institution ordained of God for the rearing of the human family, be cared for, not only with an interest that will compare favorably with that given to the calves and pigs, but with an interest commensurate with the high possibilities and grand destinies of the immortal charge. Then, I say again, let the home be made attractive and comfortable in all possible ways; let the par-

ents live more in the present and less in the future; more for the present, and the future will care for itself. Give the child's early years sufficient freedom from drudgery and stinginess that the bud may unfold in freedom; then give him sufficient to do that he may be kept from evil thoughts.

Teach him self-reliance and self-support, with a clear understanding of his obligations to God and humanity; and you have done a work that will yield a better interest than any bank dividend.

Give Them a Pleasant Childhood.

Having thus a fair foundation laid, don't let the girl jump from childhood into long dresses, the company of young gentlemen and late evenings, with the whirl and excitement of the rink or dance till she loses her head. Give her a fair and honorable girlhood in which to mature physically, mentally and morally, a girlhood in which to be a companion, friend and help to her mother, a sharer in the joys and sorrows of the family, where she may learn to do, by doing, the many little things, as well as great, that go to make up a well ordered household. Give her broad culture, all the school advantages that the means of the parents can secure, and all that she can help to secure. She will be much better prepared for a farmer's wife with a broad literary culture as she will for a lawyer's wife or a minister's wife. Narrowness is not a requirement for a farmer's wife.

People in the city can find plenty of entertainments and opportunities for growth and advancement, but farmers must make their own entertainments from good reading and from society that may come to them; hence the necessity that the wife and mother be a lady of some literary taste and culture who can entertain and instruct, who can keep pace with the children in their school life, even with the young people in their college life, that instead of being a drudge for them she may be a companion and claim their respect. So that the experience of the mother and the fresh vigor of the college graduate may hold sweet converse.

Give Them Opportunities.

I do not mean to say that there are not multitudes of noble wives and mothers, self-made women of high type without a liberal education. But if I am asked to say what shall be done for the girls, I shall say give them the best possible school advantages. In pursuing the higher course of instruction, the girl gets more than book knowledge. She comes in contact with minds superior to her own; she lives in an atmosphere of broad experience, of high and noble purpose. Thus during her formative years her mind is pre-occupied with themes worthy of contemplation; her aspirations are lifted above petty jealousies; grace and ease are acquired, that are as acceptable in the farmer's home as any where. The mental discipline acquired by the study of and grappling with difficult subjects will give mental muscle that will fortify and energize the mind for the battles of life and ability to resist the petty trials of farm life, there are more there than elsewhere.

Somebody will say that a girl who can speak German and read Latin, follow the intricacies of mathematics, paint a picture and play the piano will be quite out of place in a farmer's kitchen. Nay, it is not so. I heard of a man once who said he had found out that girls brought up ladies, milliners and school-teachers were just as good house-keepers as anybody. A wonderful discovery; but no doubt it has been made by many another man.

A Woman's Influence.

Possibly these girls for farmers' wives may call for a new class of boys for farmers. They may strike for clean mouths and clean hearts; but the law of demand and supply will hold good. Educate the girls and the boys will soon be there. So long as girls are willing to associate with tobacco and whisky, with low aspirations and evil practices, so long the boys will gravitate to that level.

But when the girls demand fewer cigarettes and more

brains, when they ask honor for honor, purity for purity, when they will have the steady nerve and strong muscle of total abstinence, the boys will soon see light in their light and begin to climb to a higher plane. Hence for the sake of the boys as well as the girls, I plead for the higher education of the girls. Being educated they will be ready to assume responsibilities in any place. The greatest of greatness is shown in the ability to adapt one's self to any and all conditions. Give a girl an opportunity to develop broadly the powers and possibilities that God has given her, and she will be ready to serve or be served, to lead or to be led.

I quote from another: "The woman who understands chemistry well enough to know why bread rises will be a more successful breadmaker, than if she did not; the woman who is acquainted with botany sufficiently to know the medicinal qualities of plants, will make a better nurse for it; the woman who is proficient in mathematics is more likely to keep her household expenses on the sunny side of profit and loss. She who is thoroughly versed in physiology and hygiene will make a better mother; in short, he who has an educated wife has a priceless treasure.

After music, the Institute adjourned until morning.

Morning Session.

The morning session opened March 29, at 9 o'clock with Mr. Morrison in the chair,

SUPT. MORRISON — Sickness prevented my being with you yesterday, but this morning I am feeling better and it is gratifying to look over this large audience of farmers and to know that your attendance is prompted by an earnest desire for more knowledge about your business. One of the chief benefits that the farm institutes have been, and will continue to be, to our farmers, is that they will cause them to think more. We farmers stay at home so closely that our farm becomes a little empire, and in our isolation we compare ourselves by ourselves and not by others engaged in the

same vocation, and we commence to think our way is the only way, too much.

We come to these meetings and hear other farmers tell of different ways. Perhaps we will disagree with them, but the seed is sown and it will take root, and the growth will be thought; then there is hope. We meet with many erroneous views concerning the institutes. It is not a school, and the gentlemen who accompany me are not instructors, and we do not propose to teach farmers just what to do, but rather as a place where they can receive hints that will provoke thought and discussion. Our farms and circumstances are so different that each one needs to think and act for himself, after he has learned all he can about how others do.

But it must be remembered that the spirit and ability of the representative farmers of the state, who have given their views, related their experience and put on record their several parts at the institutes held in different parts of the state, were not begotten in a day, but were the results of potent forces that had been working with quite similar methods and aims for years, in a field that is one of the largest and best cultivated of any on the modern highly developed farm, to-wit: The field of the intelligent horticulturist, the dairyman and stock grower. For if we look for the primary school in which these men were largely educated, who were best prepared to execute the purposes of the state when its law-making power passed the original bill authorizing the farmers' institute, as presented by Hon. C. E. Estabrook, and gave that purpose character and efficient help, we shall find that it was the State Dairymen's Association and the State Horticultural Society fostered by the state, that furnished the brain and soul that has crowned our farm institutes with success.

Our present legislature has increased the appropriation for this work to \$12,000 annually, and the probability is that next winter we shall hold a series of seventy-five or eighty institutes. Let us go forward.

TEN MINUTE PAPERS.

THE ECONOMY OF SHEEP HUSBANDRY.

By H. J. WILINKSON, WHITEWATER.

The institute season draws very near its close, and the curtain is soon to be rung down; but before we step from the platform to the furrow, a brief report of the various interests of farm and stock are called for.

The interests are numerous and varied, for in a diversity of industries is to be found not only our surest but greatest prosperity. Again, not more farmers, but better ones is the demand of the age in every department of agricultural industry.

The careless dairyman, the slipshod general farmer, the indifferent shepherd and aimless breeder are alike wanting in sympathy with the spirit of progress, fast permeating the masses of our people engaged in every industrial pursuit; and they are every day finding themselves distanced by competition and stranded by the wayside; while the success of men possessing no greater natural advantages in soil or climate, but bound to leave no stone unturned. No method proves good untried, to reach the goal is beckoning the laggard in most alluring terms to like effort and better reward. The successful pursuit of all the various branches of agricultural industry is indispensable in the economy of nature.

No other domestic animal is capable of supplying a larger number of the wants of mankind than the sheep. Five hundred and twenty millions, according to late estimates of the various breeds, supply these wants. Wants as numberless almost as the stars in the sky. Habiliments from

crown to sole, of every kind and description, for men, women and children. Couches to repose upon, cushions to sit on, dwellings to shield from the cold and food for the weak and the strong, are a few instances of the every day uses of the product of the flock, and many a home is yet illuminated and doubtless many a tale of love told by the light of the tallow dip.

Sheep Raising in History.

The industry is one of the oldest as well as favorite occupation of men. The second born on earth was a keeper of sheep, and the firstlings of his flock proved the more acceptable offering in the worship of the one true God. A shepherd king ruled Israel in the days of its greatest glory. Shepherds watching their flock on the plains of Judea were the distinguished recipients of angel visitations, and I envy not the man who can look over this audience and coolly deny all possibility of such visitations right here in the fair city of Green Bay.

The allusions to the sheep following the shepherd — the shepherd calling his flock, and "the Lamb as the son," as symbolizing all that is pure and holy in the Son of God, are all indicative of the high repute in which the flocks were held.

In Genesis 38, mention is first made of sheep shearing. Judah, son of Jacob, it is related, lost his wife, was comforted, and went to his sheep shearing. The account is meager, not giving the weight of fleece or carcass or of premiums awarded.

All these particulars will be recorded for coming generations to read, at the sheep shearing to be held by our state association at Mukwanago, on May the 3d and 4th next, competition open to the world.

Not alone in sacred history are such honorable allusions found. Heathen mythology adds its share also.

Long before the Trojan war Jason and his bold argonauts had set forth on a perilous voyage in the unknown seas to

capture and bring away the ram with the golden fleece, an undertaking they successfully performed.

Other mention might be cited but this must suffice.

It is related of Boabdill, the last of the Moorish rulers of Granada, that as he stood on the mountain top overlooking the fair kingdom to which he never would return he wept sorely: "You do well," said his mother, "to weep like a woman over that which you could not defend as a man." Could Boabdill have looked along down the centuries it might have softened the bitterness of the blow a little to know that at least one great boon and blessing was to result to mankind by reason of the Moorish conquest of Spain. They took not only with them, in their retreat, the fine wool sheep brought from the east six hundred years before and which had acclimated so easily on the sunny plains and green hill sides that swept back from the Mediterranean.

The discovery and settlement of the new world was near at hand, fine wool sheep were domesticated in Europe, and in the fullness of time in America, and in years not yet far remote, in South America, Australia and New Zealand, and to-day the people of the civilized world are clothed with a degree to comfort and elegance entirely unknown a few centuries ago.

In supplying the demands of modern civilization, Spanish Merinos and their grades, in numbers, predominate over any other breed; and it is quite likely indeed that they outnumber all others.

The great variety of articles for personal comfort and convenience manufactured from their fleecy covering, tends to such a result, which is further induced by the fact that in no branch of farming is there a greater exemption from continuous drudgery or so great a saving in the natural and acquired fertility of the farm.

Periods of Depression.

There have been periods of depression in the history of the fine wool sheep industry in our country, and in other

countries as well, but such periods are common to all industries. Since midwinter, 1882 and 1883, flock masters have had to encounter low prices for wool and slow sale of sheep, a condition of things not confined alone to the United States. Many flocks have been sold and disposed of and the owners have betaken themselves to some branch of farming, seeming for the time being at least, to promise greater reward. Such a course of procedure has not always been wise or attended with satisfactory results. Occasionally changes must be made; but where a farmer has a liking for some particular branch, and a farm well adapted to the business in hand, it is seldom that better results cannot be secured by changing methods, instead of changing business. In abrupt change in farming there is always more or less loss on the stock sold, and if the farm is to be stocked anew it takes more money to do it than expected; and then before the new business is put on a paying basis, the top of the wave has gone by, perhaps not soon to return. It would be better for the flock master many times, to see what can be done in the way of reducing cost of production to compensate for low price of product sold. Manufacturers have ever been active in perfecting inventions and improved machinery to reduce the cost of making their goods. And the time has come, it seems certain, when farmers of all classes will be obliged to give serious consideration to the same thing. Competition is growing stronger each year in the markets of the world. Wheat and beef, dairy products and many other things are the same price the world over, save cost of transportation. Have farmers given this subject the attention it deserves and must have?

And yet to diminish the cost of production twenty per cent. completely offsets a reduction of twenty per cent. in selling value. Is it possible to do this with the flock? To illustrate: there are many flocks of sheep in the country averaging not more than five or six pounds of wool per head. At thirty-five cents per pound for ordinary washed wool the flock master would be very well satisfied. It is about all he

has been getting for years. At that figure the fleece of six pounds would bring \$2.10. Now supposing he puts a little more brain work into the business, or rather suppose he puts a little more business principles into the management, and as a result of better breeding and better keeping which he can get on his own farm, and probably without adding to general expense account, he crowded the average up to seven pounds per head, as many have done, and as any man can do, that amount at current rates, thirty cents, will bring just as much money as six pounds at the old rates, and the better breeding and feeding will also advance the value of the surplus stock, and make a profit at present prices over the old way at former prices. Is not such a course the shortest way out of the difficulty?

Use Good Sires.

It means using good sires now easily had. The use of clover and fodder corn and probably the silo. It means increased product in wool and fat sheep for sale, and perhaps early lambs for the spring market. It necessitates that the flock be kept closely culled, the surplus stock being put in condition and sold, and that what is left shall be thrifty and all the time gaining in value or bringing in profit. In short it means conducting the farm in the interests of the owner, in endeavoring to make it produce a greater amount than before, without increasing working expenses.

I might give instances of excellent results in sheep farming, but I am talking to men who are conversant with what has been done in sheep farming, dairying, swine breeding and with all that is new and promising in other lines. And I feel confident that when we come together next winter in our institutes there will be a large number of those engaged in this particular branch, as well as others, who will be able to show good balance sheets, the result of improved methods of farming for profit, on business principles. Here are my sheep and my farm, how shall I increase the amount of product and cover receipts at my usual aggregate cost of production?

OUR SPANISH MERINO.

BY ANDREW KULL, JR., LAKE GENEVA.

Old Fitzherbert asserted that sheep are the most profitable cattle a man can have.

It is as noteworthy as true, that the animal best suited to the primal condition of man should also be the one most necessary to the highest condition of agriculture.

In all ages the sheep has been prominent in rural husbandry.

In patriarchial times it parted its coat for man's covering and yielded its flesh to renew muscular tissues.

All found in them, food, clothing, wealth, emblems of gentleness and innocence.

To-day a ladies' toilet proves to be of wool; wool of every grade, alpacas, cashmeres, and fine merino.

From hood to hose, from balmoral to baize, imparting those charms of a clean skin, which cotton can never give.

Thus the belle of to-day stands forth, an example of the healthfulness of wool as an article of clothing.

In the privations of war, woolen cloths and woolen blankets are as necessary to success as gunpower, or the breech that burns it.

It is cool in warm weather and warm in cool weather.

Wet or dry, woolen is the right thing to wear. It has the peculiarity found only, I believe, in cloths made of wool, of conducting moisture to its outer surface, thereby keeping the skin dry, and here lies the secret of its healthfulness that induced its general adoption for soldiers' wear.

There is no animal that combines so many qualities necessary to the comfort of mankind. This seems long to have been well understood. For more than 200 years ago the introduction of sheep was natural in peopling a wilderness with a climate like ours.

As early as 1676, it was written, New England abounds in sheep.

In 1790, the yield was two and one-half pounds in the hands of good farmers.

At the beginning of the present century, the first Spanish Merinos, three in number, were smuggled over and given to Andrew Cragie, a resident of Cambridge, Mass., by a friend traveling in Europe. Andrew, ignorant of their value, ate them, and subsequently paid long money to mend his folly, for other importations, to the extent of nearly twenty thousand followed in the course of fifteen years, made possible by war between France and Spain.

It has been truly said, that which is one's loss is another's gain. Thereby we came in possession of the breed of sheep known as Spanish Merinos. Seventy-five years have come and gone, during which time the industry has had its ups and downs, yet the coming event stands out in bold relief, a monument to the perseverance and skill of the American breeder, in the fact that to-day our pure bred Spanish Merino has no equal on the face of the earth.

Advantages over Other Breeds.

Our Spanish Merino has no equal in supplying what mankind wants of a sheep; he is hardy, long-lived, a good shearer, of good wool, sociable, docile, is adapted to large flocks, and makes good enough mutton.

No other breed combines so many good qualities; he is accountable for the more than doubling of the average fleece in less than thirty years. Some enthusiasts of other breeds now recommend crossing the long wool upon the Merino ewe.

While there may be no question that certain other breeds kept in small flocks near cultivated markets may pay as well or better, and are all right in their place and for their purpose, yet when you come to cross them upon our Merino and shear their progeny you will say as Tom did when he sheared the hog: "Here is a great cry and no wool." I know a fellow who fifteen years ago was the owner of a flock of well-bred Merino grades that clipped from five to six pounds

washed; this was good enough, but not for him; he wanted to make an improvement, possibly a new breed; he had something the matter of him; some people have it nowadays; it is called the big head; so he crossed his flock with a long wool for three years, at the end of which time his flock averaged three and one half pounds, tags counted in.

As to carcass, he agreed with what a politician once said, as he stood looking at his party's transparency, which was dying out:

There is most everything gone and very little of constitution left.

Then he crossed with a Merino, and in three years his flock averaged seven pounds.

There is no mistake about this for I kept a good lookout. *Let me add*, what a man learns in such a way is well learned and likely to stay by him.

In sheep breeding, as in everything else, active, practical men have strong preferences, not to say prejudices, and never will agree; nor is it desirable that they should, for it would prevent persistent effort in meeting the demands suited to the diversity of fabrics.

Breed to the Best Type.

Yet in breeding pure blood Merinos with improvement in view, it is necessary to breed to the best type of the kind. Here again we meet with disagreement, as to what constitutes that type; but it is safe to say it is not the smooth sheep; the most casual observer will have noted that the heavy, wrinkled, close-wooled sheep nearly always comes out of a contest with the ribbon on.

If you want a heavy shearer you find him among the wrinkled sheep.

When wool sells readily, most all want heavy shearers. When wool sells slack the rush is for nice white wool; the latter is not, in my mind, the road to successful sheep breeding for stock sheep.

The wool buyer will extol such wool, but he will not pay

any more for it; and in fact it is not as good generally, being devoid of the sufficiency of oil necessary in good wool; beside, the yellowish cast usually found in heavy fleeces is indicative of good constitution and has the preference of being easily cleaned, while white oil sometimes becomes fixed on the tips of wool and can be removed only by the shears. Evenness of fiber is necessary for a good fleece. Breeding stock sheep is a business in which a man can have great aspirations and very little success.

It costs money and time, and, after all, once in a while a customer comes along and offers you for the pride of your flock, say ten dollars. You smile complacently, while at the same time you wish some good stout sheep might try to break him in two in the middle.

In selecting a stock sheep, to produce what you want, you must go in excess of your ideal sheep to come near the mark.

It is to such breeding we owe the destruction of which we are so proud, our Spanish Merinos. One trouble with us is, we are a little selfish sometimes, rarely admitting the good that is found in our neighbor's flock.

It has often seemed a more provident way would be to accord excellence where deserved, or say nothing.

No small portion of the success of Vermont breeders is attributable to their patronizing the best, and their happy way of putting in a good word for all, just as though their interests were pooled, which is true, if not a fact.

Let us imitate a good example.

My observation on the whole had led me to believe that most sheep men are good fellows, and why not? they are usually well off, have a contented mind, reap two harvests a year and sometimes three.

Our Spanish Merinos, where is there another like him, that has brought at times such fabulous prices? All the way up to \$5,000 has been paid for single animals, and twice that sum refused; ewes bringing at times from \$100 to \$1,000 each. You may think that is past and gone! and so do I! still it

must be accepted as an index of value, real, or imaginary, yet to the seller a thing is always worth what it brings.

Instead of being discouraged, let us remember that history repeats itself, and that it is always darkest just before the day comes.

The industry has been, and is in distress, there is no denying it. Three years ago wool got down where it was considered too low in prices to grow. Many went out of the business — at something else — there are always such men.

It is truly American to be bobbing around, going out when a thing is down, going in to something that is up. After a while cussing the luck, and kicking themselves for it. Such men's tubs are always bottom side up when it rains, and it always does after a dry spell.

Even now the opinion is gaining ground that sheep pay as well as any cattle a man can have. Agriculture does not pay as it should, compared with some other industries. This is a matter that might be considered, and the reason sought out, it is perplexing to have things bobbing up and down. Some stability would be a good thing to have; more consistency in government is what farmers need.

Where is the propriety in giving public lands away to every one for the asking, or for the encouraging of growing timber, tree claims as they are called, while lumbermen are paid a bonus for the destruction of forests.

Hist! You must not talk so.

Yet, when manufacturers meet they go into every question that promises success or profit, and what is true to-day was said more than seventy-five years ago. When manufacturers meet, it may be expected a conspiracy will be planned against the pockets of the people.

Can we be astonished at this when the people pay no attention to it, or go cohoos with them, as the Indian did, who went hunting with the white man, only getting a *duck* and a *crow*. The white man said, you take the *crow* and I take the *duck*, or I take the *duck* and you take the *crow*, suit yourself, it is all the same to me.

In breeding, while blood will tell, the only way to have it tell well, is to feed well. How to do it, and not overdo it, is handsomely illustrated by the reply an artist made to the question, How do you mix your paints? Mix with brains.

The subject chosen for me, like every practical question, has two or more sides. An industry fraught with so many fortunes and misfortunes, must of necessity, contain more than an always honest element, not to say rascals, who practice deception.

Many a man has been wonderfully educated with our Spanish Merinos, or their impostors. And it will become any man wanting a pure bred stock sheep, to see that he is not only registered, but registered where purity of blood is required.

MANAGEMENT OF SHEEP.

BY DANIEL WILLIAMS, SUMMIT.

Mr. President, Ladies and Gentlemen — I was asked to contribute some experience in the matter of the management of sheep. My experience extends over a period of more than fifty years. When I was a small lad, large enough to carry a lamb, I was set to work caring for the sheep. Our friend Wilkinson, in his paper, asks the question, "Have the farmers of this state given that attention to the industry of sheep raising that its importance requires?" I answer, "No." And wherein does the mistake largely occur? It seems to me that it is in the winter care of the sheep, and on that point only shall I speak. The first cause is in the fall care in protecting the sheep from the cold storms. I am speaking entirely of fine wool sheep, never having had any experience with any other. Sheep of that grade are especially sensitive to cold, wet storms, and should be provided with shelter, or they will shrink rapidly in flesh, and commence to run down in the fall. Then, in addition to that the sheep are often further exhausted by not

having sufficient nutritious food. The first element in success in the winter care of sheep is the providing of dry, airy shelter. The next is sufficient nutritious food at this particular stage of the year. If the sheep must be pinched at any time, do it in the spring, about the time that they are about to be turned out to grass. The next condition which will add to success is a variety of feed. There is no animal that will do better with a variety of feed than the sheep, and they seem to require it. I have pursued the plan of feeding corn stalks in the morning, a feed of straw at noon, and the best hay and an abundance of it, at night, what will be eaten up clean. If grain is to be fed, feed it at night before the feed of hay. I usually feed whole or unground grain, it matters not whether it is corn or oats, corn I prefer as making a better wool grower. The starving process not only diminishes the flesh of the sheep, but it diminishes the product of the wool, it injures the fiber.

I have for several years of my life been a buyer of wool, and I can always tell, no matter how clean the wool may be, whether the sheep has been starved, and at what stage it has been starved in the growth of the clip of wool. I tell it by the strength of the fiber. Take a piece of wool out of the fleece and pull upon it. If the sheep has not been starved it will not break anywhere. If the sheep has been starved the fiber will break wherever that starvation process took place during the year. The manner of feeding has much to do with the health of the sheep, a better plan is to feed in racks in wet weather, and to feed on the ground when the ground is dry and clean. It seems to be the nature of the sheep to move about for their feed, and they will move from place to place and eat up everything when the feed is placed upon the ground, and there is no waste. But the important thing of all is during the season of cold weather, to keep the flock dry, both overhead and under foot, if it is wet under foot it is the cause of the so-called foot rot, and when that disease is established in a flock it is almost impossible to break it up, and it is better to sell the

flock and leave the land without sheep for two or three years.

Many people make a mistake in turning out their flocks in the pasture too early in the spring before there is sufficient food for them to nourish themselves, and in that case the wool will commence to shed.

By following these rules in keeping sheep, keeping them well housed, well fed, at all times, they are the most profitable stock, in my experience, that can be kept on the farm, taking a long series of years.

Discussion.

MR. SAYRE— I want to know from our friend Mr. Wilkinson, whether he has any good reason to think that in years to come the raising of Spanish Merino wool is ever going to be as profitable as in years past?

ANSWER.— I don't like to answer that question, but I will say this, that I have no doubt whatever, but what wool will hold in the future as nearly to former prices as any other branch of agriculture. Competition is growing stronger in all these leading branches of agriculture, and I cannot avoid the conclusion in my own mind that a range of prices below the former level will have to be accepted in the future, and for a good many years to come, until population crowds the areas that are now sparsely populated.

QUESTION— Don't you think the food will be wasted by feeding it on the ground?

ANSWER— No, the sheep will first pick out the best, they will come along and pick off the tassel and the leaf from their corn, for instance, but they will go back again and before they are through with it the whole stalk will be taken.

QUESTION— What is your reason for feeding corn stalks in the morning in preference to the evening?

ANSWER— To give the sheep a chance to work it during the day, to give them something to do.

MR. GROVER — I would like to ask Mr. Williams if he thinks it is a good plan to yard sheep in the summer time, or if it is preferable to lose five per cent. of the flock in the summer by dogs and wolves.

ANSWER — Better to yard them. I turned out one spring a flock of about eighty sheep, and I had thirty good strong lambs the first of June, and when yarding time came in the fall I had five sheep less than I turned out; they were destroyed by wolves, wild-cats and dogs.

QUESTION — My experience has been that it is detrimental to sheep to yard them nights in the summer time.

ANSWER — I yarded my sheep five years to protect them from wolves, and found they were quite as healthy as other times, but I took off the top board in front of my sheep shed so there was a good circulation of air through. The foul air in your sheep pen is no doubt the cause of trouble in your flock, the odor and the ammonia from the excrement is what makes disease in the summer time.

MR. KULL — Drafts are very detrimental to sheep; they take cold very easily and get diseased and die. Unless the pen is closed up tight at the bottom there is danger in the yard. The ventilation should never be from the bottom, in other words there should be no draft. The ventilation should be from above, and the yarding place should be kept clean and well littered, in that event I don't think there is any danger in yarding sheep in ordinary numbers together.

MR. CLAPP — The last mail that I took from my post office on my way from home was a paper published near Boston. I looked at the quotations of the sheep markets and they quoted early spring lamb from \$12 to \$15, seven weeks old. Now this is a branch of the industry that is worth considering, and it is one that is not occupied in any country that I know of. In Chicago there are a great many wealthy men who can afford to pay for spring lamb, and I believe we have a good opportunity all over this state in this industry.

MR. HOARD — I want to say a word in regard to a point

Mr. Williams made. There is a principle involved, that is concerning the value of a variety of food. In the summer time our animals thrive apparently better than they do in the winter. How many of us stop to think that every one of our pastures contains from fifteen to forty varieties of grass, each one at a different stage of ripeness, and these different stages conduce to the health and digestion of the animal. How many of us stop to think that in the winter time we shut an animal up and confine them to two or three — force them to eat — only two or three varieties of food all winter long. Now, a man provides himself with a great variety of food, if he don't, his wife does, but we ought to consider that with sheep and cattle, and all animals, the tremendous change there is from the summer ration to the winter ration, and it is very trying upon the animal economy. Besides the wonderful variety of food that we have in the summer, there is the warmth, the variety promotes digestion and as a consequence promotes vigor, health and vitality. The warmth makes less food necessary to keep up the bodily heat, and both these conditions fail in the winter time.

MR. WILKINSON— I want to add a word to what Mr. Clapp said. There are men in the state of New York, and perhaps in other states, who make it a business to raise lambs that are dropped in November, for the early spring market. These lambs are fed from the time they are dropped until they weigh thirty-five or forty pounds alive, and then they are shipped to Boston and New York. The mothers are clipped in the spring, and they are sold two or three months after the lambs are gone as fat sheep. These men find it possible to make a net profit of \$8 on every ewe; we could not do that here, but there are men in this state who could do it.

SUPT. MORRISON— Professor Roberts, of Cornell university, spent about two weeks with us this winter, and he looked up this market in Chicago: this same business is being pursued by J. S. Woodward, of Lockport, N. Y., and I received

a letter from him saying that he had sold his lambs at \$10 apiece; at that time he had three hundred and ninety lambs on hand. Professor Roberts looked it up and found he could get \$5 and \$6 a piece for these lambs in Chicago, and a couple of Cornell students are about starting this business in northern Illinois. It seems to me this is a pointer for our farmers.

MR. CHEEVER — Mr. Williams, what is the cause of sluffing off of the wool?

MR. WILLIAMS — I attribute it to a sudden change in the food producing an unhealthy state of the skin. Of course I am not a scientific man, I only treat it from a practical standpoint, but I find, that I never lose wool from sheep when they are uniformly well cared for. It is an absolute checking of the growth of the sheep, and, consequently, the growth of the wool. When a change occurs, the condition of the sheep is better — he begins to thrive again — the wool will part from the skin and drop out. It results something like sickness in the human, the hair will fall off the head after a fever.

There is one thing I wish to speak of. There is no man that keeps a flock of sheep that really does himself justice, and his neighbors, that don't keep a first-class shot-gun and buck-shot to protect himself and his sheep.

MR. HOARD — There is one point I want to make, and that is the value of mutton as a food. It is but very little used on our tables at the present time. You pass through the country and you may eat at a hundred different farmers' tables, and you will scarcely ever find a bit of mutton. This was not so forty years ago in New York, but it is so to-day in Wisconsin, and I think the farmers ought to eat a good deal more mutton than they do. It is one of the most valuable meats that can be consumed. Take it for instance, with invalids, physicians prescribe mutton broth all over Europe and America, and they do it because it is easy to digest and kindly of assimilation, it requires but very little digestive power on the part of the stomach to assimilate

mutton as compared with some other meats. We need to imitate the English in this respect. I am a particular friend of the Merino when it comes to the wearing of his fleece, but I don't like him very much to eat. I got a prejudice against him at an early age on account of his horns.

MR. GOULD — The trouble is the kind of mutton you got, you took on subscription, and you don't get the best.

MR. HOARD — No, John; I don't publish a paper in Ohio. I don't have to take sheep on subscription.

MR. CLAPP — You didn't tell us what kind of meat you prefer to eat?

Mr. Hoard — Southdown.

EGG PRODUCTION.

BY IDA E. TILSON, WEST SALEM.

Without commending slang, one forcible expression may be excused me; my aim is to make hens "shell out;" hence my subject is egg production, but on the farm, not in large establishments.

Assuming the poulterer has roomy, warm, sunny buildings, with reasonable provision for drainage and ventilation, and constructed, not by his own unaided inexperience, but after some consultation with veterans and builders; then, presuming him enthusiastically ready to begin operations, his first step will be a selection of breeds.

Keep Several Varieties.

I have tried more than a dozen kinds, and, like Alexander the Great, am sighing for more worlds to conquer. A good plan is to keep several varieties at once, the probabilities being that at no time will all be incapacitated from laying. Part may lay in summer, part in winter, some one day and

some another, and, according to well-known advice, the eggs will not all be carried to market in one basket. Though prices are highest in cold weather, summer eggs need not be despised, for they are more cheaply produced, and that poulterer who can furnish an unfailing supply the year around will receive most calls, and get correspondingly steady and reliable customers. Small breeds can be grouped in one house, large ones in another, an arrangement which enables me to stuff the active White Leghorns, and stint the gluttons, Plymouth Rocks. These are my favorites, and, with Wyandottes and Langshans, constitute my present flock.

Every hen has her day — alas! a brief one. Some provision, therefore, must be made for keeping suitably stocked. A majority of the eggs set by me are purchased, and from pure blooded sources, a matter easily managed when so many keep small, choice flocks of one kind for their own table use. To those purchased from neighbors are added every year some expensive and first-class eggs from professional fanciers. Where hens are forced into unusual productiveness, a smaller proportion of their eggs will hatch or make strong chickens. First crosses are unsurpassed as layers, but degeneration follows further mixing, while a heterogenous, crazy-quilt lot of fowls is not so attractive and marketable, an important consideration, because, unless their owner had Gargantua's appetite, a large number of hens, when past laying prime, must be sold for their flesh. To buy is often cheaper than to raise fowls, but whenever I purchased any, scripture was verified, and their evil communications corrupted my flock's good manners. To secure hens tame, amiable, intelligent, free from egg and feather eating, and in every way properly brought up, I can not trust their young and tender hours with another. Kind treatment must begin early and continue always. The bird that trusts its owner can be approached at pleasure, while one shy and fearful is awkward, never knowing what is wanted of it, and, by its wild flutterings, runs great risk of breaking its legs or rupturing an egg internally. Yet, glut-

tons and quarrelsome chicks must early and wisely be restrained, according to Solomon's ideas. A disposition, destined otherwise to ruin the peace of a whole flock, may be thus entirely changed. Nothing will avail so much as generous feeding from the start, an education to lay, as it were. There is no sudden leap to productiveness.

It is frequently asked at what age a hen ceases being profitable. If active, erect, plump, bright-eyed, and scarlet-combed, not over-fat nor afflicted with any skin disease, biddy will do as well or better the second year, after which she should generally be sold. About half my hens annually meet the above conditions, and are retained. The remainder are too fat, and pullets take their places. It requires less food to keep any animal in condition than to raise it from infancy. Therefore an equal number of eggs the second year will yield more profit than the first year's product.

Summer and Winter Management.

In summer is required plenty of cool water, renewed at least three times a day, in dishes rinsed every such time and often scalded. During winter, warm, or quite hot water will set in motion every function, and, after a little use, become as beloved by them as tea is by old ladies. Such a course recognizes what analysis and observation both show, that an egg is largely composed of water.

My hens have the run of a whole farm in summer. Through cold weather, my main reliance is warm whole grain of good quality and different kinds, to which is added one day, meat; the next day, warm pudding always containing bone meal and salt, but variously seasoned, a sort of Spanish olla-podrida; followed, in turn, by chopped vegetables; so around in regular rotation. The variety of food must be great, but not all kinds given in one day. Meat can be bought from the packing and rendering establishments in the form of pressed cakes, 2 cts. per pound. It must be broken in pieces and cooked. Beets are the most acceptable vegetable food. Occasionally on warm days, onions

should be given as a deobstruent and vermifuge. Clover hay is a standard article. With the solvents already mentioned, and plenty of triturating substances, gravel ashes and oyster-shell, there need be no fear of crop-bound fowls. I feed twice a day what the hens will eat up in an hour or so. There must be some interval, some necessity for scratching and other exercise.

Eggs should be gathered twice daily, that the hens may not break and learn to eat them. This course will prevent either overheating or chilling and even Shakespeare, three hundred years ago, by the mouth of Pandarns, condemned addled aggs.

A live, intelligent poultry journal will be one's best outside assistance in solving the various new problems arising. Naming one's hens will be found an excellent idea. There is a deep philosophy in this. She who knows her biddies well enough to name them, will, at the same time learn as thoroughly their needs and conditions. Enthusiasm may be first, second and third requisite for success here as it was in Napoleon's idea of a soldier's character.

My 95 hens laid almost 100 dozen eggs in December and January, 93 dozen in February alone, and the first three weeks of March, have averaged over 51 eggs a day. For some years my hens have outlaid all other flocks of which I could learn.

Regularity in Treatment.

Like produces like. Only regularity in treatment can secure uniform returns. If I have any special or personal secret of success, it is that I allow neither cold, rain, visitors, nor ridicule to come between me and my pets. Taking at random, nine days in November and comparing with the same dates a year ago, a difference of but one egg was found. Only two dozen more were laid in 1885, than in 1884. My day book and ledger are full of such coincidences as an egg is of meat, illustrating this steadiness of natural force, under unvarying care, or God's arithmetic as it is

called, when relating to higher beings. And a little boy very appropriately said to a hen he heard cackling — “you needn't make such a fuss, God made that egg, you couldn't help but lay it.”

Profits of Poultry.

With increased facilities for transportation and sale, prices are yet slowly decreasing. So it is not possible, therefore, this business may be overdone. Millions of eggs are annually imported from Denmark and Italy, from Russia, too, and even distant China, egg production cannot, then, be overdone at home, and it is respectfully suggested a tariff is needed on eggs, if needed to protect woolen and other industries. The Italian peasant is as glad to furnish eggs for $1\frac{1}{2}$ cts. per dozen, as the Chinaman is able to live on a cent a day. If “the Chinaman must go,” why not let the foreign egg accompany him? Certain it is, that only with cheap Chinese help, and clothed in cheap English goods, and building her houses of cheap Canada lumber, can an American woman produce eggs for old-world prices. While therefore, American prices are paid for other articles, let American eggs firmly demand a similar schedule of rates. Either protect all industries, or tax only luxuries.

It is often asked just what profit can be made. With present low prices and home sales, by first-class, scientific attention, \$100 can be cleared from 100 hens. Of course this will not make a woman a millionaire, nor even buy her a seal skin cloak, but it will get a splendid set of china, hand-painted too, or, better still, give her an interest in several benevolent objects. At least multitudes of farmers' wives would be thankful for \$100 their very own money, to have and to hold, to spend or to keep, for better or worse, till they are parted.

POULTRY.

BY DR. F. W. BYERS, MONROE.

The Real Value of Fowls.

Few farmers comparatively know the real value of poultry. It seems a small matter along side of horses, cattle, sheep and swine, too small indeed, to call much, if any attention to chickens, turkeys, geese and ducks. Yet when statistics show that the egg crop in the state of Maine is as valuable as the apple crop, the hen becomes prominent by virtue not only of her good lungs, but also by virtue of what good she does the state. The figures of Edward Atkinson, good *authority*, show that in 1884, we paid for eggs \$91,250,000, and over \$6,000,000 for eggs imported. The silver product at gold value was only \$40,000,000. Governor Rusk, and the bluff old fellow generally knows what he is talking about, said in some addresses at agricultural fairs, that all these hens cackling over their eggs didn't make as much noise as the silver men before congress. He might also now add that no old setting hen has ever spread herself so prodigiously to cover all the eggs within her nest as these speculating silver men have been spreading themselves in clutching all the trade dollars within their reach.

During 1886, England imported a round one billion of eggs. There were produced in the kingdom 600,000,000. The total weight of the British egg consumption is 7,200 tons, and the estimated value \$35,000,000.

Eggs alone enter into the above estimates; nothing so far has been said of early spring chickens at fabulous prices, and the immense sales of poultry marketed as a staple article of food. In the United states a given amount of corn will produce as many pounds of poultry as pork, and at the same time four times as many pounds of eggs, and both

chickens and eggs are worth *twice* as much per pound as pork. This would indicate (it seems to me) that farmers and others would be acting wisely to keep more poultry to eat *corn*, and sell more poultry and eggs for more money than they do.

Then, in addition to eggs and meat of poultry, we should not forget that the feathers and manure of fowls are both valuable, and also that a rough piece of land which is not valuable for cultivation or even pasture, answers well for a poultry yard. Then again, an old barn or cattle shed situated on a portion of the farm away from the home garden and flowers, can be made available for poultry raising, *especially* for games. I once placed a pit Game cock with a few hens on a run of that kind, paying little or no attention to them, and although neighbors insisted that hawks and skunks would leave none by fall, yet when cold weather came in the fall we brought away over thirty young birds, healthy and hardy, worth on an average one dollar apiece, costing nothing to raise them.

Breeds Best Suited for the Farmer.

What breeds are best suited for the farmer? That depends somewhat upon circumstances, such as size of run, amount of care given the fowls, surroundings generally, as well as the taste and fancy of the owner. The small breeds require more room than the larger ones; but on the other hand demand much less care. White Brahmas, Cochins and Leghorns can, with care and attention, be made profitable on a *very* small run; they will not bear neglect, must be judiciously fed, for they will not scratch for themselves and their broods too. On the other hand, shut up the Hamburgs, Polish, Leghorns and games in confined quarters and they will not do well; but fence in the garden (if you can successfully) from these high-fliers and let these same small varieties have unlimited run with but little food and less care and they will show during the spring, summer and fall months an ability to take care of themselves, as well as a

fair net profit to the owner. I still admire the hardy Dominique, which has stood the racket in the United States from, well as long ago as the settlement of New England. I go back in fancy to my boyhood days, when it was no unusual thing for me to walk a distance of five miles to trade roosters; and I well remember to-day how proudly I marched home with a blue-gray Dominicker crower under my arm, which, if not a thing of beauty, was yet a joy forever to a freckled faced boy. The modern Plymouth Rock is a good farmer's bird, and is growing in favor. True the large comb and wattles are apt to freeze in cold Wisconsin, but in these days when dehorning cattle is only a pastime, dubbing a chicken, whether a Game, Leghorn, Cochin or Plymouth Rock, is simpler and very much easier. The operation is almost painless, for after clipping off both comb and wattles from a game stag, I have tossed the bird to the ground only to see him turn saucily around and crow, not only lustily, but defiantly. Any twelve-year-old boy can readily remove these useless appendages, which despotic fashion has cultivated to enormous size, and which, in my opinion, cause much of the roup and catarrh so troublesome. There is no cruelty in dubbing, the bird does not suffer as much *real* pain in the operation as it would with a frozen comb in a singular hour. I might here speak of diseases of poultry and the treatment. I will be glad to answer any questions I can on this subject in the discussion following.

Let me say, in conclusion, that notwithstanding the almost universal neglect and positive ill treatment given to the feathered stock on the farm, but experience and figures show that poultry raising *pays*, and with small outlay, in care and expense may be made a source of wealth on the farm.

Discussion.

QUESTION — What is the best egg food in the winter, egg producing food?

MRS. TILSON — Possibly wheat would be the best, if you speak of one alone. A variety is the very best thing in the

winter. Oats rank very high as an egg food, and with plenty of water and gravel they will do very well, but it is unsafe to feed either oats or wheat without considerable water or ashes, or gravel, grinding substance. Rye is a very valuable egg food, hens are not very fond of it; but when it is ground and mixed in a pudding they like it very much, and it is a fine egg food and a cheap one.

QUESTION — How do you prepare your vegetables?

ANSWER — They are chopped fine, they are not cooked. I have tried cooking them, but I could not see results paying for my trouble.

QUESTION — Have you ever fed buckwheat?

ANSWER — Not to any great extent, because it is so very expensive.

MR. GOULD — Why would you feed buck-wheat, to promote scratching?

ANSWER — It is an excellent egg food, but it is expensive compared with others.

QUESTION — Do you chop the vegetables fine?

ANSWER — Yes, I chop them quite fine, because a hen is not like a cat, she won't put her foot upon it, and hold it in place and eat it as a cat will, but she will eat it up.

QUESTION — I have found that carrots and other vegetables, a head of cabbage fastened to the wall, is better than to chop them up. She will jump at them, if they are high enough, and pick and eat, and the exercise is good.

MRS. TILSON — Yes, I have my hen house well decorated with meat and vegetables that way, but they cannot eat it fast enough, so every third day they have fine chopped vegetables.

A GENTLEMAN — Several years ago I had twenty or thirty bushels of small potatoes and I did not know what to do with them. I had some hens and I boiled those potatoes and put them with shorts, mixed them up altogether, and fed them to the hens in the morning, all they would eat. Then I fed them clover, and timothy hay, and they commenced laying as I never could get them to do in the winter time. A

neighbor of mine, Mr. Kellogg, who has some valuable fancy hens, came to see me and I told him about how my hens were laying. He looked at the hen house and turned away his head in disgust. He was sure it was not the house that was helping them. Then I told him about this warm feed I was giving them and he understood it. They did very well.

DR. BYERS — The potatoes make a good article of diet, and then feeding them warm, it helps the digestion and keeps them in good condition. They should have a feed of corn at night, something to fill the crop, and that helps to keep them warm through the night. People who go out in the morning and throw a lot of corn into the chicken house whether it is clean or dirty, and then don't bother to see their chickens until the next morning, can't expect to make money with eggs, or to have hens that will do well. There is a bad fault with some poultry, what some term feather eating. I believe that idleness is one of the principal causes of that vice, and that the poultry should be kept busy in some way, I don't know that I can tell you exactly how to cure feather eating, unless it is by the use of the knife dividing the vessels of the neck right back of the ear. A short time ago a friend of mine, who has a number of varieties of fine poultry, asked me to go down and look at his hens. They were picking the feathers from each other so badly. I noticed one old hen had picked at another till the blood ran. He wanted me to see what I could do with them, and I took home a half a dozen, and put them in a place where they were nice and warm and the sun shone in, and I put a lot of corn there, and covered it up so that they had to scratch for it. Then I took a mixture of lard and carbolic acid and tincture of Nux, which you know is not very sweet, and with a swab I went over those chickens. One of the old hens made a peck at the swab, but she didn't like it. Last Sunday it snowed, and I didn't go to church, and I went out to watch those chickens. I saw they still had a disposition to pitch into each other, still they would pick a feather out

and drop it, and didn't seem to like it, and I have a fluttering hope that I am going to break up that habit among them.

MR. WILKINSON — One fall I had fifty or sixty bushels of broom corn seed. I didn't know what to do with it. I commenced feeding it to the hens that did not lay very well, and the result was I never had finer hens for the table in the world. I don't think it changed the laying very much.

QUESTION — Is there any remedy for what is called roup in chickens?

DR. BYERS — I believe it has been successfully treated, but unless it is a very valuable fowl I doubt whether it pays to bother very much with it.

THOUGHT AND APPLICATION IN FARMING.

BY W. D. HOARD, FT. ATKINSON.

There are some notions among farmers and men who keep cows that have worried me for a good many years, and Mr. Morrison has asked me to say a few words, and touch upon some of these ideas. I picked up the *Western Farmer* this morning and saw a statement in it that struck me as containing very much truth in a short sentence: "We never shall have successful farming until we re-organize the farmer." Now, the whole thing pivots right there. Shakespeare says, that it is not to our stars, but to ourselves we are underlings, or something to that effect. Now, there are very costly notions entertained by the farmers of Wisconsin, notions costing them more than their taxes; notions costing them more than any other cost there is; and yet those farmers are as contented as kittens, and shut their eyes to the fact that this is one of the ways that

the money leaks out. I interviewed one hundred farmers in the year 1886, and I have the notes of those interviews. This was the question I put to them? "What is the reason you don't make more money?" Not one man in the hundred laid the blame to himself. Something is wrong here, I have lived long enough in the publishing business to know to-day that if I do not make more money in my business, I am to blame, and nobody else. You need not tell me it is the low price of newspapers, you cannot blame this low priced job work or low priced advertising, you need not tell me it is any of these things, it is because Hoard is not big enough for his business, and that is all.

Pay Attention to Principles.

Now, when a farmer cannot stretch his mind, you may bet your bottom dollar he cannot stretch his pocket. When he don't value his knowledge, you may bet all he will ever own, that he will die with a corresponding lack of property too. What is the reason that we do not pay more attention to principles? What is the reason we go along mechanically like wooden men, reciting certain maxims like parrots, and do not learn principles? I sent my little boy to school once when I lived in Lake Mills, and he picked up a mental arithmetic for the first time—he was a little shaver. I wanted to see if the child was taking in the principle of combination in numbers. I says, "Arthur, John has five apples, and William has seven, and Thomas has nine, James has eleven, how many apples have they?" And he was at sea in a minute. He says, "Papa, does it say apples?" "No." "Don't it say potatoes?" "Yes." "I can do it," he says, "if it is potatoes, but I can't if it is apples." What was the matter with that boy? Just the same that is the matter with thousands of men to-day keeping cows. He has learned his lesson like a parrot, and has not looked at the question of the principle that lay under it. Now this thing confronts me to-day everywhere. I call up one little point.

How many men to-day in Brown county estimate the cow's live weight in the production of an animal? How many men have ever put the pencil and the scale beam together in their mind, and have said: "I will find out just what it costs to make a pound weight?" How can men expect to be successful when they don't know what a thing costs? I have been an auctioneer of live stock, I have sold a great many hundred cows, and I will guarantee to-day that I will go out into Brown county, and one hundred farmers will pay fifteen dollars more for a thirteen hundred pound cow, than they will for an eight hundred pound cow. Now, is that principle right? Let us see.

The German Experiments.

The Germans went to work patiently and carefully to find out what was the true philosophy of food as applied to live animals, and out of twenty thousand different experiments they adduced this knowledge — which, let me say, will apply in America just the same as in Germany. When food is taken into an animal it is divided into three distinct branches. First, the food of growth. When an animal is growing, a certain percentage of that food is taken up to form new growth. Second, the food of support. A certain percentage is taken up to support that growth and keep it steady, right there, after it is made, and third, the food of production.

Now, I have found that butter is never produced, nor is a pound of flesh ever made upon an animal until the two first are satisfied. The cow is a good deal like an Arkansas jury, when they were asked if they found for the plaintiff or the defendant, they said they did not find for either, until they first found for themselves. They had not been paid their fees and they refused to give their verdict until they had been provided in that direction.

The Germans have carefully experimented, weighing the animal every day, weighing the food, weighing the excrement, weighing the urine, and continuing it patiently as

they have, they found that it took three per cent. of the live weight in the food to support it, to just barely support it. There was three pounds of forage to every one hundred pounds of live weight. Now, when I would ask this farmer, for instance, why he bought a thirteen hundred pound cow in preference to an eight hundred pound cow, and pay so much more for it, the universal answer is this: "Because when I get through with her, I can turn her for a good bit of beef." I went to work to enquire into that proposition. I found but very few farmers made but little profit upon their animals, and I wanted to see why that was.

Now, if that proposition is unsound as stated by the farmer, why is it so? Taking up that five hundred pounds of beef, the difference in the two animals, let us trace its history.

If the Germans are correct, that it takes three pounds of forage as a rule to support each hundred pounds of live weight, we have in this five hundred extra weight of this animal, an outlay each day reduced to hay, of fifteen pounds, necessary to support that five hundred pounds. Oh, yes, says that man: "That five hundred pounds don't cost anything, it is another five hundred pounds." One five hundred pounds weighs just exactly as much as another; an animal weighing one thousand pounds, as a rule, will require thirty pounds of good hay a day to keep it in condition. Now, take the five hundred pounds for the average life of a cow, say eight years, that man has bought that five hundred pounds weight and paid \$10 or \$15 more for it with the idea of supporting it eight years and selling it in the end for old cow beef.

Let us see how his account stands: Fifteen pounds a day, for three hundred and sixty-five days, would be 5,485 pounds or thereabouts of extra forage each year. In eight years, twenty-one tons nine hundred and forty pounds. At the price of good hay—\$8 a ton—it will amount to \$175.52 for the purpose of selling it at the end of eight years for \$15.

Now, there is no romance in this thing; it can be said sadly for hundreds of farmers that it is anything but romance. Now, can any man buy a cow for a distinctive purpose cow, and support one single pound of surplus flesh on that cow, for eight years, with any profit to himself; can he shut his eyes to the fact that every pound of live weight costs money, and every single pound more than the cow requires, costs him in the eight years of her average life, too much money for any man to fool away in that direction.

We come now, then, to principle; and can the farmer disregard the fact that the principle of cow life, cow service, cow food, cow breeding, everything connected with her is an absolutely different principle from that of the production of meat. And I utter this as a prophecy to you, that the day will come when you will see, as farmers of Wisconsin, that you could have put in your pockets thousands and thousands of dollars more than you have, if you had gone to work intelligently and studied the cow from a cow standpoint; as you have undertaken to study the bullock, or the production of meats, from a meat standpoint.

How many men have ever stopped to reflect as my friend Louis has? In the production of pork, he has studied that question from the standpoint of cost in live weight. I heard him demonstrate to the farmers of Manitowoc that they had sold one hundred thousand hogs in the year 1885, and they had kept only twelve thousand, and when he figured out the cost of making the twelve thousand weigh what the one hundred thousand did, it amounted to just sixty-five cents more per hog than what they received. In other words, that they had kept these hogs, and paid out sixty-five cents for the fun of it. Now, the lesson Mr. Louis learned, was this, that he could not make pork profitable from any other class of hogs except those within the year of their nativity; and the pig, in order to give him any money, must be fattened while he is combining the food of growth with the food of production, and therefore he kills his pigs within eight or nine months. That is another of

the ways in which farmers waste so much money, and buying a cow for the sake of what she carries, and supporting her for eight years, and then selling the beef for three cents a pound at the end, is another way of wasting their money.

At the conclusion of Mr. Hoard's paper, the Institute adjourned until after dinner.

Afternoon Session.

The afternoon session, March 29, 1887, opened at 2.30 o'clock, with Supt. Morrison in the chair.

HORSES FOR THE FARM AND THE MARKET.

BY HON. C. V. GUY.

The Horse in History.

Of the value of the horse in our modern style of living, I need not speak.

We had a few years ago a touch of what it would be to be deprived of his valuable service. That experience lasted but a few weeks, and during that time we were not wholly without horses, yet we felt the inconvenience very sensibly.

The horse is mentioned in the Book of Job, the earliest poem probably in existence, and in the scripture as the servant of man. The ass, however, is mentioned as a wild, untamable animal, as well as a beast of burden, or used for domestic purposes.

The discoverers of this continent found here no wild horses, though in South America the natives use the Llama for some such purposes as we use the horse.

The wild horses of that country are descendants of the

breed brought from Europe by the early colonists, and escaped from captivity. In a country so rich in grass, with a mild climate, they increased with great rapidity, but receiving no infusion of fresh blood developed into the mustangs and Indian ponies of the south and west, though in Central and South America there are found still many fine horses. These are known as Feral horses, to distinguish them from the race of primitive wild ones.

Probably our present breed of horses sprung originally from the race that is now found in a wild state in Eastern Europe and Western Asia and in Central Africa.

I copy a description of the wild horses from the pen of Charles Hamilton Smith, taken from Vol. XX, Naturalists' Library.

The country now occupied by these wild horses is a vast tract. I quote, "The real Tarpan, a breed of wild horses are not larger than the ordinary mule, their color being invariably tan or mouse, being all shades of the same livery and only varying in depth by the growth or decrease of a whitish surcoat, longer than the hair. Mention is made of this hair being five or six inches long, increasing from the middle of the summer, as the weather grows colder, and shedding in May. During the cold season it is long, heavy and soft, lying so close as to feel like a bear's fur, and then is entirely grizzled. In summer much falls away, leaving only a certain quantity on the back and loins. The head is small, the forehead greatly arched, the ears far back, either long or short, the eyes small and malignant, the chin beset with bristles, the neck rather thin, crested with a thick rugged mane, which, like the tail is black, as also the pasterns, which are long hoofs narrow, high and rather pointed. The tail descending only to the hock, is furnished with rather wavy or curly hair. Their voice is loud and shriller than that of a domestic horse and their action, standing and general appearance resembles somewhat that of a vicious mule. When the Romans invaded Brittain they found a race of small horses not unlike the wild ones of the present

day in western Asia, and eastern Europe — a horse of very little value for riding or driving. They brought with them the black race of Italy probably mixed with those from Gaul and from Flanders, with a cross of the Moorish from Spain. We find accounts of the importing into England of a breed of very heavy horses from Flanders during the time of the Crusades, to obtain a race of horses that could carry a knight in complete armour, probably weighing 300 pounds. When William the Norman invaded England he introduced from La Perche and Normandie, the French draft horse. After the Crusades, the restless spirit of the English people demanded something more exciting than the dull routine of business afforded, and gentlemen of leisure and wealth spent much time in hunting with horse and hounds. For a rapid gallop across the country the horse of the Crusaders was too heavy and slow, and they began to improve this stock by crossing with Arabs imported for that purpose. Among noted Arabs are Darnley's Arabian, under the reign of Queen Anne, and the Godolphin Arab during the reign of Charles II. From these celebrated sires the race of running horses now known as thoroughbreds is directly traced. A thoroughbred horse must be one whose pedigree can be traced back to one of the five mares of Mahomet. The present race of English and American racers connects through the Godolphin Arab.

Among these thoroughbreds were many horses that became celebrated for their power to produce powerful trotters when crossed with mares noted for their action and speed.

Of these you will readily recall the Hamiltonian, Messenger, Bellfounder, and many others. The thoroughbred race horse of England is now claimed to be the most perfect horse in the world.

The common bone of an Arabian horse of 14-hands high, though only one-fourth the size of the same bone of a Flander's draft horse, was found by experiment to be twenty times as strong. So much have the English racers been

improved that now in all races with the pure Arabian, the latter is allowed thirty-six pounds advantage. In trotting horses the American excel all other nations, and the American breed of trotters have made the fastest time of any breed in the world. Of these that have reduced the record the lowest, I think all are traced to the celebrated Hamiltonian.

The General Purpose Horse.

The English racer crossed with the Percheron and Norman have produced many remarkably fine horses for general purposes as well as for the trotting track — none perhaps, of more deserved popularity than the Morgan for an all-purpose horse. As trotters they never fulfilled the expectations of their trainers, except perhaps, Ethan Allen, they acquired but little celebrity on the track.

This breed of horses has become so mixed with our native stock as practically to become extinct, and no authentic stud book is kept. For the New England states, where much of the farm work is done with oxen, the Morgan horse deservedly has ranked the highest.

Origin of Breeds.

The wild horses from eastern Europe found their way west through the north as well as south. Norway, Sweden and Finland, each derived their stock from the same source as France, Italy and Arabia. The Shetland pony, a type produced by hard work and scant rations on the one hand, and the English shire and coach horses on the other, represent extremes. The difference is the result of climate in part, but almost entirely in breeding and feeding. In the early immigration to this country the settlers brought each the breed of horses of his own country. The French, the Norman or Percheron, now known as the Comrodine; the English, their draft and coach horses; the Germans, the dull but very large and powerful Flander's stock; the Cavaliers, from Spain, the finest, and the prancing saddle horse, as well as the heavier dilligens, or coach horses of their native country.

The Hunter and Racer.

The more aristocratic class of Englishmen brought the hunter and racer to the early Virginia and Maryland settlements, and from these the race horses of the south have largely been developed. Of horses best adapted to different kinds of work, the English and French have each developed a race peculiar to their own country. English shire and Clydesdales of the present day are from the original Norman stock, now a very different horse from that of a hundred years ago. The first settlers in a new country found oxen quite as well adapted to their wants and means of keeping as horses, and as they could be bought for less and cost less in their keeping and handling, especially in a timber country, they generally constituted the farmer's sole reliance for a team. When the land became well cleared of roots, stumps and stones, the horse was introduced, such a stock of horses as the immigrants were accustomed to use at home, horses of all breeds, forms and sizes.

Treatment of Brood Mares.

There is much to be learned yet in relation to the treatment of brood mares.

Some years the loss of colts in the St. Croix valley has amounted to one-half, other years the loss has been small. Some of the best informed farmers, liberal feeders and careful workers, lost all their colts, and one I recall who has not raised a colt for two or three years, though breeding three or more mares. Some lay this mortality to the sire, from over work or over fat or too little work, and too much feeding of clover; others claim that the mares are worked too hard in the fall and fed too high; and still there are facts, when the losses have been inquired into, that refute every theory advanced. In a wild state or semi-wild state, where the mares run on a range of mountains, the colt is sure to live, and has as much vigor to start with for life's journey as the calf or any wild animal.

I was told by a stockman of Medina, Montana, that out of 180 brood mares turned loose on the prairies between the Missouri and Yellowstone rivers last year, that all but two bore strong, healthy colts; ten colts they found drowned during the season in deep pools and quicksands, several fell before the coyotes and wolves that found them where their mothers had cached them, some of them were never found, but 160 turned up at the round up all right. Some of the most celebrated breeders of full-blooded horses have a field of blue grass, left purposely for their brood mares to run on in winter. Col. Hollowell, of Alexis, Ills., perhaps known as the owner of Donald Dinney (the horse may be better known than the owner), has a pasture in which his brood mares run all winter, with very little grain or feed of any kind other than the pasture furnishes.

THE HORSE TO MAKE THE MOST MONEY.

BY GEO. A. AUSTIN.

The horse that the farmer wants is the one that he can make the most money out of. This is the first thing I want to call your attention to, and in the next place you are going to put yourself in a position to make the most money out of it without regard to your particular fancy, you will cater to the market demands, instead of your own ideas. You will find it a much shorter road to success to find out what the market demands than it is for you to create that market taste or demand. As a general rule you may lay it down that any man that is breeding for a specific purpose is master of the situation, and is in the direct line for success. The man that has the capability of successfully putting on the market high priced roadsters and trotters,

undoubtedly can make money out of it, but the average farmer can best handle the average horse, but I want to lay it down as a rule that you want to breed for a purpose to be specified, and I state right here that the promiscuous breeding of the horse of America has been such as to make them nearly worthless, in other words, the country is over-stocked with horses that nobody wants. Now I am going to talk about the horse that the average farmer can rear and rear successfully, and a horse that the market will hunt after and he won't have to hunt after the market. I want to call your attention to this fact, that there are men riding all over the country, now searching for large sized draft horses, and for medium sized draft mares, commencing at fourteen hundred pounds and going up; there is a growing demand for this class of horses, and there is no corresponding production to meet that demand, and that demand has got to be met, and met largely through the farmers, because men who engage in the science of breeding horses, breed for breeding purposes only. One hundred thousand horses are used annually around the chain of lakes, and in the pine-ries, and they are heavier horses than are usually grown upon the farm, there is no fear of over production.

Breeding up to the Market Standard.

I may not agree with my friend Guy in this matter about breeding up, I don't care how small the brood mares are, the quicker you commence to breed up to the standard the market demands, the quicker you will get there. Now, there are none to many money crops on the farm; we all know that. We can rear just as many colts annually, with an occasional loss of course, as we have brood mares, and we can control the time when the colt will follow the dam, when we have the least work, and the most time to do it, and I apprehend that we can get better colts from fall colts than in the spring. They will do better to go on to their feed in the spring, and they will be nearly as large by the time the next fall comes as the colts that were foaled in the spring

preceding. If you will breed up you will find the market right at your door, and you will add to the farm a monied crop and that property will be as staple in the market as one hundred cents is for a dollar; they don't fluctuate up and down as road horses do and light horses used upon the farm; there is a standard value; they will always bring a remunerative price; and it costs no more to carry a horse that weighs seventeen or eighteen hundred pounds than to carry one of the roadster class that weighs from nine to eleven hundred. You will say this is in direct opposition to the theory advanced this morning in regard to the cow, but the cases are not parallel, and I thoroughly believe that it costs no more to carry a large draft horse to three or four years old than it does a small horse of the same age. I am feeding both, and I will give you my idea of the reason that it costs no more. You take a section of two or two and a half inches from the hind leg of an English thoroughbred horse, and take the same amount from a section of a leg of a draft horse, and you will find the latter to be from two to two and a half times as large as the English thoroughbred horse. You put them into the scale and the thoroughbred horse is only a third as heavy as the other: but the bone of the draft-horse is like ivory, while that of the thoroughbred is like steel. Those two hind legs below the gambrel joints project that 1,200 pounds through the air twenty-five feet at a jump, and no steel could stand the strain. The bone of the draft horse is more spongy; they hardly ever go off a walking gait. You take the thoroughbred horse, they are full of life. They waste a great deal of energy. He is all over the place, here, there and everywhere. You never know where to find him, while the draft horse goes along slowly; if you leave him anywhere, you find him there; and he goes on and makes up in growth what the other one wastes. Now, I merely want to emphasize what I said, that you should cater to this market taste and demand, and add to the monied crops of the farm.

HORSES FOR THE FARM AND MARKET.

BY JOHN M. TRUE, BARABOO.

The best horse for the market, *should* be the best horse for the farm. I base this assertion upon the fact that the breeding of good horses is one of the most certainly remunerative occupations presented to the farmer.

It is safe to assert that considerable less than one-fourth of the horses raised upon the farm remain there, either as work horses or brood mares.

The remaining three-fourths are demanded for heavy work in lumber camps, upon city drays, express wagons, street cars, omnibus lines, or for lighter work in livery or for general road purposes. In each of these departments good horses are required, and the demand is for an animal suited for the work in hand.

The breeder who succeeds, has come to fully recognize the fact, that there is no place for the scrub. The horse that fifteen years ago ranked among the best, now mainly serves to show the great advance made in a proper appreciation of the principles of breeding within that time.

A Demand for Greater Weight.

One of the most noticeable changes in the general requirements of the horse market, is the call for greater weight. The 1,200 pound dray or pinery horse of ten years ago, has given place to the more popular weight of 1,400 to 1,600 pounds.

The gentleman seeking a model horse for his carriage, calls for 1,200 pounds or upwards. While the liveryman is no longer content with from 800 to 1,000 pound nags.

The man who still adheres to his old time theory of the

1,000 pound general purpose horse, and persistently breeds in this line, is drawing over a heavy track, and on an up grade and cannot win.

It is just as inexcusable for the champion of the little Morgan or other light breeds of horses to claim that they meet the requirements of the general horse market, as it would be for the Clyde or Percheron admirer to enter his massive animal in a 2.20 race.

Good Breeding Required.

The first requirement in the production of a good horse is good breeding.

So long as our farmers are contented with using the old unsound, vicious, and unsalable animals as their brood mares, they are far from working in a line that will give them the best of horses; but when through ignorance, penuriousness, indolence or prejudice, they mate these mares with some mongrel, said to combine the blood of all the approved and popular breeds of horses extant, their merits wonderfully developed and intensified in this nondescript animal, they reap what they deserve, a miserable failure. The best mares obtainable should be selected for breeding purposes. I would have the horse-breeding farmer, carefully select the line of horses he can best hope to succeed in raising, and then steadily and persistently adhere to breeding in this line. The fickle man should not become a stock breeder.

While I admit that there are many fine roadster mares in the hands of our farmers, by breeding and individual merit fitted for the production of excellent road horses, and that such mares will be best used in breeding in that line, I still think that a very large proportion of the mares upon our farms will make much larger returns to their owners if bred to full blooded draft stallions.

Experience with the Percheron.

Aside from consideration of the better prices paid for heavy horses, less skill and care is required in the develop-

ment and shaping of the draft than the road colt. This is proved by the fact that the high prices paid for good road horses, seldom come to the farmer raising the colt, but rather to the later owner who has time and taste to bring out the fine points. This means fine harnesses and carriages, and more time upon the road or track than the average farmer can give. On the other hand in a recent number of the *Breeders' Gazette*, the cashier of a bank in Bloomington, Ill., states that for a long time past, that bank had paid out over its counters, on checks an average of over one thousand dollars per day for draft horses alone. If asked to particularize with reference to the breeds, I shall be excused for answering from my own experience, and acknowledging my satisfaction with the Percheron. Some of the farmers of Sauk county, have been breeding in this line for the past twelve years, and the people at large after years of violent opposition to the "great oxen," as they termed them, with singular unanimity now recognize the excellence of the breed, while our county has established a reputation for the high quality of its horses, that is generally recognized by buyers of good horses. Five imported Percheron stallions have been added this spring to the previous grand showing made in this stock. Fifteen or sixteen colts are found in the hands of several of our breeders. Either we have been specially fortunate in our selection of individual horses, or this breed is remarkable for the strength and uniformity of its breeding. Some of the best farm horses I have ever seen were one-half blood Percherons, from mares weighing from 850 to 1,000 pounds. These horses weighed from 1,200 to 1,400 pounds, compactly built, with good feet and legs, good life, a square trotting movement, and the best of walking gaits. They were models of form, disposition and endurance. But these constitute the least salable stock from this line of breeding.

Colts from the same stallions and mares weighing from 1,200 to 1,500 pounds, at four years old weigh from 1,400 to 1,700 pounds, and command prices that, in these times of

slow sales and low figures, are very convincing arguments in favor of the heavy horse.

Heavy colts are raised with less liability to accident and resulting unsoundness than the more active roadsters. They are quiet; less inclined to get in dangerous or forbidden places. I have never seen a Percheron colt or horse, one-half blood or more, with a bone spavin, and curbs or ring-bones are very rarely found. I never shoe my farm horses, unless it becomes necessary in icy times. The quality of the hoof is such as to stand the necessary farm and road work without causing lameness.

The Shire or Clydesdale.

Of the Shire or Clyde horse I know little by experience. Their reputation is well established, and in many localities farmers have made good progress in grading from these breeds.

Having started in either of these lines it is best to adhere to the chosen breed. Don't make "hash" of your breeding. If road horses are wanted select the brood mares with great care, and then use the best standard bred sires obtainable.

If the breeding of heavy horses is preferred, less care in the selection of mares is absolutely necessary, as the defects found in the common farm mares, are usually mitigated or overcome, by the prepotency of the well-chosen full-blood sire, while the second cross in this line of breeding produces grand results, giving points of excellence almost equal to the full blood.

Raise More Salable Horses.

Our farmers need to raise more good salable horses. No line of farm industry makes better returns for the time, labor and money invested. It costs no more to raise a good colt than a good steer or heifer — to keep a brood mare than a milch cow. The colt at three years old will bring from two to three times the price of the steer or heifer. The brood mare will do the work upon the farm and each year

produce the colt that grows to the \$200 to \$250 horse. The horse-breeding farmer has no place for mature geldings or non-breeding mares. The brood mares and colts can do the work of the farm with profit to all concerned.

To the man who likes the horse, and whose horse likes him, the specialty of horse-raising commends itself. And an application of that care and intelligent action requisite to the production of good results in any other special field, will render this one of the pleasantest and most profitable of farm enterprises. Good horses sell more readily and at better prices than any other farm stock. There is no apparent danger of this demand failing in the near future.

Give us then more and better horses upon the farm, and from it for the market, more satisfaction with our farm results, as shown by more money in our pockets, and a consciousness of doing the best of work in our chosen field of farm industry.

Discussion

MR. HOARD — Mr. True said, don't make hash with your horse breeding, don't go into the succotash idea of breeding, have a distinct purpose and stay by it. Now, I will tell you what a distinct purpose did for me.

A War Incident.

At the battle of Cedar Creek in the Shenandoah Valley, in October, 1864, you will remember some of you, how that battle was not in favor of the Union forces at first. At five o'clock in the morning the Eighth Corps was surprised by Early, and it was completely demoralized. But few men can have an idea of what it means to chop to pieces an army corps, kill some, wound others and send others fleeing down the roads in utter demoralization. The right of the army maintained its integrity, the centre maintained its integrity but the left was completely broken up. Some months before your humble servant had the good fortune to capture a thoroughbred Virginia mare, a mare who bore within her veins

right royally the bluest blood of both continents, a thoroughbred racing mare, high tempered, vicious, full of energy, power and speed, she was to me an object of interest. The captain found her so ugly he could do nothing with her, and he says, "Hoard, you can have her, if you can take care of her." And I went at it under the Rarey system, and finally established an understanding between the little girl and myself. I used to call her "Little Girl." The day of this battle came; I was ordered to remove the second section of the battery. I thought I knew my ground; I thought it was easy for me to jump a fence and take a short cut and do my duty. But I got lost; the confusion was of such a character that I did not know where I was, and finally I jumped a fence into a dirt road about one hundred rods from the pike, when I was saluted with the remark: "Surrender, you Yankee son —," of immortal descent. I be-thought me as did young Lochinvar, "They will have fleet steeds, who do follow." And I thought to myself "astride of two thousand years of straight specific breeding and surrender? Never!"

A Ride for Life.

I lay down upon the neck of that little mare and I says, "Susan, get out of here immediately." Susan responded. The lieutenant who commanded the squad was nearly as well mounted as myself. Down that pike we went thundering, the thirteen men shooting at me with carbines, and every moment I expected a bullet to go ploughing up my back, or my mare to be killed, but the strange Providence that attends the soldier, whereby it takes two hundred and fifty rounds to kill one of them, attended me. After me they rushed, yelling "Surrender, damn you, surrender. And I says, "Susan, get out of here." Oh, I thought to myself then, "Thank God that somebody has had sense enough not to make hash of breeding, somebody has been wise for Hoard's sake." Down that pike we went, they shooting, and I running. Finally, I became so excited

in seeing that wonderful stride, that tremendous fire, that wonderful reaching for the ground in front, and that tremendous hurling away of it in the rear, that tremendous condensation of the heredity of two thousand years laid into that little body, I became so inspired with it, that I reached back and motioned to him to come on. He responded with a shot from his revolver, dip would go the bullet by my ear, but I didn't think anything of it, I was so intent on seeing the little mare do her duty. By and by I began to see the gap widen between us, and then came this wonderful quality we call endurance. Suppose her line of heredity had been chopped into hash, could she have drawn on two thousand years of this heredity? No, she would have laid down by the road and Hoard would have gone to Libby prison, if he hadn't been shot.

You remember how we were defeated until one o'clock in the afternoon, when Sheridan came riding down that pike from Winchester, twenty miles away.

Sheridan's Ride.

My friends, do you think he was mounted on a Norman? Did he straddle a Clydesdale on that day? Not a word against a Norman or a Clydesdale, but when it comes to saving the Union, you have got to get a thoroughbred. Who knows to-day how much the Union cause is indebted to the men who bred that horse for a specific purpose; who can reach into the great Arcana of events and answer that question?

Mark the queer fortunes of war. After the battle Sheridan came, by virtue of having a gamy horse. He reorganized the forces, turned this great current of men who were flowing down the pike like a stream, turned them back and yelled to them: "About, face! we will sock it to them." And Sheridan stopped that mad tide of fear, and changed it into a consummate, grand strength and resolve, reorganized those regiments and those companies, and in two short hours had this tremendous army again with its face to the

foe. Then came the matchless power of the man and the material that you know of; in a few hours we had Early flying into the swamp, and ten thousand rebel prisoners. Did it come by virtue of making hash in breeding horses? No, it didn't. It came by virtue of that man "getting there," because he had a horse that could bring him there.

A few days afterwards I was placed in charge along with others, of the prisoners. Among them was a rebel lieutenant belonging to the 24th cavalry. I found him a very congenial, pleasant man. I liked him, and I did what I could to relieve his captivity, and we got to talking over the events of the battle, and finally he says: "By the way, I had the confoundedest race I ever had in my life after a battery sergeant." When he said that my heart was in my throat. He says: "I would like to know where he got his horse, he was mounted for God's sake." And I could have added, "And for Hoard's sake, too. Then I says to him, "Did he motion to you come on?" and he says, suddenly, "Yes, he did; did you ever hear anything about it?" "O no;" but I says, "Shake;" and he shook. "Why," I remarked, "I am the huckleberry you was after that day." And his eyes filled up and as he gave me a grip of the hand he says, "Well, I am glad I didn't hit you."

Specific Breeding.

Now, my friends, I am a positive and earnest believer in specific breeding. I look back on the blood my mother gave me, coming down through generations that are telling their story, and to-day, if I am anything, it is by virtue of what lay there; and I thank God to-day that there was a spice of clean, straight blood to help me out in many a time, and I tell you, my friends, when it comes to our domestic animals, we must remember one thing, that nature deals in straight lines, and that there is no crookedness in her.

MR. CHEEVER—I want to encourage myself and other farmers with the idea that they can raise good sizable colts from their small mares. Some of the speakers have dis-

couraged this idea, but I want to tell you something that occurred on the ranches in Colorado but a few years ago, and one of the parties in interest was a Rock County man. Mr. I. M. Bennett had some sons who were rather given to consumption, and he took them out on a ranch. He went out there to visit them, and there came along a man who was taking a drove of horses from Nevada to the eastern markets. In that drove of horses he had a hundred small mares, weighing from seven to nine hundred pounds apiece and Mr. Bennett finally bought them, paying \$2,300 for them, with thirty colts. He went back to Wisconsin and bought some high grade Norman colts, stallions, and he told me afterwards that he had learned that he could raise good sizable colts from small mares and large stallions. He kept on breeding in that direction until he had pretty high grade colts, and he said the first cross, they sold a number of colts for \$200 with the stipulation that they were to be caught with the lasso and halter broke. He kept them until he had high grades and some fellow came along and saw he had got a good thing and paid \$50,000 for that one hundred mares and their increase.

MR. SAYER — I would like to know of Brother Hoard, what became of that thoroughbred mare?

MR. HOARD — The last I saw of her she was on a breeding farm in Burlington, N. J. The captain wore shoulder straps and Hoard didn't, and the captain got the mare, but I saw her about six years afterwards. I never struck her a blow in my life, and I speak here in behalf of that kindly sympathetic usage that ought to lie between a man and his horse.

At the time I saw her I stepped into the paddock, and she was grazing with a colt by her side and I says, "Little Girl." She raised her head, stopped a minute, and I said once more "Little Girl." She came across the paddock, as far as from here to Main Street, if that is the name of the street. She came across on the run, left her colt and came up to me and stopped a minute, about twenty paces from me and looked

me over. I stood still, then with a nicker that was as glad as the cry of a baby, just as glad in its character as that, she came up to me and caressed me with her face as she used to do years before. Then with a touch of maternal pride that was almost human, she trotted across the paddock to her colt and brought it back to show me.

It was six years afterward, but she knew me instantly, and yet she was the most vicious animal that I every saw in my life. I threw her thirty times by the Rarey process before I could reach that one point that Rarey calls for, the bending forward of the ear, and when I did convince her that I was not going to hurt her, that I never should strike her a blow, but that, in the nature of things, she must acknowledge me as her master, when she became convinced of that, her attachment and her fidelity were as marked as that of a dog. She had high intelligence and high temper, and I wouldn't give a snap for a horse, or a woman that hadn't either.

BREEDING AND MANAGEMENT OF SWINE.

BY THEODORE LOUIS, LOUISVILLE, WIS.

A few practical suggestions on the raising and breeding of swine, such as observation and experience have taught me, may be of use to those who have given the subject but little attention, and raise swine with as little thought and intelligence as any other farm crop. Although the result of the past and the prospect of the future are unquestionable inducements to continue to raise more swine, either as a specialty, or in connection with other farming, to this date the number of swine in the west has decreased 1,479,207. But no one should embark in the breeding and feeding of swine unless he feels himself adapted to the business, and will treat them with the same care, kindness and intelligence as other animals on the farm.

Swine breeding if properly conducted with an eye to profit, and the health of the animals, should utilize a great variety of food. Clover, green or in a dry state, is always of first importance. The near future will probably develop the fact that the silo will enable the farmer to winter his swine at less cost, and insure them with health and vigor. Squash, pumpkins, rutabagas and mangels will cheapen the cost of production, and add materially to their growth. Bran, middlings, ground oats, of equal parts, steamed and fed warm will be found profitable feeding, as to growth, development of muscle and bone. If oil meal is added, well cooked, one pound to twenty, it will fill the bill of fare for milk, and a large proportion of nitrogen.

Where buttermilk is fed in large quantities, one pound of oil meal, well cooked, added to every hundred pounds of milk, will increase the feeding value highly. Buttermilk is slightly constipating, but the oil meal will remedy this. The food should be as nature left it—sweet. Sour, decayed swill is poison. Salt should always be placed where swine have access to it in their yards or pens, in troughs on shelves, not on the ground in barn-yards, as it will absorb the poison of yards. Two bushels of charcoal, broken into fine parcels, one half bushel of wood ashes, eight quarts of salt, well mixed, one and one-quarter pound of green copperas, either dissolved in water or ground fine, mixed with the above, should always be in a self-feeding box, with good cover on it, where swine can have free access to it. When high feeding of carbonaceous and concentrated food is resorted to in time of fattening, soft sandstone, brick dust, or even dry clay will be greatly relished—in fact all the above ingredients are essential to aid digestion, and kill intestinal worms. I consider ground food, as a rule, the most economical.

The Boar.

Always breed from a thoroughbred boar of good constitution, and vigor—his vigor should always be in excess of that of the sow. He should be a rapid grower, good feeder,

good grasser, kind disposition and intelligent. Keep him separate from the herd, and give him yard room sufficient to develop his form and muscle by exercise.

Let his service be limited to but one service per day; more ought to be exceptional. Give him such food as will build muscle and bone, never leaving clover out of his bill of fare. Keep him until he is four or five years old.

The Sow.

Let her be at least fourteen months of age at farrowing time. She should be of great length, have twelve good developed teats, broad over her loins, not too short in legs, broad between eyes, denoting intelligence to take care of large litters, of good hearing, a kind disposition (be sure to cultivate this), a good feeder and grasser, and, of all things, a good constitution in all her vital organs; keep her in good condition always.

In time of gestation, give her such food as will be laxative in its nature, with a little corn in winter. Do not feed too many brood sows together; they will crowd and worry. Do not compel them to drag over bars, when heavy with young, but let them have exercise. When time of farrowing is approaching, feed them in quarters where you wish them to farrow, at least two months before farrowing. Have the pen face the south. Be sure and have a fender or railing in your pen twelve inches from floor, so she will not overlay her pigs. Do not remove the placenta the first twelve hours after farrowing. I am satisfied that the instinct to eat it, supplies a want of nature to replenish the system; she will often eat her pigs to satisfy a ravenous appetite for animal food.

Give her warm slop of scalded bran and water the first four days; increase her food gradually to a more concentrated ration, but never over feed her. Let her have exercise daily (keep pigs in), but feed her a full feed just before farrowing. Beware of letting pigs go out in cold storms, feeding all day in wet clover. Let pigs nurse ten weeks at

least, and raise but one litter a year from each; that is all nature requires of the hog in nature's state. Have shallow troughs for dams, so that the pigs will commence to eat with them at an early age; trough room should be in length not in depth.

If she proves to be a good mother in all respects, keep her until she will breed no more, and save from her another breeder. Give her and the pigs all they will eat clean and no more, at each meal. Feed twice a day when on clover. Overfeeding of sows, musty grain, sour swill and the sudden change to clover, will often cause diarrhoea in pigs. If so, give the dam, for two days at least, one-half teacupful of sulphur, or one-half teacupful of castor oil, in sweet milk; change her food. If she has inflammation of the udder, bathe it with hot water, or rub it with crude kerosene oil. Change the bedding of young pigs at least every two days; let it be dry always.

Grow the pigs from the day of birth to the day of slaughter, which should not exceed nine or ten months. Last, but not least, do not follow the practice of breeding from immature parent stock; it is breeding downward in size and constitutional vigor.

If one must winter stock hogs to have them 18 months old before marketing, keep a book one winter and see what it costs to winter hogs, without any material increase in weight and size; it will be found a complicated example to figure your profits when pork is selling for \$3.50 to \$4.00, gross weight; but it is not a complicated estimate to show that one can get the largest and quickest returns from a well developed, matured sow, bred to a mature boar of good breeding. To starve a breeding sow improves her for breeding about as much as it improves milch cows to be poor in flesh. The cow is not a good milker because she is kept in thin flesh; this is a serious mistake, too often made.

Live Stock Carries off Little Fertility.

When one thousand pounds of pork carry off from the land plant food only to the value of \$3.57, the fertility of the

farm ought to be yearly increasing. But in the face of all this, the raising of swine is becoming more risky from year to year. There has been a steady decrease in hog-raising in the last three years. In the Miami Valley, the home of the great American hog, disease is sweeping the herds; throughout the western corn belt disease is widespread, wherever hogs are kept on a large scale. Swine breeders' associations have held their annual meetings; they have framed sanitary laws for state and national government, to investigate, to stamp out, to punish the guilty who sell or keep diseased swine. Hundreds of well-informed and un-informed men herald their remedies, and admonish the careless to adopt a better system; but no one has been successful, as yet, where the disease is fairly settled. In our state only a few counties report disease. The northern portion of the state has suffered only once; this was by direct importation. Having visited thirty-four counties or more, as an institute worker, speaking exclusively on rearing of swine, I have observed that, in that portion of the state where few swine are kept, and under more natural conditions, there is no complaint, showing plainly that they are no more susceptible to disease than other stock; but have found throughout the state that there is a tendency to breed from immature stock, and that they are gradually losing their constitutional vigor. There is much complaint in this direction: Lameness in loins; breaking down in feet and legs. Much of this may be largely due to sanitary condition, wintering them in straw-stacks, in damp beds; turning out in a heated condition to find their food in snow and ice or mire, with a drink of ice-water; and we may well ask the question, are we not slowly but surely drifting in the same direction for which agriculture, in its several branches, has paid such severe penalties in the past? Overstocking, and then entirely ignoring that there is a natural law not to be violated, proper hygienic surroundings, higher sanitary conditions are ever lost sight of, when the accumulation of larger herds is the interest; ever forgetting the moral lesson that actions and their con-

sequences are inseparably linked together; that human conduct draws after it results corresponding with its nature and interest. Are not range cattle a fair example of this?

In my opinion, the prevention of the dread disease rests entirely with the farmer, and probably nothing but a stringent law will show him his sense of duty. No greater calamity could befall this continent, than to make swine raising an uncertainty. In our own state, where we don't pretend to be great pork producers, the income from thoroughbred hogs exceeds that from thoroughbred cattle and sheep, and wool combined. I will stand by the pigs.

EXPERIMENTS IN HOG FEEDING.

BY PROF. W. A. HENRY, OF STATE UNIVERSITY, MADISON.

Mr. President, Ladies and Gentlemen—I am aware that time crowds, and I ask that each of you follow me if you can, in a short presentation of the topic that has been assigned me. I follow a gentleman who has a reputation all over the northwest as a successful breeder of the hog, and knowing that he is all that he seems to be to you from my own personal observation, I feel that you have had a great treat. He has taken up that side of the question and I know it has been given as it should be, and he has kindly left to me the subject of how we shall feed the hog.

I am anxious to present this matter to you so as to help you to have the best understanding of the principles, the laws that lie at the bottom of right feeding.

There is not a farmer before me that has thrown corn to a hog, but what has stopped some time in that operation and said to himself, "What is there in that corn that goes to make that flesh? Is there one part that goes to make lean

meat and another part that goes to make the fat? and is it possible that I am not feeding this hog as I should feed him? Am I wasting part of this corn when I feed it alone, or is it the best way for me to feed it? If it is not the best to feed corn alone what should I feed with the corn?" I know those questions come to you. Then adding to that the trouble you have with the difficulty that comes from the different prices of market food, and we have a very complex question. We must not only feed our hogs economically so far as the cost price of our feed is concerned, but we must feed our animals in such a way that they shall be healthy and thrifty. In Wisconsin we are feeding, for the greater part of the state, entirely too much corn; not that I have anything against Indian corn, for separately and alone it is the grandest crop we raise, but as I say, as a rule, our farmers feed too much corn, or too much feed similar to corn in its chemical composition.

Chemistry of Feed.

Now, for my lesson in the chemistry of feed. All food compounds whether for man or beast can be divided into two elementary classes. Now, there is not a boy here but what can follow me in this if he will listen closely. The carbohydrates and the protein. Now don't say "there are two words I never heard before, and I shall forget them before I get out of the room." You remember the time when you had not heard the word "telephone," you had to learn it, and so with these two words which are new in agricultural science. Carbohydrates and protein.

Now, the carbohydrate feed contains three chemical elements, carbon, hydrogen and oxygen. How are you going to remember that? You will probably get them confused before you get very far. C. H. O., that stands for carbon, hydrogen, oxygen; is that plain? Those three elements, chemically united by the life of the plant during its growth, make all of the carbonaceous food we have. Sugar is pure carbohydrate, starch is a pure carbohydrate, sawdust is almost

a pure carbohydrate. Nearly all the elements of the trees in the great forests are carbonaceous, the woody fibre in our cornstalks, in our oat straw or wheat straw, and these as fed make carbonaceous food.

Now about the second of these two, protein, the protein or the nitrogenous food. What do they contain? Carbon, hydrogen and oxygen, and one more, nitrogen, which is four, C. H. O. N. A carbonaceous food has the three, C. H. O.; a protein food has four, C. H. O. N.

I am anxious that you should follow me carefully, for this reason: These farmers' institutes are going to keep on, you are going to read the agricultural books, and you will hear a good deal about the science of feeding; it is to be brought up in these institutes; so you see, if you are going to keep up with advanced agriculture, you must learn the technical terms of your profession.

Well, what about our protein feeds? One of the most concentrated of human foods in the protein foods is eggs; cheese is a protein food, skim milk containing also the cheese of the milk, is protein, lean meat is protein, blood is protein. For our stock, there are shorts, bran, oil meal, cotton-seed meal, all rich in protein, while of our rough fodders, clover hay is the richest that we have.

Remember then, that there is a broad distinction between these two classes of feed, remember that feeds like bran, shorts and oil meal and clover hay for our cattle all have that element of nitrogen. Over in Germany the chemists at the experimental station have been at work for years and years feeding animals to see how much these different kinds of feed each must have in order to make a perfect growth and make it economical. If an animal's body is made up naturally of a certain amount of carbonaceous material, and a certain amount of protein material does it not follow that we can feed our animals so as to make these compounds serve their purpose, and waste none either. You see that you may be feeding an animal incorrectly, unless you understand something about this you may be feeding too

much protein in proportion to the carbohydrates, or you may be feeding too much carbohydrates in proportion to the protein, so that you are wasting one or the other.

When a man puts up your brick house he puts in so much sand and so much lime, according to the proper proportions, and you don't say to him: "You shall have all the sand you want, but be sparing of the lime." You know it won't make proper mortar. By using the two in proper proportion he makes good mortar, and so it is with our feed, if we mix exactly enough of the carbohydrates with the protein the animal will have all it wants and waste none.

How Much Does an Animal Need?

The pig, the young animal needs one pound of protein to every five of carbohydrates, and the man that feeds differently from that, wastes more or less of his feed. May be he can afford to do it, may be he can afford to build a house and put in more mortar than the right proportion, but for practical purposes we want to know how to feed without wasting either of these elements.

Where Can We Most Economically Get These Feeds?

In general terms for the state of Wisconsin, barley and Indian corn supply the cheapest carbohydrate food we can get in the market. One hundred pounds of Indian corn contains over seventy pounds of digestible carbohydrates, and it contains only eight pounds of digestible protein, or perhaps a little better. If you divide eight into seventy-two you see it goes nine times, so that you see there is about one pound of protein to nine pounds of carbohydrates in Indian corn, and I told you that the pig needed one to five. That explained why Indian corn is not just the feed we want. If I remember right sweet skim milk is about one part protein to two or three carbohydrates, so that skim milk is too rich in protein for the pig and to feed our pig one of protein to five of carbohydrates we can mix the skim milk and corn together, or the skim milk and barley, barley being very similar to Indian corn, and get a perfect ration of the two.

As the pig grows older he needs less protein, you can get the ratio up to one to eight when he is fattening and still give him enough protein along with his carbohydrates, so to fatten the hog after he is grown, you can feed one of protein to eight of carbohydrates which comes pretty nearly to Indian corn. That explains why Indian corn is such a good and economical feed for the fattening hog and why it is a poorer feed for the younger animal.

From what I have said, I suspect you understand already the functions of these two classes of feed in the human and animal body. What does the protein go to make in the animal body, I don't care whether you are talking about men, pigs, or babies, the principle is the same, to make red meat in the body, to make muscle, you must have protein feed, to make fat, carbonaceous feed, to make heat, carbonaceous feed. Ordinarily we need all three. Our bodies must keep up to the temperature of ninety-eight and to keep that heat there in the long winter months, we eat carbonaceous food. To keep up the muscles of our bodies, we eat eggs, lean meat, whole wheat, graham flour and materials of that kind. For our live stock to make the muscles of the pig, the muscles of the ox, the muscles of the horse, we feed oats, which is pretty rich in protein, bran, shorts, oil meal or clover hay with our rougher fodder.

To show you the importance of this, if you were to take a dog and shut him in a tight room and give him what water he wished to drink, and what sugar he wished to eat, and what starch he would eat, your dog would live comfortably for a few days, and then he would begin to whine for something, he could not tell you what, even if he had language, he would only know that he wanted something. Well, he would become emaciated, his muscles would wear out and he would die for lack of protein food. On the other hand if you took that dog and fed him cheese and lean meat and blood he would keep on indefinitely. Protein feeds can take the place of carbohydrates, but the carbohydrates cannot take the place of proteins, so that we might with safety

pick out protein feeds and get along with them, while we could not with the carbohydrates. But the difficulty is, protein feeds cost more than the carbohydrates, straw is always cheaper than bran, it is more easily raised, and so it is protein feeds always have a high market value, nitrogen is an expensive element wherever produced.

Experiment with Protein and Carbohydrate Feed.

I wish to describe to you now a little experiment that we tried at Madison to test the effects of these two feeds, the protein feed and the carbohydrate feed. Please notice carefully the elements of the experiment. A litter of six pigs was taken for our experiment; they were divided three and three. To these three pigs when they were 100 days old and had got a frame started, we gave corn meal and water.

To these other three pigs we gave dried blood, shorts and skim milk. Remember that that dried blood was no more than feeding them dry meat; you might get confused on this matter and misunderstand me and think that the dried blood had worked some sort of miracle which it did not, it was the same as giving them dried beef.

We fed them one pound of dried blood mixed with six pounds of shorts and that stirred into twelve pounds of skim milk and the pigs got all they desired; that was a very rich ration.

This other ration was rich in carbohydrates but poor in protein. The pigs took their feed very regularly for one hundred and thirty-six days, then they were slaughtered; and now I want to tell what were some of the conditions.

From these three pigs we got twelve pounds of blood. From these three we got eighteen pounds of blood, that was the first difference.

Next, as to the weights of the animals. These three pigs weighed 116 pounds, to every 100 pounds that these weighed; these grew the fastest, yet it was remarkable that the grain-fed pigs did as well as they did.

Next, we went to work and dissected some of the mus-

cles. We took the two large muscles lying along the spinal processes of the back, the two largest and strongest muscles in the hog's back, that part that goes to make the nice tenderloin meat, what we call spare-ribs. We found that the muscles of these three hogs fed on protein, was sixty per cent. heavier than the muscles of those hogs fed on the carbohydrate feed. We found that the loin muscles were forty per cent. heavier in the protein-fed hogs than the corn meal-fed hogs.

We got a large number of records in addition to these that I cannot explain, but will tell you in conclusion about the bones of the hogs. After separating the fat from the lean meat and carefully weighing both, our last observation was to put the skeleton of each hog into a large kettle and boil the flesh off, and weigh the bones of all six of these hogs. Then we took the thigh bones of these hogs to our testing machine to see what the strength of them was.

There isn't a farmer in this room but knows that in shipping hogs to Chicago or wherever they go, we often have trouble in the breaking of the hog's legs, and we have to dispose of that hog at a reduced price or suffer some loss.

Now, we ask it ourselves, if there is more lean meat there, if there is more blood in such a hog, how about his bones?

So we took the thigh bones of the hog, we set the plates of the testing machine four inches apart, laid the bones on them, and then we brought a breaking strain down upon the bone, and the testing machine is so perfect that we could mark every five pounds of weight being brought down upon it. A man turns the crank and brings down the weight very slowly, while another person moves the scale beam. In this case the weight was brought down until finally the thigh bone snapped. Then we would put on another thigh bone and so on until we had broken the six thigh bones of the hogs on each side of the experiment. The result of that was that the thigh bones of these hogs fed on the corn, broke at a pressure at a little over five

hundred pounds, while the hogs fed on the protein ration broke at a pressure of over nine hundred pounds.

I think that we can see now that we can feed ourselves, our children, our families in an intelligent way by understanding these principles, as well as we can feed our live stock, and that we can feed our live stock if we only understand these things better than we do. There cannot be a possibility I think, but what we can feed them more economically.

Skim Milk for Pigs.

Now, in starting with pigs, one of the best feeds we have upon the farm where we make butter, is skim milk, because all the cheese of the milk is left there, and only the carbonaceous matter is sold off, and we have left in it all the protein. So far farmers, we can mix skim milk with our corn meal, and get this large healthy gain that our animals need.

Shorts one of the Cheapest Feeds.

The next feed that the farmers of the state of Wisconsin have is shorts, one of the cheapest feeds we can buy to furnish the protein. Remember that nature in growing the wheat grain put the protein around the outside of the wheat grain, the inside is starch and the ambition of the miller is to get into his flour as little of the protein feed as he can, much to the detriment, I think of the human family, our stock get the best part of the wheat grain. If you were to sow a ton of starch upon your field hoping to get a fertilizer therefrom you would miserably fail, but in a ton of shorts or bran made from wheat, lies about all the elements of fertility that there are in the wheat grain. Every farmer knows that the growing of wheat robs his land of the fertility, it is somewhere in the grain, and if it is not on the inside of the grain it must be in the outside. If the miller puts all the starch in the flour, we must get the protein in the bran and that fertility passes into the animal and goes

into the body and then passes out in the excrement. And you have the benefit of it in fertilizing your land.

I believe and hope that in the future about the feeding of their hogs the farmers of Wisconsin are going to show more intelligence, and as evidence of this I will ask you to bear me out in this. If there is a boy that goes home to-night and feeds the old horse or the cow and when he goes to feed the corn or hay he does not say to himself, "What is there in this that makes the flesh and what the fat?" I shall be disappointed. But I won't give it up? The boys will remember it, the boys of our time must take up with modern methods. Their fathers may not take these things up very much, but the boy that is going to take hold of high priced land and succeed in farming, it is the boy that is going to take an interest in these things and see whether he can get the greatest profit from a given amount of certain kinds of feed.

Minneapolis shorts can be bought to-day for fourteen or fifteen dollars a ton and yet farmers will pay very nearly that price for Iowa hay, just because they are blind. I don't believe the boys will do that.

I think I have said enough to start you thinking. This is my second time in Green Bay, and the next time I come up here I am going right over this same thing, but in the meantime I want the boys to get books and read about these matters.

Discussion.

MR. CLAPP—How would Mr. Louis drive a hog over a bridge?

ANSWER—Put some straw on the bridge, sir, and they will walk right over it, or on the other hand, take some cotton cloth and put a stick on each side. Have it long enough so it spreads clear across the road, have a man on each side holding it and go along with that white cotton cloth, don't hurry the hogs, go quietly along and as quick as the hog

turns and sees that white cloth, if you have some straw on the bridge they will walk right over.

MR. CLARK— Why was it that your son in your absence lost eighteen pigs out of twenty-five, what could he have done differently than he did?

ANSWER— I would have gone into the sty or into the stable where the mother animal was. I would have talked to her and taken the pigs and put them in a basket and carried them into the house, let them nurse and return them. She is an animal that weighs five or six hundred pounds, I would bring them back to her at different times during the night. My son got scared of the animal because she was furious, and I told him, said I, "Let this be a lesson to you, and if is I will willingly lose the litter." He reached over the partition. My stables are so arranged that I have a door and I can walk quietly in there, which is much better than for a man to climb over a partition at such a time. He reached over the partition to get hold of the pigs in his desire to save them, and she got furious, she would lie down any where on them and crush them, really meaning to shelter them. She was really an intelligent animal.

QUESTION— Have you ever had experience in pasturing hogs in clover in the summer season? And how many pounds of pork can you make from an acre of clover?

ANSWER— I have made as high as 1,000 pounds gross weight from an acre by actual weight, and let me say right here that Professor Roberts told me that 1,000 pounds of pork only carries off of the fertility of our soil \$3.57, and he is good authority. Now, if that is the case, if we can make at the price of four cents gross weight, forty dollars from an acre by feeding, with a little addition of corn, we can get the value of clover as a feed. I have found in my practice, that feeding clover alone, it is not good practice, but it is better to give them an ear of corn at each end of the day, or some corn meal at one end of the day you will find that they gain more, that you will sustain the animal and will gain more without waste. The Professor has

just told you that the clover is a nitrogenous feed and the corn balances it.

QUESTION — You claim that it takes about three pounds of corn to sustain a hundred pounds of weight?

ANSWER — Yes, sir.

QUESTION — How does that agree with your statement, Professor Henry? You said it took one and a half to feed a pig.

PROF. Henry — That was a fifty pound pig.

QUESTION — Mr. Lewis, I want to know whether you permit any in-breeding at all, or do you introduce new blood?

MR. LEWIS — I introduce new blood, I think it makes a great difference in the health and vigor of the animal. Thoroughbred sires are very cheaply obtained to neighbors and individuals. A farmer goes to his neighbor and he gets a sire, he may have come out of his own yard only two years back, he may be a full cousin or half brother; I consider in-breeding ruinous practice.

MIXED FARMING.

BY A. BARKHAUSEN, MEQUON.

In the institutes held heretofore, a number of farmers have advocated the opinion that mixed farming is most recommendable, and I fully agree with them. But what is mixed farming? As far as I understand it it means to draw the greatest possible profits from all branches of agriculture and stock raising. But all this requires a much greater knowledge and science than where farming embraces only single specialties. For farms that are in the first stages of culture (and the greater part of the state can be included in them) mixed farming is so far the system most adapted to them. But it now becomes our

task, to subject to a closer examination all the experiences which we have had so far, and to adopt into our system what is most suitable and adequate to our conditions, climate, weather and soil. And since many of our farmers still lack the proper knowledge of the soil and are sadly ignorant of the proper mode of preparing the various soils, and do not have a rotation of crops suitable to their soil, or none at all, the greatest possible yields of their farms have not been reached by a great many; and yet none of them will admit having made any mistake. All failures are ascribed to other influences than one's self, for everybody claims to be the true prophet. A great number of our present farmers' generation have grown up imbued with the good old customs; and to satisfy the self-interestedness of parents, were never allowed to leave the home clod, and thus he must be a bright, clever boy, who will ever succeed in acquiring a knowledge of his vocation superior to that of his father.

Prices of Farm Products Deteriorating.

For several years past the prices of our farm products have not only been deteriorating to an alarming extent, but the prospects are such as to warrant no anticipation of their bettering in the near future. Exceptions will be only transient and of short duration. But what shall we do meanwhile that our income may afford us satisfaction in some degree? In the first place, we must learn, as above stated, to draw the greatest possible profits from every branch of mixed farming, and secondly, to limit those wants that are not absolutely necessary for life. For us farmers there is no use in striking and the strikes in other occupations help much to make our own situation worse. Even our government treats us in a step-motherly way. Now and then a crumb is thrown to us to stop our clamor; but there is a need of broadening knowledge in our vocation which nobody seems to comprehend or care about.

Importance of Knowledge on the Farm.

The smaller a farm the less advisable it is for its owner to use considerable means to acquire considerable agricultural knowledge. The larger the farm, the greater are the opportunities for a farmer of more than ordinary agricultural education to turn his knowledge and derive greater profits from them. For the former it must be sufficient if he once in a while looks over the fence of an intelligent neighbor; but for the latter the knowledge acquired beyond the mere practical will certainly be a source of profit. For this purpose we must have an education for our young generation in which theoretical and practical knowledge can be acquired, for the proverb says, "an ounce of practice is worth an hundred weight of theory." Thirdly, while we have to depend upon our soil, we must also take the greatest care that our soil can depend upon us. The science of soils is therefore of the utmost importance to a farmer. The different kinds of soil need a different cultivation and tillage. If a certain crop does especially well on one kind of soil, we may give it the preference on it; but we must not expect the same good results from a soil less congenial to that crop. But let no farmer be tempted by the good looks of a crop while growing, to repeat raising it on the same field; for the good condition may have been the result of other favorable influences; it may have a bribing appearance, and yet not unfrequently will yield much straw and few kernels. The strength of the soil is wasted by repetition without profit. It is a mistake to raise on a soil a crop which it can produce only with abundant manure. It is also wrong to apply abundant manure to one part of the field and leave the other to starve. It not unfrequently happens that the one part yields much straw and few kernels, while the other brings neither straw nor kernels.

Rotation of Crops.

The farmer himself can help a great deal toward securing a uniform even standing of his crops, especially when

he understands how to bring the grain crops, food crops and stock raising into proper relative proportions. But above all it is enhanced by a regular rotation of crops. But what is a change or rotation of crops? Answer—It comprises the number of years that must elapse before clover is to be sown again on the field. One and the same rotation is not suitable to every kind of soil, but the circuit must be adapted to the soil and the marketing facilities. The more capable the soil is for clover the narrower may be the limits of the circuit; but with less capability for clover the stages of the circuit must increase in time.

This 7-field or 7-year circuit has been executed with success since the year 1869, and has given no cause for making essential alterations, as the yield of the field for a number of years has been greater than at the time when the soil was still fresh.

Such a regulated rotation allows a great deal of playroom which gives opportunity to a farmer to utilize his knowledge and heighten the yield. Each kind of crop has, as it were, its own peculiar soil, in which it can be brought to its highest state of perfection without great exertions. Just so each crop has a soil not adapted to it, in which it can be raised only with extraordinarily favorable circumstances of the weather, or with more than common application of manure. From this we draw the most important conclusion. A crop needs more or less manure in proportion as the soil on which it is grown is more or less congenial to it. Further, we see its yield is less in proportion as it is raised in places contrary to its nature, where it does not belong, and that are not congenial to it. This is a rule of utmost importance to farmers.

It is true that much in agriculture can be accomplished by favorable means and great expense that nature does not favor; but this is seldom done with profit and impunity.

If we follow the course indicated by nature as near as possible, and evince as little as possible desire of mastering nature, we sail with the wind and have the surest, easiest and shortest way to success.

GROWING WINTER WHEAT.

BY T. B. TERRY.

At the institutes here in Wisconsin I have heard dairying praised up very highly, and almost nothing said in favor of wheat raising. This is quite natural as the state has grown grain too exclusively in the past. On the Western Reserve where I live, farmers have followed *dairying* most too exclusively in the past. They are now turning their attention to wheat growing, in connection with their dairying, and the results are very satisfactory. I know dairymen who raise about a thousand bushels of wheat a year, getting an average yield of twenty-five or more bushels per acre. This wheat will sell for enough to pay their help and their bran bill, and they keep just as many cows, and get as good returns from them as they did before they began raising wheat. Twenty years ago one could travel all day in this dairy region and hardly find wheat straw enough to fill a bed. Now, large straw stacks can be found on the majority of farms. With the grain drill, and twine binder, and steam thresher to help us, wheat has become one of our best paying crops. Raised in rotation, on a dairy farm, there is money in it, even at present low prices. With us it is the most profitable crop to seed down with. Then on a dairy farm the straw is very valuable for bedding, and as an absorbent. Cows are more *comfortable* when lying on a deep bed of straw, and hence give more milk. What straw is not needed for bedding and an absorbent is worth one half as much as good hay per ton, to feed out, provided proper quantities of wheat bran and oil meal are fed with it. It would seem to be the wisest course to have the two great industries go hand in hand to a certain extent. Dairying, per-

haps, should be the main one, and just wheat enough raised so the straw could be all used to advantage.

With the tools we have now there need be no clashing in the work. Where twenty cows are kept ten or twenty acres of wheat can be put in and harvested without interfering with the care of the cows. On some farms oats may answer the same purpose; but they are not as profitable as wheat with us. On *some* dairy farms it may not be wise to raise any small grains, but I believe, as a rule, they can be worked in with the dairying so that it will pay better than either one would exclusively.

I have said there was money in wheat, in rotation, on a dairy farm, even at present low prices.

How to Raise Large Crops.

But you *must raise big crops*, to get the money. Just a few words about how to do it. I speak entirely of winter wheat, which I understand is raised to some considerable extent in your vicinity. Have had no experience with spring wheat. First you want the soil in a proper condition of fertility. The manure from your dairy will help you about this. Clover should go hand in hand with it. Put your manure on clover sod; plow it for ensilage corn; as soon as the corn is in the silo work the ground two or three inches deep, most thoroughly, with a disk or other harrow, and then drill in your wheat. This would be about my way. Winter wheat wants a very firm seed bed, with just enough mellow soil, or loose soil, on the surface to put the grain in. I would never think of plowing the corn stubble or potato stubble for wheat. Leave it alone and simply work the surface and you have the proper conditions for the best results. The most thorough work in the preparation of the soil pays. After corn or potatoes the land gets much of this work while the crop is growing. If you plow the land in the early fall, for wheat, work it early and late until it is mellow and firm clear down. If left too loose it holds too much water, and then no crop can do its best

among clods or poorly pulverized ground. The idea that clods protect the wheat was brought out by a lazy man. No work on my farm pays better than that spent in pulverizing them most thoroughly. Next about the seed; sow only choice *absolutely* clean seed. We have fanning mills now that will take all the foul stuff out. In a few years, by being a little careful, one can have his wheat perfectly clean. Some farmers would hardly believe this, but the writer has, for several years, sold his wheat to a company of farmers in Kentucky, for seed, always guaranteeing that there was absolutely not one grain of it of any thing but clean wheat, taking it just as it comes from the separator. This pays, as we get ten to twenty cents a bushel above market rates, and our wheat is sold before it is harvested, and sometimes before it is sown.

The Best Always in Demand.

There is always demand for the *best* of anything. From one bushel to one bushel and a peck of choice seed, per acre, planted at a depth of one inch to one inch and a half, gives the best results. More seed makes more straw and more heads; but shorter ones, and the crop is more likely to fall down. I like to sow rather early, as a good fall growth is an excellent winter protection, with us, where snow cannot be depended on.

For many years I have raised wheat in rotation with clover and potatoes, and although I have never raised a *big* crop, I may say also, that I have never raised a *small* one. By doing the best, according to our best present knowledge, I have been able to average about 35 bushels per acre for a term of five or six years, and no manure or fertilizer of any kind was applied directly to the wheat. We depended on clean roots, tillage and what manure was left over in the soil from other crops and choice seed.

I am what you might call a garden farmer. I do not believe there is any profit in half doing a great deal of busi-

ness. We till only 36 acres and shove them for all there is in them.

In 1881, we sold the wheat from $11\frac{1}{2}$ acres, to Cummins & Allen, millers, for \$655, and our land is no better, naturally than a large part of the land in Wisconsin; in fact I do not believe it is as good. The wheat raised on my farm the year before I took possession, yielded eight bushels per acre, and under the same careless management it would not have got any higher. We have thousands of farmers now, who, on equally as good land, are raising eight to ten bushels per acre, with clear and good tillage, and rotation, and the manure from a dairy, and underdraining where needed. In fact if we do our best we can easily double the average yield. There may be just as much money in wheat raising as in dairying if the two go hand in hand. At any rate, with the tools we have now, the wheat money comes *very easily* when we get a good crop.

GRAIN RAISING.

BY DANIEL WILLIAMS.

Preparing the Ground.

Fall ploughing is the first important factor in the successful effort to raise a good crop of spring grain, for one reason that seeding can be finished earlier than where the land is to be ploughed in the spring. Another important reason why land should be ploughed in the fall is, that the action of frost destroys many worms and insects injurious to the life of many of our useful plants, and on some soils, especially clay, the action of frost renders the soil less liable to work up in large lumps, thus reducing the labor required to make a proper seed bed. A common mistake among farmers is the neglect to properly prepare the ground to

receive the seed, and by doing a large part of the cultivation after the grain is sown, some even sowing the grain before the surface has been stirred. Such working of the land when finished will leave the seeds at different depths, it will come up uneven, and never grow as well as when the soil is well prepared before the seed is sown. The land should be thoroughly worked and a good even surface prepared before any grain is sown and little or no cultivation of the land should take place after the grain has been sown. If a roller is to be used upon the field it is more beneficial to use it just before sowing then to follow after, as is the usual practice. The reason for the use of the roller before seeding is that all lumps are broken and prepared so as to properly cover the grain, which cannot possibly be the case when used after the seeder. It will seriously affect the yield of grain on heavy soils to commence to work the land when cold and wet; the surface in such cases being packed into small balls in such manner that no after cultivation will reduce them to a proper condition to be used by the growing grain. This condition of tillage will usually reduce the yield of grain at least twenty-five per cent., and often only one-half of the amount is produced that would have been under a different and better working of the soil. The amount of seed used has much to do with the product, both in quantity and in the quality of the crop harvested. If too much seed is used the grain stalk or straw will be small, producing a small and not well developed head, consequently a small and imperfect kernel, if too little seed is used weeds will spring up on the unoccupied ground and choke out in many cases what would have been a fair crop. This is especially the case with barley. Land that is rich and in a high state of cultivation does not require as much seed as that which is of a poorer quality. One and one half bushels of wheat and two bushels of barley or oats per acre on good land is sufficient seed, if the land is free from weeds, a less quantity would be better than any greater. A liberal use of salt upon all grain in dry seasons is of benefit in holding more

moisture in the surface of the land than would otherwise be retained without the use of salt. This seems to be the principal benefit resulting from its use, although some portion of the salt may be appropriated by the growing grain, in some manner which I am unable to fully understand. Grain grown where salt is used usually has firmer straw and is not as likely to mildew or rust, the berry has a brighter and healthy color. The use of plaster upon growing grain retards the ripening from ten days to two weeks without really producing any increase in the yield of grain. It is, however, of benefit to clover sown with the grain, and when used, the clover is more likely to live after the grain is cut. After the grain is cut it should be well shocked and allowed to stand until thoroughly dried to prevent heating in the stack or mow, thus retaining the vitality of nearly all of the kernels which is not possible where the stacking is done before it is fully dried.

Land should not be manured on the surface where grain is sown, as it hinders the proper cultivation of the soil and has a tendency to produce too great a growth without increasing the yield of grain. Where winter grain is to be sown a better crop will be produced where the ploughing has been done several weeks before seeding, and usually the best crops are produced where the second crop of clover is ploughed under. Grain sown with a drill, if the land is properly prepared, will certainly produce a better yield than that obtained by the use of a broadcast seeder or hand sowing.

The Institute now adjourned until evening.

The evening session, March 29, 1887, convened at 7:30 o'clock and was opened with music by a double quartette.

GALLOWAY OR SCOTCH DODDIES.

By J. C. KIRKPATRICK.

This breed of cattle seems to be rapidly gaining in public favor as beef producers. They seem to be *the* cattle for the west and northwest, and in fact for the average farmer everywhere. Their extreme hardiness, early maturity and great uniformity, added to their quietness and gentleness of disposition, makes them one of the most desirable breeds of cattle for beef production.

The Doddies will thrive on coarser and cheaper food than will most other breeds of cattle, and on good and abundant food they finish up for the butcher equal to any animal in existence. The Galloways are covered with a thick coat of hair, that enables them to withstand the cold almost as well as the buffalo.

It is seldom that you will see a Galloway with his back humped up, in fact we never did, even in the coldest weather. The entire absence of horns renders them quiet and harmless and safe to handle, allowing them to be packed in close quarters, without danger to themselves or attendants. In the coldest storms I have stabled thirty-four head together in a building twenty-four feet square with a manger on three sides, all appearing to be perfectly comfortable and without the least accident occurring.

Characteristics of the Breed.

Their color is jet black; they stand low on their legs, showing wonderful development of both arm and thigh; they are level and even in their lines, both above and below; they are straight and broad on the back, and nearly on a line from head to rump; they are full and round in the loin and

crop, the rib and hip bones or hooks come very near together; they are remarkably full but not broad in the twist.

Taken all in all they present an almost perfect model of an animal that will take on flesh rapidly and readily, and place it where it will be of the greatest value, and also an animal that will dress as many pounds to their live weight as anything of the cattle kind that was ever slaughtered.

These cattle of the same age are as near alike as so many peas; and the grades can not be distinguished from the full bloods by those inexperienced. We now quote from the *North British Agriculturist*: In a recent article a Scotch writer traces the genealogy of hornless cattle to long before the Christian era, introducing them into Britain with the Gauls, that Celtic tribe who gave their name to the district in the southwest of Scotland, Galloway. He says further: Herodotus, the historian, born 484 B. C., writing of the land north and east of the Black and Caspian seas, says: "The tribes there are great feeders of cattle, and in the part called Garrhus, the beeves have not horns." From this breed of old-polled cattle are probably descended all the modern polled breeds, those of Austria, of Norway, of Iceland and others, as well as our modern British breeds.

We read of polled cattle appearing in South America among horned ones, probably a throwing back to a remote polled cross.

Their Early Origin.

In a survey of the reign of Alexander III, 1249, a compiled history of Scotland refers to the black cattle. We have frequent mention of their early establishment and recognition. The agricultural reports of Scotland, 1794-5, says: "The Galloway breed of black polled cattle is universally known and admired. It is further stated that in one parish alone, that of Inch, in Wightownshire, there were 2,500 head. And that at the close of the third quarter of the last century, from 20,000 to 30,000 Galloways were annually driven from their native pastures, feeding as they

went along the old, well-known trails, to the Norfolk and Suffolk fairs or markets, where they were bought up and fattened for the London market. Thus the Galloways are the old ranch cattle of Britain, and while the ancient trails are fenced and tilled, and the drivers long since gone to the land of their fathers, these cattle still retain those hardy and impressive traits which especially fit them for the hardy out-door life to which cattle are frequently subjected in all parts of America. Their long ancestry of the same fixed type is what gives them their great prepotency, a wonder to many modern breeders, since crossing a thoroughbred Galloway bull with any breed of horned cattle, gives a very large percentage, in my own experience, fully ninety-eight per cent., of black polled calves.

Beef Producing Qualities.

They are the largest and most typical breed of Scotch polled cattle, and with the exception of the west Highlander, the only existing breed of superior beef producing quality that still retains its aboriginal coat of long, rich, warm hair. In their character as a superior beef-producing cattle they have been so long and favorably known to the English epicure, that for many years the "Scotts" have commanded two cents per pound more in English markets than other breeds. As "Scotts" have often also been included the west Highland cattle, as well as those crossbred Galloways of the Angus estate, from whence the Aberdeenshire breeders and dealers first procured their present stock, known in America as Aberdeen-Angus.

I now quote from the *Live Stock Indicator*, December 20, 1883.

"J. D. Gillette, of Logan county, Illinois, the great feeder, had in the Chicago market on Monday of last week a car of fifteen steers, averaging 1,860 pounds for which he obtained \$8.10 per hundred. A day or two afterwards Mr. Abe Sandusky, of Vermillion county, sold eleven head of 1,981 pound steers for \$8.15 per hundred, these two lots bringing the highest prices of the year up to date."

While the above prices seem flattering, the new west goes them ten and fifteen cents better, as will be seen by the following, taken from *Drover's Journal* of December 13th.

"There was one load of grade steers of the Galloway breed, sold at the yards to-day for \$8.25, per hundred pounds. These cattle were the property of M. R. Platt, Esq., of Kansas City, the noted importer and breeder of Galloway cattle. They were two and three year olds, and weighed 1,553 pounds. They were one-quarter and one-half blood cattle, were bred on the range and out of Texas and Colorado cows."

Will now quote from the *Live Stock Record and Price Current*, December 20, 1883.

"A few Galloway steers are now finding their way to market, and are bearing their breeders out in every thing they have claimed for them in the way of beef makers. Their superiority as butchers' beasts is unsurpassed. Not only do they fatten evenly, and the fat well marbled with lean; but despite the charge of their opponents, of slow maturity, they are proving thrifty growers, and so far as hardihood and ease of keeping they are unequaled. They sold for \$8.25 per hundred."

Aiton, in his agricultural survey of one of the south western counties of Scotland, drawn up for the National Board of Agriculture, in 1810, says of the Galloways: "This superior breed has not been improved by crossing with bulls from other quarters, but has been brought to its present improved state by the unremitting attention of the inhabitants in breeding from the best and the handsomest of both sexes and by feeding and management. The Galloway breed was improved as early and probably earlier than any other breed of British cattle. Immediately after the union of England and Scotland, a very active and extensive demand for animals of this variety sprang up from Norfolk and the other southeastern counties of England. In the latter part of the last century this trade had assumed such dimensions that as many as 30,000 cattle were annually sent from Galloway to these districts of England. What were considered

at the time very high prices, were given for these cattle and this induced the breeders to exert themselves to improve the breed, and all authorities unite in testifying to the success of their efforts."

The same author speaking of their degree of improvement in the end of the last century, says:

"It is well known that the Galloway breed of cattle have, by the attention of the inhabitants, been brought to a degree of perfection for feeding, equal or superior to any breed in Great Britain. They possess all the excellencies of shape, size, constitution and qualities that can recommend them to the English grazers. They are of tolerable size and very handsome. They are spirited, strong, very healthy and hardy, and no cattle whatever feed better or yield that which is more relished at table, as can well be attested in all parts of South Britain. The old hunters and trappers say that when taken to the range the Galloways go prepared for service, taking their winter clothing with them; and were never known to turn their tails to any blizzard, but always "face the music." The butchers say that when followed to the block, the last and most trying test of all, the Galloways are invincible. The Galloway breeders say if you want to breed and raise a class of cattle that have no superiors, the Galloways will suit you.

In other words, they are THE cattle, and especially for the range, as they can and do feed and clothe themselves.

The polled cattle were never known to be afflicted with that terrible scourge so prevalent among other breeds, the scrofula or big jaw.

In conclusion I will say, the good old cow is one of the noblest gifts of God to man, and has paid for more farms, and paid off more mortgages, than any other known product. She is not only beef herself, but the mother of all our beef.

THE ASSESSMENT AND COLLECTION OF TAXES.

BY J. W. REWEY.

Mr. Chairman, Ladies and Gentlemen:—I am very well aware that the task that I am undertaking to-night, to enlighten this intelligent audience upon this old question, is considerable effrontry on my part. We all know what it is to pay taxes. We may all differ very much in regard to the different breeds of cattle and other subjects, but when it comes to taxes and death, we can never escape them. Had it pleased the Almighty to have created man intelligent, and imbued him with a large degree of the principles of the golden rule, perhaps there might not have been any necessity for the organization of governments, or as far as that is concerned, any other organization, even the church. But the facts are that mankind are not imbued with that principle. Self comes up and every man is for himself, and hence the necessity of governments, and the object of government is protection to the people, and the best government is the one that offers the greatest amount of protection, economically administered and the burdens of that government equally distributed among the people. Now, Judge Cooley in his law on taxes on p. 14, says: "The protection of the government being the consideration for which taxes are demanded, all parties who receive or are entitled to that protection may be called upon to render an equivalent."

In governments there are no rights demanded of individuals but what protection is guaranteed, and no protection can be accepted, without corresponding rights from the government. In the constitution of Massachusetts, they embody the same principle in Sec. 10, which says: "Every individual of society has the right to be protected by it, in

the enjoyment of life, liberty and property. He is obliged consequently to contribute his share to the expense of this protection."

Now, we think these principles are plain and cannot be contradicted, but the workings of the assessment laws sets aside and contradicts all of these statements. Taxes should be equally and fairly divided, in other words, a man should be called upon to pay in proportion to the protection that he receives from the government under which he lives.

Now Sec. 1036 of the Rev. Stat. of this state says that "all debts due from solvent debtors whether on account of note, contract, bond, mortgage or other security, or whether such debts are due, or to become due, and all goods, wares, merchandise, chattles, monies and effects of any nature or description, having any real or marketable value, shall be assessed at their true cash value."

I am well acquainted in many counties of this state, and I believe it is true that law has never been attempted to be enforced and yet it stands upon our statute books to day as much as any law in existence.

History tells us that when Stephen A. Douglass was lying upon his death bed, he said to his son, "whatever you do, obey the laws of the land in which you live, if they are not proper in your estimation it is your right and privilege to petition for their repeal, but as long as they are laws, you are in duty bound as a good citizen of this government, to obey those laws."

All Should Bear Their Proportion of Taxes.

Now, there are many men who act rightly under almost all other circumstances, but when it comes to the matter of assessment and collecting of taxes, they disregard the law entirely, and sneak out and seem to think they have done a cunning act by evading the law, and it is the great bulk of the farmers of this state that suffer in consequence, because for instance, the assessor comes around to my place; he can see at a glance all I own, all we have to-day is our little

farm, our farm stock and property. We have not an item of value but what goes on the assessor's list. It is not so with many others. I have been on the county board for ten or twelve years; and acting for two years as chairman of the committee of assessments and taxes in the legislature and I have had many opportunities to hear able arguments upon this question, and I have come to what I believe to be the only reasonable conclusion that can be reached, that the trouble is not so much with the law, but in the execution of it. Just that, and nothing more.

There is no possible reason why these men that own large amounts of personal estate, that own bank stock, and loan money at high rates of interest, that live down east and fare sumptuously, should not bear their just proportion of this government the same as you and I, who earn our bread by the sweat of our brow. I want to impress this matter upon you so that you will go home and go to work in earnest. Every prominent man in this town can do something to put this thing before the people. This law is often evaded in this way. A man says, "I don't want a mortgage on your farm, I want a deed in fee simple, then I will give you back a bond." Then when the assessor comes around he says, "I have no mortgage on that land, I own it and my tenant pays the taxes." Now, every business man knows that those two papers taken together make a mortgage. That man could no more get possession of your land with those papers than he could with a mortgage.

How Taxes are Evaded.

Another way is when the assessor comes along and asks: "Have you got any money?" he will fold his arms and say: "You don't tax greenbacks, do you? They are government securities." "No, sir, they are not taxable." That is a weak evasion. Business men do not hold government bonds; they can do better with their money, and I am sure there is no man in the state that keeps any large amount of greenbacks by him. If they do, perhaps it is done for the very purpose of evading the law.

There was a gentleman in our town who was known to loan large sums of money, and our town board have sent for him time and time again to appear before them, and show cause why he did not give in a better and squarer assessment.

Now, he did not quite dare to come and take the oath that he did not have that money; men will not often do that; but when he came before the Board of Review, we told him that we had raised the amount of his taxes \$5,000, on money loaned, although we believed he had considerable more. By and by the Grand Harvester came along and took that man from our midst, and his estate went into the probate court, and among other items in the inventory of his estate, was \$40,000 in notes, bonds and mortgages. He was making more money than any other man in our town, simply by loaning out his money at high rates of interest, but he was not bearing his just proportion of the taxes, and it is just individuals of this class who are the most ready to call upon the law to protect them in their rights. It is not the farmers, as a rule, that are asking the courts to protect them in the possession of their property.

I called upon the cashier of our bank at Mineral Point, and asked them how much their bank stock was assessed at. And he said to me: "It is assessed at $33\frac{1}{3}$ per cent. That may seem low, but it is very high in proportion to some of my neighbors." For instance, there was one store in that city, that a year ago a third interest was sold in it for \$7,500, and the assessment for that firm, including not only that stock, but all the debts due them, was \$6,000. I compared my assessment with that of the senior partner of that very firm, who is worth \$200,000, and mine exceeded his by \$4,000, and yet I am not worth one-fortieth what he is. It is just as much an injustice to compel me to pay a part of that man's taxes as it would be to compel me to pay his grocery bill, or any other bill he might incur.

The Law Not Enforced.

People say that the present practice of enforcing this law is obnoxious to the people. A man told me the other day "You cannot enforce the law." This law says that every man shall be assessed in accordance with the value of his property. Is there anything obnoxious in that? Do the farmers of Wisconsin to-day consider that obnoxious? I claim that it is not, and the trouble is in the execution of it. The men who are employed in our state to-day as assessors generally have little experience in the business and go on about the same as their predecessors did and they feel as many others do that if they did their duty they could never be elected again. We have got in the habit of disregarding that law, men sign the paper that is given them, saying that it is a true statement of all the property they own themselves or as agent, guardian, or administrator, or on account of the wife or any person, then they subscribe and swear to it before a man authorized by law to administer oaths. I tell you there comes ringing down through the centuries from Mount Sinai a voice as clear as it was when it uttered the words "Thou shalt not bear false witness." That is just as much a perjured man that signs that paper, and files it among the public records of his town, as any other public record, and you have just as good a right to go and copy and publish that paper in the journal of your county or use it for any other purpose as you have the proceedings of any court.

I remember a few years ago in the state of Missouri where they have a *similar* law to ours that a firm got their stock of goods insured for about \$5,000. Afterwards the assessor came around and one of the firm took his oath that they had but \$2,500 in that store. After a while that stock of goods was burned, and they sued the insurance company for the full amount of their policy, \$5,000, and the defendant, the insurance company, plead this oath of one of the partners that the goods were not worth but \$2,500. And the court held the plea good, and they obtained \$2,500.

What Should be Done.

There was a very intelligent gentleman talking to me on this subject, and he said: "When you get through talking on that question, I want to know what you are going to do about it?" I will tell you what I want to do about it. I want you to become interested in it. I want you to let the assessors in your town know that there is a power behind the throne, ready and willing to hold up their hands and aid them in doing their duty. I would make the office of assessor more respectable. In small counties I would have but one assessment district in the county, and in large counties I would have more than one. Then I would have the best men, and sometimes, I think, it would be better to have them appointed by the county board of supervisors, or by the governor of the state; appoint men that have got backbone; men of intelligence; men that know what business is; men that can say "yes," and can say "no." Let us go to work in this direction, and never cease until some good has been accomplished. All we want is to take this matter up and get to understand it, and enforce the assessment law, or have such laws as the state can enforce. I thank you for your attention.

DOES KNOWLEDGE PAY?

BY W. D. HOARD, FT. ATKINSON, WIS.

Mr. President: Does knowledge pay? I judge from the description here to-night of some big property owners, that the only knowledge that does pay is a knowledge of how not to pay.

Pardon me for a few words expressive of my deep conviction upon the question just before us. I do not think any

man in Wisconsin has had a deeper love of agriculture than your humble servant for a great many years; I do not allow any man to go ahead of me in my ardent desire for the upholding of the farmer, for the making of him a man big enough to fill his place, but I am heartily tired and sick of the kind of false sentiment that I hear uttered every day. I am told for instance that the legislature ought to contain more farmers, and then I ask the question, in God's name, hadn't it ought to contain more citizens? My friends, if there is to-day any decadence of the old-fashioned spirit of American patriotism, American sense, it is because a class interest and a class idea has seized hold of these people to the extent that it has. Sound citizenship is the basis of American liberty, and no man has a right to ask of his fellowmen the sufferages that shall place him in positions of power and trust, except it be upon the basis of citizenship. What has a man's business to do with that citizenship? I know plenty of men who possess riches that might be fabulously stated, whose citizenship is as poverty stricken as was the rich man in hell, and I know other men whose citizenship is a grand citizenship in their own hearts and yet are despised of all mankind. Isn't it about time that we came to the center of this question and ask ourselves as American citizens, what is citizenship? What does it mean? The basis of citizenship is intelligence. Now, does knowledge pay? is a german question to the American people as well as to the American individual. Does knowledge pay? Does it pay to be constantly truckling to a spirit of dishonesty, and where is American society drifting to to-day? Who knows but before another year has rolled by, the lurid light of internal dissention shall light up the horizon of American government? Who knows but socialism and anarchism shall rise with its horrid front? Who knows what is wrapped to-day in the future, and if it comes how will it be met but by the old-fashioned spirit of American honesty and citizenship. I tell you, that in the mad haste for getting money, the prostitu-

tion of public character has grown to that extent that the name of the legislature has grown as a stench in the nostrils of the people, they flaunt it in our faces, and are not afraid to have us know that they are bought with a railroad pass; and you have not knowledge enough to stand up squarely and do what you believe is right. When men will do anything in God's heaven, keep anything but their word, hold anything but their tongues, and lose nothing so patiently as their character, it is pretty near time that men of less knowledge whether they are blacksmith or farmer, come to the front upon the great question of American citizenship, and on this question I feel a very great interest. I have not raised voice or lifted pen on this matter much, but I say to you, my friends, that you men who have a future to think for, and to study for, and children to leave it to, must pretty soon begin to look at the insidious drift and tendency of things, of this your present day.

What Constitutes Honesty.

When you can find adulteration of food, adulteration of all that which constitutes character; when you can find men piling up substance, and find the young men to day seeking Chicago, and other cities, in the vain dream that money, filthy money, shall bring them distinction among their fellows, and you will find lowly virtue, and integrity, and sincerity smothered up by parvenu ambition, the question is, does it pay? It is pretty near time that the honest heart of every man and woman in this country arose and cast an effort on the side of virtue, intelligence and integrity. I do not believe any man is honest because of his business. I ceased long ago to believe that because a man either swung a hammar or swung a pen, or swung his tongue, that he was on that account, honest. It lies back of that. It lies in the training in the family; it lies in the example the father gives to the son; it lies in the instilled instruction of the mother to the daughter; it lies in a sense of what is peculiarly right, and honest, and true.

Now, then, when we approach the question from a personal standpoint, as individuals and as farmers, does knowledge pay? I will answer it by asking you, does it pay to be a confounded fool? Of course it doesn't. Does it pay to be a fool if you are not confounded? Of all the fools in the world is that fool that is not confounded with his folly; who rolls it like a sweet morsel under his tongue; who is proud of it, and who makes a religion of it and worships it.

I believe in a man walking humbly before the Lord when it comes to an appreciation of his own intelligence, or his own virtue; but I do believe, my friends, that the time has come when we, as farmers, when we, who have an interest to-day in the agricultural matters of our country, must begin to ask the question, does knowledge pay?

Farmers Should Think More.

As I survey the interests of agriculture in Wisconsin to-day, the soil is all right: the cattle on a thousand hills are here and all right. If they are not right, they can easily be made right. The horses are the same; the means of marketing are easy to almost every farmer in the state. Everything is right, and right for an abundant reward to intelligent effort, except one thing, and that is the farmer himself. When I take up the statistics that indicate his intelligence, and I am not speaking of individuals, but of the farmer in general, when I take up the statistics, and I find that the circulation of all the agricultural papers of the United States is so many, and the number of farmers in the United States are so many, and divide one by the other, and it amounts to one agricultural paper to fifteen farmers, I make up my mind that before that paper is read you cannot see half the print which was in it. What is the matter with the farmers of Wisconsin? Is it mental laziness? that is it. It is not hand laziness. There is not a set of men in the United States that go to work with the hands with more energy, but they are mentally lazy, lazy in the upper story. They do not like to think, and I don't blame them, as I know of, because it is hard work to think.

I had a little boy once that I was about to correct for a certain misdemeanor, when he suddenly arrested my steps, and the progress of the forth-coming punishment by saying: "Papa, I wish to think, let me go into a room a little while and think." I says, "Think? what do you want to think about?" He says, "I heard you say that everybody ought to think, and now it seems to me I would like to think." Now, that boy represented his father very largely; all my life have I been unwilling to think, until punishment for not thinking, smote me in the face, and then I wanted to go somewhere to lean up against something and think.

Intelligence Pays.

I want to call your attention to just a few statistics drawn from the state census of 1885, I want to show you just what difference intelligence makes in the fortunes of two sets of people in my own county. The town of Koshkonong, the town I reside in, in 1885 made 124,000 pounds of butter. The farmers of that town have been educated and worked upon and have worked upon themselves, until they have come to be thinkers and reasoners and students, and readers of dairy literature and studied the problems upon the farm. They sold their butter in 1885 for 21 8-10 cts. a pound on the average. Only 12 miles distant is the town of Watertown; a better soil, a more favorably located town than ours. The farmers of that town have not spent \$50 in ten years for information on the dairy question. They made 83,000 pounds of butter and sold it at the average price of 12 8 10 cts. a pound. They lost on the butter they made, \$7,520, by not getting the same price for it that the other farmers did, that is the tax they voluntarily put upon themselves, and they paid it because they would not pay \$50 for good sense and information. It amounted to \$3.21 to every man, woman and child in the town. Now what kind of farmers are those men? Good men, fairly intelligent on almost every question, yet though an angel from heaven had come down and put a charge of dynamite under every man there, you could

not blow them into a condition of thinking. Now, when I have seen men throwing away money year after year I feel that it is time somebody stood up and placed this momentous question squarely before them.

But, says one man to me, when we were talking about the census of 1885, and this story it tells us, "Don't you suppose it would have had a very different effect upon the price of butter in Wisconsin if the 38,000,000 pounds of butter that were made in 1885 had all been as good as the best?" Not half so much difference as it made on the consumption of butter because so much of it was poor. Why, any man knows that a pound of poor butter discourages him more than to pay a high price for two pounds.

Now, is this not an argument, my friend, for the necessity for a greater mental activity, greater study on the part of the farmer as to the money he is losing because he refuses to be intelligent. Does knowledge pay? I fail to find a single man to-day getting a good price for his butter without that man is intelligent. I fail to find a man to-day who is intelligent, that doesn't make money producing butter, I mean intelligent on the butter question.

But, says one man to me the other day, "We have no market in Brown county." Well you ought not to have, Brown county is not a butter market, sell your butter in a butter market. Is there anything to hinder a farmer in Brown county to-day being intelligent and posted well enough to make nice butter, and put it up in decent packages and send it to Chicago, is there any law against that, any law against sending it to New York or Buffalo or Philadelphia? There are hundreds of farmers in Jefferson county who are doing it, and O. C. Gregg does it from the western side of Minnesota. He is not complaining for the lack of market. Now, intelligence, not only teaches a man how to make good butter but how to sell it. Now, how is he going to get that intelligence, how shall he make knowledge pay? I am only speaking of it in the butter line. It pays in the line of understanding the cow as a dairy ma-

chine, understanding the horse, understanding sheep, understanding your soils, understanding the rotation of crops, in other words, understanding the business we are doing.

I have not given you the lowest figures on the statistics that I have brought forward. One town sold their butter for only 10 cts. and a fraction. Now, these are stubborn facts, and if I could only get hold of the agricultural mind of Wisconsin and make it see the value of right knowledge as I see it, I would not be afraid to take the job of making every farmer in Wisconsin \$1,000 richer in another year. We need money, we must look at the question from a money standpoint; this view of it may lack sentiment, but I tell you sentiment don't flourish very well in a poverty stricken home. We need this money because our children are clamoring for it. The expenses of our civilization to-day are greater than they were thirty years ago when I came into Wisconsin, you could pass in society for one-half the money you do to-day; the land was worth more than one-third less than what it is to-day, every single expense of our civilization, our schools, our churches, our courts, our roads, our bridges, all the expenses of our civilization have gone up four-fold what they were thirty years ago, and we need more money, we must have it. We cannot go on with our farms in the way we have done. All this is simply an answer to the question. Does knowledge pay?

At the conclusion of Mr. Hoard's paper the Institute adjourned.

The morning session, March 30, 1887, convened at the usual hour, with Supt. Morrison presiding.

BREEDING AND CARE OF CATTLE.

BY MR. GEORGE HARDING, WAUKESHA, WIS.

Mr. President, Ladies and Gentlemen:—I am particularly interested in one class of cattle but I do not want to speak particularly of that class, I want to speak of the management of cattle in general from a practical standpoint. As I believe that there is room enough for all the different breeds—I will except one breed, and that is the scrub breed, I do not think that we have any room for that breed, and I want to be understood that I do not mean grade cattle, I mean scrubs; I think grade cattle, if properly graded are one of the best class of cattle for the average farmer to own, when we take the cost into consideration.

I think that where a man's surroundings are all right the dairy is a very profitable industry, but there are hundreds of farmers in the state of Wisconsin, that are not situated so that they can take advantage of that line.

I think that in making up his mind what business to pursue, a farmer should study his situation, his surroundings, locality and opportunities, and also, to what business he is adapted himself. There are some of us unfortunately that never find out what we are adapted for. To such I would suggest that when we start out that we had better find out what our wives are adapted for, so that we can engage in a pursuit where they will be able to support us if we cannot manage it ourselves.

Experience with Shorthorns.

After studying the question somewhat carefully, when I first went into the business, seventeen years ago, I adopted the breed of cattle, which I have since been interested in,

Shorthorns. I will speak of them first in regard to their early maturity. Ten years ago, it was no uncommon thing for feeders all through the country to be turning off their cattle at four years old. We have learned that there is very little money in cattle kept for beef purposes after they are two years old, that is, the increase is so slow after that time, that there is not much money in feeding them. I consider Shorthorns as one of the earliest maturing breeds, and also the grades. I consider a grade from a pure Shorthorn stock one of the most profitable breeds of cattle that the farmer can handle. I have sold good animals to farmers that have made the comparison to satisfy themselves.

Last winter, a gentleman to whom I had sold an animal, asked me to come over and look at the increase. He took me into the barn and showed me sixteen steers that would be two years old in the spring, and then he gave me the history of steers that he had been feeding seven or eight years previous to that from the same class of cows, and he told me that he would get one cent more a pound for those steers than for others of the same age, and they average 250 pounds more. Now, this is what a plain farmer was doing with the difference in the blood through the sire. We all know that cattle that have been bred for beef purposes will take on flesh easier than animals that are not so bred. Our local butchers tell me that they can distinguish when they come to kill and cut up an animal, they can tell whether or no it has the blood in the leading beef breeds through the sire, by the quality of the meat. I have visited Kentucky several times to purchase animals and I must say that the grade steers that I saw in Kentucky interested me more than the thoroughbred horses that I saw there. It was a grand sight to see them in the fields and along by the railroads in such great numbers.

THE PRINCIPLES OF BREEDING.

BY A. A. ARNOLD, GALESVILLE.

Mr. Chairman, Ladies and Gentlemen:—I want to emphasize what Mr. Harding has said about cattle as to their beef qualities. I never had this more firmly impressed upon my mind than at a late visit to the stock yards at Chicago. Going into Mr. Swift's butcher shop, you will find the different kinds of sirloin steak cut up and ready to send out, to be sold to other butchers for retailing, you will find them of different lengths and different depths, the difference in the price ranging from ten to twenty cents per pound in proportion to the quality of the meat, which shows you the difference in the value of a deep-fleshed animal and one that is not; you could also see the difference in marbled beef and that which shows a vast amount of rough, tallow on the inside. Some of that meat is not worth over three or four cents a pound, when, perhaps, it ought to be worth twenty-four or five cents.

There are gentlemen to follow me who have great wisdom on this subject. They are trained in eye and hand and it is necessary, if they are to be successful breeders. Breeding is something of a science, and why? Because we have ascertained principles, fixed known facts upon which to base our business.

Breeds, How Obtained.

Breeds are obtained by getting certain kind of cattle of similar characteristics and breeding them together until you get these characteristics fixed, so that there is a potency of blood whereby they can transmit their qualities to their progeny, and until they get there they are not entitled to be called any breed. When I talk about breed, I am talking about cattle where they have their pre-potency of blood.

Qualities are not made by breeding, but are made permanent and hereditary, qualities can only be obtained by long and continued breeding animals of the same characteristics, but these qualities are not made by feeding or by handling, they must be constitutional with the animal. I believe it is an accepted fact that no quality in animals has ever been obtained by handling. For instance, you want an animal with good crops. You couple together two animals of this character and breed until you get good crops on them. But the original characteristics must be in the breeds or otherwise it cannot be got by handling. Handling depends upon associations, when you take away those associations, or surroundings, the animal relaxes into its normal condition; the effect being in nature to go back to the ill-formed animal so that the only way we can retain a well-formed animal is by continued breeding and good attention.

Keep and handling effect personal quality and only effects the person itself. As quick as you withdraw the good handling and keep, the animal goes back into its former condition, and, therefore, you sometimes see over-bred animals that in this are not as good as some grades, or even native animals, but blood determines everything. It is better to have an ordinary animal with good blood than a poor animal with bad blood. I believe in blood, we can see the effect of good blood in all kinds of animal creation, blood will tell, so that no keep, no handling, no personal characteristics, can compensate for poor blood, if you want to have these characteristics transmitted to the offspring.

Instinct or brute reason is developed by the animal caring for itself, therefore, the animal in a wild condition, uncared for, has stronger instincts than an animal that is well handled, so that if a man is a scrub farmer he had better have scrub stock, because they can take care of themselves, but on the otherhand, they will not respond to liberal treatment and good handling like well-bred animals.

Qualities and physical proportion more generally follow

the sire, while mental qualities or instincts more usually follow the dam. The instincts and mental qualities, the ability to take care of herself usually predominates in the female, whereas the physical qualities predominate in the sire. You see it in humanity, you never see smart boys if they have a fool of a mother, nor very strong ones if the father is delicate.

Pure blood animals, then, transmit their qualities through this potency of purity of blood, and this is something that farmers should recollect and not go and purchase a half blood because he is a good looking animal, but no matter what breed he chooses, he should get a full blood every time. The weak blood yields to the strong, so that I would not encourage breeding pure bred animals together because there would be war between the breeds, but where there is a cross breeding, where you use a pure bred sire, you almost always transmit the qualities of the sire.

Breed From Mature Animals.

I have always found out this. If I have any pride in farming it is in the taking care of stock and handling it and have it to suit me, and I have made up my mind in all kinds of animal husbandry, that it is the worst kind of folly to undertake to breed from animals not matured. It is damaging to the offspring, damaging to their constitution, and does not give the dam or the sire a proper opportunity for personal development.

The food of animals should be suitable to their age and condition. If you want to raise your animal for the dairy they should be fed with that in view, but if you want to fatten them you want to use nitrogenous food. The condition of the animal, the keep, the surroundings, the room, heat and cold, all those effects the condition of the animal.

The muscular development depends on the keep, the kind of food you feed, the manner of handling and the amount of exercise. You never can expect a well developed muscular animal and keep them in the stable. Hair is something

that should be considered. A good thick coat of hair is a fine thing to have on a beef animal. Lack of exercise and overfeed in my opinion is bad treatment for any kind of stock, which I think that all farmers will bear me out in it. I want to say a word as to cost of feed; cost of feed does not depend upon the size of the animal, it depends upon the temperament of the animal. If it was true that the size determined the amount of feed, why we gentlemen that have got large wives, made a big mistake, because our wives would eat their heads off; it would be poor policy for a man to marry a wife that weighed over sixty or seventy pounds. Just so in other things, we would grow down, we would have little chickens, little horses, little cows, everything in proportion. It is all sheer nonsense, I don't care what the Germans say, I have tried this thing, I have a Jersey cow in my stable that doesn't weigh over seven hundred pounds that eats just as much as a large cow weighing fourteen hundred pounds that stands next to her.

Give your cattle pure air, clean water and treat them kindly.

THE FAMILY COW.

BY J. J. CLAPP, RACINE, WIS.

There is at the present day, in our densely populated cities, a great demand for a family cow.

The swill milk venders are sowing the seeds of disease among the little ones, who are compelled to obtain their nourishment from such sources. Hence the demand! Our wealthy men will pay well for an animal possessing the requisite needful.

Intelligent breeders, in attempting to meet this want, must see that the cow possesses beauty of form and color — is quiet in disposition — a good feeder — easy milker, having

good sized teats, and, above all, furnishing a liberal supply of milk, rich in quality and color, furnishing cream for family use — a necessity now that oat-meal diet has become so general, and during the fruit season it is indispensable. And more than all, furnishing milk that is healthful for the little ones, upon which diet they are more safely carried through the summer season when sickness is so prevalent among children. The need of such a cow is an absolute necessity; and what parent of means will not pay liberally for such a cow.

The demand for such a cow is yearly increasing. It is also desirable to have her a fresh milker in the fall.

Families are then returning from their summer vacations, producing a demand greatest at this season. Let any one start out to find such a cow in the fall. When you find her the owner will say, "I cannot sell her; she is just what I need."

How to Raise a Family Cow.

Now comes the question how to raise such a cow.

I know of but two breeds of cattle that meet my idea of a family cow, and they are the Jerseys and Guernseys.

Experience has taught me that grades of either of these breeds will fill the bill if properly selected. Procure a thorough bred sire, and commence to breed for the grades. You will find very soon that you have a cow, like your neighbor you will not part with. "She is too good," you say, "worth too much to me." Here let me say you cannot "keep your cake and eat it."

Now let us reason together — your cow is never ready to sell to a city customer until she had at least three calves — oftener you have from four to six from the same cow before disposing of her to your city customer.

Never sell an inferior, vicious or coarse animal to a gentleman with plenty of money. Always be sure to give him a cow that will meet the demand, and he will abundantly reward you, and be gratified.

Now, I said, you can have from three to six calves. Experience has taught me that nature divides the sex about equally, and you will have from two to three heifer calves to rear out of your choice cow, which you were so reluctant to part with, and if you are wise in the selection of your sire, you will find an improvement in her offspring. I say a Jersey or a Guernsey are the only breeds to accomplish this object that I am familiar with, and of the two, my preference is for the Guernseys, I find the description expressed in an article I now quote from, by the venerable Shorthorn breeder and writer, L. F. Allen, on

Experience with Guernseys.

As a rule my Guernseys are uniformly good milkers. Their udders are square, well set "fore and aft," with well sized teats, easy to grasp by the hand, and giving their milk freely. They are remarkably kind and gentle in temper, loving, even in disposition, and frequently, as I drive with horse and buggy into the pastures in summer, they surround me—the young heifers—almost climbing into the wagon, or on getting out to fondle them, licking my hand or grasping my coat tails, in their affectionate fondness.

"Not one of them has proved a kicker in milking, nor has shown a single vice in management, being always treated with kindness. No milk stool or switch flogging, even on a fractious cow of any breed, has been permitted in my herds, and with my Guernseys a deserving instance of the kind has not been developed.

They yield their milk continuously from dropping their calves until nearly the time of the next coming calf, and in some instances would continue without cessation, having to force a drying off for four or six weeks which always should be done for a rest to both the cow and the good condition of her offspring. Their percentage of cream to milk is quite equal to that of the Jersey, as I have compared them as in the quality of their butter. They are quite to my satisfaction as butter-makers."

Be sure and use a thoroughbred sire. Such an one is not too good for any farmer with even a very small herd. They can be procured reasonably, and if you cannot afford one alone, join in with your neighbors, and have one in the neighborhood. Rear all your heifer calves out of good cows, and you will find but a small proportion of them that you will be obliged to consign to the block, and they will prove to you that they make the finest of beef, juicy and tender.

Treatment of Calves.

Now a few words about the treatment of calves. I will give you my method. Allow them to draw their nourishment from the dam for two or three days, until the udder of the dam becomes soft and healthy, more for the good of the dam than the calf. Then milk the dam, reduce the milk with warm water about one-fourth or one-third and teach the calf to drink.

The younger the calf the more easily he can be taught to drink.

Feed the calf, when young, three times a day, using warm skim milk at the noon hour. After two or three weeks you can safely omit the noon feeding, and feed her on skim milk entirely, by gradually using the skim milk with the natural milk of the mother, the calf will not feel any sudden change. In feeding skim milk never feed it cold, but warm it by placing the can or pail in a vessel of water on the stove to prevent any danger of scalding the milk, as this will produce costiveness in the calf, and right here you have more use for a thermometer than any other place I know of on the farm. Never trust to your finger. Heat your milk from 92 to 100°, about the natural temperature of the animal, and feed to the calf.

Always have a nice bunch of hay before the calf, to induce her to eat, thereby expanding the stomach. A small handful of crushed oats is excellent daily, and produces a healthy growth if regularly fed. Keep their stalls clean and let them have exercise in the open air daily, when the

weather will permit. It does the calf good, and strengthens her muscles, and helps to keep the bowels in a healthy condition. Never let your calves out to grass, while feeding milk. Access to salt is advisable.

You should, by gentle treatment, have your calves so they will come to you to be petted. They should be tied up often enough to become accustomed to the halter. They learn readily, and will not forget it.

It is an absolute necessity to have them "halter broken," if you expect to sell them for family cows. My cows are accustomed to the halter, and can be led as well as horses.

BREEDING AND CARE OF CATTLE.

BY J. C. KISER, OREGON.

I came to Wisconsin in the year of 1854, bought a farm near Oregon, Dane county, where I now live. Went to raising wheat, corn and oats and kept a little stock of cattle and hogs; raised wheat for some time when we commenced to have chinch bugs. Well, I kept on trying to raise wheat for several years and found that I was raising chinch bugs enough to eat up the wheat and other grain, and would have to do something else, and commenced to seed my land to grass, clover, timothy and to improve my stock, which I did by buying a Shorthorn bull and using him on the cattle I had and made a great improvement. and commenced breeding Poland China hogs, and still keep them. Now, I do not intend to give you a great history of Shorthorns, but will give you my experience:

Experience with Shorthorns.

For the past sixteen years I have been breeding Shorthorns, and I find that cattle want good care the first year, for if you loose the first year you can never get it back again. I would let a calf suck about six months, and as soon as he begins to eat, I would feed him whole oats with a little shelled corn and wheat bran. Feed this the first year as they always grind their feed well for that length of time. After that you can feed corn and oats ground together, about half-and-half and plenty of wheat bran. Feed liberally, as it will pay to feed well so as to make your steers weigh about 1,500 at about thirty months of age, then they will command the highest market price. Always use a thoroughbred bull and raise grades, as they mature as well at three years old as a native or scrub will at four. Then you will save the keeping of one year and you will have from a quarter to a third more beef, and can get from a quarter to a third more money for them in the market, and you will never need to hunt a buyer for them. Therefore, I claim that a man cannot afford to raise a native or scrub steer. My experience has been more with Shorthorns than any other breed of cattle, and I believe them to be one of the best breeds of cattle for the general farmer for what cattle are intended, beef and milk combined, as they take on flesh faster and have the most weight, where the beef is the most valuable, on the backbone and hind-quarters. If you have a cow that stops breeding or gets old, you can make her weigh about fourteen hundred pounds and get about the price steers bring, for her. I have had several that weighed fifteen to eighteen hundred pounds and have got as high as six cents per pound at home, and never less than four cents.

A man cannot afford to raise scrubs in this country and should always breed to a good thoroughbred bull of some kind, as they will make a great improvement on the native or scrub. I will tell how we manage our cattle in the win-

ter. We have stables or sheds to put them in nights, and feed hay and what grain we feed while in the stable or sheds, and then let them out in the yard where they can get water when they want a drink; have a windmill and a large tank where they can get water, and about 9 o'clock we give them shock-corn and leave them out until it is time to put them up for the night. I believe in letting stock run out as much as possible when the weather is not too bad and stormy. They are better off, much healthier than when indoors.

Management of Bulls.

Now I will say how we manage a bull. We let him suck until about six months old and feed him whole oats with a little shelled corn and plenty of wheat bran the first year, and then can feed corn and oats ground together, equal parts with one-third wheat bran; feed him liberally and let him have plenty of out-door exercise.

A bull wants to be fed well until he gets his growth, which will be at about four years old, and then he does not require as much to keep him in good order as while he is growing. When about one year old put a ring in his nose so as to have control of him instead of him having control of you. Always use a composition ring that will keep bright and will not rust or corrode and make the bull's nose sore. Use a staff to handle him with, made with a spring so that you can snap it in the ring handy and quick. Always treat him kind and gentle and you will have no trouble with him. We let the young bulls we raise to sell run out all the time and have a shed for them to lie in nights where we feed them their hay. We have a trough out doors where we feed them their grain, oats, corn and bran, morning and evening. We feed them shock-corn at noon in the winter season. We think it much better for the bulls and know they are much better for the men who buy them to use, and save a good deal of work and trouble in taking care of them. We keep them away from all other stock. We have

a grass lot of about six acres for them to run in winter and summer. Now in conclusion I would say to every farmer, never allow yourself to be over stocked with any kind of stock, I care not what kind, whether horses, cattle, hogs or sheep, he would better be a little short of stock than short of feed. Keep the best you can afford of every kind, and feed well and you will find it will pay.

JERSEYS.

BY GEORGE A. AUSTIN, NEILLSVILLE, WIS.

Mr. Chairman, Ladies and Gentlemen:—In the papers that have been read it seems to me one thing of importance has been lost sight of, and that is the monied value there is in hereditary, the monied value there is to the farmer in breeding for a specific purpose. I know that it has cost the people of the state of Wisconsin hundreds of thousands of dollars, yea, millions of dollars, that idea of a general purpose cow, the idea that you can combine beef and butter in the same animal. Now, in the few words I have to say I want to call your attention to the little Jersey cow, the cow that has been bred for over two hundred years for one specific purpose, and that purpose to produce butter to supply the London market. A little animal weighing from seven to nine hundred pounds has shown herself able to produce more butter than any of her compeers of a larger type, and an animal that will give you a large and liberal return for the money invested in her, that will give you a bigger return for the food you give her than any other animal you can feed it to, for this specific purpose. She is not a beef animal, if you are in the beef business you don't want any

Jerseys or Guernseys, you don't want any of the milking strains, and that includes the Holstein; the Holstein cows, they claim have been bred for one thousand years for a specific purpose, and yet the reputation of the Holstein in this country has been nearly ruined by breeding for general purposes. But thank God, the little Jersey is so small that she has escaped as a beef animal, and she stands pre-eminent to day as the dairy cow of the world, and why? Because for two hundred years she has been bred for that purpose alone.

SOME NOTED JERSEY COWS.

BY T. L. HACKER, COTTAGE GROVE.

The Jersey breed of dairy cattle has been built up through centuries of selection, and has become such a grand type, that it cannot be improved by crossing with any other race; but it improves every dairy breed upon which it is crossed, so that the best dairy grades, cross or full bred, may be produced by the use of Jersey sires, whatever the breeding of the dam.

About 1840, Henry Clay and R. A. Alexander, of Kentucky imported a herd of cattle which had all the characteristics of pure Jerseys. They have been bred pure but no record of pedigrees kept.

The first importation of Jerseys recorded in the Herd Register, was made in 1850, at the suggestion of Daniel Buck, Jr., of Hartford, Conn. This was put in the care of John A. Taintor, also of Hartford, who was then importing Merino sheep. The bull Splendens 16, was among this lot the first bull imported from the Island of Jersey.

From the superior excellence of the descendants of this importation, it appears that no better agent could have been found than Mr. Taintor, who was a good judge of cattle and

a cool and judicious business man. It is doubtful if there has ever been a herd imported of more uniform excellence.

Mr. Taintor saw Splendid 2, while on the island, and upon his return reported the bull to be a perfect animal. He was noted for his exceedingly rich, yellow skin, which gleamed beautifully through white patches, he being "broken colored."

The following year (1851), Thos. Motley, of Boston, Mass., imported the noted bull Colonel 76, reputed to be from the best cow on the island; also the cows, Flora 113, and Countess 114; the former, in February, 1853, at 3 years of age, eight months from second calf, and two and a half months before third calf, with only ordinary feed, made 14½ lbs. of butter in seven days; after the third calf, she made 511 lbs. 2 oz. in fifty weeks.

The latter (Countess 114), made 16 lbs. on grass only; but is not known to have been tested for a longer period.

It may be well to state, that all imported Jerseys up to this time, were broken colors, principally fawn and white.

The inbreeding of the three above named together with the imported cows, Twilight and Duchess and the bull Czar, culminated in that wonderful cow,



Jersey Belle of Scituate,

for whose picture we are indebted to Schreiber & Sons, Philadelphia. She has a record of 705 pounds of butter in a year, and 25 lbs. 3 oz. in a week; the largest yield ever

known, for kind and quality of feed having received, not more than four quarts of grain per day.

This cow is in almost every point the ideal of perfection, her breeding was according to one of the best formulas for inbreeding; the product of sire to daughter, her sire being from brother and sister.

It may not be improper, parenthetically, to relate that this cow, when a yearling, was offered to a neighbor for \$30. and it was indignantly declined, on account of her broken color, later an offer of \$20,000 was made to her owner, and refused.

Alphea 171, the foundation of the famous "Alphea" family made a pound of butter from six quarts of milk, when yielding at the rate of a hundred and eighty quarts of milk per week on grass only; consequently a full week's test should have yielded thirty pounds of butter. The accounts of her partial tests have been examined with great care, and it is believed, by our best authorities, that the above estimate of her butter capacity is correct.

Her daughter Europa 176, by her own brother, has a record of 15 lbs. 8½ ozs., and Europa in turn was the dam of

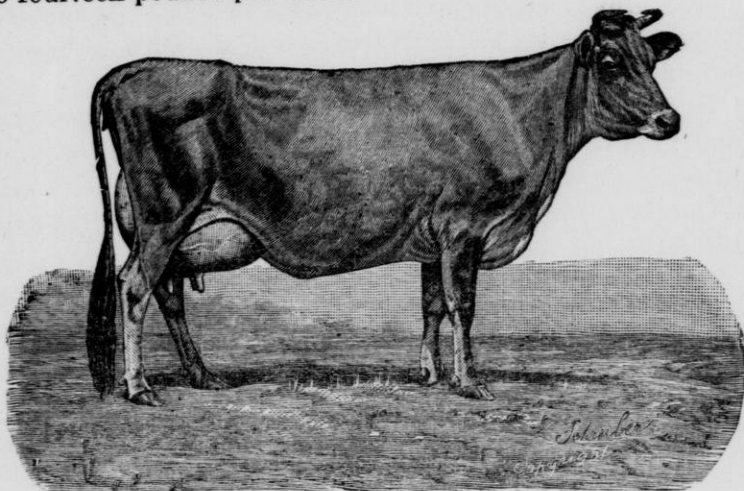


Eurotas,

that tested for her owner A. B. Darling, of N. Y. City, 778 lbs. 1 oz. of butter, and gave birth to a healthy calf in a

year, and this is thought less by a hundred pounds, than she gave the preceding year, as indicated by periodical tests.

As a proof of the prepotency of Alpeha, we instance her son Mercury, who sired twenty cows ranging from twenty to fourteen pounds per week.



Mary Anne of St. Lambert.

One of the most remarkable cows now living, is Mary Anne of St. Lambert, owned by Mr. Valancy E. Fuller of Hamilton, Ontario, Canada. This cow, in breeding on sires side, is in some respects similar to that of Eurotas, she being a granddaughter of Rioter 746, E. H. B., and Stoke Pogis, the grandsire of Mary Anne, being a grandson of Rioter.

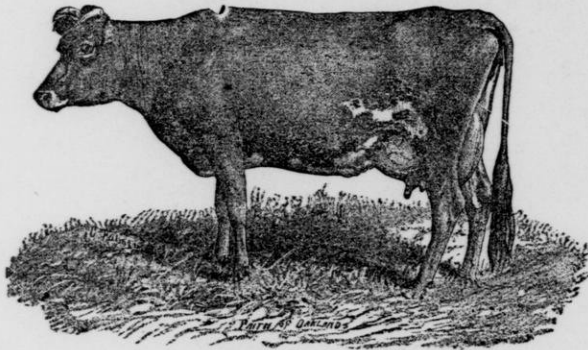
She produced as a five year old, 36 lbs. 12 $\frac{1}{4}$ oz. of butter in one week and 867 lbs. 14 $\frac{3}{4}$ oz. in one year. Her general appearance indicates remarkable strength of constitution, and her wonderful tests fully confirm the evidence of great capacity given by her outward conformation, while her ability to digest and assimilate food is phenomenal and her power of secretion of cream is marvelous; she is large for a Jersey, weighing 1050 lbs. at six years, very long in the barrel and very deep in chest and shoulders.

Stoke Pogis 3d, the sire of this cow, has twenty-seven daughters, with an average butter record of twenty lbs. per week.

Princess 2d., 8046, was born on the Island, February 22, 1877, and was a granddaughter of the noted Island bull Welcome 166. She was placed in the charge of a committee of the American Jersey Cattle Club, for testing, and made in seven days, the unparalleled record of 46 lbs. 12½ oz. of butter.

Oxford Kate 13646, also a descendant of Welcome, made under the supervision of a similar committee, 39 lbs. 12 oz. in seven days.

Ona, a great granddaughter of Welcome, made 22 lbs. 10½ oz. in seven days.



Faith of Oaklands,

A granddaughter of Welcome, is one of the most famous cows in Canada. Her owner Mr. Valancey E. Fuller, of Hamilton, Ont., says: "She is unconquerable in the show ring" and has defeated all other breeds for both butter and cheese, yielding annually over 9,000 lbs of milk and 17 lbs. 4 oz. of butter per week, with only ordinary feed.

Masena 25732, tracing twice to the ancestors of Jersey Belle of Scituate and to Sam Weller, made 892 lbs. and 2 oz. in one year.

Landseer's Fancy was born November 23, 1873, and is light fawn and white. She is now, for amount of butter

and richness of milk, the champion cow of the world, having produced the largest amount of butter, for tests of thirty and sixty days and one year — of respectively 111 lbs. 15½ oz., 206 lbs. 9 oz., and 936 lbs. 14¾ oz.; toward the latter part of her year's test she made a pound of butter from three pints of milk, the test for richness of milk was public. Her owner says he is satisfied there is more in constant care and watchfulness than in forcing, and the feed should be for butter only — a cow is not made rich in a week or month, and possibly not the richest even in a year.

She traces to Splendid 2, whose many descendants show how wonderfully rich he was, and how he has been able to perpetuate this quality.

These are only a few of the noted Jersey cows, but our space forbids a more extended notice. We expect in the near future to hear of even more wonderful tests, for this department of dairying or breeding is only in its infancy. One must read, study and watch the cows; learn how to feed for the best and largest results. It will pay in largely increased profits as well as pleasure.

Discussion.

ISAAC CLARK — *Mr. Chairman, Ladies and Gentlemen:* — There is a point which I have taken considerable interest in in connection with this subject of the breeding and care of cattle, and which I have never yet seen explained satisfactorily in any such meeting as this. For my own convenience I desire to know where these cattle originated that we have in this country. I want to know where the Herfords originated. How many men are there in this audience who can tell where they came from?

HIRAM SMITH — We don't care where they came from.

MR. CLARK — Where do the Polled Angus come from?

MR. SMITH — Don't care.

MR. CLARK — I care. Perhaps you don't. Where does the little Jersey originate?

MR. SMITH — Same answer.

MR. CLARK — I guess you are a scrub man.

ANSWER — No.

MR. CLARK — I had prepared a paper on that subject, but it is too long and I will not read it. My impressions are that we as farmers cannot afford to raise any scrub stock for any purpose. What we call scrub is the native stock of the country, starving under a straw stack, leaning up against railroad fences, and, perhaps, wire fences, and by combining together, three or four farmers, there is no reason why you cannot have a good animal for breeding in your dairy. We have worked at it up in our part of the country until we have very much improved our stock. A grade animal may be equal in individual merit with a pure bred animal that has been bred for one particular purpose for years and years, maybe equal in beauty and size, but you cannot afford to take the chances on isolated individuals. We cannot afford to feed unless we have the best improved stock. If a man desires to breed for beef wholly, he has a wide range of choice. There are the Polled Angus which originated in Northern Scotland. There is the Galloway, the only difference between them being that the Galloway has long, thick curly hair. There is another breed of cattle, not many of them in this country, that I saw in Chicago in the fat stock show, called the little Brittany cow, that cow had a record of making four pounds of butter a day, which beats anything we have a record of. She was small in stature, only about thirty-six to forty inches high, symmetrical in form and a fine shaped animal.

MR. REWEY — The gentleman who sits behind me here, Mr. Hiram Smith, answered Mr. Clark that he didn't care where the Jersey came from. When Mr. Clark asked if he was a scrub man; I answered no! Now, Mr. Smith is a man that knows all about Jerseys, he is a man whose shoe latchet I am unworthy to unloose. I wish Mr. Smith, of Sheboygan, would give us his reason why he does not care where the Jersey came from.

MR. HIRAM SMITH — *Mr. Chairman, Ladies and Gentlemen:* While my friend, Mr. Clark was rather (indicating) that he wanted to give the original history of the different breeds of cattle, I said in the honesty of my heart, I don't care where they came from, where they originate. We heard last night that the Galloways probably originated five hundred years before the birth of Christ. What benefit is that to us? We are offered oranges in the market, do we buy them because we know where the tree originated? Will we suck a dry pumice from Florida, and refuse a good juicy, sweet orange from California or New Orleans? What I want and what you want is present merit. A man don't pay thirty thousand dollars for a colt because his great grandfather won a great race, it is his present merit and not the record of the ancestor that we are after, therefore I do not care anything about where these breeds originated, I have not the slightest interest in it. What I want to know at this time, is, what breed is best for my purpose.

I heartily assent to almost all that was said by Mr. Arnold and those advocating Durhams. They are good for beef, I know of no better, but the question comes right home to Wisconsin farmers, can we pay six per cent. upon our investment and raise beef in Wisconsin? I have yet to find a man that can make three per cent. upon his entire investment in raising beef in Wisconsin, and why? Because he has competitors that have natural advantages which he cannot compete with. Now, it is for us, living in Wisconsin, who can't get away, and don't want to get away, to make up our minds what is best for us under our present circumstances, and therefore we are all examining for present merit. Mr. Arnold made one rather wild statement. He has got no experiment behind him to show that a fifteen hundred pound Shorthorn, eats no more than a seven or eight hundred pound Jersey, he has no experiment and no evidence, while any man that feeds Jerseys when not giving milk, knows that the food of support is in proportion to the weight of the animal. This has been fully demon-

strated by the German experiments and they have reliable experiments to sustain this position in opposition to Mr. Arnold. More than that I think the reason of the thing would indicate that an animal weighing fifteen hundred pounds cannot be supported in muscle, blood and bone on the same feed that an animal of half the weight can.

But after all this is immaterial to Wisconsin men, if we cannot afford to raise beef in Wisconsin at a profit, that question makes no difference. The next question presents itself. What shall we do, and looking the field all over, we know of nothing that pays so well to which Wisconsin is so well adapted naturally, as the dairy business, and in any business I do, I want all the natural advantages I can get to aid me in my enterprise.

In conclusion, I will say that if a good herd of cows is offered to me, and after properly testing them, I find that they are such as I want, I am quite sure that I shall buy them without waiting to look up the history of their ancestors.

FIVE POINTS IN CORN CULTURE.

Fertility.

HON. D. G. CHEEVER, Clinton — In the early history of the state of Wisconsin the fertility of the soil did not have to be taken into consideration. We had but to tickle the soil with the hoe to be rewarded by an abundant harvest, but forty years of grain raising has made the question of grain raising a serious one for us to contemplate. The virgin soil has become exhausted, and without fertility, which is the bed-rock, the corner stone, the foundation of success in farming, we cannot succeed. The question to-day with Wisconsin is how this fertility can be restored, how we can make the

most of our soil. For our wealth and prosperity comes from the soil we till. I consider corn and clover the sheet anchor of the Wisconsin farmer's success, and to raise these in large amounts and great abundance, we must have fertility of soil. How shall we get it? There are several ways, but to my mind the keeping of cattle, horses, sheep and hogs is one of the sources from which we are to obtain fertilizing qualities, which will restore it to its native fertility. Clover is another process, but the two combined are better than either alone. I will illustrate by a little personal experience. Some years ago I purchased a small farm which had been so thoroughly ruined by raising grain for a large number of years that my neighbors laughed at me. I immediately commenced to sow clover on every piece of land that I sowed to small grain and commenced to till and top-dress with manure as fast as I could manufacture the manure from the barnyard, and I have more than doubled the production of the farm in ten or fifteen years. Last season although a dry season, I had eminent success in raising corn on this same farm. I top-dressed in the previous fall with barnyard manure on clover sod. I ploughed in the fall, in the spring I put on a Randall harrow, and pulverized it very smoothly, I put on a smoothing harrow, and made it like a garden bed. In this seed bed I planted corn and cultivated it most persistently until the time of harvest nearly, and then I harvested one hundred bushels of corn to the acre.

What the foundation is for Bartholdi statue of Liberty or the Washington monument or the bridge of St. Louis where the workmen penetrated into the bed of the river to get a good foundation, I consider the fertility of the soil to the farmer of Wisconsin. It is the foundation, the bed rock of his whole success.

Seed Corn.

JOHN GOULD— Not a dozen of us ever thought, perhaps, that the same laws govern the plant that govern the animal life, that of heredity. If we look at a pile of corn which is of

many different kinds apparently to the eye, we sometimes wonder why it should not all be alike, and it suggests the question of breeding corn. There is the same principle that Brother Hoard talks about. Why should we not follow out the same idea? We have now got thoroughbred seed corn, and it is not beyond the reach of any farmer.

Plant a little piece of seed corn by itself, and just as it is going into the tassel, cut out every inferior stalk. Remember, if your ear of corn is fertilized from the stalk and has an ear, it is liable to be a robber or defective ear. If you cut them out you have sound stalks from which to fertilize your ear. Then, cut off the tassel of every other stalk, so there shall be cross fertilization, and now you are on the road to get thoroughbred seed corn; you have got a sound growth, and ought to have a sound, perfect ear. Follow that up year after year, and you have got something you can rely on.

Why does seed corn sometimes rot in the ground? Simply because we have not taken care of our corn. Fire heating is the thing to take care of that corn. Thoroughly dry that corn by fire heating, not by the atmosphere. Husk your corn; pick out the seed corn before the cold weather comes, and put it in a dry room and let it be there until you plant. The vitality of corn is affected by freezing and thawing, and then you hear about seed corn that has lost its vitality, and it rots in the ground. No one ever saw good, mature seed corn, fire heated in the fall, and kept dry during the winter, that ever rotted in the ground when planted.

Last year I took one hundred ears of fire-cured corn that had been in a room where there was a fire all winter, and took one kernel from each of those one hundred ears, put them in a dish of water with a little sand, and put them in a refrigerator of forty-five degrees. It took forty-five days for that corn to sprout, but every kernel sprouted. One field was planted the first of last April, and we had a long spell of bad weather, and a snow storm, and that corn

stood through it all, while my neighbors were having trouble, and they came and gave me two dollars a bushel for ears that I had thrown out.

Now, why should we not thoroughly breed our seed corn, and fire-dry it, and have good seed corn?

Preparation of the Soil.

MR. SAYER—Five minutes to prepare forty acres of ground. In the first place I am going to commence two years ahead, for the reason that I want a good, soft, mellow seed bed for my corn to be planted in. Of course I know the place where I am going to plant it two years ahead. I seed with clover and timothy; the first year I cut the clover, the next year I cut the hay. Now, I take and spread as a top dressing all the manure I can possibly get on this last crop of hay. I wait till fall. I don't allow my cattle to go on there after I cut the hay. Then I bring up my plough. I have got it sharp. I want a good level even sod. I have got something which we call a jointer with the blade like the point of a plough, I put that on in front of the plough and set my horses going. I strike out my land ten rods in width, and I run an even furrow three and-a-half to four and-a-half inches. This jointer cuts a furrow of about four and-a-half inches deep, that turns it very quietly, and as the plough share comes on, it turns your sod over, and you will scarcely see a particle of green grass or anything in your furrow. I would lay the outside of furrow on the inside of the last furrow. Now, that work was done in the fall, say October. I let it quietly rest, I take my ease, I have done what I could do, and I try to serve the Lord during the winter. But God's beneficent laws come in and work for me during that time, in the disorganization of the grass and the roots, and in the accumulation of fertility. I let it rest until the first of May or as soon as I can get to work. I put a pulverizer on it, run it over carefully with a weight on it, turn a second time and go the other way. Now, I have got that piece of land level, I have got the mass of it pul-

verized. I then go over it with a harrow as I did with the pulverizer, and I have it all ready. I take four planks, eight feet wide, and go over that until I have broken up every lump in that field of corn, and now I have got a good seed bed, four and-a-half inches deep for brother Gould's seed.

How to Plant and Cultivate.

DANIEL WILLIAMS — *Mr. President, Ladies and Gentlemen:* We have got the corn field fertilized, good seed furnished us, and the land pulverized, ready for planting, and I have to plant the field in five minutes and cultivate it which is something I never did in my life.

If your field is to be planted with a hand planter, the first important step is to get a straight mark both ways through the field. The next is, that the man that uses the planter shall strike the mark exactly in the center. If the field is to be planted with a machine planter, no marking will be necessary, the machine doing its own work as the work progresses. Where planted by hand, the quantity of seed to be used in each hill is four kernels, more would be injurious to the crop and less would shorten the crop. I am inclined to the opinion that where corn is planted with a horse machine that planting the corn in single kernels and having it rowed only one way in the field, will produce a better crop than planting it in hills, that is, one kernel in every foot. It gives an opportunity to develop a good ear on every stalk which is not the case where four kernels are put in a pile together.

Cultivation, where there is no doubt about the seed, should commence as soon as the corn is planted, at any rate immediately after the first rain, whether the corn has come up or not. Use a small toothed harrow, diagonal teeth are better than round teeth as they will cut anything they may strike. Use the harrow before the corn comes up and also afterwards, when the corn is very short; there is very little danger of destroying any of the plants. After the corn is well established then commence the use of the cultivator

and use it in such a manner that very little dirt will sprinkle against the corn, enough to smother any minute weeds that may be in the hill, and my practice is to cultivate corn, flat culture. I think I get better results one year and another than I do by raising the corn to a hill as is done by many people. Keep the cultivator going at all times, whenever the soil will permit, but do not cultivate when the ground is too wet. You can tell whether it is too wet by feeling of it, dig down as deep as you are going to run the cultivator. Take a piece of the soil in your hand and squeeze it up in your hand, and if your hand is wet after pressing it together it is too wet, it will come to the surface and bake and it will never fertilize after. If the land crumbles when you squeeze it, it will do to work upon, that is the best rule I know of. Sometimes it is impossible to get the start of the weeds but the best way is not to let the weeds appear at all, begin to harrow at once. I believe in shallow cultivation. I plant corn about two inches with a hand planter, even a little less if it is dressed over the top.

Harvesting and Feeding Corn.

PROF. HENRY — *Mr. Chairman, Ladies and Gentlemen:* As to harvesting, I suspect that the coming way is, to silo; everything points to that direction as one of the best, and probably the best way, to harvest our crop, and to attempt to discuss that in five minutes would be folly.

I want to say one word, however, before I go to the subject of feeding. In harvesting the corn crop for the silo, it seems to me, we must not allow the number of tons that we are going to cut to the acre of our fodder, to be the criterion of success. When a man tells us that he has got forty tons of green stuff to the acre, we could well ask him what part of that is water, and nine-tenths of that water we may consider useless. When a man tells us that he has a cow that gives one hundred pounds of milk, we have now got intelligence enough to ask him how much butter and cheese that milk will make; and so with corn. How

much nutriment is there in it, not how many tons. So, in curing our corn, let us take it at such time that there is the minimum amount of water and the maximum amount of nutriment, and I think that cannot be very far from the time that corn is ordinarily cut and shocked by our successful farmers. Three out of four wait too long. When Dent corn begins to dent it is about time to cut it, if for the silo or for shocking. I believe the time will come when we will cut and shock that corn, and put it where the water will get out of it, before we put it into the silo, and then, putting it into the silo, it will keep sweet. This year, at the experimental farm, the very best silo corn we had was cut and shocked and then put in the silo; our cows preferred it.

Now, as to feeding. Indian corn is born of the sunshine; it is a hot-weather crop, and when the nights are warm, so we cannot sleep, we know the corn is making its growth. The heat and energy of the sun goes into the crop, and with the carbonic acid gas of the air and water, it is built up. In fact, if you burn up a stalk you will have only a little heap of ashes left, and that represents the nitrogen what came out of the ground; all the rest has come from the carbonic acid gas of the air, which, united with water, and knowing that fact, we get an idea of what our corn crop is. It is a carbonaceous feed, as I told you yesterday, and should be fed with that understanding. We can furnish our cattle in the most economical way we have with carbonaceous feed, material that will make the fat of butter, the sugar of milk and the fat of animal bodies, with corn stalks; the corn and the stalks together are lacking the muscle-making food. We must not have a cow give nothing but sugar and butter in her milk; and to make the protein of the milk, to make the muscle of the body, the creature must have protein feed.

Now, where can we get it best? As I told you yesterday, living near the milling center of the world, we have in Wisconsin, fortunately, a great store house of protein feed in the bran and shorts that comes in such quantities from these

milling centers, and the farmers feeding with their corn and corn fodder this material, have a perfect feed by the combination at a very low price. I think the farmers can see how very important it is that you make carbonaceous food a part of your ration. Corn stalks and hay and straw are, all things considered, the cheapest part of your feed, but they are not very cheap, when we have to use them in large quantities, and it is not cheap to use too large a proportion of them. A cow must have twelve pounds of digestible carbohydrates, every day she is giving milk, and she needs only two and-a-half pounds of digestible protein, so you see we have need for large amounts of corn stalks and similar feed.

MR. CLARK — Will this ensilage food answer the same purpose?

PROF. HENRY — Ensilage is simply that carbonaceous food put up and stored in an economical way. The cow must have succulent food. A cow giving forty pounds of milk a day of which eighty-five parts are water, besides all the succulence of the body, the perspiration, etc., she needs a large amount of water, and I do not believe in giving too much water. She should get a portion of the succulence in her food.

I think the day is passed in Wisconsin when corn stalks will be left standing in the field, with the wind and the storms destroying its good. Another thing that is past, I hope, is the practice of throwing corn in the mud or snow for the cows to fight over it. The question of the comparative value between dry fodder and ensilage has been largely discussed, and I want to put on record that I believe the silo has got the best of it up to date.

We are about to close an experiment, and it looks as though we were going to get good results, cutting up corn stalks and feeding them. I say, farmers, let us begin and save every bit we raise. I believe that by a little carefulness a great deal of the good that is in the corn stalks can be saved.

I want to say one thing more: In this climate and in this vicinity be careful and do not use too large a variety of corn. If you were down as far as Beloit and in the corn belt probably I should say something different about that.

FRUIT CULTURE.

Strawberries.

J. M. SMITH, Green Bay — *Mr. Chairman, Ladies and Gentlemen* — We have had a great deal of talk about cattle and horses and about grain growing, and they are all very good but we want some strawberries in the summer. You get tired of pork, I know you do.

How shall we get some strawberries? The best land that you have got is not any too good for strawberries, but any land that will raise a first-class crop of corn or potatoes will raise a good, fair crop of strawberries. In this section, I think you will find nothing equal to the Wilson. I have tried I don't know how many varieties, I have spent hundreds and thousands of dollars, but I find nothing equal to the Wilson.

Now, when you get your land selected, plant in rows, get your land in good condition, and plant in rows three or three and a half feet apart, or, if you choose, to get Crescents plant them four feet apart, and the plants twelve or eighteen inches apart in the row. Spring planting for the average farmer is very much better than fall planting. Get your ground ready as early as it is in good condition to work in the spring, cultivate it well. Drain it well, if it is not under drained, surface drain it very thoroughly, and put in your plants as I have said. Set them carefully, pressing the earth around the roots of each plant, and then keep it care-

fully cultivated during the summer season. That is all there is to do. It is very easy and simple. Keep down all the weeds, you can cultivate it with a horse cultivator, make your beds long, rather narrow than square, because you can cultivate it more readily. When fall comes and the ground has frozen over, get some marsh hay, it is better than straw for this purpose, as straw almost invariably contains more or less foul seed. Cover the plants just enough to hide them, and let that remain until spring. In the spring after the ground has done freezing and thawing take off your covering, and if your plants stand thin upon the ground, I would leave a portion of the covering under the plants, so as to keep the fruit off the ground. Where our plants grow as thin as we like to have them, the runners cover the ground, and we take the covering all off, and the plants have the full benefit of the air and sun. In the spring when we take off the covering we generally put on some wood ashes. If unleached, put on at the rate of fifty to seventy-five bushels to the acre. If it is thoroughly leached twice that amount won't do any harm. Keep out the weeds and you are almost sure to have a nice crop of fruit. It is very simple. There isn't a farmer but what can raise a crop of strawberries just as easy as he can raise a crop of potatoes. In the method we have mentioned, you cannot get so large a crop as you would if you made your land very rich, and then stand the rows two feet apart, and let them cover all the ground, but your outside land is cheaper than labor is, hence it is better to put up more land, and not expect so large a crop, but, if you follow the suggestions I have given you, you ought to have at a low estimate one bushel of berries off of every rod you put into berries, hence you can tell just how much to put in. Each square rod will give you a bushel of fruit. If you plant Wilsons, it is better to plant a bed every year, because if it does as well with you as it does with me, it will bear itself to death the first season, so that it won't be worth cultivating for another

year. The Crescents will bear two or three years, the Manchesters will bear two or three years.

As Mr. Adams is not here to speak upon the subject of raspberries, I will say a few words on that subject. We are now cultivating the Cuthbert raspberry, and we like it so much that we have plowed up all the rest. We plant them in rows seven feet apart, and the plants about three feet apart in the rows. We cultivate them thoroughly, and the next fall when they have made their growth, you take the plant and tip it over, put a shovelful of earth on the tips of the plant, and cover them with straw, the same as strawberries.

I have no recollection of ever losing a crop that has been covered in that way. They will go through the winter, and the crop is more certain with me than either corn or potatoes.

For the black raspberry you can get nothing better than the Gregg. It is a large, fine berry, a great bearer, and needs to be treated in the same way as the Cuthbert.

We have a new variety of the running blackberry, called the "Bartells," also the "Lucretia." We are testing them and I will let you know if they prove good. If they are not good, there is no use wasting your money to buy them.

Q. — Do you mean that you will get a crop the first year you set out your strawberries?

MR. SMITH — No; you can get a few, but we cut off our blossoms, so as to keep the entire growth the first year in the plant, and the next year we get a tremendous big crop.

Q. — How soon would you plant the same ground to strawberries again?

A. — Three or four years.

The Blackberry.

C. H. HAMILTON, Ripon— It would seem that nature had given her mind more to blackberries than to strawberries, for instead of five, she has scattered about one hundred

and fifty species up and down the globe and at this late date of our institute work, we do not wish to introduce any theory or literary attempt to describe them in our brief time necessarily allotted to this subject. That the blackberry can be successfully grown, has been practically solved, by giving it due care, good cultivation and protection. Prepare your soil well by giving it a liberal coating of manure. Plow it thoroughly and drag it till all large lumps are well pulverized. Set your plants out carefully, press the dirt around them firmly, in rows seven feet apart, the plants three feet apart, hoe them well, and keep the center of the rows well cultivated. In the fall, cover your plants with earth. The first year, you are really laying your foundation for a profitable undertaking and no care should be neglected to have each plant well established and in as strong and healthy condition as possible. The second year, the plants need more care than the first year. The wood that will grow this year, is that from which you have good reason to expect a bountiful crop of fruit. It is necessary to protect the growth from being broken by the winds by placing a wire on each side of the row, the same to be supported by stakes every sixteen or eighteen feet, and this same wire will answer to protect and hold your plants when loaded with fruit, for the succeeding years.

When the new growth has reached the height of two feet nip the top off and that will cause the new growth to branch out and form good strong branches, and be more handy to handle, while covering also produces more growth of wood suitable for fruiting. In laying them down remove a small quantity of earth from the side you wish to lay the bush and press with foot firmly against the crown and press the top lightly with a fork. Secure the plant after you have it laid over by putting a few spadefuls of dirt upon it and the next plant will lop upon the first, and by laying them down lengthwise of the row you have them in a close, compact row. After your row is down cover the plant out of sight, but be careful not to put too much upon them, for it is not

necessary. I have endeavored to give you briefly a mode of procedure which is not an untried theory, but has been successfully practiced and fully demonstrated to be a success. Many will think that to go through all the work which has been mentioned in the cultivation, and especially in laying them, because we would not wish to be understood that all the work to be done on a blackberry plantation is of a really inviting form. Likely the laying of them down is where many of you think the greatest difficulty, but this is an age of improvement. We do not know whether the first gardeners we read of ever practiced our mode or not, whether they adopted the hill system or the massed row, as our honored namesake who is one of our co-workers. Who is a disbeliever that the work can be so cheaply and swiftly done?

Apples.

BY J. C. PLUMB, Milton — Ten minutes for the apple! Ten minutes for the king of fruits! — the fruit which more than all others enters into the domestic economy of our northern civilization; the fruit which more than all others combined should be a part of the every day diet of the farmer's family; for the apple is the most cheaply produced, most readily kept in a fresh state, most cheaply preserved by drying and canning, affords the largest variety in flavor, the longest in season, most healthful and most foodful of all fruits of the temperate zone!

The apple is the fruit that every farmer wants, and wants to know how to get, how to grow — 1st, surely, 2d, cheaply. The problem of apple growing in our state has been a hard one to solve. With rich soils, and a climate essentially different from any east of Lake Michigan, correspondingly different results come from our fruit tree planting. Forty years ago all southern Wisconsin thought we could successfully grow the New-York list of varieties, and planted it. Twenty years ago that list was generally cleaned out by our adverse climate; but the varied experience of the past twenty years, through every district of the state, has given us the key note of success in

Local Adaptation.

We have five distinct climate districts, namely the lake region; the southern; the central; the northern, and the northwestern. Each of these districts has, or will have, its own adapted list of apple, which will be found best for that region, and local conditions of soil, elevation, and aspect must be taken into the account, completing the local adaptation plan of fruit-tree planting for success.

We are within the apple belt, and not out of it, as attested by our successful exhibitions, both at home and abroad. We have the best home market in the world, a people who do and will consume as many apples as any other in similiar circumstances; and we have transportation facilities for any surplus second to none in the union. We have eight counties bordering on Lake Michigan in which judicious systematic apple growing will pay larger returns on the investment than any other permanent industry of the farm. These counties alone should furnish Wisconsin the million bushels of choice winter fruit now imported.

The remainder of the state, which has not the soil and climate adaptation of the lake region, will then need to grow a fair supply for home use, as most always do the average farmer.

Apples for Every Section.

In the great central and northern regions of our state, success can at present be assured only by using the best of the Siberian class, which with their crosses give good fruit of every season and flavor: to these may be added the best, and most hardy of the new Russians as they prove themselves valuable in any given locality. Of the Siberian class I will name as especially worthy Sweet Russet, Briar St., Telfer Sweet, Richland Sweet, Winter Golden, Sweet, Whitney, Transcendent, Hyslop, Lake Winter, Red Lake Winter. Of the Russian class we know the Duchess of Oldenburg to be an apple of wonderful endurance, and very fruitful over a wide range of territory, and hope as much for many other less

known varieties of this class, such as Yellow Transparent, Thaler, Charlamoff, Hibernial, Lieby, Antonovka, Zuzoff, Red Reinette, etc., etc.

All fruit trees successful in central and north Wisconsin must have the habit of early maturity of wood, which adds largely to their hardiness. The Oldenburg and most of the Russians are of this class.

These northern lake shore counties will find especial profit in growing a list of large apples of fine appearance and good cooking fruit, which are not strictly winter in our list for the southern district, but which will, in this cool climate, be easily kept for the spring market and command top prices, such as Colvert, Utter, Twenty Ounce, Alexander, Wolf River, Wealthy McMahan, etc.

In the millions of our native seedling apples many are found with enough good qualities to make them very valuable locally, and they should be carefully preserved, if not propagated. If one in a million such prove a jewel, like the Wealthy, Wolf River, Northwestern Greening, Windsor Chief, and others of accidental origin, great encouragement will be given to crossbreeding, according to known laws of vegetable growth, with promise of most hopeful results in the line of adapted apples.

The testing of new fruits is the work of years of careful experiment — first for local adaptation and second general.

In the older sections of our state are found vigorous, healthy, specimen trees of good old varieties which show that, under certain conditions of soil and location, they are successful, and so form a guide for future planting. Such is local adaptation.

Soil Cultivation and Training.

Other questions would come in here, of soil culture and training, if there was time. But briefly, the apple in our country succeeds best on a strong porous clay, richer in mineral elements than in vegetable matter, with good sub-earth drainage. Plant for choice on the northern slope, or

any but the warm south east exposure, and lean to the south west about fifteen degrees at planting. Let the culture be thorough early in the season, and not much late; trees should have low tops and be so pruned as to shade the trunk summer and winter on the south side.

Plant the apple for home use; any way, such as do well in your neighborhood will generally be safe for you to plant. Grow your own family supply, and then you will have it and enjoy it.

Orcharding.

GEO. J. KELLOGG, Janesville — This paper has cost me \$10,000 and thirty years' time.

An occasional failure at these institutes may be accounted for on the Indian theory.

The old Indian after becoming half civilized tried many ways to obtain a livelihood and failing, he, like many of his white brothers, went to preaching. On being asked if it was not pretty poor pay, he replied, "Pretty poor pay and pretty poor preach." So we get "pretty poor pay" if you get "pretty poor preach," and it is so the world over. We get about what we pay for; poor farming, poor crops; poor stables, poor care, poor stock; poor butter, poor prices; poor fathers, poor children, poor wives, because we have deserved no better, and like our Ohio friends, I fear too many of us have bought for them "light axes" and insisted on their splitting the wood. We have poor orchards, poor adaption to soils, poor cultivation, poor protection, poor management, poor pruning, poor shaded tops, and a very poor idea of the necessities of protection and growth needed for the orchard in Wisconsin. Many of our orchards are on the wrong side of the hill—they should be on the highest, driest, poorest clay, timber ridges, with northern and northeastern slope. Never on the south and southwestern side of the hill and no protection on the north and east, and only a low windbreak on the southwest. Never plant on a gravel or sand knoll without clay or limestone, within four feet of the surface. If you must

plant on low, level black loam, plough as deep a dead furrow as possible where each row is to stand, then fill this with stone with an outlet as drainage if possible, then plough back and raise as high an edge as possible where the trees are to stand, and if you have an outlet put a tile drain half way between the rows of trees.

The preparation of the upland sides will usually require only deep ploughing. Never dig a hole for the tree deeper than the whole field is dug. I believe it would pay to tile even the uplands for orchard planting. Selection of varieties is a difficult problem; plant those kinds that on like soil have paid best for ten or twenty years. Wisconsin has, perhaps, as great a variety of soil and free climate as any state in the Union. As proof of this, you need only look over the one hundred varieties of apples exhibited at our last state show at Waukesha; there we had R. I. Greenings, Spitzenburgs, and those tender varieties grown along the lake shore, while we have plenty of evidence that in some parts of our state crab apples and the hardiest of the Russians only will survive.

Pears even pay along the lake, while inland, the most profitable pear trees are those usually sold by tree agents; and that never leaf out. Every tree district of our state, and nearly every county, needs a separate list of varieties. I will name a few kinds from which to select, Tetofski, Sops of Wine, Red Astrachan, Duchess, Fameuse, Wealthy, Alexander, Haas, Talman Sweet, Pewaukee, Golden Russett, and Willow Twig; of new varieties, McMahan, Wolf River and Northwest Greening; of Russians, Early Campaign, Thaler, Red Duck, Blushed Calvill, Yellow Transparent, Beautiful Arcade, Golden White, Bohemian Girl, Good Peasant, Longfield, Repka and Antonovka: from this list of twenty-seven kinds, you may select and add as many more as have paid in your own neighborhood, and what crab apples you desire. If you can afford 100 cherry trees for the birds, you ought to plant them by all means; Early Richmond, Krutish and Eng. Morello: as yet, no plumb pays equal to De Soto.

Size of Tree.

If you expect apples before you get home, buy trees with blossom buds, fully developed; if you want a healthy orchard set root grafts and take care of them. Plant two grafts where you want a tree to stand. Set a four-foot stake on the southwest side of the graft. Cultivate to low, hoed crops for five years, and your orchard will be better than if you had started with four-year-old trees. Root grafts can be put up for you at 1 to 2 cents each. A year from planting take up the surplus and fill all vacancies if any, and set the remainder in the garden for emergencies; better still, plant Hibernial and Duchess root grafts, and top-work at three feet. The best: Plant the seed where the tree is to stand; graft at the crown, and again at four feet. Whatever the size of the tree, leave only one central trunk, and let no crotch form; have the branches come out as near right angles as possible, and never nearer than six inches of each other, and then on opposite sides of the tree.

Pruning necessarily comes in right here. If your trees are not in shape, prune them severely at planting. If pruning should have to be done when it could be done with the thumb, never use anything larger than a penknife; but if you have neglected it, then put the tree in shape the first week in March or the first week in June, painting or varnishing the wounds.

Protection.

Cattle do not understand the best methods of pruning. Fence that orchard; and why not with woven lath and wire fence, costing 60 cents per rod besides the posts; this will keep out the rabbits, except when snow drifts. Each tree needs encircling with lath and wire and brown building paper (don't use black), or wrapped with cloth or hay bands to shade the southwest side of the tree both winter and summer, and also to protect it from the rabbits. Bank up about each tree the size of a water pail in November, to protect it from mice. If mice have girdled your

trees; if you will bank them with snow and then mud before they dry in spring, you will save nine-tenths of those injured; leave the banking on all summer. To clean out the rabbits, pay the boys 10 cents for each one caught, and give them time to catch them.

Cultivation.

The soil if of strength for producing forty to fifty bushels of corn per acre, is sufficient to give a healthy growth to the orchard; the new wood should not grow more than eight to fifteen inches each year. No cultivation should be given the orchard after the first of July; the orchard should be planted to low hoed crops, corn is not as good. After it comes to bearing, the growth of the trees must be stimulated in proportion to the crop of fruit taken off, keeping up an annual growth of four to six inches of new wood. Do not over-feed, and starvation will not pay in the orchard any better than in the dairy; if your trees are giving an annual crop they must have an annual mulch of manure in winter and an annual dressing of wood ashes or lime in the summer, and these top dressings should be liberal and extend as far out as the drip of the branches.

Never let a tree over bear, and with a good set of fruit, it is better to pick off the inferior and wormy fruit in June and save the tree from an unnecessary strain in the production of so much seed; the maturing of the seed weakens the tree more than anything else, so pick off one-half the fruit in June and you will then get as many bushels and much nicer fruit.

A tree after a burdensome crop or a late summer growth is not able to stand a hard winter. The orchard may be seeded to clover when it comes to bearing — and sufficient hogs or sheep turned in to feed down the clover; but do not let the feed get short or the stock will bark and ruin your trees. All wormy fruit should be fed to stock and the sooner after it can be discovered the better.

Insects without number, we shall always have. Nearly all leaf eaters can be poisoned the first week after blossom, and at this time will greatly reduce the codling moth; if a

heavy rain follows the application, another dose is necessary. Paris green or London purple, one pound to two hundred gallons of water, put on with a fine spray; one pound arsenic, dissolved in one pail of boiling water, to three hundred gallons. Whatever you use, keep out stock for one month, or until after a heavy shower; do not use the poison strong enough to burn the leaves. There is no hope for the curculios and gougers by poison; pick the infected fruit and feed to stock, and depend upon the sheet and jaring process.

Just here, let me say, catch these enemies of the orchard, and any insect upon the farm, and send them by mail to Prof. Wharry, of our Western Farmer, at Madison, and learn all about their habits and how to catch them. We have an entomologist right at home; send him all sorts of bugs and all sorts of questions, and don't fail to subscribe for the paper.

We must have apples and crab-apples raised on the farm. No other fruit can take their place; the health and comfort of the family demands it; talk about buying — you don't do it. "Now, Jonnie, you must not have but one apple to-day; that barrel is most gone; can't get pa to buy any more." Now John wants a dozen apples every day, and he will never get them if you don't raise them.

A Word About Harvesting.

Hand pick every apple and handle them as careful as you would eggs. Keep them at 34 degrees as near as possible. Plant of the varieties I have named, and you need not be out of apples a day in the year; pick when the kind begins to drop. If you have a splendid soil and surroundings, grow apples for market; use all the precautions I have named; use clean, new packages; sort all fruit; grow but few kinds; send them to market marked with the kind, quality, and your own name on each package. If you are ashamed of your own name, mark them "Smith."

The institute now adjourned for dinner, and at assembling at 1.30 o'clock the subject of Fruit Culture was again resumed.

Russian Fruits.

A. G. TUTTLE, Baraboo — It is now some 34 years since I commenced as an orchardist in Wisconsin, and during that time it has been experimental work. We have been trying to find something that would be adapted to the climate of Wisconsin, some apple that we could grow with as much certainty, with as much profit as it could be grown in Michigan or Ohio or western New York. When I set my orchard thirty-four year ago, I set five Duchess apple trees, and those five trees are there to-day in a healthy condition, while the balance of the orchard (some of it has been re-set several times), is nearly all dead; the Duchess trees are in a very healthy condition and bearing heavy crops. The merits of the Russian trees which were manifest at that time led me to think that there should be in Russia something that would be adapted to our climate, and it is now twenty years ago that I received my first importation of scions and commenced experimenting with new Russian apples. I have experimented with over one hundred varieties. What I wanted was a class of apples that was as hardy as the Duchess apple, an apple that was not only good for cooking but for eating, an apple that would supply the place of the Baldwin and the Greening, and I will say to day that after experimenting twenty years, we have apples in those Russian fruits that will fill the bill. We have apples that will fill the place of all the old sorts that we have tried and failed with. It has been said that we have not any good for anything. The Transparent now stands as the best early apple that has ever been fruited east or west. It is acknowledged to be a valuable early apple. We have those coming later that fill the bill, all through the fall and winter, that are equal in quality to the "Wealthy" which has been said to be our best, and the day is coming when we are going to grow orchards in Wisconsin with just as much certainty as in Michigan; we are going to bring our apples up where they will stand as high as any eastern apple. I am here to speak for the great growing apple interest of Wisconsin. I

cannot get trees enough to supply the demand. We have got the class of fruit that will keep, equal to the Duchess in hardiness. We have better apples among them than the Fameuse and hardier than the Duchess. I know that we have got trees that will bear just as well as the Oldenburg, equal to the Northern Spy in quality. Of course along the lake shore they can grow a better crop than we can in the interior, but we can grow a good many kinds. We have gone forward in this thing, and we have fruited over eighty varieties of apples, and we know what we have now.

Seedlings.

PETER PEFFER, Pewaukee—I don't know that I can do justice to this subject. Mr. Tuttle has been experimenting with the Russian varieties, and I have been experimenting with natural seedlings raised here in this country. He has told us that he has got some Russian varieties that are so very good, long, keepers, winter varieties, but he did not seem to show any here. I have got some of my own winter varieties which have been raised here, and which have been kept in an ordinary cellar. What little experience I have had with the Russian varieties towards the lake shore, is that a good many of them crack, and a great many wilted, and rotted on the trees. In the western part of the state, where there is a clearer atmosphere, it appears that they are doing a great deal better than with us, but as to their extra hardiness, I doubt if all those one hundred varieties are hardy. He has tried them around Baraboo, but that is not all of Wisconsin. He tells me that the coldest weather they had was 25° below zero. Now, we had it one morning 28°, the next 30 and one morning 35 for half an hour, and there are places in this state where the thermometer went down to 31 or 52 degrees below, and I don't think that out of that one hundred varieties, there is one that will stand that climate. Then, again, there are places in the state where the summers are very short, but the thermometer runs right up. In that climate apples will have to ripen in sixty days.

Now, about seedlings: We want to improve on many of the varieties of trees that we have. The trouble is they don't get the quality in them as in the older countries, because the time is too short, they are lacking in quality. Now all of those varieties that you can grow here of the early ones, and save the seed from, invariably you can get either a later or an earlier one, especially if the tree is isolated. If you want to grow the variety to have the same kind, you want to isolate it by taking a paper bag and tying it over a bunch of buds, and let it blow inside of that. When it is through blossoming, you take the bag off, and that apple will be the same variety as the original tree. We have a good many natural seedlings here, which I consider fully as good as our Russian varieties. Now, the seeds saved in that way can be propagated further north, probably a degree, and if the seed is grown again there, you can go still another degree further north, and in that way Russia and Germany have brought their varieties of apples to become hardy to their climate, and that is the way we have to do to get our apples. We want to get a good quality, long keepers, as they have in the older countries, and on that plan I have been to work raising seedlings.

I started first in 1845, and some of those that are here are from the seed planted in 1845, and the original tree stands yet perfectly sound. This plan can be followed with pear trees as well as apple trees. We have now, pear trees that are over fifty years old, from the seed and good qualities, and, as I said before, if you want to propagate the same variety, you have to isolate that way, and it will go on growing more hardy from year to year, and if you want to cross-grade, just before the flower bud opens, you take the pistils out, those little things right next to the large leaf, you cut them off, and leave the stamens standing, and put something over them so that nothing can intrude on them until you can get to another variety, and you get the pollen from any variety you wish, you can get it by mail anywhere, and it will keep a number of days, and that can be intro-

duced into that bag, so as to fertilize that flower. That is the way Pewaukee was raised. That apple on the table was from the Duchess seed, another was from the Northern Spy and so on. In that way we can fertilize. If you grow from the seed promiscuously, you cannot tell what the variety is unless it is isolated; as I said before, there are other varieties in bloom at the time and they mix very readily.

Discussion.

QUESTION — Have any of you gentlemen ever been troubled with bark lice on your trees, and if so, what was your treatment?

MR. KELLOGG — If you are troubled with bark lice, give them a spraying of kerosene emulsion or soft soap at the time they hatch, in June.

SUPT. MORRISON — I notice Mr. Kellogg said something about shading trees on the south side. What is the idea?

MR. KELLOGG — Our orchards are, many of them, dead on the southwest side of the tree, that is where your borer will come in, because the bark has become diseased. The hot sun of February and March, and also of July and August affects the trees. Shade the south side of your trees and you will protect them both from borers and from the sun. It is the sun that kills, not cold. It is a good plan to shade the bodies by winding with cloth or hay bands, any way to protect them.

THE DAIRY COW --- HOW SHALL WE KNOW HER?

BY W. D. HOARD, FT. ATKINSON, WIS.

Ladies and Gentlemen — The dairy cow is just as much the subject of specific heredity as is the fox-hound, the bulldog, the setter dog or the greyhound.

I wish to show you from the diagrams in front of you the difference that lies between a specific dairy cow and a spe-

cific beef cow, and I wish to show you how to judge a dairy cow. Why is a fox-hound different in his qualifications and heredity from a setter dog? Both of them have the sharpest noses known in the dog family, yet a setter dog will pass over a fox track a thousand times and never know it, but the moment he strikes the track of a bird, every muscle in him stiffens and you see then and there the answer to the long years of patient work to establish in him a special heredity. The fox-hound will pass over a thousand bird tracks and never know it, but the moment that his nose strikes the track of a fox, instantly every instinct of his being is alert. You see in this comparison, how it is nature runs in straight lines, and when a farmer undertakes to mix her up, put hash in his breeding, that moment he has violated one of the fundamental laws of nature, if he would produce the best results in each. We have before us here a representative Jersey cow, "Gabriella Champion," a cow which has produced 17 pounds and 8 oz. of butter in one week. We have here a Holstein-Friesein cow of a butter temperament. Here is a Hereford, and I wish you to notice that the three cows of dairy or butter temperament, show, in the main, the same outline of build, while the Polled Angus, Herefords, Galloways and Shorthorns are all essentially alike in outline of build. You see that nature constantly strives to assert herself, having a direct purpose before her, all that man can do, is simply to reverently study nature and take advantage of her and do what he can to assist her. I wish to present this idea to you. The butter temperament in cows is based upon a distinct and peculiar temperament.

The Butter Temperament.

What do I mean by temperament? Please look at me. I am of a peculiar temperament among men, known as the nervous-bilious temperament. Why is my hair a certain color? Why is my build of a lean and angular type? Because I belong to a certain temperament. The nervous-bilious temperament. That produces these effects.

In cows we have the nervous temperament, showing certain conformations of build, and the butter secretion is almost invariably allied to this temperament. In the Hereford herd we have the lymphatic temperament, a temperament that secretes fat easily, is of a sluggish and slow motion. Mark the difference in the build; see the heavy beefy lines, the close ribs, the straight line on the back, the great channel of nervous communication from the head to the rest of the body. In the dairy cow the shoulder should be lean, retreating and sharp, coming to a point. After passing the shoulder you come to the chine, the joint lays just back of the shoulder, or the crops. The loin should be thin and lean, and the spring of the ribs entirely different from this animal's, where you need room to lay flesh on. A dairy cow should be one that you can feed up to the top notch and she will put the result into the pail, and not on her body. If I have a cow of the lymphatic temperament, she takes my costly butter feed, and puts it into cheap fat, and that is loss to me.

A dairy cow has an open expression, open ribbed, a loose, easy, relaxed expression of the body. Here we have the arch of the pelvis. The object of this dairy cow, my friends, is maternity, she is a great mother and we build the whole of our understanding of a dairy cow right upon the function of motherhood. Van Arnot says, that the women of Holland are more successful in dairying than the men, and why? Because it is one mother caring for another. A woman instinctively understands how peculiar is the nervous action that effects the secretion of milk, and consequently women are more gentle, more intelligent, more patient, more painstaking, and more successful in contact with cows, and no man can have success in that line that is not two-thirds mother, and one-third father. We come next to the great mammary gland, or udder; draw a line from the highest portion of the udder in the rear, to the farthest reach of the udder in front, and that line is called the line of absorption against the body, and just in proportion as that line is long, does the udder take posses-

sion of all the functions of the cow and she is a successful cow as a rule. This mammary gland is the great repository of this maternal function. It is tied to the Uterus in a wonderful manner by the sympathetic plexus which connects with the spine, and the spine with the brain and we have the circle complete. The whole is a matter of absolute brain and nervous force, and therefore we want the cow that shows the most nervous power. Remember I am not talking about nerveless power, but nervous power.

Right here in the flank is a curious little gland, called the flank gland, or by some the butter gland.

Best Indication of Constitution.

I know from a test of a thousand butter cows that it is of wonderful importance. Pass your hand over the cow in this way and you will feel it slip under the finger; it is an elongated muscle and in proportion as the cow has a dairy temperament will you find that developed. In some cows you will see it stand out as big as my thumb on the side of the cow. The best indication of constitution that I know of is in the umbilical or navicular development of the cow.

Constitution is that which the mother gives to her offspring. The ability to stand long, great strains is inherited. You can not feed it into an animal, nor can you train it into her. Pass the hand under the abdomen. If the abdominal muscles are very strong, if they come fully to the point, and are distributed strongly, and cross-laid, you will find that animal is of a very strong constitution, and you must have that in a dairy cow.

Now, all this is not theory; it is not the utterances of a crank or a visionist, or a theorist; but it is the result of experiment and observation by practical men.

In a dairy cow you want a thin ham, wide, so the udder can have an opportunity for place. Pass the hand down the partition of the ham and find the muscles; in a dairy cow you will find it open; on this other cow you will find the muscles cross-tied, the whole tendency of this cow is away from milk; she didn't give enough to keep her own

calf. The man who seeks a dairy cow looks for the very opposite of this type. I have completed the circle and only wish to say a word more. Remember this dairy cow to-day has diseases particularly belonging to her. A cow of a nervous temperament is particularly susceptible to nervous diseases, and to ill usage. The man who undertakes to use a mother as he would a bullock, don't deserve a mother; he don't deserve a wife, and if he has one, in ninety-nine cases out of one hundred, the poor woman is most egregiously humbugged by the union. I never saw a man yet that was a fine, intelligent man, who could understand dairy cattle, but was a chivalrous and tender husband. I never saw a man that was rough and brutal to the cow, but was rough and brutal to women, and this is not all sentiment. You want to remember that milk fever comes to the cow of this character. I never heard of a cow of this other character having the milk fever; what could she have a fever about?

Milk Fever.

Milk fever is induced by a chill, and I will give you what I believe is the finest preventative that has ever been used. Never empty the udder for the first four days. Commence and draw one-eighth the first day, one-sixth the second, one-fourth the third day, and the whole the fourth day.

This was ascertained by noticing the cows that suckled their calves. Two thousand cases were carefully studied and experimented upon in this way, and not a single case of milk fever. When I got hold of this system, I was impressed with its physiological soundness, and I am of the opinion that it is a valuable fact. If you take out all the milk in the udder you collapse the sides, and you produce a consequent predisposition to chill. Chilling sets in, this sympathetic plexus that I told you about connects these organs and suddenly this whole connection is aroused, it passes along this telegraphic system and lands finally in the brain, and the cow swings her head around, poor tired thing. Maternity has been her ruin, she lies down and dies, a victim to her maternity and our stupidity.

BUTTER MAKING AS A FINE ART.

By MRS. E. A. ROBERTSON, VIROQUA.

It seems to me that Mr. Gould and other members of the institute, have churned and made enough butter this winter, for the subject to have become familiar with every farmer's wife in the state, but if there are any over worked women here, such as I was myself, when I made butter by the old common, two-pan dasher churn, hand-working with butter-ladle method, and are situated as I am, in a neighborhood where there are no cheese or butter factories, I would be glad to help them and save them the aggravating work caused by the shallow tin-pan arrangement of raising cream. By that system a pure atmosphere of a temperature of 62° for from thirty six to forty-eight hours, is necessary for the best results, and it must not vary more than six or eight degrees, either way, night or day, to obtain even good results; and that you know is almost impossible in most farm-houses. If we want to obtain creamery prices, we must adopt their system, and that is neither troublesome or expensive. Have a number of tall, slim cans that the men can take to the barn and strain the milk into them, through a fine wire strainer covered with double dairy muslin. Keep them closely covered and as quickly as possible get them into the tank of cold water. There they are left until the next milking, when they are brought into the house, and the next are served in the same way. They are then skimmed and the cream set away until it is time to ripen for churning, and the skim milk is fed to calves or pigs, from the same pails. Instead of forty or fifty pans to skim and

empty, wash and scald, three or four swill-pails setting around, with more or less milk splashed about, you have only to wash four or six pails that have never had sour milk in them.

In this way you will get quite as much cream as by the old way, and always perfectly sweet and free from odors.

Ripening the Cream.

Ripening the cream is one of the most important operations of butter making. By the old way the cream often remains on the milk too long, then again is skimmed too soon. No matter how hard you try, this variable climate will upset all your calculations. By the submerged way, it is dipped off sweet and cold and kept so until enough has accumulated for a churning. A little cream closet that I had made has been the greatest help to me in holding the temperature of the cream for ripening in very cold weather. It is 13 inches square on the inside, $5\frac{1}{2}$ feet high with close-fitting door the whole length, with 16 inches space between the bottom and the first shelf. In the bottom place a can of hot water, on the shelf above your pail of cream that has previously been warmed up to 70° . Stir frequently and when it shows signs of acidity churn it at a temperature of about 64° , in winter, in a churn that has no inside fixings. Use sufficient butter color to make a bright June color, and stop churning when the granules of butter are not quite as large as wheat grains. Give repeated washings in weak brine until the water runs off clear, drain thoroughly, then let it lie awhile in brine made by putting into cold water more salt than the water will dissolve. It will then be salted about one-half ounce to the pound. Pack solidly into the best made, best looking ash tubs you can find after their having been first scalded to take the strong taste of the wood, then soaked in strong brine and again filled to the brim with a scalding hot brine. Ship as soon as possible and it will readily command creamery prices, and why should it not, for private dairy butter rightly made from the

best cows fed and cared for by one person, can not but give more uniform results than those managed in all sorts of ways by as many different hands. What success I have had in dairying I attribute to its having been done in winter. The fact of my having been able to make my land (that until five years ago had been rented and cropped year after year without having been seeded to clover or any fertilizing material of any kind applied, judging from the state of the barnyard when I first saw it), produce in such a season of drouth as that of last year, forty bushels of wheat to the acre, and fifty-nine bushels of oats, with other grain, hay, roots and corn fodder sufficient to winter fifty head of cattle and then being able to sell off enough hay and straw to buy a car-load of bran, is certainly favorable for winter dairying.

I know Mr. Morrison does not approve of selling hay and straw, as he urged the folly while he was with us in Vernon county of not keeping stock enough to utilize the straw stacks he saw there, but the temptation of high prices was too great for those of us who needed money more than we did hay.

Winter Dairying.

Many ask if it pays to milk in winter. If they feed nothing but a little corn, with good, bad or indifferent hay, in a cold barn, of course it will not pay; neither will it pay to milk in summer if a cow is only kept alive in winter. She cannot eat enough grass to get into condition to give a paying quantity of milk before winter has come again. You must feed her well and keep her comfortable all the year around to get good results, either in winter or summer. I said at a farmers' meeting this winter that by winter dairying my farm would keep one third more cows; that it takes more land to keep a cow five months in summer than it does to winter her seven months. Many of the farmers present seemed to doubt it or rather not to understand how it could be done. Since that, Mr. Hoard has made the same statement in his paper, so I am sure he will

be able to explain it satisfactorily. You can get as many pounds of butter per cow and more than twice as much per pound for the butter. It is better for the men. In the busy time of haying and harvesting they have not been compelled to quit work when tired and out of patience to milk so many cows. In the fall and early winter they have plenty of time to devote to their welfare, and it is better for the women, because it is much easier to keep the milk, cream and butter from getting too cold in winter than it is to keep it from getting too warm in summer. There is not half the care about it, and then the vacation in the hottest days from almost all care of the milk, and the possibility of going away for a few days yourself without feeling that you are sadly neglecting that milk. The first class help that must be kept for dairy work can in this way be retained and profitably employed throughout the year, and all will have the satisfaction of knowing they are not lying still all winter and grumbling because farming don't pay. You can raise better calves; at least that has been my experience for a number of years, and during the last winter I have succeeded just as well in raising good calves by feeding less milk, giving a part of what usually went to them back to the cows, and feeding the calves more oats. I somewhere read that the Scotch farmer raises the finest and hardiest dairy cows on but little milk with their oat meal gruel. That will produce a better heifer than one fed wholly upon milk. We do not want to raise a big-boned animal, or to develop that secretory system which produces fat, but we do want to develop that part of her body connected with the lacteal system. Begin at once and keep the calf for the dairy within such bounds in regard to growth as to make a good cow of her. Oats and milk! the best food in the world to bring a young animal into fine growing condition. If the breed is good, the blood good and the ancestry good, we will get pretty nearly what we want. We must feed for the purpose, one way for one object and another way for another.

THE DAIRY.

BY MRS. A. M. BRAGG, VIOLA.

Mr. President, Ladies and Gentlemen — The *Dairy World* says, What is a dairy without a diary? A dairyman cannot arrive at any safe conclusion regarding his business unless he bases them on facts, and the latter in order to be remembered must be "jotted down." The first thing in a butter dairy is the cow, and she must be a butter cow. We have the grade Jerseys. Now a man may have a grade Jersey and she be worthless.

Testing Cows.

The only way of knowing, not guessing, is to test her. A cow must give over 200 pounds of butter to give any profit to her owner.

I tested ours last year in this way, as I had no oil test churn, or any other appliance for testing. As each cow came in, and the calf was thirty days old (if you test her sooner you will be deceived in her, as the milk is so much richer at first, it takes her thirty days to settle down to business), I set her milk by itself for one day, and wrote under her name thus: Dolly, calf named Frisk, April 29, calf thirty days old, milk 27 pounds, cream 26-16 pounds, butter 19-16 pounds, making 1 pound of butter from 1612-25 pounds of milk. Then I wrote under this the weight of her milk one day each week, so I could get an average of what she would do per day for the season. Knowing that the milk was richer in the fall than in the spring, I retested her December 27th: milk 10 pounds, cream 2½ pounds, butter 11-16 pounds, taking 97-17 pounds of milk for one pound of butter. After I got the average weight of milk to make a pound of butter, I added up the weights of her milk for the

season and found out what she was worth; she gave in $7\frac{1}{2}$ months 3,220 pounds of milk, the average weight of milk for a pound of butter was 12 pounds. She would make 268 $\frac{1}{2}$ pounds of butter in $7\frac{1}{2}$ months.

Two hundred and sixty-eight pounds at the low price of 15 cents would bring \$40.20, calf \$2, skim milk at 20 cents a hundred \$6.44; she would earn \$48.64, and if her butter sold for 30 cents she would earn \$88.84. So you see it makes quite a difference in the value of your cow, whether you get 15 cents or 30 cents.

Now, if she only gave 150 pounds at 15 cents she would earn \$22.50, calf \$2 — \$24.50. After paying for hay and labor how much would you have left for profit?

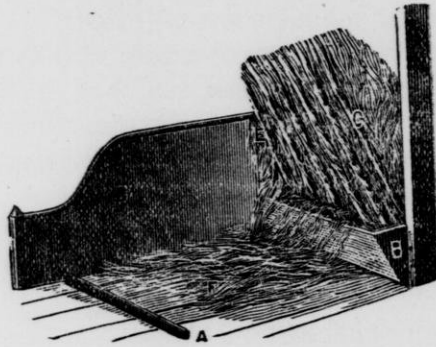
This year I discovered accidentally that by milking three times a day, I get more butter, and that the noon milking had twice as much cream as the night and morning. I have tried two cows. Block, $2\frac{1}{2}$ years old, February 27, 10 lbs. milk in the morning had 8 oz. cream; 5 lbs. noon's milk had 12 oz. cream. Maude, 3 years old, night and morning 13 lbs. milk, 16 oz. cream; $5\frac{3}{4}$ lbs. noon's milk 12 oz. cream. I have not as yet gone to the bottom of this, but hope to before the year is out. Some of you try it. Set a portion of the three milkings in a water goblet and you can see the difference.

Next after you have a good butter cow, you want a good place to put her. Some one has said, write "comfort" in big letters over the barn door. I will add, put it in practice. Now when I go to the barn and see a mother cow fastened in a stanchion, I always think of the Quaker's curse. The Quaker was angry at one of his friends, and he wanted to curse him, so he put it in this mild way: "Friend, I wish thee no harm, I simply wish thee continual itching and no power of scratching." Now we wish the cow no harm, but I think we give her a small dose of the Quaker's curse, don't you?

A Model Cow Stable.

Here is a cut of a model cow stable for comfort and cleanliness, the bedding does not need to be changed till

worn out, as it will not get soiled. The floor should slope towards the rear one inch in 6 feet, and be divided into stalls about 3 feet wide, or wider for larger cows. (See D.) A rack should be put at the head of the stall sloping backwards, at an angle of 45 degrees, (see C,) and at the bottom on the outside there should be a meal box half way across or clear across, (see B.) In the corner there should be a ring (see E,) in which the halter may be tied. When the cow stands in this stall in a natural position her hind feet will be in the rear of the round stick, (see A,) and her droppings will all fall behind the stick (see A,) which is held in place by



staples. When she wants to lie down she will lower her head and step in front of the stick (A,) and always have a clean bed. (See F.) Mr. Ruddock says his cow has stood in such a stall all winter and never been soiled with the manure. The stick which should be about four inches in diameter (A,) must be placed just far enough back so that the cow will stand with her hind feet behind it.

Milking.

Next, milk cleanly, cheerfully and quickly, never set pail on barn floor, hang up on hooks or pegs, bring in as soon as milked. Put a white flannel cloth over your strainer and fasten it on with four common clothes-pins. If you use cans, at once plunge it in cold water; if pans, set where it

is cool in summer and sixty degrees in winter. Skim while sweet. You may have good cows that give good milk, and still make poor butter, because the cream when it goes into the churn is poor. Good cream must not be bitter, oily, mouldy, or taste of the food of the cow, or be tainted with foul odors borne from a ten year old clay pipe, or pig-sty, barn or kitchen.

Colored Butter.

Do not keep the cream more than two or three days after skimming; put the cream in a tin can and keep where it is cool, till ready to churn, then bring it where it is warm, and ripen the cream in this way; set the cream can in a pail and put warm water in the pail till the cream warms up to 70° , as soon as it sours it is ready to churn; cool the cream to 63° ; use a thermometer. Then take a teaspoon and dip it in the cream so that the coloring will not stick.

A merchant once said in my presence and two or three other farmers, that he would just as soon eat oleomargarine as colored butter, and one of the farmers spoke up and said if his cows did not color their own butter he surely wouldn't color it for them. I felt like saying yes, and take ten cents for your butter, but didn't. Another man refused to buy some butter that was colored, said it would not keep. In my Viroqua paper I made this remark on the point of making butter to suit the customers: If Merrill & Eldridge should write me, that my butter would sell better if colored green the next tub would go out green.

We are not making butter to sell to ourselves. Let me read you a part of a letter received from Merrill & Eldridge. Now this comes from a buyer:

CHICAGO, JANUARY 29, 1887.

MRS. A. M. BRAGG.

Madam — We were quite interested in reading in this week's "Dairymen" the proceedings of the meeting at Viroqua, and particularly with your remarks which embodied such practical and solid common sense. As you took occasion to refer to our firm incidently as an "authority" we take the liberty of writing to express our acknowledgments of the compliment. That dairying like any other occupation should be conducted on business

principles, and for profit, rather than to demonstrate a pet theory or gratify a personal idea or whim, is what we often have had occasion to impress upon some of our shippers, who seem to think that their way of making, and not what an average consumer demands, is the only true and perfect butter, some absolutely declining to use coloring matter on "high moral grounds," which is all very good in theory, but when the customer must have June colored butter in January, or none, why we say lets give them the June every time and take their money.

Churning and Packing.

I think you will all be willing now for me to go back and put the coloring in and go to churning; churn till the butter has come in little grains; stop and put in one quart of strong brine, turn a few times, then let stand five or ten minutes; take a tin pail and put a piece of cheese cloth over it, and pin with clothespins; take out the cork and draw off the buttermilk; if any of the butter comes out, take the cloth up and put back in the churn; put in a pail of cold water, and take this fork (shows fork) and stir the water through the butter, then draw off as before; do this three times, then let drain; then take some salt and put in a pail, and put boiling water over it, and make a brine as strong as you can. When cold put in churn, cover and turn a few times. After it has stood one hour, put in one or two pounds of fine salt, to salt the water that has come out of the butter. Let stand six hours, and every time you go near it give it a few turns. Now the butter is ready to pack. Have your tin pail clean and cloth pinned on; take out cork and draw off the brine; then look in and see if the last salt is all dissolved. If not, take some of the brine and throw in, and let run out till it is all washed out; then shut up your churn and turn a few times. If it gets into a lump it is all right, if not, it is too cold. If too cold, take some of the brine and warm up to 65 or 70 degrees; use a thermometer, never guess at it. Put in churn, turn few times and draw off; it will mass nicely now. When in a solid lump cut a few times with a straight ladle, so the brine can run out. Take an ash tub that has been prepared by putting in boiling water, let stand

till cool, fill with cold water, let stand five or six hours, see that it is clean and rub a handful of salt over the inside, then take your fork and take out some of the butter and pound in tub with a masher; put in more till the tub is full, not one-half inch from the top, but full; cut off the handle of a hardwood broom stick, have it clean (if you are not suffering by the hard times, buy a glass rolling pin), wet a piece of cheese cloth, put on the butter, then take your stick and roll it over till smooth or push it over, take off cloth, and put on a clean new piece of cheese cloth, snow white; there is money in the whiteness of your cloth. Then cut even with the tub, don't cut three or four inches too large and let dangle at the sides, it takes off a cent or two; butter is sold by the eye as well as taste; sprinkle on a little salt, put on cover and fasten, and our tub of butter is ready to ship. Boil your brine in a clean tin pail, strain, and it is ready to use next time, as long as there is a quart left of it.

Now, if any of you try to make butter my way and fail, don't give up; a good dairyman must have the grit of a W. C. T. U. woman, for they will stick and work and pray, till rum, the curse of the town boy, the more than curse of the farmer boy, and the curse of the poor cow, is driven from our land. I didn't make my butter this way till I heard John Gould tell how, at the Sparta convention, the first trial was a complete failure, second, sold for twenty-four cents, third, sold at Elgin creamery price, twenty-seven cents. If I can make twenty-seven cent butter you can. I have no doubled wall milk room, or any of the nice things that some of these men have, I have only a general purpose kitchen and an 8 by 8 foot pantry, cheese cloth and clothes pins, and broom stick. Now, we all know there is no money in ten cent butter, unless it is in the immense quantities that are sold, like the old lady's sugar; she bought it at \$1.05, sold it for \$1, and when asked where she made her money, she said, "Don't you see, it is the immense quantities I sell of it." I would like to speak of one more thing and you can take it for what it is worth.

If each one that has read a paper at an institute, has had as many letters, and people come to see them as I have, they must have thought of the same thing, it is this, the need of a butter teacher, to follow up the institute work; now, my plan is this, let some man that has worked in a factory all summer, and it is closed in the fall, take a team and put in all the things he would need to make a tub of butter, models of barns, and other things that the average farmer never has a chance to go and see for himself, talk the matter up at the institutes, then go out in the country and get up a butter class, the same as a singing school or any other class; get six or ten families to join together and make the butter with their cows, their milk and conveniences, and let one of the class make a tub her way, and send the two tubs the same day to the same man, and when the returns come, let them see for themselves, and while the cream is getting ready for the churn, go out to the barn and show the man how to improve his barn with the things he has, how to make a milk stool, with cloths in the box for use, sheepskin on top for comfort, and twenty other things, that a wide awake man could think of, he could almost regenerate a place in a week.

We can already see the great good that the institutes have done all through our state in the uplifting of the farmer, and would we not see the same good results following a butter teacher?

If the institutes and a teacher would not regenerate the average farmer, I would feel like saying, "let him alone for he is joined to his idols."

SHALL WE BUILD A SILO?

BY H. S. WEEKS, OCONOMOWOC, WIS.

How to Build.

“Shall we build a silo?” This is the question propounded in your programme for this afternoon’s discussion, and it seems to be the great question of the hour for farmers and dairymen all over this broad land, and the logic of facts is dictating an affirmative answer wherever light is thrown upon the subject and its merits become thoroughly understood. The question is then changed to, “*How* shall we build a silo?” I have been made aware of the new interest engendered in this particular question of ensilage, by the number of letters of inquiry I am receiving and the frequent calls to personally inspect my silos and hear from my own lips the tale of its merits, mine having been among the earliest built in the northwest, and therefore perhaps looked upon as having less of the experimental character than those of more recent construction. Some who come have been *almost*, but not *altogether*, converted by what they have heard, but want a few more “cold facts” from actual experience to clinch the nails driven at the institutes. They want to see with their own eyes the cattle fed for years on ensilage, and be assured that it is a fact that I raise enough on sixteen acres of land to winter by this method upward of forty head, and they are willing to a man to admit that the cows don’t look as though they had been quartered on the weather side of a straw stack and fed with an occasional armful of dry uncut cornstalks, the woody fibre of which would make better fuel for the stove than for a cow’s system. To be sure, they are “little Jerseys”

that don't require much feed, a fact which I in turn am most willing to admit. Finally, they want to see the silos, learn all about their construction, capacity, mode of filling, etc. And this brings me to that portion of the subject to which I have in the wisdom of the superintendent been assigned to say something to you, viz.: "How to Build a Silo." Far be it for me to question his judgment, but never having built one, it would seem as though some one else could better impart the information. I can, however, tell you how mine are built, and in a general way what is required. It is a question though which to answer correctly, one should know the location, surroundings and requirements of each builder.

My two silos, each 30 feet long, 12 feet wide and 14 feet deep, are built in a side hill, the upper wall against the bank being of stone, 18 inches thick, and the balance of concrete, finished with cement, and bottom also of same. Imbedded in the top of each wall are plates of 2x12 plank, on which rests a baloon frame carrying the structure up five feet to the eaves of a peaked shingled roof, over all. These extension walls are boarded inside and out, and have tarred paper underneath, and are for the purpose of allowing the silos to be filled higher than the masonry before settling, also for head room. The cow stables adjoin the silos, the stock standing in the lower story, the yard being on a level with the floor, and the bottom of silos four feet below. We fill through doors in the side on a level with the high ground above, and feed out at the ends below, having doors one above the other, as in an ice-house, opening into the stable. These silos are substantial and convenient, and when built six years ago, it was deemed essential that they should be wholly or partially underground, according to the custom adopted from foreign countries, where the system originated. Since then, however, the American farmer, with characteristic originality and inventiveness, has worked out for himself plans and arrangements in building silos, planting, cutting, filling and feeding, suited to his individual requirements and means. A costly building and plans is no longer

a necessity, and ensilage is within the compass of almost any one.

An *air tight* receptacle for green cut fodder, constitutes a silo, whether of stone, concrete, or wood, and we build them to preserve the fodder just as we seal up fruit in air tight jars and cans. A silo may be cheaply built in the bay of a barn. If of stone plaster with cement and make your partitions with double walls, of matched stuff with tarred paper underneath, floor of same or of concrete. A detached frame building may be built in the same way and placed where most convenient to feed out. It must be borne in mind that the lateral pressure of ensilage, when the silo is filled and weighted, is very great, and a frame building should be thoroughly strengthened, otherwise it may spread and cause much trouble. Where the building is entirely above ground, doors should be from top to bottom, as in an ice house, and boards fitted with tarred paper back of them for the inside openings, to put in as filled. I think it well to tack tarred paper between the studding in the center, which makes two dead air spaces and helps render it frost proof, and for that matter walls of masonry are the better for being double. I am frequently asked if the ensilage does not freeze in my silos, to which I answer, not to any serious extent, but when the weather is very severe it freezes to the outside wall on the exposed side more or less. The loss is, however, not great, and could be prevented entirely by a double wall of wood lining of inch boards and tarred paper. I have seen articles published recommending many divisions in the silo for the purpose of filling sections at different times, and with different kinds of fodder, and also in order to empty one section at a time and not expose too much surface to the air. It occurs to me there are objections to this plan, as well as reasons in its favor. It is desirable to have at least two divisions, so as to fill first in one and then in the other, allowing time for the fodder to heat between fillings.

In regard to the proper size to build a silo to feed a

given number of cattle, I do not find that there is any exact data to go upon. Mr. Bailey, of Massachusetts, who I believe built the first silo in this country, estimates that his silo, 30 feet long, 12 feet wide and 12 feet deep, held about 87 tons, which he thought enough to winter 12 to 15 cows, but his ensilage was of the primitive kind, cut when very green and full of water, and consequently heavier than the ideal ensilage of to-day, cut when the ears are in the roasting condition, the juices concentrated and the stalk comparatively dry. It would be impossible to get the same weight into a silo, but on the other hand feeding value is so much greater, that a correspondingly smaller quantity is necessary, hence the amount of space required would be about the same, or as Mr. Bailey estimates, say about 275 cubic feet to feed a cow six months.

In conclusion, let me offer you the experience of six years, in the use of the silos, at Oakwood farm, during which period no failure of complete success in the growing, curing and keeping of the crop has occurred, the past season of phenomenal drouth proving on the whole, the best of the six for perfecting the ensilage to the point of most value for feeding purposes. The small crop goes further than any full one has before done. If there is nothing in this to convince you that there can be but one sensible answer to the question, "Shall we build a silo?" then indeed is the adage true, "None so blind as those that won't see."

How to Plant.

GEO. A. AUSTIN, Neilsville, Wis. — I can not plant it till I plow the ground. I plow the land three to four inches deep; clover sod will do to plow four inches deep. Thoroughly fertilize and prepare with disk harrow, acme or spring tooth harrow. I don't know but you might, but I can not afford to pay or board a man to use a common drag on any field of mine, except it is the eight-tooth harrow in cultivating corn. Make the seed bed perfect, have no lumps. Plant in rows three feet ten inches apart, one to one and one-half

inches deep, put the kernels from five to seven inches apart in the row. Bear in mind that the object of a stalk of corn is to mature an ear, and if you deprive it of that object it has nothing to do, and consequently it won't do very much of anything. You must decide for yourself the fertility of your soil, its peculiar location and determine how far apart to plant the corn. It wants to be planted just as thick as it can be planted and each stalk mature favorably. Plant early in the spring as the weather will permit and as the ground can be prepared in good condition. Keep the drag in that corn, and never let the weeds start; it is cheaper to kill weeds before they put in an appearance than it is afterwards. You want to drag twice before the corn is up; then, by going through once or twice with your cultivator it will take care of itself. Plant the Southern Virginia ensilage sweet corn, that has been demonstrated a good thing. Plant as an experiment some of your own corn, and see which is the best.

Fillings.

JOHN GOULD, Aurora, Ohio — The question of filling the silo is most important. We started out with the impression that we must fill as rapidly as possible to get it away from the air. Now we have found out that the farmer can take more time and get twice as many tons in. So we cut the corn with a reaper. Take a row at a time and load it on to low wheeled trucks with platforms on. Take one of those gavels that is left by the machine, walk up and plow it crosswise of the platform on the wagon. Cart this to the silo. Have the ensilage cutter put on a platform, just on a level with the top of the wagon. The carrier on the cutter carries the cut fodder up over the wall of the silo and drops it into one of the pits, so that to-day we can put a certain amount in this pit, and to-morrow in the other. Now, what is the result? We fill this pit, to-morrow the temperature has risen to 120 degrees, the cooking degree. We have got to preserve the corn fodder, as the lady does her preserves. Fill this pit to-day, and this to-morrow. By

the old plan it would settle one-half, and we must put on half as many tons of stone upon the covers as we had tons of ensilage under the cover. Now, by the slow filling, and the heating, and the settling we get the silo full, the air has been excluded from it, and it is warmed up, and all we need to do is to put a cover on to it, which will keep the air out. We simply cover with tarred paper, well lapped, and crossed with common inch boards, and lay a load of hay on top, and our silo is covered. When we get ready to feed, we throw the cover off the pit and feed off the top, and we have got sweet ensilage.

How to Feed.

Hon. HIRAM SMITH, Sheboygan Falls, Wis. — In the first place I wish to announce that I have only had one year's experience. A professor of agriculture wants from two to three and eight years in order to determine the utility of an experiment.

About a year ago I decided to build a silo, and built it so as to hold near three hundred tons, thinking it would last me through the winter, and it would do so, but I would say here that I do not feed milch cows, I run a winter dairy as some of you may know. I do not feed but twenty five pounds of that ensilage to each cow per day in two feeds, about equally divided, because I have not got enough to feed more, putting upon that two pounds of bran and two pounds of corn meal or barley meal or oats, or other mixed ground feed, making four pounds of ground feed at each feed, in total twenty five pounds of ensilage, eight pounds of ground feed and eight pounds of hay to a cow of about 1,000 pounds weight. To a Jersey cow, I give about twenty pounds of ensilage, three pounds of hay, and seven or eight pounds of ground feed. They are cows all in milk. And I have found, to my satisfaction, that the butter is equally as good as any I ever made in June. It churns about like grass cream, has the appearance of it. The flavor of the butter has been materially improved, and I can account for it in no other way than by the ensilage feed.

I will say that in my opinion from the little experience that I have had, that the older corn made the sweeter ensilage, more nutritious, and another year I shall plant two kinds of corn, one of the earlier variety which I can commence to cut about two weeks earlier than the B. and W. corn. I want to study out the question more thoroughly. There will be a little acidity in it but it not unpleasant to the cow. I think I never fed any kind of roughage that the cows relish better than they do ensilage feed. If I throw ensilage before them with the best hay, they immediately buck away the hay with the nose, and will not touch it until all the ensilage food has been consumed, proving that the cow's judgment is, that it is good for her.

The ensilage feed has been heated up to 120 degrees during the filling process, it is partially cooked, and is succulent. It is easily digested, and there is not a particle of waste about a crop if it is properly tread down in the corners and along the edges. I am entirely satisfied with it, and I believe I shall be borne out by anybody who has fed it for winter dairying. It improves the flavor and the color of the butter. It is equally good for the production of beef, and our butchers say that the beef is as good and juicy as grass fed beef. I have no doubt that this is the only method by which the production of beef can be made profitable in Wisconsin. For those who have tried it it is equally valuable for a soiling food when land becomes worth \$80 or \$90 an acre. There is no sort of return for the investment in such land to pasture cows or any other animal upon. Neither can a man on such valuable land afford to winter his cows on hay. It costs too much money. Therefore, we must provide a cheaper food in order to compete with the low prices which we now have and are likely to have for a number of years. The silo has come to our relief. The first experiments in that direction were very expensive, but we have found out that if we only keep the air out, all the old expensive methods were unnecessary and a building of a silo is perfectly practicable for every farmer in the state.

THE RESULTS OF FEEDING ENSILAGE.

BY AUG. SHULTZ, LALE MILLS, WISCONSIN.

I built my silo in August, 1886. It is 20x14 feet, eight feet in the ground and eight feet above, total height sixteen feet. The wall in the ground is laid up with stone; above ground, of wood laid with brick between the studding. There is no partition in the silo. It is plastered on the inside, my idea being to build it like a cistern in character.

I planted four acres of the W. & B. ensilage corn and four acres of the "Sweet Dent" variety, the seed of which I obtained in Chicago. The corn was planted in June—a mistake, shall plant next spring as early as possible—on clover sod turned last fall.

I commenced filling silo October 1st, cut the stalks in the field by hand, let it lie one day and wilt, then commenced cutting it into the silo. I cut twelve tons a day, then omitted one day until the heat arose to 130°, then resumed, and so on until the whole was cut, amounting to seventy-two tons on eight acres. The silo was then covered in the usual way, weighted with five cords of wood.

I opened the silo about Christmas and found the silage in fine condition. My neighbors all laughed at me, they were so smart, you know. They told me that they would have to make a bee in the spring and help me draw out my big box of manure. When I had been feeding it some time I called in some of my neighbors and stationed them in the barn so they could see the cattle come in to get their feed of silage. The cattle came in so fast and anxious as to make my sceptical friends jump to get out of the way, which of course was fun for me after what they had said.

My stock of cattle consists of twenty-three cows, twelve

two year old heifers coming in, and fourteen year old heifers. These are full blood Holsteins, grade Holsteins, and a few Short Horn grades.

The cows get twenty-five pounds each day, and the young cattle fifteen pounds. Besides this, they are fed: Cows ten pounds of dry cut corn stalks and young cattle proportionately of the same, and all are fed at night a feed of fair marsh hay. The cows are fed besides four quarts of bran each a day; the young stock none.

The effect on my cattle may be stated thus: For the first time in my life I have been enabled to save all the old hair of my animals to go into manure before they were turned to grass. Heretofore they have waited until grass feed, and so the hair blew over into my neighbor's fields, and I couldn't save it. I fed two grade Short Horn three years old heifers, all they would eat of it, with a view of fattening them. In addition I fed each heifer one barrel of corn meal. The time of feeding was two months. One heifer weighed 1,100 pounds, the other 1,000 pounds when put up. When sold at the end of the sixty days, the first weighed 1,305 pounds; the other 1,250 pounds. All this time I was milking the heifers and they were not dry when I sold them for beef, at $3\frac{1}{2}$ cents a pound, live weight.

From all I can gather, I consider my silo a wonderful help to me. When I commenced feeding silage to my cows, who were strippers, I was getting four cans of milk a day. In two weeks the yield had increased to five cans. My cattle seemed to hold up their flesh better than ever. They do not stand round in the yard, all four legs in one hole.

I fed it to my horses two weeks for a trial, 15 pounds a day, I noticed it made their hair look very much better. I also fed it to hogs and they ate it greedily.

My silo cost me about \$85, using the roof of an old wagon shed for a cover.

I am convinced that no farmer who has a decent amount of farm stock of any kind to handle, can afford to go on in

the old way of wintering his cattle. But to the dairyman who will reject this method of saving the cost in the production of milk and butter or cheese, I can only say, he doesn't want the full reward of his time and labor as badly as I do.

BUTTER MAKING AND FEEDING ENSILAGE.

BY F. C. CURTIS, ROCKY RUN, WIS.

Last season I raised five acres of the large southern corn known as the Burrall & Whitman ensilage corn.

Being somewhat skeptical about the results of preserving the same in the silo, I concluded to follow the advice of Superintendent Morrison "to go slow," hence, I brought into requisition a part of my barn which was of solid masonry, for a silo, and ensilaged only three of the five acres of corn all of which was done, as near as I could remember, in accordance with the directions of Mr. Gould at the institutes last season. It will be well here to note that Mr. Gould spoke disparagingly of the stone silos, that this silo was about 12x24, and about fourteen feet deep, being just about the space required to hold the three acres, and according to Mr. Gould's arithmetic, I computed the ensilaged corn to be about eighty tons in round numbers — as it settled about two feet, we will call it seventy-five tons.

The 10th of November we commenced feeding this ensilage twice a day to thirty-four head of cattle, about twenty of which were milch cows and the balance were young stock, all stabled in the same building. While the weather was pleasant and not uncomfortably cold, the cattle were allowed the range of the pastures, but when the weather was cold or unpleasant, they were kept in the stable except

about an hour for watering each day, and when kept in the stable they had a feed of hay at noon.

Their allowance of ensilage was a well heaped one, and one-half bushel basket divided between two head of stock, and the milch cows had in addition five quarts each of dry wheat bran, twice a day.

Upon stripping the ensilage for feeding, I found it damaged a little at the sides and corners caused, of course by the air getting in, and possibly by a want of packing in the corners, and also from the fact, that the masonry of the walls, although very true and well made, were not strictly true.

A Discussion Followed.

QUESTION — How do you get your corn stalks from the low trucks, to the cutters on top of the silo?

MR. GOULD — We don't put the cutter on top of the silo; it is put on the ground on a platform at the level of the top of the trucks. A carrier carries the fodder from the cutters over to the silo. The man that takes it off the truck, puts it on the cutters. There is only one lifting of the fodder.

QUESTION — How much shrinkage in weight is there from the green fodder put into the silo?

MR. GOULD — In Ohio, last year, it was almost universally left on the ground twenty-four hours to wilt. It has been estimated that there is about ten per cent. evaporation after that.

QUESTION — What is the length for cutting?

ANSWER — One-half inch. Fill your silo full and it won't shrink more than ten to fifteen inches. We put on the cover as soon as the top layer is warmed up.

QUESTION — Why would not a silo of circular form, without corners, be preferable?

MR. GOULD — Simply because of the waste of room.

MR. WEEKS — The corners of my silos are in an octagon shape, a very small corner cut off, and it treads down a little better than square corners.

QUESTION — Mr. Smith, what has been your success in filling a silo with clover hay?

MR. HIRAM SMITH — Two years ago I put my second crop of clover in the silo. That does not require cutting. You merely mow it in the forenoon, in the afternoon pick it up from the swarth, put it on the wagon, and the horse fork will take it off and drop it into the silo, and it is spread around evenly just the same as the corn. It is the best and cheapest way to take care of the second crop of clover. You get all the value there is in it. When you fill the silo you let the temperature raise to 120° and then refill.

QUESTION — What is the comparative value of clover and corn ensilage?

MR. SMITH — I don't know and don't like to guess; but we know from the nature of the plant that it is much more nutritious than corn fodder, ton for ton, but not acre for acre.

QUESTION — What does the gentleman fill his silo with that keeps forty head of cattle on sixteen acres of land?

ANSWER — Southern ensilage corn.

QUESTION — No clover at all?

ANSWER — No, sir; none at all.

QUESTION — Would you recommend the feeding of this ensilage to your horses.

ANSWER -- I have tried it, and found it very satisfactory.

QUESTION — What do you feed in the summer time?

MR. SMITH — Feed pasture grass and ensilage and keep twice as many as we used to.

QUESTION — How do you get the ensilage out without letting the air in?

ANSWER — Cut the door in the end of the silo into sections of two feet long, put it into its place, using a little bit of tarred paper, as you shut the door together, and then it is perfectly air-tight, but don't use any hinges, the ensilage will keep it shut. When you get ready to feed, take the cover off of one pit, and feed as evenly as possible from the surface and rake it down to this door. Make the door come up to about four feet of the top of the silo. When you feed

take out cut section, only, of the door, and rake to this door, here is your wheelbarrow to catch the ensilage, you fill it and go down the isle and throw "Block" one shovel full, and "Brindle" another, so that the action of the air is wholly upon the surface of the ensilage, and as it is frequently removed in feeding, no damage can result.

QUESTION — What is a proper ensilage ration?

MR. GOULD — From 40 to 60 pounds, according to the size and capacity of the cow. In full milk she will want that with about 6 to 8 pounds of bran per day, to balance the ration. Six tons will be ample to winter her if she is kept warm and comfortable.

QUESTION — Why plant corn so thin as 10 to 12 quarts per acre?

MR. GOULD — The object is to get an ear of corn and make your cornstalk develop and store up a stock of food. The more feed you can get off an acre, the more profitable it will be.

QUESTION — What do you consider a cheap and effective cover for a silo?

MR. GOULD — The most perfect cover I have seen this year is damp straw that was packed very hard, and then a load of hay put on that, and no tarred paper or anything of the kind. Mr. George Austin has one of the largest silos in Wisconsin. I would like to hear him tell about his silo.

MR. AUSTIN — I will take just three minutes to fit out a silo. You remember last fall that summer ended at night, and winter opened in the morning. When that came, my cows were upon as fine pasture as could be produced in northern Wisconsin. They were fed four quarts of bran twice a day in the stable. As quick as it came cold nights they were stabled nights and fed dry feed.

The next morning after it froze up, I opened the silo and commenced feeding ensilage. I gave 25 lbs. a day at first and gradually raised it to 50 lbs. to the full grown cows; in one week the flow of milk increased about twenty per cent. I was milking about thirty cows; they were strippers. The

thing was a revelation to me. I had been trying to solve this problem of low prices, and I believed that they had come to stay. I thought that this discovery of the silo was a solution of that problem. My cows give as good returns as I got in the summer, and it costs me less than ten cents a day to keep a cow, grain included. The expense of putting up the ensilage, I figured out, cost me $71\frac{1}{2}$ cents per ton. Five men and two pair of horses cut from the field and drew to the silo, and put in, forty tons a day. In feeding out this ensilage, I discovered that my dry cows and steers kept taking on flesh, as rapidly as they did on pasture grass, and I think it is the solution, not only of the dairy question, but of the beef problem. I think that with what we know and what we are going to learn on this subject, we can successfully compete with the men on the plains where it costs them nothing to feed. My silo has two thicknesses of walls and two thicknesses of paper between the walls; the whole silo is 44 feet long, 16 wide and 18 high, divided into three compartments. At the bottom and top of the centre posts I put an inch iron rod and drew it up tight to keep it from spreading.

A silo must be built strong. I open one pit at a time, and dig it out from the top with a common four or six tined fork.

QUESTION — Does it freeze on top?

MR. AUSTIN — No, sir; when the thermometer went down to 41° below you could put your hand on the ensilage, and you would feel a little frost.

QUESTION — Is not a masonry silo a failure in this climate, without there is a dead air space?

MR. AUSTIN — I have been told it is.

QUESTION — How will timothy do for ensilage?

MR. AUSTIN — Timothy will not make good ensilage. Timothy is the poorest forage crop I know of. I have no use for it.

MR. A. P. MCKINSTREY — My silo is wood. It is made with two air-spaces. If I was going to make another, I wouldn't make but one. My silo is 42 feet by 16 wide and 13 feet

high, on the north side of my barn so that I can take it out directly into the barn. My door is simply a hole in the barn, and I laid some loose boards across there, and tarred paper. When I wanted to open it I simply took an ax, and opened one of these boards. I have not got any roof that will shed water on it. The thermometer has gone down to 40° several times, but it has not frozen. I make my follower do all the protecting that is necessary. I built the silo so that I could put five feet more on top of it, but I think now, I will put four more below it, instead of on top, and I think I will protect the roof a little better. I think most of people cut their corn before it is matured, before the milk is in the ear. There is no question of its cheapness, I won't argue that. We started in this winter with twenty tons of hay, and we have got half of it yet, and I think we will have some left in the spring.

MR. CURTIS — I have a stone silo, the outer wall is two feet thick, about four feet above the ground, and seven feet below the ground. I have not discovered any frost on the ensilage at all. I took out what might be termed the floor over the cellar, and filled it right into the cellar, about eleven feet deep, and it settled about two feet. I put in three acres and calculated it was about seventy-five tons, according to the figures of Mr. Gould. We fed twice a day, last winter from that, thirty-four head of cattle, from the middle of November, until the first of February, when it was all fed out.

MR. GOULD — What was the effect when you stopped feeding the ensilage, and went to feeding hay?

MR. CURTIS — It was discouraging, the milk fell off quite a little, and the yield of butter also.

PRES. MORRISON — I met Mr. Putnam, living in Dodge county, last winter and he said that he had read a great deal about silos, and he went to work, and erected one, and he was very much like Thomas Jefferson, in putting up a saw mill on top of a mountain, he had no ensilage to put into his silo, and he went into the dent corn field which was

sufficiently matured to harvest, and he run it through his cutter, and put it into the silo, and he said afterwards, "If I didn't know that was put in last fall, I would swear it was put in yesterday." It was perfect, and he was feeding not only his cows but his horses, sheep and hogs. Now, many of you will go home from this convention, and commence your experimental work. I shall put up a silo the coming summer, I shall send to Mr. Curtis, at Ft. Atkinson, and get some of the southern sweet corn, and I shall take some of our ordinary yellow dent corn, and try that. I shall have one compartment of each kind.

Ensilage has already become an important factor in gathering and saving for use the product of the farm, and I believe the time is not far distant, when by this system, the fodder product of our farms may be doubled, and the value of our lands for keeping dairy cows. Yes, all our domestic animals, and fattening them too, correspondingly increased.

No subject at our farm institutes this winter, creates the enthusiasm and charm the attention of the farmers so thoroughly, and I think over 500 silos will be built in Wisconsin the coming season.

It is unnecessary to longer dwell or take more time of this convention, on the advantages of a system of curing a ration which shall place us independent of the weather, and which will enable us to double the feeding capacity of our farms. Try the ensilage corn and put up a small silo, and if another drouth like the one the past summer should shorten our hay crop, you will thank the members of this Association for dwelling and impressing this subject upon your attention.

NOTE.—The season of 1887, has justified all the attention that was called to the subject of fodder corn, and silos.—
[W. H. M.]

OUR COUNTRY ROADS.

BY ROBERT FARGO, LAKE MILLS.

A suggestive topic, especially so when one has bounced and bumped over the hubs and hummocks, and through the mud holes on a cold November day. Soft words ill befit a rough subject. There may be "music in the running brook" but there is no poetry in wallowing through a mud-hole. If there are grades of idiocy, then he is the greatest who deliberately cheats himself. If the manner in which we improve our highways is the measure of our ability, then there are 136,108 farm owners in Wisconsin, one half of whom should be prosecuted for assault and battery on the earth, and the other half sent to asylums for the feeble minded. It is not only a question how to make roads, but whether we make them at all.

I am here to assail, and if possible help destroy a custom (I cannot say system) that has nothing to recommend it except its antiquity. A relic of the feudal system, wherein the tenants were bound to furnish specific service of various kinds, and among others maintain the roads for the passage of my Lord and his troops.

Did you ever watch the process of working out the road tax from the stand point of a practical business man? I cannot, without thinking it the most ingeniously devised system to accomplish nothing ever invented.

Working Out the Road Tax.

The supervisors have drawn arbitrary lines subdividing the towns into road districts of contiguous lands, oftentimes putting the most valuable properties in districts having

from one to three miles of highway, and in another having an equal valuation, there may be six or eight miles of road, and half that through marshes. At the annual election of overseers the self cheating farmers are on the alert and see to it, that their district gets the right kind of a fellow for overseer, which means: that he will be easy, let the work go by default, and the coming tax workers get rid of the tax without interfering with the work on the farm.

The farmer has wallowed through the mud all the spring and when the roads are just passable the overseers by a sort of common consent call them out to work the tax. This is usually done at a time when a man's time with his team is worth five dollars per day in his corn field, or other pressing work. A general stirring up takes place all over this state; without method, without the faintest idea of how a road should be made the overseers tear and rend, throw dirt out and throw dirt in, fill an old mud hole by making a new one. He attempts to gravel the road by putting on stone indiscriminately in sizes from a bird's egg to a boulder twelve inches through. Woe betide the man who attempts a fifty-mile ride in the month of June. Fortunately or unfortunately, all the overseers are not of this type; with most it is a period of half rest, of watching the sun, of telling stories, and with all a longing for the end of the tax.

In some districts they are not called out at all. "What's the use? ain't their roads as good or better than their neighbors' down across the marsh?" A prominent farmer of Columbus county, said to me, "We don't do much work on the roads, our roads are naturally good and we don't purpose to disturb them." An observing Yankee puts it in this way: "The time for working out the highway tax (as it is rightly called) arrives. At 8 o'clock A. M. a motley assembly gathers, of decrepit old men, each with a garden hoe on his shoulder, of pale thin mechanics from their shops armed with worn out shovels. Half grown boys sent by their mothers, who, perhaps are widows, with perhaps the doctor, lawyer and minister, who all understand that 'work-

ing on the road' does not mean hard labor, even for soft hands. The farmer brings his steers, great and small, with the old mare in the lead, with a cart. The Irishman drives up with his sickly horse cart, with the rusted remains of a worn out rail-road horse, to do his part. The only effective force on the ground, consists of two or three yoke of oxen and a half dozen men hired by the overseer with money paid by non-residents, or men whose time is of too much value to themselves to be wasted on the road. Here is the overseer who never held the office before, and knew nothing about road making, or ordering a gang of hands. It is regarded rather as a frolic than serious labor. The old men tell stories, the audience lean on their tools and listen, and so on to the end of the chapter. About a week ends the farce. The husbandman resumes his honest toil. Soon the June rains come and seas of mud greet the eye in the districts where they have tried to do some work. And the cautious farmer who has cheated himself, may be seen feeling his way to town, dodging here and there with his team to escape miring. July dries up the mud leaving holes worse than ever. And who is to repair the roads now? Nobody. The tax is worked out. Should there come a mud hole large enough to hold all the voters at the town meeting the supervisors might feel constrained to repair or fill it otherwise it remains till the next annual spasm. Thus year by year, we with the paraphernalia for high art in road making, enact the farce and trudge on over most contemptible roads, content to be bumped and pounded, and broken to pieces, rather than inaugurate a system abreast of our times.

The man who would exact a square and honest day's work from his employe, and would scorn to withhold from another his honest due, does not hesitate to cheat the overseer and himself at the same time.

Now a system that is in such practical contempt by those most affected by it, and who are unwittingly the greatest sufferers, must be radically wrong and out of joint with our day and generation. This is true.

How City Roads are Worked.

The villages and cities discarded it long ago. Observing men have come to see that a week's work in June on the highways, is a work of ill directed force. They have come to have a contempt for a system so unequal and unjust, and withal a disgraceful farce. Why should the property owners, in a district having six or eight miles of highway, with a valuation of, say \$25,000, be expected to keep their road in good order, while an adjoining district with an equal valuation, may have but two miles of road, and that through a neighborhood rich in gravel, while their neighbors may be compelled to make roads without gravel.

To make a railway bed, skilled engineers are employed to take levels, and grade stakes are driven. To lay a drain tile in the farmer's field, he hardly feels competent to the task, until a few levels are taken. But men who never saw a level are deemed quite competent to take down the hills and ditch the swamps — to lay out thousands of dollars annually on the highways. In this economic age, why this work of force? Sit down a half hour and compute the taxes levied for highways in your town, and you will find in the older portions of the state money enough has been levied which, if collected in cash and wisely laid out, would have macadamized the roads twice at \$1,000 per mile and left a surplus. Now, what have we to show for all these "wasted years?" not even "leaves." Why? First, because a part of the tax has never been worked or pretended to be; second, for want of system — method — the labor has been mostly thrown away.

Most of you will recognize the picture I have drawn. I beg of you don't put it aside until its disgraceful proportions are indelibly photographed in your minds. You ask what is the remedy? We would abolish the present custom. Collect the taxes in money. Make the levy uniform in each county. Enact the township system; each town levy and collect the tax, and expend the money through a road commissioner appointed by the supervisors with reference to his

fitness rather than his politics, and the work laid out by or under the direction of the supervisors, not as now, in one week, but systematically through the year — beginning in the spring, and continuing till it freezes up in the fall: first, mending the roads; second, making roads. The usual tax levy in Southern Wisconsin will bring \$2,500, in a township. With this sum, four teams with tools and ten men, can be hired from April 1st to October 1st, six months. Suppose they move thirty-two yards (or loads) of gravel per day, and put three yards of gravel to a rod, they would make five miles of permanent road the first season; let two-fifths of the time be devoted to repairs, then you have three miles of permanent road. Suppose then one hundred and fifty-six consecutive days were devoted to grading and ditching, I imagine at the end of the first season the average countryman would think "something had happened."

Supposing a 4-mill tax was levied on the \$500,000,000 worth of farm property in this state. It would build 2,000 miles of macadamized road costing \$1,000 a mile. Do this five years, and Wisconsin roads would be the wonder of the nation. Can we, in the light of these facts, afford to plod on through the mud and leave to another generation the simple task that belongs to us?

About Road-Making.

A word about road making and I have done. What besides the overseer and his gang make bad roads? Water. What is most destructive to roads when made? Water. The first question then is prepare drainage, and the second, to hasten the rainfall from the road bed. When this is successfully accomplished you have a fairly good highway. In our undulating state ditches can be made on either side of the road bed that will serve as under drains and water courses at the same time. The surface should be so made as to serve the purpose of a water shed as well as a carriage road, for without the one you cannot have the other. The wagon track should be not less than sixteen feet wide, better twenty, with a slope of half inch to the foot from the

center out. And this slope should be maintained throughout the year. Avoid a too convex track, piled up in the middle, it is dangerous, difficult to turn out upon; all teams crowd to the center to find a level track, which results in deep ruts and rough roads. The covering of the road should be broken stone or gravel, which should be of uniform size — never mix small and large stone together. The small stone is crowded down and under and the large ones come to the surface. If the large stone must be used, put them all together, laying them systematically side by side and cover with gravel. Better the stone be broken or crushed to a uniform size. A depth from six to ten inches is regarded of sufficient depth. McAdam truly says: "The whole science of road making consists in furnishing a solid dry path on the natural soil, and then keeping it dry by a waterproof covering of stone which should form a hardened, smooth surface for transportation." Above all keeping the roads in repair cannot be overestimated. It is emphatically true, "that a stitch in time saves nine." A road kept in the best condition receives the least injury from travel and is kept in repair at the least expense. Why then is there not as much wisdom in keeping men on the roads at all seasons, filling up the holes and digging out the stone, as the railway companies do with their watchful section men?

Finally, let us "stop this foolishness" and act the part of wise men. The law-making power will echo our wishes when they crystalize into a rational system.

In these days, when steam, electricity and brains, have brought in their train ten thousand improved machines and methods and have forced divisions and subdivisions of labor, ought not the farmers of Wisconsin to yield to other and skilled hands the business of road making and road mending? And devote to "these" days in time "wasted" on the highway, to planting a few more acres of corn for the silo, or in building silos to put the corn already planted into, or in some equally as profitable employment in this form?

The wooden plough is gone, the sickle is only a symbol. The mower, the reaper, and the harvester have in their season superceded the sickle, sythe and cradle. The cooking range stands for the trammel and the crane. The steam car for the coach and the telegraph for the carrier. Let us move on a few generations and build our roads as we do other things of less importance by the light of the last paragraph of the nineteenth century.

If on the other hand, like the disciples of Confucius, we propose to stand with our backs to the front and delight in the mummied past, let us remove our "chop-sticks," let grow the "pig-tail" and commence "feeding the dead."

THE DAIRY INDUSTRY OF WISCONSIN.

BY J. A. SMITH, OF CEDARBURG.

In attempting to say what can be said, in the short time allotted, about the great dairy industry of Wisconsin, the statistics about the monied investments in it, the avails from it, its influence on the soil devoted to it, and all speculations as to the prices for its products, for the coming year, must all be ignored. The methods, of manufacturing either butter or cheese, instead of being explained or discussed, must also be ignored, and those wishing information on such points, must be referred to other sources, which are now abundant and cheap, so far as printed directions are concerned. So far as to learning how the actual manufacture of dairy products can be most successfully achieved, there is no better way, if indeed, there is any way, that should supercede the practical one of taking off the coat, rolling up the sleeves, donning the apron, and going at it, under the eye, and having the benefit of the oral instruction of the man or woman who really knows how to manufac-

ture either, or both butter and cheese. It is much like learning to play a musical instrument—we may read a description of the science of music, and see and hear men play to the end of our days, and then not learn to make music, unless we practice note by note, till we can make harmonious sounds. So in the manipulation of the delicate products of the cow—it is step by step we recognize the changes that take place, and learn to adjust ourselves to new conditions, much as the musician recognizes the changing notes in a tune. An effort made at the right time, and in the right way, makes music, in the one case; and in the other makes a good product of the dairy. In both cases, the education of the head and the hand must go together. It is discord, or a bad product, otherwise.

So on all these subjects that might—under other circumstances—be interesting or instructive to certain ones in a miscellaneous audience, I will consume no time upon; but confine my remarks to points that are the newest as well as most hopeful of the helps we have, that are now waiting to be appropriated for the advancement of the great Dairy Industry of the State, and the nation, and the world as well.

Three Advanced Steps Necessary.

We have arrived at a period in the progress of the industry, when a prosperous continuance in the business is contingent upon taking advanced steps in three things:

First. Increasing the production, at less cost of suitable food, for the growing of dairy stock, and the feeding for milk-making; and the preservation of the food for more successful assimilation by the animal force, we keep to transmute the coarse products of the land into milk.

Second. We are confronted with the problem as to the character of the animal we use for the purpose of producing the most solids of milk, for the food consumed; and, how we may know her, if we see her, and how we may reproduce her kind, when we obtain one of great performance.

Third. As the coming way to manufacture dairy pro-

ducts, is likely to employ more and more co-operative methods, we are, since competition has become so sharp, compelled to search close for a margin of profits, at all, confronted with the problem how to give each man his own after he has mingled his productions with those of his neighbor. Thus far, in the manufacture of gathered milk into either butter or cheese, we have taken little or no note of the relative value of different messes of milk delivered, so far as that difference has been made by the feeding, breeding, or time of farrowing the cows that produce it. In a feeble and unsatisfactory way we have been concerned only to know if no fraud in skimming and watering has been done, leaving the far more important matter of the quality of the milk, as determined by the character of the cow, to go almost unquestioned, and certainly unadjusted, on the basis of right.

These three points, comparatively new to nearly all, quite new to the immense majority, and unaccepted as truth by many who are conservative, but still on the part of those who have studied the bottom facts pertaining to each, there is an intelligent conviction among them, that leads them to found their hopes for the good future of the dairy industry, on not one, but on all the truths involved in these three points, as the imperative needs to be employed to enhance the just profits of the dairy business, and equitably divide the avails.

So to briefly enforce these three points, will be the aim of so much of an effort as I can make, within the brief time, I may be permitted to speak.

Make the Acres Produce More Food.

In regard to the first,—the necessity of making the acres we occupy produce more food for the cow than the old system we are outgrowing, which called for four acres to maintain a cow during the year, and in milk eight or nine months of the time, and at spasmodic production at that, according to the weather and drouths,—I apprehend there are now few of the better class of dairymen who will not say

we must get out of that, to keep in sight of the procession. If such area for the feeding of the cow is indulged in, it must be far away from the chief centers of production of fine dairy products,—out upon cheap lands; and, usually, that means an abandonment of the business, for one more in accord with the undeveloped condition of agriculture where land is very cheap. The other horn of the dilemma is, to work for low wages on high priced lands; of which, in point of fact, too much is yet being done. That this is needless, and may be avoided by those who will but open their eyes, and get a little inspiration from facts and observation, is now apparent to the intelligent. I have only time to assert, but the proof is within easy reach, that three acres, two acres, and even one acre of good land, will profitably grow all the grain and forage any cow can eat in 365 days, and her skim milk or whey, will pay for all the foreign substances she needs to balance the ration, that the land will not produce. The one, two or three acres will be required according to the present condition of the farm, and the degree of intelligence and energy there is in the man or the woman at the helm. The how to do this, has been heralded by the Farmers' Institute, within the past winter, from Barron to Kenosha county,—from Manitowoc to Grant county, and at forty or more other points all over Wisconsin, and must bear fruit in the near future. This computation admits of all the variety in food that may be got out of corn fodder and the corn that grows on it, clover, and a choice of small grains and the straw it grows on, together with just as much variety in other grain foods, as the by-product money will pay for. This is no dream,—it is being done. Few have reached the goal,—but there is a small army on the way.

The Animal We Need, and Feed.

The second point:—the character of the animal we need, and feed, how we may know it, and how reproduce its kind: The census, the co-operative factories, and the scale beam,

tell us that the average cow of the country, does not yield — even to be very liberal about it — 4,000 pounds of common milk per annum, of which it takes twenty-five pounds to make a pound of butter. That would give us, in round numbers, 1,000 pounds of milk per acre that is devoted to feeding the cow, and we have to add the value of the fertilizers she leaves on the soil. That yield is not enough on land costing \$40 or \$60 per acre; and it would be ruin to the farmer and the farm, but for the fertilizers that even stupidity does not entirely waste. One certain result comes from such work — low wages per day for the farmer, and less than United States interest on the investment. It would be safe to assume that such dairy farming does not yield any more gross revenue than an average of \$7.50 per acre — the cost of labor in cultivating the land, and waiting on the cow, summer and winter, to come out of that. Of course the waiters work cheap. Suppose now we get a better cow, one that yields even no more than fifty per cent. more than the scrub we have taken the measure of, — have her earn \$45, and keep four of them on the same four acres of land, and we raise the gross revenues from \$30 per annum to \$180, and in doing it have incurred extra cost for labor on the land, and taking care of three extra cows, say at \$20 per head, added to the cost of waiting on the one; still we have \$90 more from each four acres of land than under the present average regime; or \$22.50 more profit per acre. Part of this gain it is true, comes from point No. 1, to wit: the better utilization of the land, in raising big crops, but \$15 per cow comes from the improved character of the animal used, and I have only taken a \$45 earning cow at that, when there are many men in this crowd who have cows enough better, than I have taken to illustrate a point of easy accomplishment, to earn \$50, \$60 and \$70 each, and may keep one on each acre if they choose to. Two hundred pounds per day of such a mixture of corn fodder, corn, clover and oat straw and oats with the value of the skim milk or whey expended for other varieties of food, will be all four cows can eat; and all, but

the little purchased food, will grow on even less than four acres of land, that four cows fertilize. You don't believe it, perhaps? But Miller & Sibley, of Franklin, Penn., are actually doing better than I estimate.

As another and essential part of the second point under discussion, I might speak of the flood of light that has been poured in to elevate and advance the dairy industry of Wisconsin, within the past year by inculcating sound views about the "butter temperament in cows," and the "nervous theory" as it gives capacity to the cow to perform; as that subject has been discussed from the rostrum by Mr. W. D. Hoard. It has been a chart held up before the eye, and a lesson of truth poured into the ears and consciousness of the farmers of Wisconsin, and some other States, that has been for their hope and encouragement, equal to a reinforcement, to a wavering column on a battlefield; teaching them that they need not go blundering along, seeking milk and getting meat; but that we may know the true dairy cow by the flags she carries, and breed from her with a reasonable assurance that we shall not be disappointed in results. But the facts of this sustained advance along the whole line, have been told to you, by their able expounder, already: in far more fitting words than I could hope to command; so I forbear to add a word. I only ask you to keep in mind the full force of them, as they substantiate my point.

Value of the Oil Test.

On the third point, of vital import, not only to the farmers who should know the butter producing capacity of the cows they feed, but as an umpire to decree justice between men who use the co-operative system of manufacture of dairy products, and to enable the consumers of milk in the cities to easily know what they pay for, I regard the facts of the oil test as a measurer of the butter value in milk and cream of inestimable value to the true interests of the dairy industry of Wisconsin, as well as of the world. It relegates guess work, and puts the industry on a business basis. It

may be truthfully said that if all the improved methods for making the test correctly were not invented and manufactured in our state, yet it is true that the methods have been simplified and cheapened, and their correctness intensified by Wisconsin men. It is also true that through its dairy and other journals, and through its farmers' institutes, more has been done to pave the way for its introduction and established use than has been done in any and all other states of the Union. The use of it showed one farmer that seventeen out of thirty-seven cows had better be hurried to the block. With an eight-cent tube the city purchaser of milk can put the milk distributor on his good behavior; the patrons of factories may get their own as their cows produce it; and as a peace measure, between contending breeders of dairy cattle, it makes contention profitless, and assumption silly; as much so as to contend about weights, when the scale instead of guess work tells the whole truth. No man need to buy a milch cow without knowing what is the character of the milk she gives, any more than he need buy a bond without knowing the per cent. of interest it calls for. No breeder need make himself ridiculous by talking about caseine richness in milk, and boast about a "cheese cow," any more than one need talk about the value of straw in unthreshed wheat. There is value in each, but the butter in one case, and the wheat in the other, measures the value, when all products are in good normal condition.

To summarize this talk — The imperative demands of the dairy industry of Wisconsin are: Vastly more food grown upon an acre; a cow that will produce 250 or 300 lbs. of butter per year, to consume the food, and still have enough; and then, in co-operative work, have the just value of her milk paid for by an honest test.

AGRICULTURAL EDUCATION.

BY HON. HIRAM SMITH, SHEBOYGAN FALLS.

Instrumentality of Farmers' Institutes.

Ladies and Gents — On behalf of the regents of the Wisconsin University, I will give you a short history of the origin and inauguration of the system of agricultural education, through the instrumentality of Farmers' Institutes.

Not a single member of the board of regents had any knowledge or expectation of the fund that finally was appropriated by the liberality of the legislature of our state, and placed in the hands of the farm committee. The notice in the paper of a bill introduced by Hon. Mr. Estabrook, of Manitowoc, was the first notice that the members of the board had that the money was intended to be placed in their hands. After a brief consultation, we accepted the trust, and endeavored to carry it out in the spirit of the law, and to meet the expectations of the farmers of this great state.

With the unanimous consent of the board of regents, Mr. Wm. H. Morrison was chosen Superintendent of these institutes, it being deemed necessary to take such a step. He knew as no other man in this state did, that an audience must be enlightened and interested, and have the worth of their time in information received from the laborers he employed. And he wisely chose, as he gained a knowledge by correspondence and by personal knowledge, of what each man could best represent. The man who had made it the study of his life to raise beef cattle, was selected to represent that branch, another man horses, others the dairy, others horticultural knowledge, and so on through, and in

looking the list over after they were selected, it was a great satisfaction to learn that nearly every member of the corps he has carried with him as his assistants, has come up slowly from his boyhood, and has graduated in that most important of all schools, "Root hog, or die." They understood how they had succeeded, they had come up through many trials, it was enforced economy on them, and therefore they were particularly fitted to point out the best measures to pursue to avoid certain pitfalls which farmers and all other classes were liable to fall into. It has also been pointed out by the best writers and thinkers among agricultural people in other states, that Wisconsin was very fortunate in securing as assistants, to go with the superintendent, from who had practical experience in every single interest they attempted to represent. It was important that the people of the state should be furnished with all the knowledge which the present age has been able to develop, and our success in securing experts in their respective lines, has been a source of great gratification.

Class Legislation.

I am not in favor of class legislation, neither should we be paid an appropriation from the general fund of the state. Distributing through the state agricultural knowledge, is not in its nature, class legislation. The great body of the people of the state are engaged in agriculture, directly or indirectly dependent upon the prosperity of agriculture. We are an agricultural state; the last census shows that there are 800,000 farmers in this state with an invested capital of \$568,000,000. There are barely \$20,000,000 capital invested in manufactures; and we think it is a pretty good manufacturing state, too. There are \$168,000,000 invested in railroad enterprises in the state of Wisconsin. So you see that the agricultural interests of Wisconsin over-shadow all other interests combined, and those other interests are directly dependent upon the prosperity of the agricultural classes.

Therefore it is not class legislation, but in its broad sense it is legislation for the prosperity of the entire state. Now, I said it is not taken out of the general fund. How is the general fund of the state of Wisconsin made up? There is not a man in the state of Wisconsin, that has paid personally one shilling towards the entire expenses of the farmers' institutes for the past two years. You know we have had no state taxation. We have paid shillings and dollars to special appropriations for different subjects, but not a dollar has been appropriated of the state taxes upon the farms or other property of this state, but it is raised by a license from the railroad companies, the insurance companies, and in various ways, but no direct tax comes to a single farmer,

and if we had had no Farmers' Institutes, our taxes would not have been a cent less.

Food and Clothing.

Now, the great body of agriculturists in Wisconsin are producers. They produce food and clothing, the two great central necessities of the race. Agriculture not only furnishes employment to the great masses of laboring men, but it adds strength and stability to the nation. We are the producers of the great body of wealth of the world. They are the great central necessities.

Now, music is good, education is a good thing, music stirs the nobler sensibilities of our nature, knowledge and the fine arts refine any people, but the great necessities are food and clothing. From the ravages of fire, from the desolation of the flood, from the destruction of the cyclone, comes the first cry of necessity for food and clothing. Yet these are cheap common things, but, you must remember the rapid advance in the population of every nation. Starting in 1887 with nearly 60,000,000 of people in this country, the population is doubling in numbers every twenty-five years. In the next twenty-five years you will find over 100,000,000 people in the United States. Many of you in attendance upon this meeting will, in all probability, live to see a population of 200,000,000. The population is increasing, but the cultivated fields are not increasing in equal proportion. Therefore food and clothing will be the great central figures to provide for. It will require the wisest statesmanship, the broadest philanthropy, to provide ways and means by which those wants will be met. If we, as agriculturalists, improve upon the knowledge we can gain, and live up to our high privileges, we shall not only make wise provisions for ourselves and families, but will be aiding the great republic of the world to sustain her position, her prestige among the nations of the earth.

Closing Remarks.

SUPT. MORRISON — *Ladies and Gents.*—I had intended to take some time to review our past winter's work, but it is late and I will only say, we have held fifty-four institutes, comprising something like 300 sessions, reaching, I think, in the neighborhood of 50,000 farmers.

I have nothing to say in reference to the work, that is with you, and if it has been good work, it will bear its own fruits. I thank you for your attendance, and for the appreciative attention that you have given us.

LIST OF

Institute Workers, Post-Office Addresses and Subjects.

- ADAMS, H. C. *Editor of Western Farmer, Madison*—The cost of keeping a cow. Forage crops. Manures. Small fruits. Our Experiment station. The question of markets. Schools of agriculture. The rights of farmers' wives and daughters.
- ALLEN, N. E., *Beaver Dam*—Clover, how to raise. All about chinch bugs, and how to fight them successfully. The renovation of exhausted lands.
- ANDERSON, HON. MATT. *Pine Bluff*—My experience with Alsike Clover. Corn culture.
- ANTISDAL, O. D., *Afton*—Our farms. Care of cattle. Dairying.
- ARNOLD, A. A., *Galesville*—Corn culture. My experience with hogs. How I raise cattle. Farming the most profitable of all occupations. How I make fence.
- ARNOLD, OMAR J., *Fennimore*—Plows and plowing the basis of farming operations. Wisconsin weeds, and how to destroy them.
- ATKINSON, DR. V. T., *State Veterinarian, Milwaukee*—Crippled horses (illustrated.) Contagious diseases of animals. Horse shoeing and horses. Reproduction and its consequences in domestic animals. (Illustrated with charts.)
- AUSTIN, GEO. A., *Neillsville*—My experience with the silo. Butter making. How shall we improve our cows. Will it pay the farmer to breed draft horses?
- BEACH, C. R., *Whitewater*—Success in Dairying. Permanent pasture. I built a silo. How shall we select our cows?
- BILLINGSLEY, J. J. W., *Editor of Drainage Journal, Indianapolis, Ind.*—Practical talks about tile drainage.
- BREHETON, G. R., *Mazomanie*—Dehorning cattle. Breeding and management of farm horses.
- BROWN, WALDO F., *Oxford Ohio*—Farmers' clubs. Fertility. The farm barn. Food feeding and nutrition.
- BRYANT, GEO. E., *Madison*—My experience with thoroughbred stock. The farmer's horse. Bush, W. B., *Sparta*—Dairying. Raising pork and clover in connection therewith. Economy and brains in farm management. Are farmers as a class doing as well as they might?
- BYERS, DR. F. W., *Monroe*—Hygiene and sanitation on the farm. Poultry on the farm.
- CARSWELL, FRED., *Lone Rock*—The cultivation of grass. Best methods of keeping mowing lands productive. Management of pastures.
- CHAMBERLAIN, T. C., *President of the University of Wisconsin, Madison*—Agricultural education. Our country schools.
- CHAMBERLAIN, W. I., *Ames, Iowa, Pres. Iowa Agricultural College*—Our experiments. Management of manure. Industrial education. Commercial fertilizers—To what extent can they be profitably applied.
- CHEEVER, D. G., *Clinton*—Success or failure, which and wherefore. Lessons from the drouth.
- CLARK, J. A., *Sparta*—"Wisconsin and its varied soil." "The average Wisconsin farmer."
- CLAPP, I. J., *Kenosha*—My silo experience. The Gurnsey cow. Forage crops.
- COLEMAN, HON. NORMAN J., *Commissioner of Agriculture, Washington, D. C.*—The business farmer, his opportunities in the various industries connected with farming.
- COOK, PROF. A. J., *Michigan Agricultural College*—Our insect pests and how to destroy them. Successful bee culture. The chinch bug—can it be destroyed? If not how can we check-mate it?
- CURTIS, F. C., *Rocky Run*—Hints on dairying. How to restore fertility. My silo. Mr. C. is well known throughout the northwest as a good butter maker, receiving first premium on dairy butter at the state fair. At several of the institutes he will churn, wash and pack the butter that brings gilt edge prices.
- CURTIS, COL. F. D., *Kirby Homestead, N. Y.*—How shall we feed our hogs? Can we make our sheep pay?
- CURTIS, J. A., *Patch Grove*—Producing, saving and applying manures. Mixed farming. Corn culture.
- DARROW, A. H., *Brandon*—Forage plants.
- EDGERTON, S. R., *President Walworth County Fair, Spring Prairie*—From wheat to live stock. What kind of farming pays best?
- ELLIOTT, C. G., *Engineer and Superintendent of Special Drainage District No. 1 of Illinois*—Tile drainage. Road making.
- EMERTON, THOMAS, *Cooks Valley*—Improvement of meadows and pastures. Sheep, the best stock to improve an impoverished farm. What kind of fertilizers shall we use? My experience with plaster, lime, ashes and salt.
- ESTABROOK, HON. C. E., *Attorney General, Manitowoc*—Economy of the state.
- FARGO, ROBERT, *Lake Mills*—Evolution on the farm. Corn, the farmer's bank, how to grow it. Hints about a drouth. Our country roads and the highway laws.
- FAYILLE, STEPHEN, *Delavan*—Our grass crop. Clover. The value of corn as a forage plant.
- FOSTER, A. T., *Sparta*—The advantages of diversified farming over exclusive grain raising. My dairying experience.
- FOX, A. O., *Oregon*—The changes which are affecting our beef production. The use of the thoroughbred horse for the common farmer.
- FORBES, PROF. S. A., *State Entomologist of Illinois*—Insects injurious to small fruits, and insect enemies of our grain crops.

- FULLER, E. G., *Manager of Houghton Farm, Mountainville, N. Y.*—Practical butter making. Dairying for profit. How to feed for butter. Economical feeding.
- GAGE, R. H., *Whitewater*—How I managed to induce 13 cows to produce 4,498 lbs. of butter in one year?
- GAINES, J. W., *Lowell*—Horses for the farm. Mutton sheep. Winter care of cattle.
- GARFIELD, CHAS. W., *Secretary of Michigan Horticultural Society, Grand Rapids*—My way of making a rural home attractive. Tree lessons. The roadside by the farm. Conversation in rural homes. The farmer's duty to his school. Learning to see.
- GEORGE, F. A., *Hale*—My experience in dairying. How the ordinary farmer can improve his live stock.
- GOULD, JOHN, *Aurora, Ohio*—The kind of dairying demanded. We will churn and pack the butter. The silo and its management. Ensilage as a factor in dairying. Clover as an agent in farming. Fodder corn.
- GRANGE, PROF. E. A. A., *State Veterinarian of Michigan, Lansing*—The external conformation of the horse, sound and unsound, illustrated. The horse's foot in health and disease, illustrated. Diseases of the digestive tract of the ox, illustrated. Relation of the diseases of the lower animals to man. Diseases of the digestive tract of the horse. The teeth of horses and cattle in health and disease, illustrated. Lameness, its causes and symptoms, illustrated. The lungs of horses and cattle in health and disease, illustrated.
- GUY, HON. C. V., *River Falls*—Cost of producing beef as related to the cost of feed. The value of lands compared with the value of crops produced.
- GROVER, EDWIN, *Amherst*—The importance of the corn crop. Winter feeding.
- HACKER, T. L., *Cottage Grove*—Bloodlines in our great butter cows. How to breed, rear and handle the dairy cow.
- HAMILTON, C. H., *Ripon*—Can the growing of small fruit be made profitable? The care and culture of the blackberry. Fruit upon the table. Tillage, or value of good culture.
- HARDING, GEO., *Waukesha*—Shorthorns for beef and butter.
- HATCH, C. A., *Ithaca*—Bee culture. Feeding and handling of sheep.
- HATCH, A. L., *Ithaca*—Fruit culture as a business. Farming for a living. The discouraged farmer. Field notes for home use. Planting of trees.
- HENRY, W. A., *Madison*—Corn fodder; how to handle and feed it. Some of the things we have found out in our experimental work. A talk with young men who intend to follow farming. Our agricultural course at the state university.
- HOARD, W. D., *Editor of Hoard's Dairymen, Fort Atkinson*—Principles of dairy breeding. The cultivation of grasses. The butter temperment in cows. The horse.
- HOXIE, B. S., *Cor. Sec'y. Wisconsin Horticultural Society, Evansville*—What has science done for the farmer? The economy of out-houses. Farm buildings, with models and plans. Waste places.
- HUBBARD, H. F., *Manitowoc*—Home surroundings.
- HUTCHINSON, HENRY, *Randolph*—Sheep husbandry.
- HUEBNER, F. A., *Manitowoc*—Potato culture. Poultry.
- JONES, GEO. W., *West Bend*—Bee culture.
- KELOGG, GEO. J., *Janesville*—Forestry. The fruits you can grow and the fruits you cannot. The insects most to be feared in the orchard. Why the farmer grows so little fruit. Is it profitable for the farmer to grow in Wisconsin?
- KISER, J. C., *Oregon*—Use only pure bred sires.
- LOUIS, THEODORE, *Louisville*—Swine breeding and pork making. The possibility of our corn crop. Movable fences.
- MCKINNEY, H. D., *Janesville*—The road and trotting horse an important factor in successful farming.
- MCPHERSON, D. M., *Lancaster, Ont.*—Cheese making. Cheese factory management. Dairy barns.
- MILES, PROF. MANLEY, *Lansing Michigan*—Stock breeding. Rotation of crops. Barnyard manure. Nitrification of soil.
- MILLS, COL. CHAS. F., *Sec'y. Illinois State Board of Agriculture, Springfield, Ill.*—Improved stock.
- MORROW, PROF. GEO. E., *University of Illinois*—Needed changes in western farming. The soil and its management. Corn and its culture. Grass and clover. From grain to live stock. Principles of breeding. Improved stock, what it is and how to get it. The average farmer and his prospects.
- NORTHROP, S. S., *Clinton*—Corn and clover. The farmer's sheet anchor. Noxious weeds.
- PARK, E. H., *Dodge's Corners*—Diversified farming. Lines of thought and education that the farmer should follow through life.
- PARKER, G. S., *Janesville*—Human foods. The farmer and the grange. The relation of the farmer to the common schools.
- PAULSEN, AUG. A., *New Holstein*—Raise the calves. The farmer as a dairyman. Stock feeding.
- PERROT, LOUIS, *Greenville*—Care of dairy stock in winter. Marketing dairy products.
- FLUMB, J. C., *Milton*—Evergreens and how to have them. Tree planting. The coming apples. Implements for the garden and how to use them. Poultry for profit.
- PUTNAM, W. H., *River Falls*—Bees and their management. The farmer's mistake.
- RAHR, HON. REINHARDT, *Manitowoc*—How crops grow, and how crops feed. (Illustrated.)
- RICE, MILES, *Milton*—The theory and practice of dehorning cattle. Pig hobbies. Production of beef. Making butter and raising horses compared.
- REWEY, HON. J. W., *Roway*—The revenues of the state, who pays them and what becomes of the taxes we pay. Why the boy leaves the farm and his education. The business farmer.
- RHODES, JOHN, *Kansville*—How to feed a farmer. How to make money at mixed farming.
- ROBBINS, H., *Plattville*—Can we compete with western cheap beef?
- ROBERTS, R. F., *Woodworth*—Wintering horses. Why boys ought to leave the farm.
- ROBERTSON, PROF. J. W., *Montreal, Canada*—The rearing of calves. The feeding of milk cows. The care of and preparation of milk for cheese factories or creameries. Butter making. Cheddar cheese making.
- SANDERS, J. H., *Editor of Breeders' Gazette, Chicago*—Potency of transmission.
- SANGER, T. L., *Pres. State Agricultural Society, Milwaukee*—The relation of the Wisconsin State Agricultural Society to the Farmers' Institute.

- SANFORD, PROF. MARIA L., *University of Minnesota*—How to make a happy home. How to make work hard.
- SANBORN, PROF. J. W., *Director of Experiment Station, Columbia, Mo*—Experiments at the station. Cattle feeding. What foods are most economical, and how should they be fed.
- SAYRE, DAVID F., *Fulton*—Experiments in hog feeding. What kind of grit pays on the farm. What the institutes have done. I built a silo. My experience.
- SAYRE, D. F. JR., *Fulton*—Breed to a purpose. Thoroughness in farming. Weedy plants on the farm.
- SCOTT, GOV., *Iowa City*—The grazing and feeding problem to the farmers of the central west.
- SHELDON, S. L., *Madison*—Farm machinery.
- SLOAN, HON. I. C., *Madison*—Laws relating to the farm.
- SMITH, J. McLAIN., *Dayton, Ohio*—English notes. Red polled cattle. Feed rotations. Farm improvements. Making and saving manure. The farmer's social position.
- SMITH, J. M., *President of Wisconsin Horticultural Society*—Drainage, fertilizers and tillage. The farmer's protection in time of drouth. Root crops for stock, or for the market, varieties and methods of culture.
- SMITH, M. J., *Fairplay*—Management and care of live stock. Care of farm machinery.
- SMITH, HON. HIRAM., *Sheboygan Falls*—Facts about dairying. The value of the silo. Shall the dairyman buy grain?
- SMITH, J. A., *Cedarburg*—The value of milk, how determined. Good points of the factory system.
- STICKNEY, J. S., *Wauwatosa*—The ornamental in horticulture. The farmer's home surroundings.
- THAYER, HON. J. B., *Superintendent of Public Instruction*—School district library.
- THOM, H. C., *Beloit*—Summer feeding. The farmer a business man. Education an essential to successful farming.
- TOOLE, WM., *North Freedom*—Practical floriculture.
- TRUE, J. M., *Baraboo*—How shall the ordinary farmer best improve his live stock? What kind of horses shall the farmer breed?
- TUTTLE, A. G., *Baraboo*—Hardy fruits. Thirty years experience as an orchardist in Wisconsin.
- VAN MATER, T. J., *Fayette*—Profits of hog raising. The secret of success in farming.
- WEEKS, H. S., *Oconomowoc*—The silo in winter dairying. The production of cream.
- WEST, H. P., *Fayetteville*—Potato culture. The farmers' garden.
- WILLARD, FRANK H., *Editor Western Farmer, Madison*—What dairy farming demands to-day.
- WILLIAMS, DANIEL., *Oconomowoc*—Economy of the farm. Rotation of crops in connection with grain-raising. Farm fences, how shall they be made?
- WILKINSON, H. J., *Sec'y. Wisconsin Sheep Breeders' and Wool Growers' Association, Whitewater*—Will it pay the Wisconsin farmers to raise sheep? Preparing the soil for growing crops. Can the ideal in farming be realized?
- WOODWARD, J. S., *Sec'y. of New York State Agricultural Society, Lockport, N. Y*—The profit of early lamb raising.
- WYLIE, GEO. *Leeds*—Swine.
- N. B.—At each institute J. A. Smith, John Gould or F. C. Curtis will churn, work and pack butter: explaining in detail how the best quality is made.

The Reason Why.

It is said "there's nothing new under the sun," and it may be a true saying. But when the light of reason is thrown on some of the every day occurrences in life, it is astonishing how little we actually know as to the whys and wherefores of matters which attract our attention. In the hurly-burly of this world we are apt to take for granted facts as they appear, because we have not time to thoroughly investigate them. The Chicago, Milwaukee & St. Paul Railway Company has endeavored to save the enquiring mind the trouble of much research, and has published in a little book entitled "Why and Wherefore," many reasons why various facts exist. The language is plain and simple, and the volume might be used with profit as a reliable class book in public and private schools. As a household reference it is invaluable, and children as well as grown people can read and understand it.

While this publication is in a measure an advertising medium for the Railway Company, that fact does not detract from its value, and a copy of "Why and Wherefore" will be sent free to any address by enclosing *ten cents* in postage to A. V. H. Carpenter, General Passenger Agent, Milwaukee, Wis.

A Great Railway.

The Chicago, Milwaukee & St. Paul Railway Company now owns and operates nearly fifty-six hundred miles of thoroughly equipped road in Illinois, Wisconsin, Minnesota, Iowa, Missouri and Dakota. Each recurring year its lines are extended in all directions to meet the necessities of the rapidly populating sections of country west, northwest and southwest of Chicago, and to furnish a market for the products of the greatest agricultural and stock raising districts of the world. In Illinois it operates 320 miles of track; in Wisconsin 1,220 miles; in Iowa 1,575 miles; in Minnesota 1,125 miles; in Dakota 1,190 miles; in Missouri (now build-

ing) 150 miles, and the end is not yet. It has terminals in such large cities as Chicago, Milwaukee, La Crosse, St. Paul, Minneapolis, Fargo, Sioux City, Council Bluffs, Omaha and Kansas City, and along its lines are hundreds of large and small thriving cities, towns and villages. Manufacturing interests are cultivated, and all branches of trade find encouragement. The Railway Company has a just appreciation of the value of its patrons, and its magnificent earnings are the result of the good business tact which characterizes the management of its affairs.

The popularity of the line is attested by the fact that notwithstanding the strongest kind of competition of old and new lines, the Chicago, Milwaukee & St. Paul Railway continues to carry fully sixty per cent. of all the business between Chicago, Milwaukee, St. Paul and Minneapolis. It is the best patronized route to and from all points in Wisconsin, Minnesota, Dakota and Iowa, and on the completion of its Kansas City line early in 1887, it will undoubtedly take equal rank with the older lines leading to and from the southwest.

On all its through lines of travel the Chicago, Milwaukee & St. Paul Railway runs the most perfectly equipped trains of Sleeping, Parlor, and Dining Cars and Coaches. No effort is spared to furnish the best accommodations for the least money, and, in addition, patrons of the road are sure of courteous treatment from its employes.

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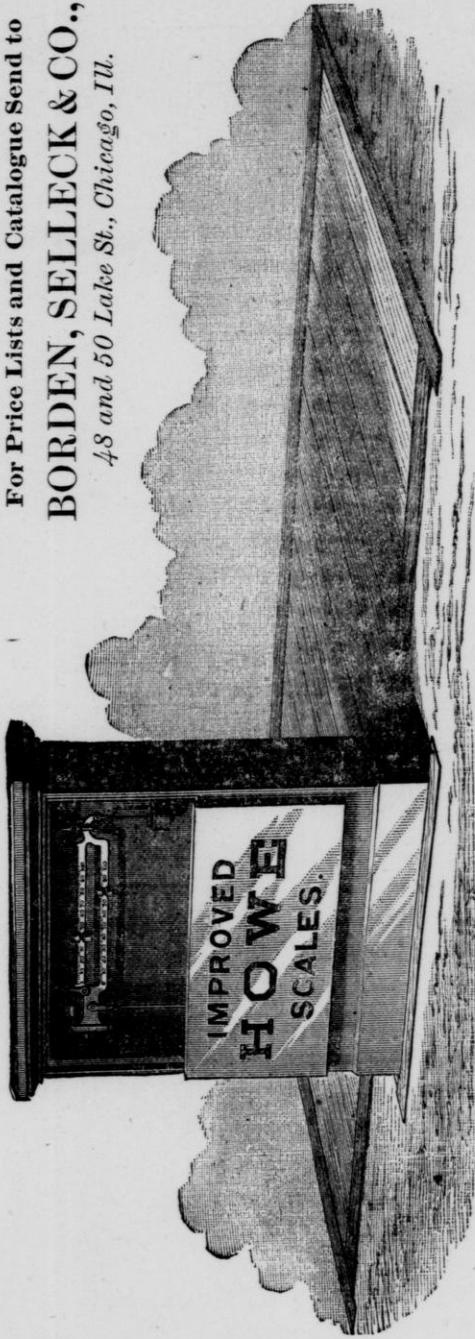
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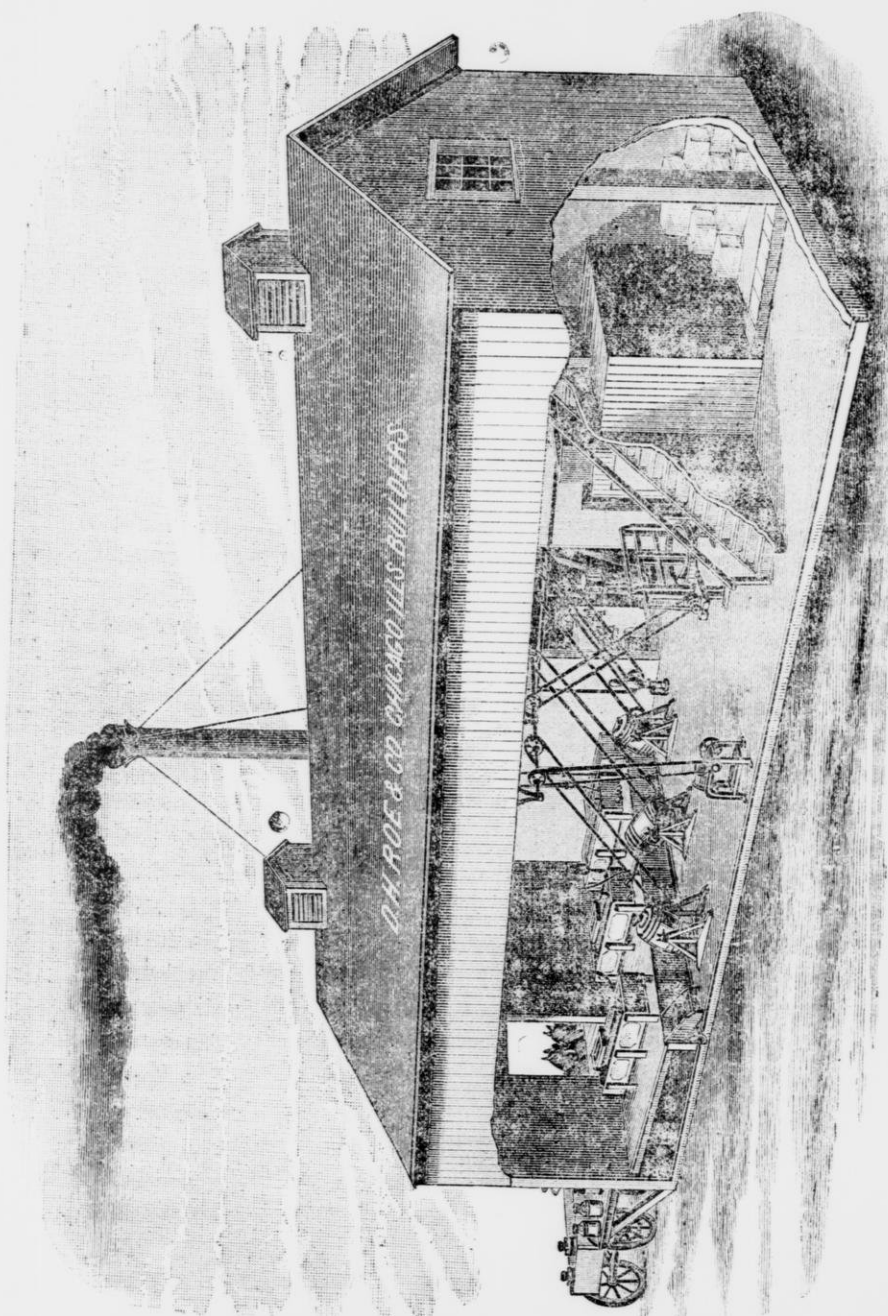
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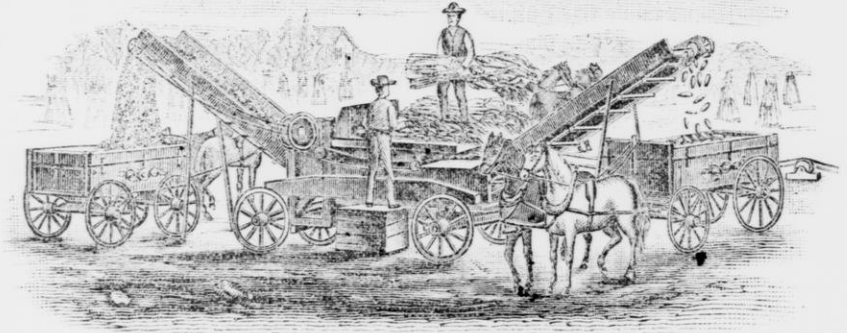
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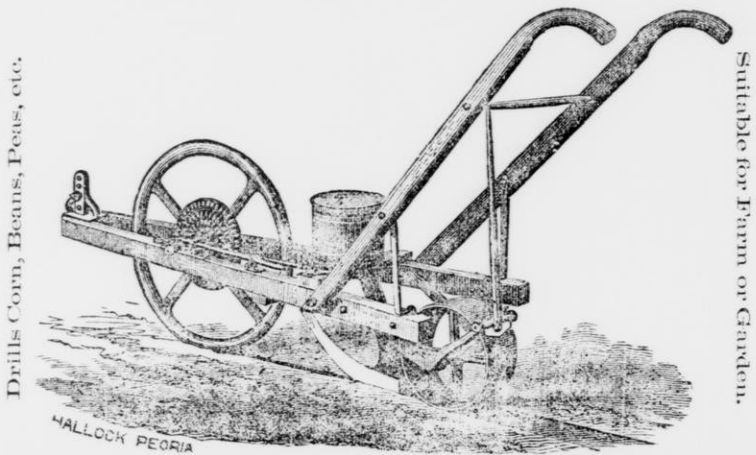
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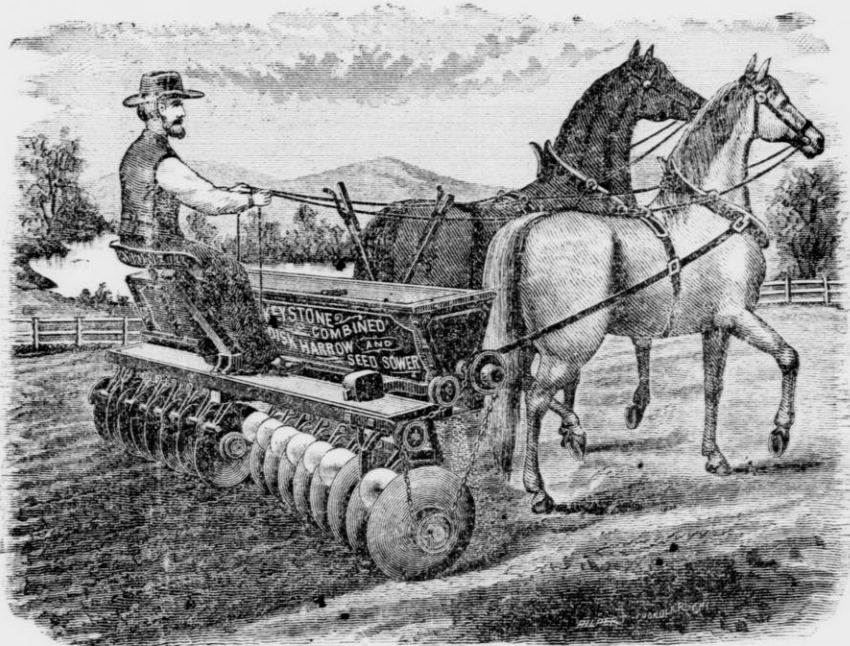
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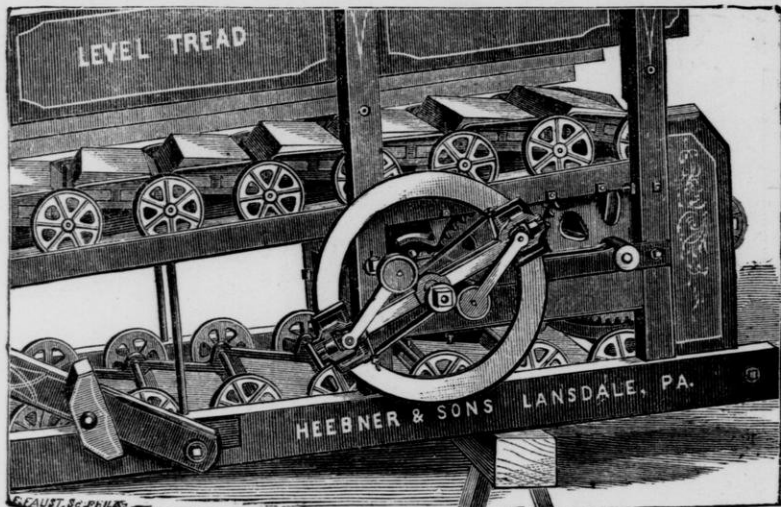
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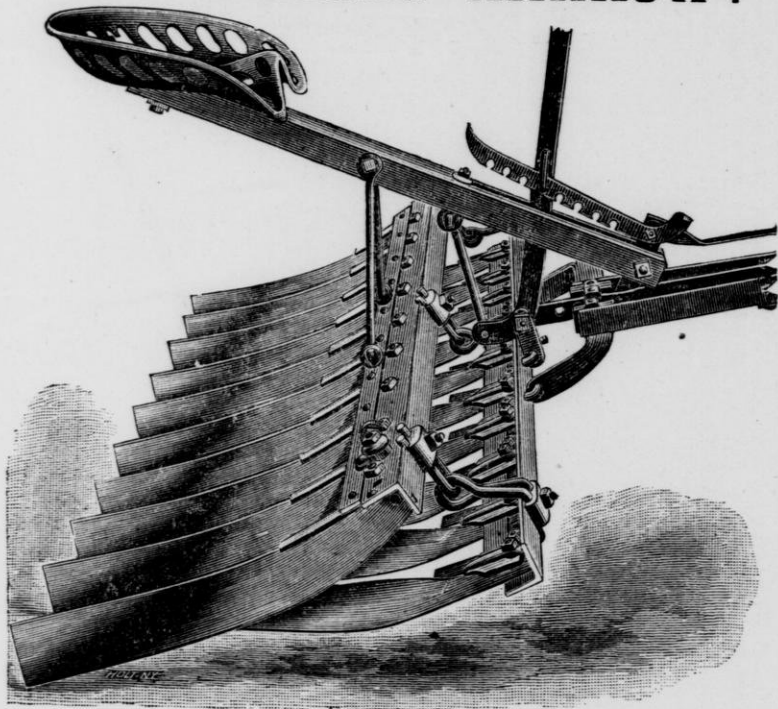
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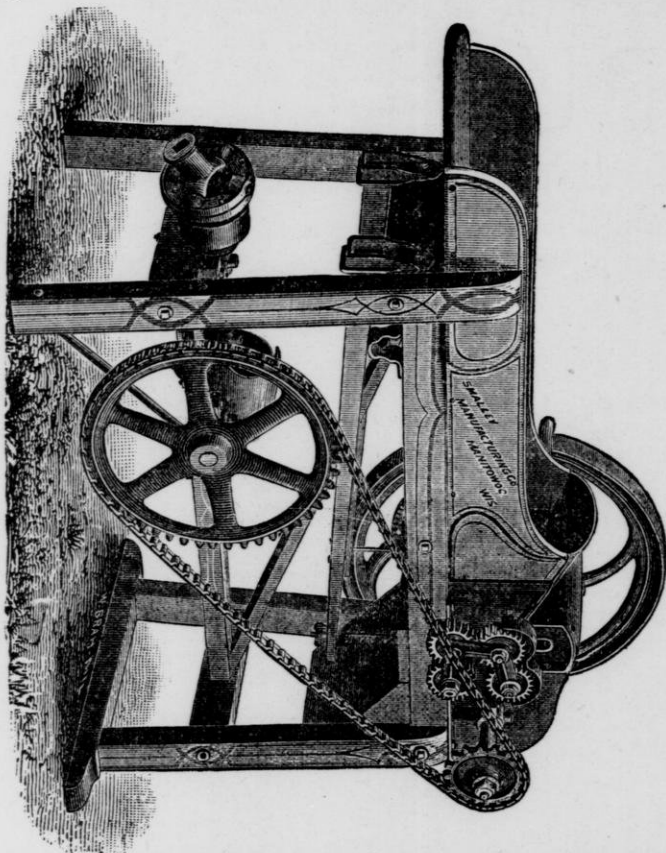
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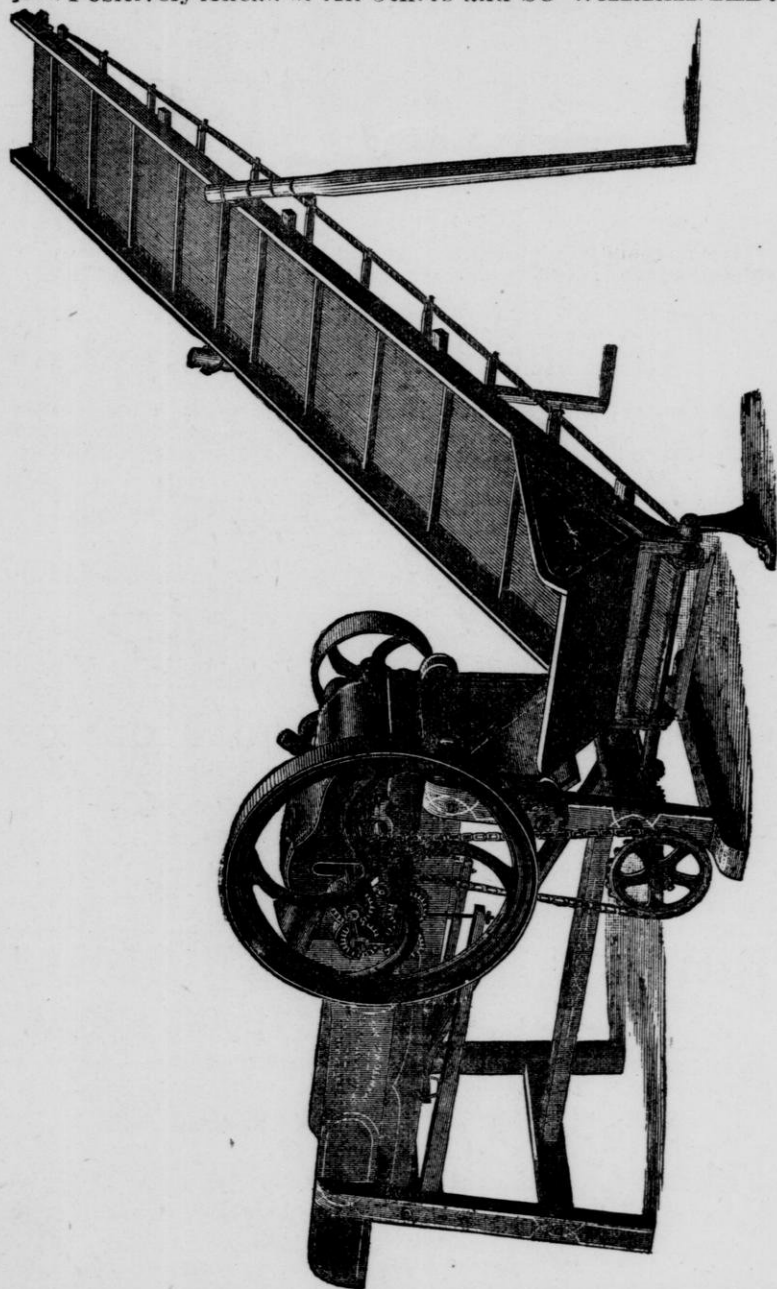
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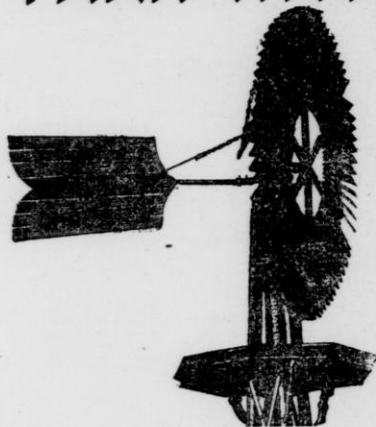
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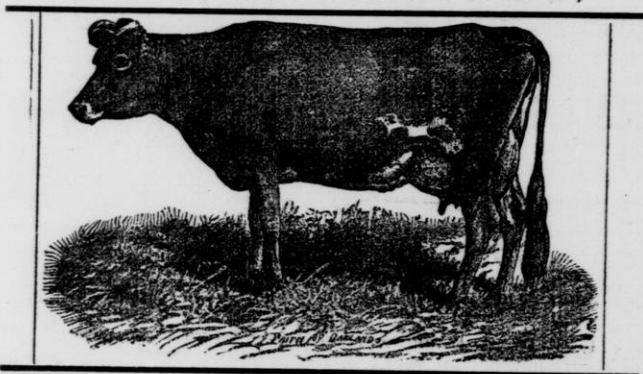
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Its rapidly increasing annual sales during the past five years have aggregated about 2,000 pure-bred horses, and its total sales nearly \$4,000,000.

To its influence is largely due the establishment of public records for Percheron Horses in France and America, which has been of such incalculable benefit to the breeders of the race in both countries.

As the first and continuous large purchaser of Percherons (always buying the finest individuals to be procured), together with a personal intimate friendship for many years with the best breeders of the Perche, its proprietor enjoys the following extraordinary advantages:

The first choice of the finest herds is held for Oaklawn, no other importer being able to buy the best until after the selection for Oaklawn has been made, as was shown by the experience of competitors the present year.

A superior personal knowledge of the pedigree value of individual Percherons from having imported and owned most of the famous sires of the Perche.

Both risk and cost of transportation reduced to lowest point by reason of large numbers, experienced shippers, and the ownership of the finest palace cars.

THE CHICAGO AND
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RAILWAY.

Penetrates the Centres of Population in
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J. I. CASE

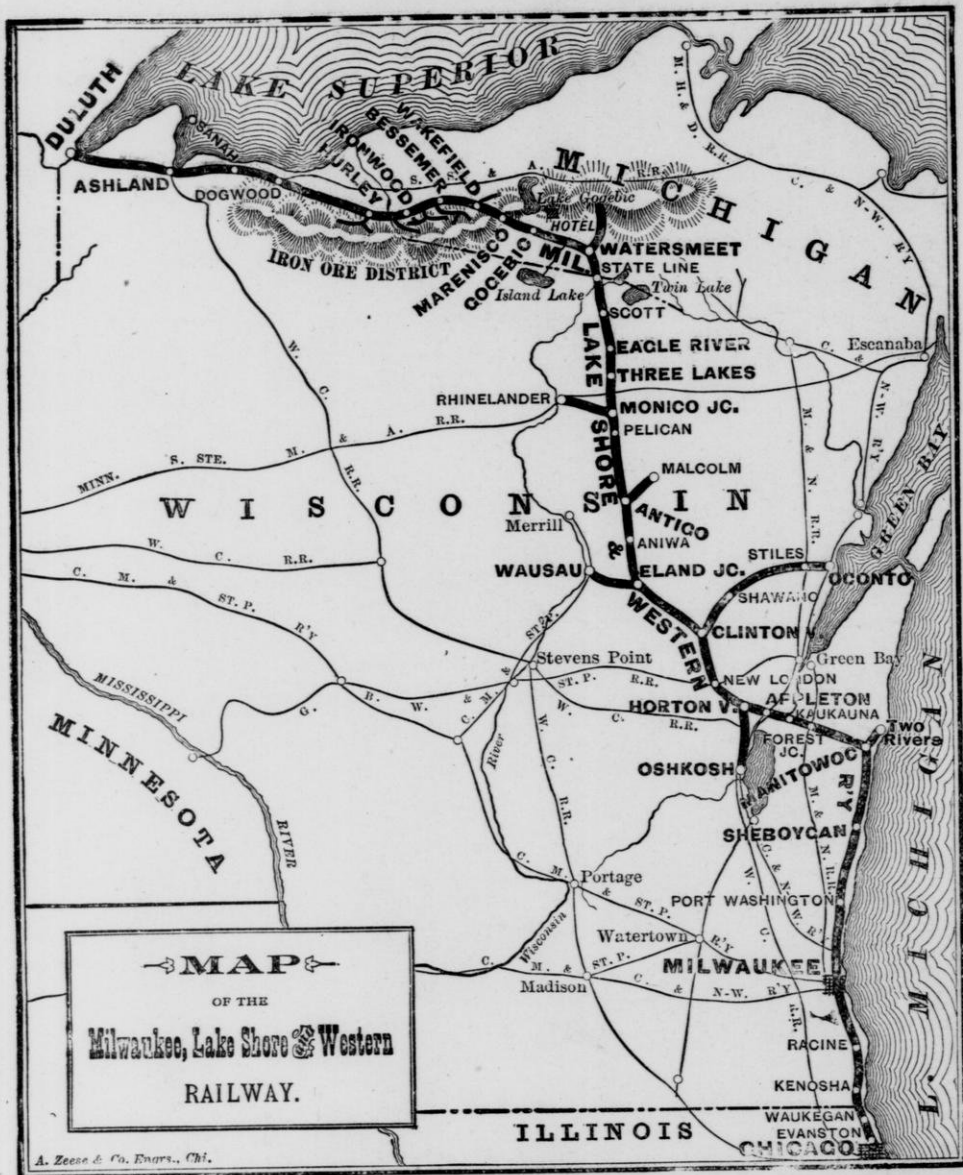


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The Best Paper in the State.

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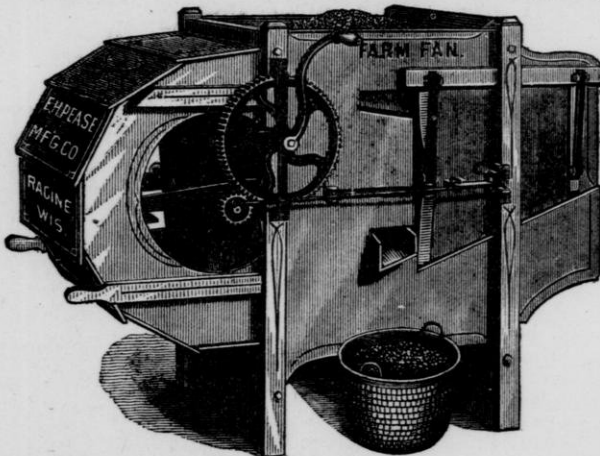
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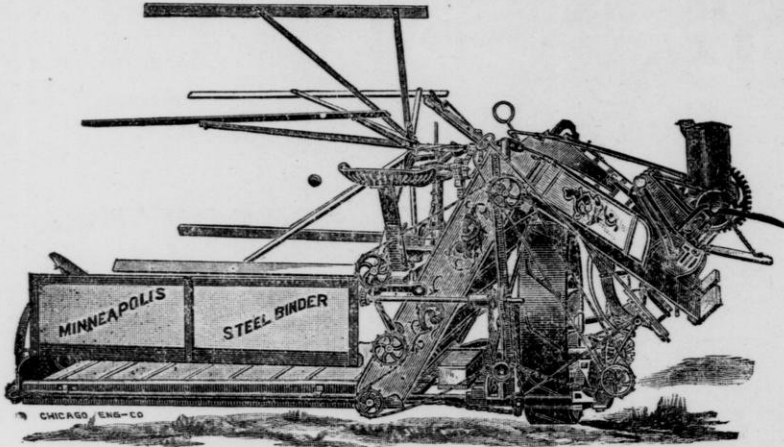
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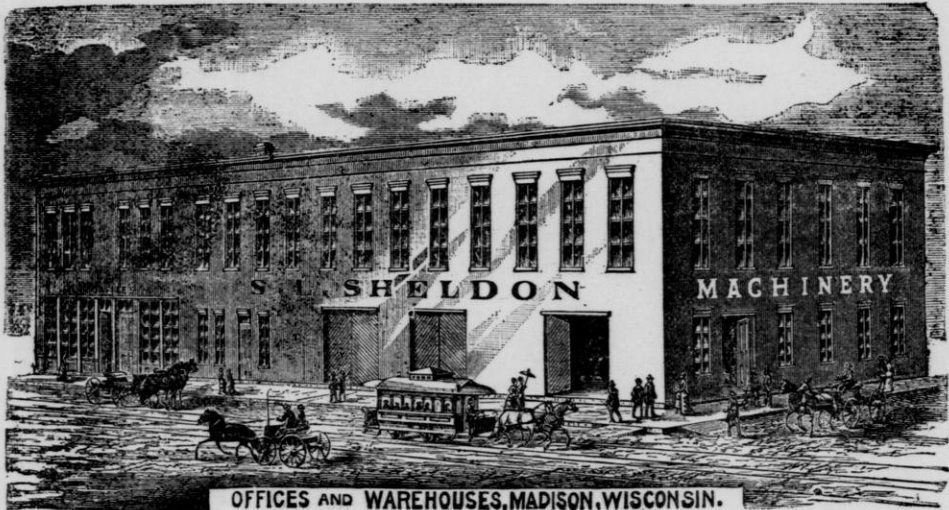
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THESE LANDS ARE ADAPTED TO THE PRODUCTION OF THE

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Grown anywhere. They are most excellent for dairy purposes and the production of

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In a healthy and matured condition. Situated as they are, on the broad prairies or among

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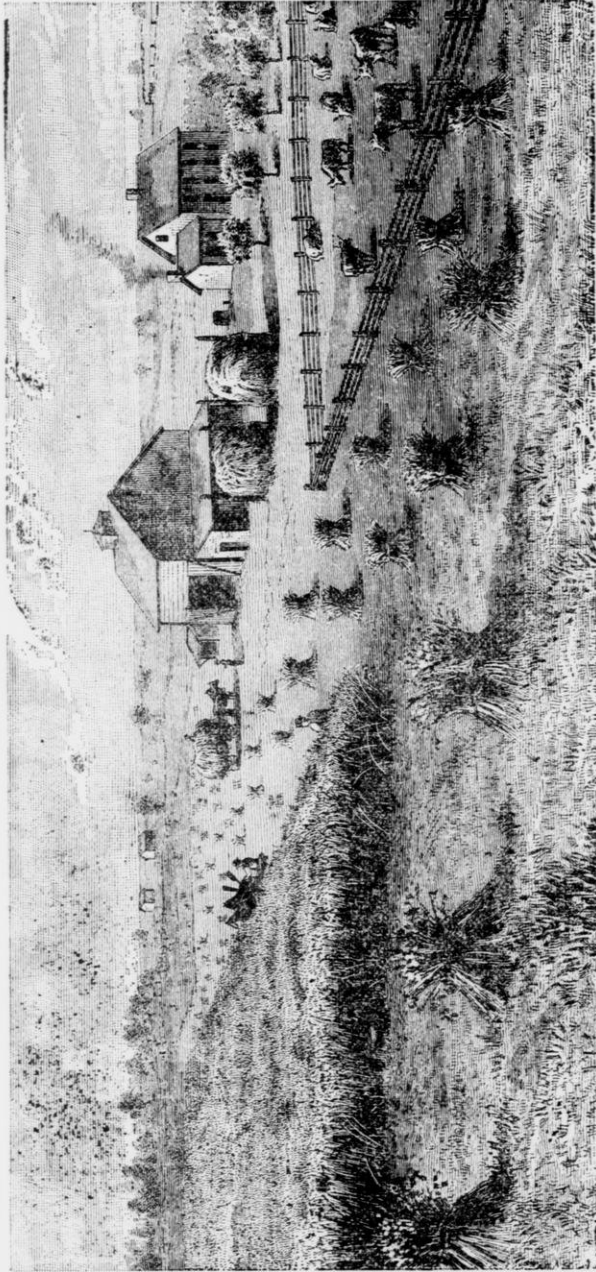
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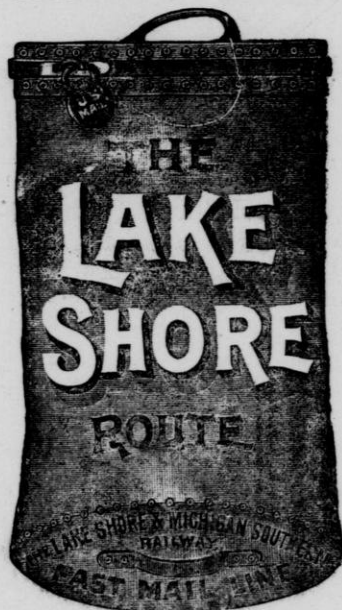
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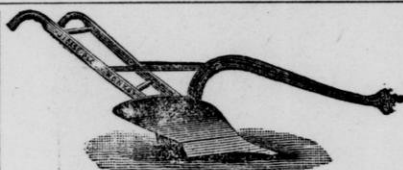
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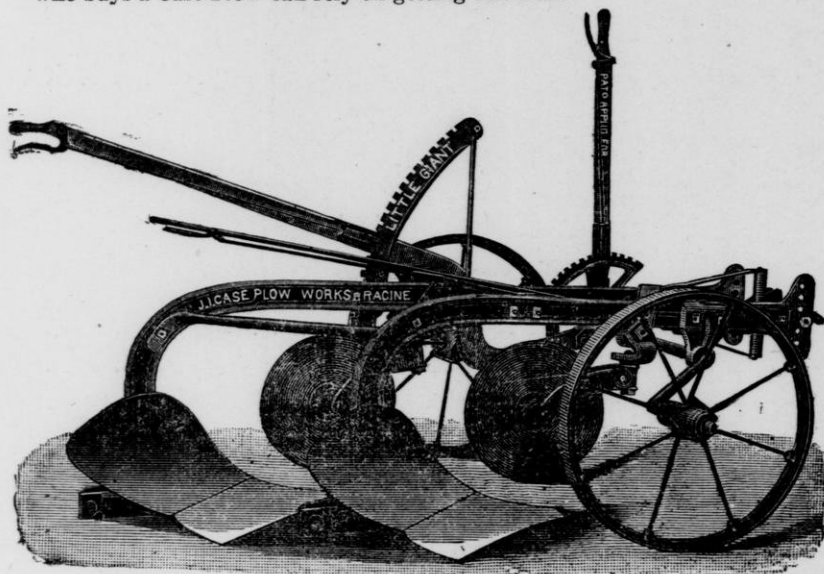
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Fitted With
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WE MANUFACTURE

The Most Complete and Perfect Line of Walking Plows Made. Special attention is given to every detail in their manufacture. Every plow is closely scrutinized before it leaves the shop. The farmer who buys a Case Plow can rely on getting The Best.

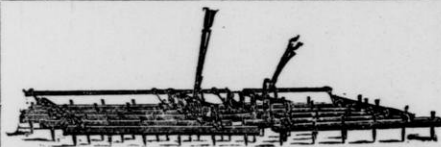


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The Little Giant Wheeled Plow.

We make them either Single or Gang. This style of Plow is coming into general use. We use Special Levers to level and land the Plow, which is a great advantage over other Plows of this class. Farmers will find therein a great saving of labor and time by using Gang Plows.

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HARROW.



THE FIRST
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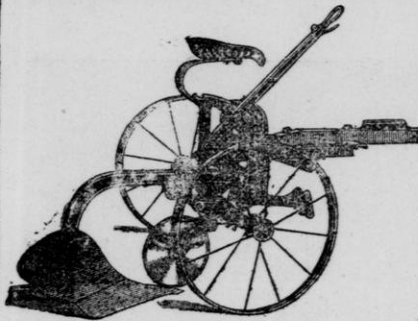
DON'T FAIL to SEND for ILLUSTRATED CIRCULARS.

RACINE, WISCONSIN.

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STRONG
AND
DURABLE.

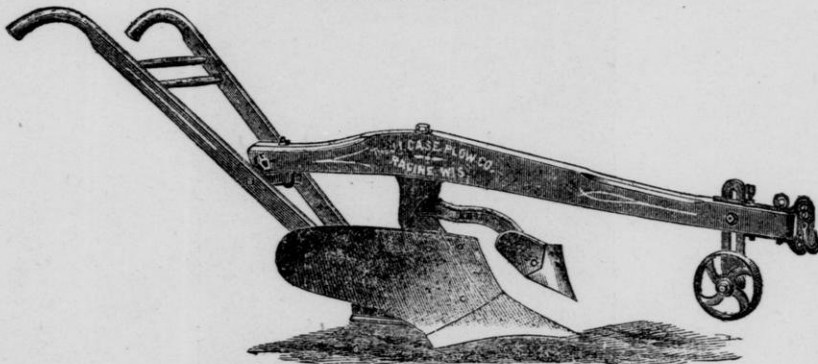


LIGHT
DRAFT AND
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THE SUPERIORITY OF

The Fay Eye See Sulky Plow

Is owing to the fact that it is, beyond all question, the Lightest Draft, Easiest Operated Sulky Plow made.

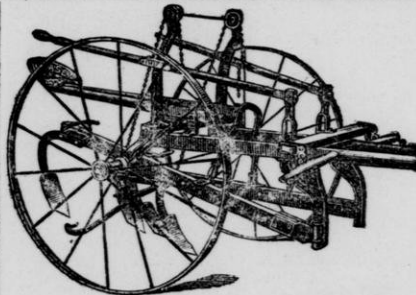


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This Jointer is so constructed that trash will not clog it. There is no better Chilled Plow made.

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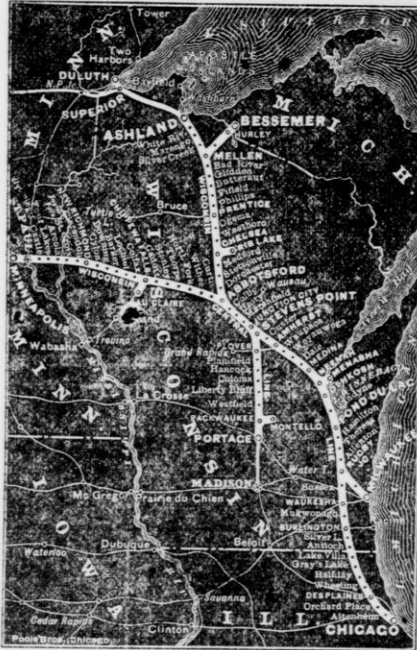


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The
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RENNET EXTRACT, CHEESE COLOR.

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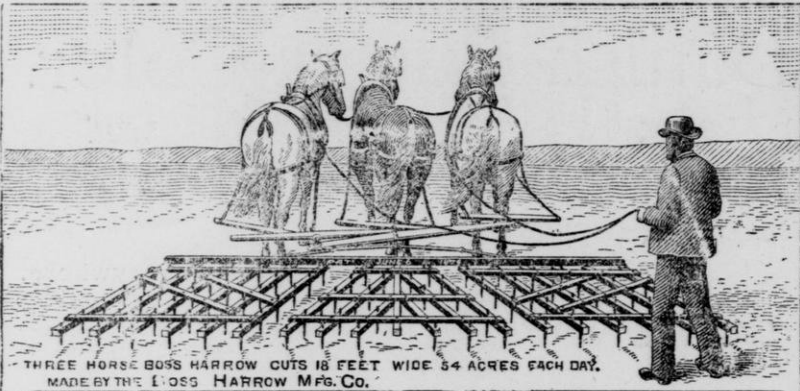
By writing to us, and mentioning where you saw this advertisement, we will send you our Wholesale Price List, giving full particulars of our large line of goods.

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The Celebrated Boss Harrows.

THE TWO HORSE BOSS

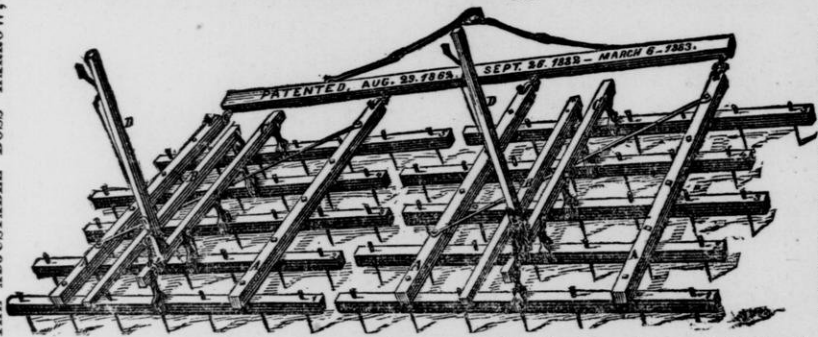


CUTS 14 FEET WIDE.

THREE HORSE BOSS HARROW CUTS 18 FEET WIDE 54 ACRES EACH DAY.
MADE BY THE BOSS HARROW MFG. CO.

Our Harrows Are All Filled With Patent Dagger Pointed Steel Teeth.

THE ADJUSTABLE BOSS HARROW,



ALSO MADE IN STEEL.

These Harrows are Models of Convenience and Give Extraordinary Satisfaction.

THE BOSS PULVERIZER (not shown here) works on a new principle and will pulverize (not cut up into cakes) hard fall plowed, clay soil seven inches deep. Leaves ground mellow and smooth—Does not turn the soil over. We warrant much better work can be done than with any other machine, and that larger crops will grow when used.

We call attention to statements of farmers who are familiar with its work, and also in regard to superior value of the Boss Harrow.

L. J. Walbridge, of Cottage Grove, Wis., says: "Having used your Three Horse Steel Adjustable Boss Harrow last spring, I found the following advantages: The edge shape of the teeth cut the ground and leave it fine—quickly adjustable to cut shallow or deep, and being in independent sections and levers convenient, easily lifted over obstructions, and with your Two Horse Evener, makes quick change for two horses. I used your Boss Pulverizer preparing a heavy clay soil once over in fine shape for the drill. The ground was left in a finer and more level condition than the work of the Disc Harrow. By using three horses a boy pulverized the ground, keeping far enough ahead of a 13 hoed drill to also harrow after it with your Three Horse Steel Harrow. Notwithstanding the continued drouth I obtained a good crop of wheat, oats and barley, owing in part to the finer cultivation of the soil in the spring."

T. L. Hacker, of Cottage Grove, Wis., says: "The Two Horse Adjustable Boss Harrow I bought last spring gave perfect satisfaction—could not get along without one—best harrow I ever saw."

R. J. Arthur, of Cottage Grove, Wis., says: "The Two Horse Adjustable Boss Harrow is the best in the market. No farmer can afford to be without one."

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The Boss Harrow Manufacturing Company, of Madison, Wis., exclusive manufacturers of these implements, Write to them for descriptive circulars.

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Railroad Lands

—IN—

Minnesota, Dakota, Northern
Wisconsin and Michigan,

—FOR SALE BY THE—

Chicago and Northwestern R'y.

Some of the Finest Agricultural, Timber and Cleared Lands in the
Northwest are Now For Sale by this Company at

EXCEEDINGLY † LOW † PRICES!

And on the Most Liberal Terms.

TITLE PERFECT. PLENTY OF GOOD WATER.

Farm Lands adapted to all kinds of farming. First class
market facilities and everything necessary to make

Farming Easy and Profitable.

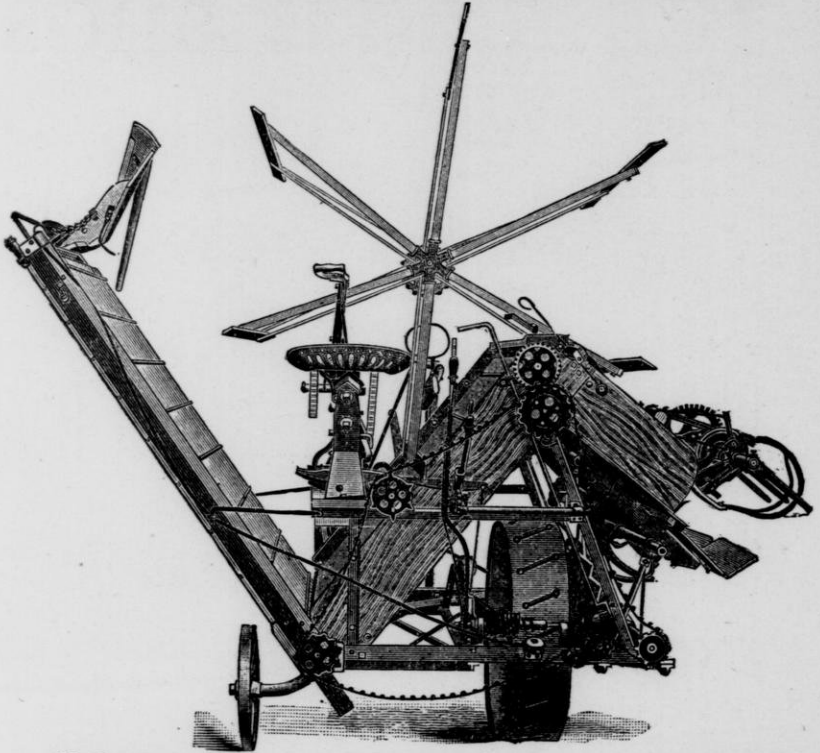
— Maps, prices, terms and all information furnished on ap-
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G. E. SIMMONS,

Land Commissioner C. & N. W. R'y, - Chicago, Ill.

(273)

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ESTERLY STEEL TRUCK BINDER.



No Trucks needed in traveling on the road or over narrow places.

We desire to call special attention to the Angle T Steel Gear Frame, Platform, and A Frames made entirely of Steel, the whole supported by Double Trusses, Truss Rod Supports and Cross Braces, making the strongest possible combination for neatness, strength and durability.

It is a Model of Strength and Durability.

All Parts are Thoroughly Braced and Riveted with Double Rivets.

It Cannot, by Any Fair Means, be Broken or Drawn-Out of Line, Its Adjustable Reel is a New Departure, that has Long Been Sought But Never Before Found.

A Record of Perfection Through the Harvest of 1887.

We invite examination and comparison of the Esterly with all competing machines.

The Esterly Light Draft Mower

Is conceded by all who have used the machine to possess all the essentials for a Superior Mower. For Circulars, Agencies and other information, address,

ESTERLY HARVESTER MACHINE COMPANY,

Whitewater, Wis.



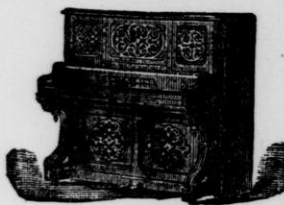
CLYDESDALE and ENGLISH SHIRE STALLIONS.

Because we take fancy trotting horses to Europe and bring back Clydesdale and English Shire Stallions, making our trips pay each way, it enables us to sell imported stock our customers less than any other importer. Regular importations permit to suit customers.

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SOLE AGENT FOR WISCONSIN FOR

Chickering, Sohmer, Gabler,

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PIANOS,

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PALACE ORGANS

The "Chickering" are all with the new repeating actions, and with other late action improvements. They are now the

UNRIVALLED * FAVORITES!

—OF ALL THE BEST ARTISTS.—

The "Sohmer" is not surpassed in beauty of tone and finish, and of great durability. The Uprights are unsurpassed. The "Gabler," with its

Forty Years of Excellent Reputation,
in French Walnut; Mahogany, Rosewood and Ebonied Cases,
stands at the head of **MEDIUM PRICED** Pianos for beauty of
tone, exquisite cases,

And Will Wear a Life-Time.

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422 Broadway, Milwaukee, Wis.

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Chicago, St. Paul, Minneapolis & Omaha,

—AND—

Chicago & Northwestern Railways,

—GIVES THE PUBLIC—

FINER EQUIPMENT,
FASTER TIME,
GREATER COMFORT,
THAN ANY OTHER ROAD IN THE COUNTRY.

TAKE THIS LINE FOR

Chicago, St. Paul, Minneapolis,
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Kansas City, Des Moines, Atchison, St. Joseph,

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ALL CALIFORNIA AND SOUTHWESTERN POINTS.

Luxurious through sleepers on all night trains. Parlor Chair Cars on day trains.
Owing to superior connections, and its facilities for carrying the business,

The Royal Route

Is usually chosen by excursionists to California and the Pacific Coast. Special attention is given to the

DINING CAR SYSTEM,

Which, for liberal service and convenience, is unexcelled.

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Green Bay, Winona & St. Paul R. R.

—IS THE—
SHORTEST ROUTE
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and all points in **EASTERN WISCONSIN** to
 NEW LONDON, MERRILL, STILLWATER,
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and all points in Minnesota, Dakota, and all points on the **NORTHERN PACIFIC RAILROAD** and **ST. PAUL, MINNEAPOLIS & MANITOBA RAILROAD**; is the

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MERRILLAN, STEVENS POINT, FOND DU LAC,
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 GRAND RAPIDS, OSHKOSH, GREEN BAY,

and all points in

Eastern Wisconsin, Northern Michigan and Lake Superior Regions.

Passengers from all points—West, Northwest and Southwest—will
find the

G. B., W. & ST. P. R. R.

the **DIRECT LINE** to all the above points.

THE PASSENGER EQUIPMENT of this Road embraces all the modern improvements and conveniences that tend to make traveling by rail safe and comfortable.

Be sure your tickets read via the

GREEN BAY, WINONA & ST. PAUL RAILROAD.

G. CAMPBELL, Gen'l Manager. S. W. CHAMPION, Gen'l Pass. Agt.

THE CELEBRATED
White Southern Sweet Fodder Corn

SUPERIOR TO ANY OTHER.



FORTY TONS PER ACRE.

FOR GREEN FODDER OR ENSILAGE.

It has no equal for either of the above purposes as it is sweet and tender, with the stalk very full of leaves and of unusual height. Great care has been taken in the selection of this corn. There is nothing in the market to compare with it. Our own farmers say that 30 to 40 tons can easily be grown on an acre of ground. An acre of this Fodder Corn is equal to at least six acres of meadow hay. I handle two grades of Fodder or Ensilage Corn—the "Horsetooth" and "Sheeptooth." The "Horsetooth" resembles closely the "B. & W." brand and in my trial grounds, where they were grown side by side, I failed to notice any difference in them. The "Sheeptooth," as the name implies, has a long and narrow grain, about half the size of the other, so that it requires less seed per acre. The above cut represents the "Sheeptooth" Corn. It is earlier than the "B. & W." and ears nicely. Hiram Smith, of Sheboygan County, says: "I much prefer your 'Sheeptooth' Corn to the 'B. & W.' for Ensilage." I purpose furnishing the above varieties of Fodder Corn at anti-monopoly prices the coming season. I am headquarters for Fodder Corn in the northwest.

For prices and additional information, address

ALBERT LANDRETH, Seedsman, Manitowoc, Wis.

F. B. FARGO & CO., *LAKE MILLS, WIS.*

CREAMERY APPARATUS And General Dairy Supplies,

Embracing Boilers and Engines, Steam Pipe and Fittings of all kinds, Cream Tanks, Cheese Vats, Butter Workers, Factory and Dairy Churns, Parchment Paper and Dairy Cloth, cut in circles and squares for rolls and packages, Fargo's Rennet Extract and Cheese Coloring, and Rennets of our own importation, Thermometers, Test Tubes, Press Rings, Cheese Gills, Butter Trays and Moulds, Butter Tubs, Pails, Cheese Boxes and Factory Account Books.

WE ALSO CALL YOUR SPECIAL ATTENTION TO

Fargo's Milk Test Churn,

For testing the milk of each individual cow in order to learn her butter value, as well as the comparative value of different feeds and pastures. The use of this churn will determine whether it is more profitable to keep a cow for her butter than to sell her to the butcher. Write for prices and illustrated catalogue.

ALSO MANUFACTURERS OF

Fargo's † Improved † Butter † Color.

Will Not Color the Buttermilk.

It is the Strongest Color Made.

It Will Not Change to Rancidity.

IT IS THE ONLY OIL BUTTER COLOR MANUFACTURED THAT

WILL NOT FLAVOR BUTTER.

BEWARE OF IMITATIONS.

USE ONLY THE RELIABLE,

We have been engaged in the manufacture of butter color since 1870, and are the largest manufacturers of butter color in the United States. We were also the first to make an oil color in this country. Other manufacturers have followed our example, and are now endeavoring to reap where we have sown. Ours is the old reliable butter color, and the only one that is safe to use. All others flavor the butter.

Our butter color is for sale by druggists and grocers generally throughout the United States. If they do not have it, ask them to order it from their wholesale druggist or grocer. On receipt of price we will send our color to any point.

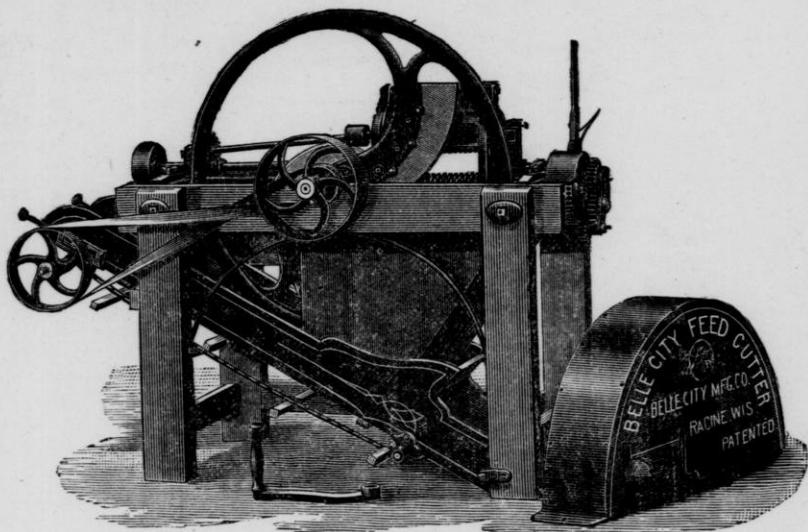
WRITE FOR PRICES.

(280)

TRADE MARK.



Belle City Ensilage AND Feed Cutters



THE BELLE CITY CUTTERS

Are made in all sizes to be run by power, or for hand use. These machines are now too old and favorably known to need any other recommendation than their own merit has made for them.

⇒SEND FOR OUR ILLUSTRATED CATALOGUE.⇐

We will also give our book on Ensilage free to any who may send for it. The article on Ensilage was written by one of our most successful experimental farmers. The matter is reliable, and would be of great value to any who are interested in the subject of Ensilage. Write to the manufacturers of the machine for any information you may want in regard to Fodder Cutters or the work they do. Address the

BELLE CITY MANUFACTURING COMPANY,

Racine, Wisconsin.

(281)

ALBERT DICKINSON, Prest.

CHAS. DICKINSON, Vice-Prest.

NATHAN DICKINSON, Treas.

THE ALBERT DICKINSON CO., SEED MERCHANTS.

GRASS SEEDS

TIMOTHY, RED TOP, BLUE GRASS, ORCHARD GRASS, LAWN GRASS,
HUNGARIAN, MILLETS, ALSO IMPORTED NATURAL GRASSES.

CLOVERS

A SPECIALTY:

RED, WHITE, ALSYKE, ALFALFA.

FLAX SEED

Being dealers we do not handle on commission, but buy and sell for our own account. Any one having Seed to dispose of is requested to send fair average sample, stating quantity, and we will endeavor to make a satisfactory trade.

BIRD SEEDS

CANARY, RAPE, HEMP, MILLET.

POP CORN

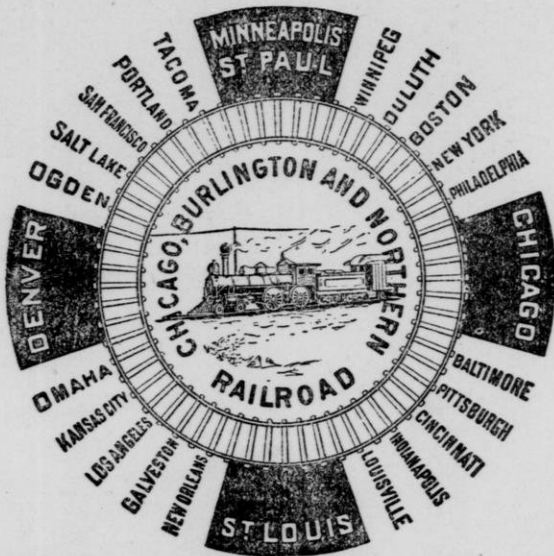
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115, 117 & 119 Kinzie St.
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OFFICES, 115 KINZIE ST.,

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PRINCIPAL LINE TO

ALL POINTS NORTH, EAST, SOUTH AND WEST.

The Chicago, Burlington & Northern R. R.

AND ITS CONNECTING LINES OF THE

“GREAT BURLINGTON ROUTE,”

Offers to the travelling public the most expeditious and comfortable means of reaching
Chicago, St. Paul, Minneapolis, St. Louis, Peoria, Kansas City, St. Joseph, Omaha, Lincoln and Denver,

From all the principal places in Wisconsin and Minnesota.

Its road bed is unexcelled, the grades are light, enabling fast time to be made, and the equipment is of the very best.

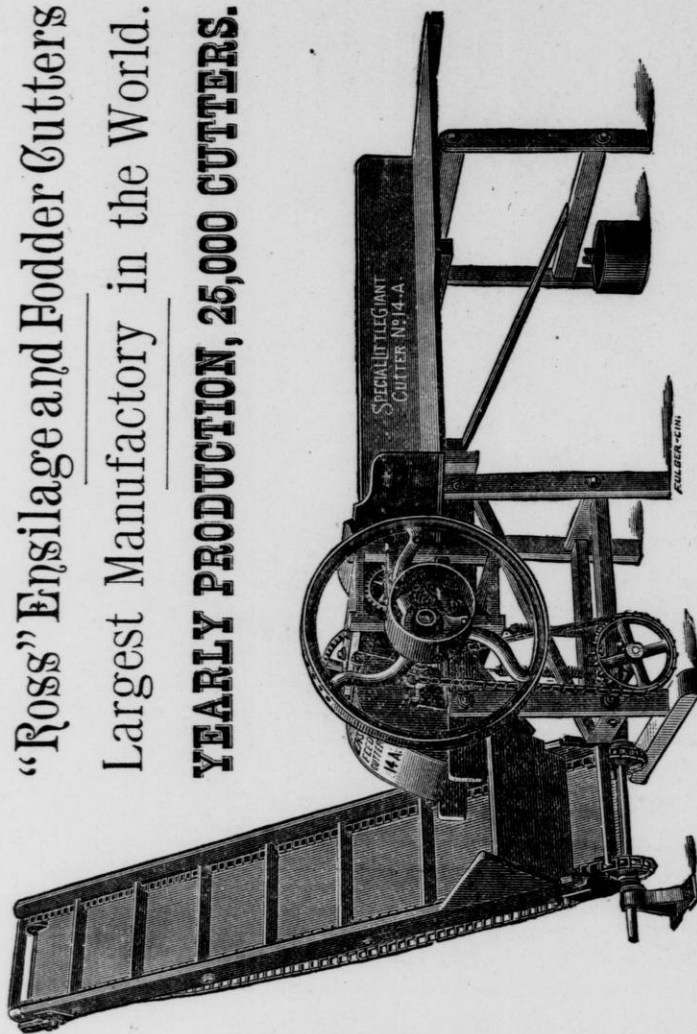
Starting from Minneapolis and St. Paul, its line runs along the east bank of the Mississippi to Savanna, Ills., whence one branch runs east to Chicago, the other south to Fulton, Ills., connecting with the Chicago, Burlington & Quincy R. R. Through coaches and Pullman sleeping cars are run to Chicago and St. Louis without change. Pullman parlor cars on day trains between Chicago and St. Paul and Minneapolis, and Peerless dining cars on all trains, furnishing an unapproachable cuisine at moderate prices. For tickets, information, etc., apply to any railroad ticket agent, or address,

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General Manager,

W. J. C. KENYON,
Gen. Pass. Agent,

ST. PAUL, MINNESOTA.

“Ross” Ensilage and Fodder Cutters
Largest Manufactory in the World.
YEARLY PRODUCTION, 25,000 CUTTERS.



THE CELEBRATED
“ROSS” ENSILAGE AND FODDER CUTTERS,
CARRIERS AND POWERS,
MANUFACTURED BY
E. M. ROSS & CO., SPRINGFIELD, OHIO, U. S. A.

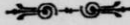
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Distribution to all applicants about November 21st. The book will contain choice literary matter and latest FASHION NOTES, and will serve as a guide to those desiring to select appropriate Holiday Gifts for Ladies, Gentlemen and Children.

Address,

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117 to 123 STATE STREET,

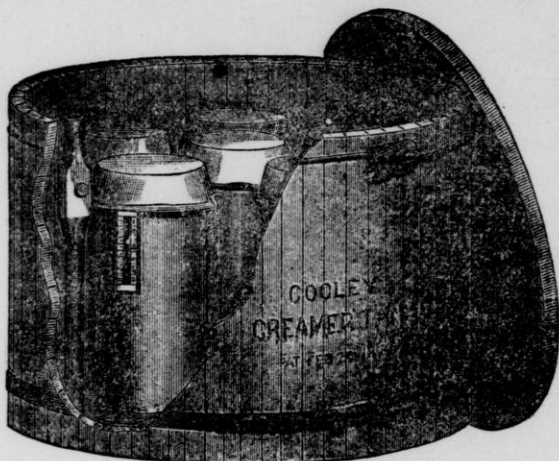
CHICAGO, ILL

ESTABLISHED, 1855.

(285)

The Cooley or Submerged System.

Produces more Cream and of Better Quality than any other Can in Use.

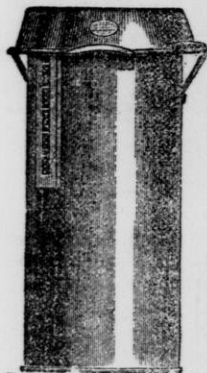


FOR GATHERING CREAM IT IS THE BEST YET.

Saves in Transportation of Cream Its Entire Cost Every Thirty Days or Less.

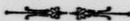
IT PRODUCES ENOUGH MORE MONEY FROM THE MILK TO PAY FOR FOR ITSELF EVERY THIRTY DAYS, OVER AND ABOVE ANY OTHER APPARATUS ON THE MARKET.

THE COOLEY PATENT!

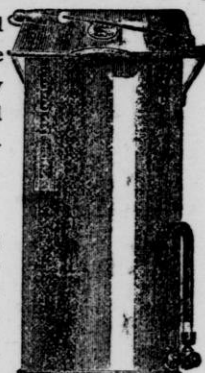


Cooley Can as used for gathering cream.

Has been fully sustained by the United States Court. By decision of the United States Court it is the only creamer or milk-can which can be used water-sealed or submerged without infringement.



It has received more Gold and Silver Medals than all other Creamers put together, and the Butter made from it has been honored by more Premiums.

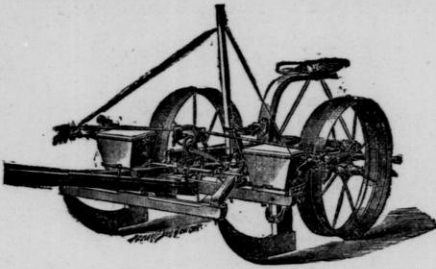


Cooley Can as used in the whole-milk factory.

For prices of cans for collecting cream, or Cooley Creamers for private dairies, apply to

JOHN BOYD, Manufacturer,
199 LAKE STREET, - - CHICAGO, ILL.

Bonanza Force Drop Corn Planter and Check Rower.



The above cut shows our Bonanza Force Drop Corn Planter with our Improved Check Rower,

—SPECIAL POINTS.—

Force Drop, Iron Joints, Metal Wheels, Iron Seed Boxes, Center Lock Lever.

Runners can either be locked in the ground or depth regulated by the Driver's feet.

It forcibly THROWS the corn so that it drops to the ground INSTANTLY when the lever is thrown, so that it makes no difference whether team is driven fast or slow, or by jerks.

Will plant corn in straight rows both ways, whether team goes fast or slow. This alone will save price of Planter for every 100 acres planted, by not having corn destroyed by cultivating.

The operating slides rest on anti-friction rollers, so that the slide bar is much more easily operated—a great saving of wear on the Check Rower—which will therefore last much longer.

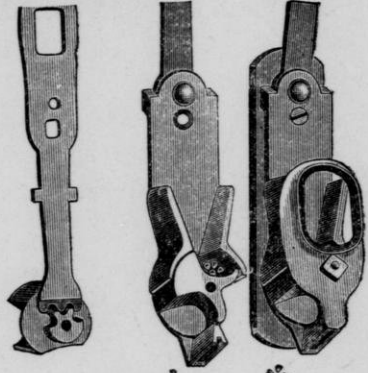
When raised out of the ground it is self-locking, thus avoiding the use of latches.

It has glass at the heel of the drop so that the driver can at all times see the corn dropping.

The lock being in the center, the runners go a uniform depth. Planters that lock at the side run deeper on one side than on the other, when the planter is locked in the ground.

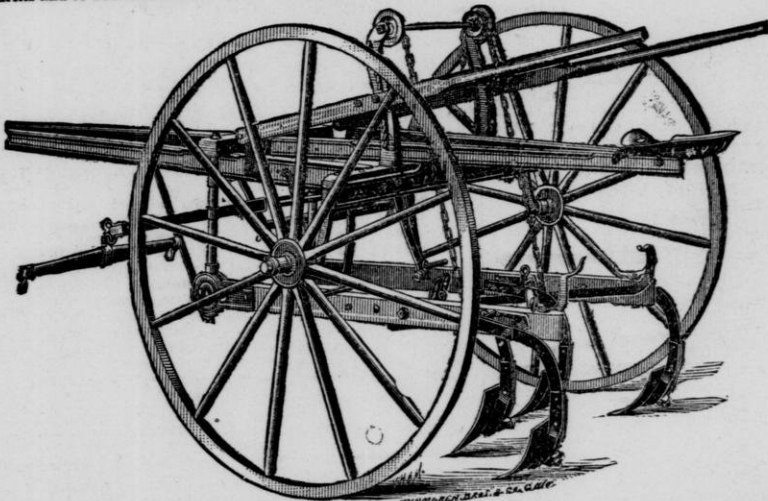
—FOR ENSILAGE.—

We have an attachment that we can furnish with the Planter for the purpose of sowing or planting the corn in drills and to be harvested for fodder or ensilage.



The above cuts show the working parts of the Force Drop.

Cut at left shows the manner in which the lever causes the seed cup to revolve, and throw the corn to place. The center cut shows the seed cup in position with corn in cup, and also hill of corn that has just been dropped. The cut at right shows the whole seed cup and lever, and also hill of corn just dropped.

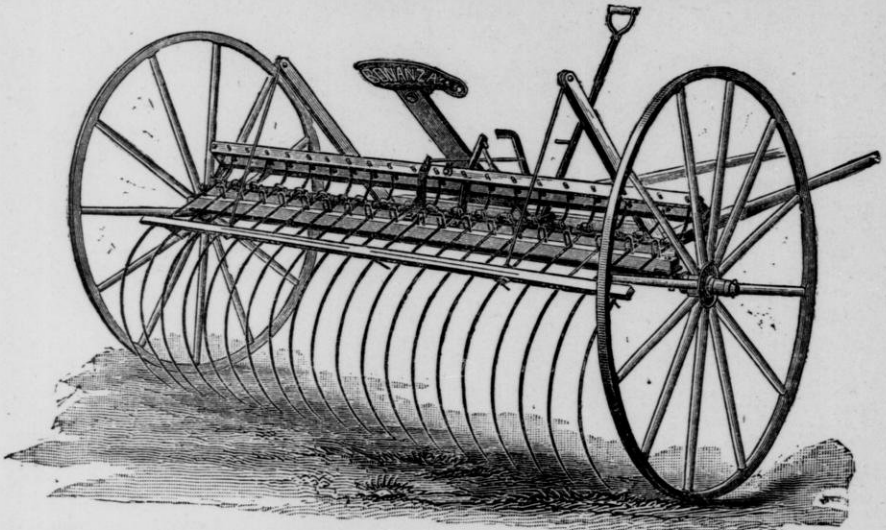


BONANZA RIDING CORN CULTIVATOR.—Please examine the following valuable improvements: 1st high arched axle; 2d, axle four (4) inches higher than other cultivators; 3d, ends of axle made of steel; 4th, width of tread adjustable; 5th, draft direct from axle; 6th, double tree can be raised or lowered to any desired height; 7th, both break pin and friction bearing.

The above, with our perfect manner of constructing the cultivator, makes it the very best in the market. The Fuller & Johnson Manufacturing Co., Madison, Wis., manufacture the above machines, as well as a full assortment of Plows, Cultivators, Harrows, Hay Rakes, both hand dump and horse dump, Corn Planters, and the Red, White and Blue Mower. They have agencies in nearly every town in the state, but should the farmer fail to find what is wanted at his trading point, he should write to the manufacturers. All farmers should have their illustrated catalogue, which will be sent free to any address upon application to :

FULLER & JOHNSON MANUF'G CO., Madison, Wis.

BONANZA HAY RAKE.



Used With Either One or Two Horses.

Twenty Oil Tempered Steel Teeth,

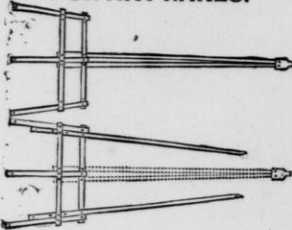
Works on the Roughest Meadow,

No More Broken Teeth

The distinctive feature of the Bonanza Hay Rake over all other styles of Horse Rakes that have been invented, is its peculiar shaped Steel Tooth, and its ready adjustability to every variety of crop and surface.

The Tooth has a spiral spring attachment at its upper end, which relieves it from severe and sudden strains, and makes it especially adapted to rough work and uneven ground.

Combined Pole and Shafts FOR HAY RAKES.



Hay Rakes made with this device can be used with either one horse or two horses. The upper cut shows it arranged as a pole, or for two horses; the lower cut shows it arranged as shafts, or for one horse. The same parts are used in both cases. The farmer at all times has all the parts with the Rake, to make it either a one or two horse. The change from one to two horse can be made in a few minutes' time.

Farmers readily see the advantage of this over other rakes, and will buy only those made with Combination Pole and Shafts. We have three patents covering the invention, and Rakes made this way can only be had from ourselves or our agents.

Ask for the "Bonanza," "Star," or "Johnson Self-Dump."

—MADE WITH—

Our Combined Pole and Shafts.

Ask your dealer for Implements made by the Fuller & Johnson Manufacturing Co., of Madison, Wis., and if he does not have what is wanted, write to the manufacturers. Buy no other kind before examining what we manufacture. THE BEST IS CHEAPEST, and we manufacture in your own state. Send for Illustrated Catalogue, which will be mailed free to any address upon application to

FULLER & JOHNSON M'F'G CO.,

Madison, Wis.



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